

PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 1 – Revision 1

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

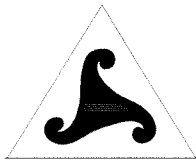
SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18

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RECORD OF REVISIONS

Revision 0: Original Issue

Revision 1: The Final PDI Report (Revision 0) was submitted in July 2000. Revision 1 to the Final PDI Report incorporates the following significant changes: revision to text headers and footers; addition of results of confirmatory radiological analyses to [Table 1-4](#); and addition of Toxicity Characteristic Leaching Procedure (TCLP) data to [Table 1-5](#).

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ACRONYMS AND ABBREVIATIONS

AT&T	American Telephone & Telegraph
BNI	Bechtel National, Inc.
C	Degrees Centigrade
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
Conc.	Concentration
CQCP	Contractor Quality Control Plan
DOE	U.S. Department of Energy
EPP	Environmental Protection Plan
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	grams
GMS	Groundwater Modeling System
GPR	Ground Penetrating Radar
GPS	Global Positioning System
ID	Identification
ISOCS	In Situ Object Counting System
keV	kilo electron volts
kg	kilogram
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCW	Maywood Chemical Works
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
mg	milligram
MHTDP	Materials Handling, Transportation and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJVIS	New Jersey Vehicle Inspection Station
NYS&W	New York, Susquehanna & Western Railway
ORNL	Oak Ridge National Laboratories
pCi	picoCurie
PDI	Pre-Design Investigation
PDIWP	Pre-Design Investigation Work Plan
PID	Photoionization Detector
PVC/PET	Polyvinyl Chloride/Polyethylene Teraphthalate
QA	Quality Assurance
QC	Quality Control
QCSR	Quality Control Summary Report
Ra-226	Radium-226
Rn-222	Radon-222

RCRA	Resource Conservation and Recovery Act
RESRAD	Department of Energy Computer Code; RESidual RADioactivity
ROC	Radionuclides of Concern
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
St.	Street
Th-232	Thorium-232
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
ug	microgram
U-238	Uranium-238
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank

1.0 SITE BACKGROUND AND PHYSICAL SETTING

1.1 General Site Overview

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (hereafter referred to as the Maywood Site) is located in a highly developed area of Bergen County in northeastern New Jersey, in the Boroughs of Maywood and Lodi and the Township of Rochelle Park (Figure 1-1). Portions of the Maywood Site are radiologically impacted from process wastes and residues associated with the recovery and refining of thorium and thorium compounds from monazite ores by the Maywood Chemical Works (MCW) from 1916 to 1956 (Bechtel National, Inc., BNI, 1992).

Waste produced at MCW was a fine sand-like material containing residual thorium with lesser amounts of uranium and its daughter products including radium. Wastes and residues were disposed in low-lying areas west of processing facilities. In the early 1930s, a portion of these wastes and residues was separated from the main property by construction of New Jersey State Highway 17 (NJ Route 17). Additionally, the former channel of Lodi Brook runs through the majority of the properties making up the Maywood Site. Some of the contaminated materials are assumed to have eroded from the facility area and were transported downstream via Lodi Brook (Figure 1-2). In addition, from 1928 to 1944, local residents were known to use process waste in their lawns and gardens and as fill material (BNI, 1992). These are the major mechanisms for distribution of radiologically-contaminated materials on the Maywood Site.

The Maywood Site consists of 88 designated residential, commercial, municipal, and state or federal properties. All 64 Phase I properties (including all residential and municipal properties) have either been remediated by the U.S. Department of Energy (DOE) or U.S. Army Corps of Engineers (USACE) or are currently being addressed under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). The remaining 24 Phase II properties are being addressed by the Stone & Webster Team (i.e., Team).

1.2 Pre-Design Investigation Scope

On December 29, 1998, the USACE issued a Scope of Services for the design and remediation of the remaining 24 commercial and government properties. These properties potentially contain deposits of radioactive material in surface and subsurface soils resulting from operations of the former MCW. They have been designated as the Phase II properties.

A Pre-Design Investigation Work Plan (PDIWP, Stone & Webster, 1999a) was submitted in October 1999 for the Phase II properties. The purpose of the PDIWP was to address data gaps necessary to complete remedial design efforts. In determining additional data needs, it was assumed that remediation of radiologically-impacted soils would be conducted on “accessible soils” only. Accessible soils are defined as soils not under permanent structures such as buildings and roadways. Data acquisition was limited to accessible soils only.

A preliminary evaluation was performed to determine the human health risk from leaving subsurface radiologically-impacted soils proximate to these structures. The RESidual RADioactivity (RESRAD) computer code was utilized to quantify the dose and risk under a

number of assumed conditions. Based on the preliminary results, it was determined that any radioactive residues left adjacent to existing buildings, roadways, and railways would need a minimum of two feet of clean soil cover to be protective of human health. As such, it has been assumed that where radiologically-contaminated soils exist at depth adjacent to structures, at least the top two feet of radiologically-contaminated soil would be removed adjacent to the structure to a six foot horizontal setback, and then sloped at two horizontal to one vertical (2H:1V) to the required depth. However, it is recognized that site-specific calculations will need to be made during the remedial design phase in order to determine the actual depth of excavation adjacent to each structure, the horizontal setback, and the slope to final excavation depths (Stone & Webster, 1999a).

In preparing the PDIWP, the 24 Phase II properties were sub-divided into 12 clusters. The purpose of the clustering was to take a 'collective' view of a set of contiguous properties to efficiently secure needed pre-design investigation (PDI) information for those properties. [Table 1-1](#) lists the 12 clusters for the Phase II properties, from south to north. The reader is directed to the PDIWP for additional background information (Stone & Webster, 1999a).

The purpose of this PDI Report is to present data collected during the PDI for Cluster No. 1. The evaluation of PDI data, along with data collected by others during previous investigations, is documented separately.

2.0 PDI FIELD ACTIVITIES

PDI activities were performed by the following Team members:

Stone & Webster, Inc.	Team leader and engineering services
Malcolm Pirnie, Inc.	Engineering services
Science & Ecology Corporation.....	Health physics services
Cabrera Services, Inc.	Radiological survey support
Canberra Industries, Inc.	Radiological survey support
Garden State Surveying, Engineering, and Planning, Inc.	Surveying and mapping
NAEVA Geophysics, Inc.	Geophysical investigation
TerraProbe, Inc.	Direct push services
Franklin Environmental Services, Inc.....	Construction services
ThermoRetec	Radiological sample analysis
RECRA LabNet.....	Environmental sample analysis
Kestrel Environmental Technologies, Inc.....	Data validation

PDI activities involved non-intrusive surveys followed by intrusive investigations. The preliminary, non-intrusive PDI activities (including surface gamma scans, surface In-Situ Object Counting System (ISOCS) readings, geophysical surveys and field surveying) were initiated in August 1999. The intrusive portion of the PDI program began in January 2000 and was completed in April 2000. [Table 1-2](#) presents a summary of PDI intrusive field activities. For logistical reasons, PDI environmental borings were performed at the outset of the Groundwater Remedial Investigation program during the latter part of March and beginning of April 2000.

PDI field activities were conducted in accordance with the PDIWP, and in compliance with procedures established in the following project documents: Contractor Quality Control Plan (CQCP), Site Safety and Health Plan (SSHP), General Environmental Protection Plan (EPP), Chemical Data Quality Management Plan (CDQMP), and the Materials Handling, Transportation and Disposal Plan (MHTDP), (Stone & Webster, 1999b, c, and d, 2000a, 2000b, respectively). Variances in methodology and sample locations between the PDIWP and the actual PDI execution are discussed below.

2.1 Variances from PDIWP

This section discusses deviations in methodologies and sample locations from the approved PDIWP.

2.1.1 Methodology Variances

Methodology variances from the PDIWP were as follows:

- The PDIWP called for the use of an ISOCS utilizing germanium gamma spectroscopy to quantify radionuclide activity in soil. Following approval of the PDIWP, regulatory concerns regarding the use of ISOCS for subsurface investigation were raised. The PDIWP was subsequently modified by replacing intrusive ISOCS sampling with conventional sample

collection using direct push methods to collect soil cores for laboratory analysis. Due to this change, Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled “Soil Probe Investigation” was developed and followed. Refer to the USACE letters dated December 8, 1999 from the Project Manager, Mr. Allen Roos, informing the U.S. Environmental Protection Agency (USEPA) Project Manager, Ms. Angela Carpenter, and the New Jersey Department of Environmental Protection (NJDEP) Case Manager, Ms. Donna Gaffigan, of the modification, as presented in [Appendix 1-A](#). The USEPA approved use of SOP-SW-MWD-509-0 on December 29, 1999 and NJDEP approved it on January 20, 2000.

- A Bicron[®] Model G1 one-inch by one-inch (1” x 1”) sodium iodide (NaI) detector was substituted for the originally proposed 3/8” x 3/8” NaI detector for downhole gamma logging. This substitution was needed to provide greater detector sensitivity through the soil probe casing. Due to the addition of this detector, SOP number SW-MWD-509-0 entitled “Soil Probe Investigation” was revised. These revisions are outlined in [Table 1-A](#) in [Appendix 1-A](#). The 3/8” x 3/8” NaI detector was used only when the manual direct push method was employed. Manual direct push methodology was required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- The CDQMP originally specified a frequency of 10% for field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. This corresponds to the USACE internal quality control standard. However, due to the significant number of samples to be collected as part of the PDI program (totaling approximately 2000 soil samples and in excess of 10,000 gamma count rate and photoionization detector (PID) readings), the USACE agreed to reduce the frequency to 5%, which is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and USEPA guidelines for MS/MSD analysis. USEPA Region II does not have a specific guideline for field duplicate samples. Refer to the USACE and USEPA/NJDEP correspondence in [Appendix 1-A](#).
- The PDIWP stipulates that geotechnical borings with associated laboratory testing may be required in order to provide design parameters in locations where excavation may impact adjacent structures. Since radiological clean-up criteria have yet to be finalized, final assessment of limits of radiological contamination cannot be made at this time. The geotechnical investigation program was suspended from the PDI. During the design process, existing geotechnical information will be evaluated for design and a determination will be made if supplemental data are needed.

2.1.2 Sample Location Variances

The PDIWP was developed with the intent that proposed sample locations would be deleted, added, or moved as additional information regarding site features and contamination distribution became available during the course of the PDI implementation. In accordance with this approach, sample locations as proposed in the PDIWP were deleted, added, or moved for the following reasons:

- Base mapping developed subsequent to completion of the PDIWP provided additional information regarding underground utility locations and other site features. Proposed sample

locations proximate to these utilities and site features were moved in order to minimize impacts.

- Review of surface gamma survey data collected as part of the PDI, coupled with additional review of data from previous investigations performed by BNI and ORNL, indicated that certain proposed intrusive locations should either be moved or could be deleted. To address potential areas of surface radiological contamination not previously identified as areas of concern, a protocol was established for determining the need for additional intrusive sampling locations. Refer to “Protocol For Addressing Gamma Scan Anomalies” in [Appendix 1-A](#).

Specific rationale for the deletion, addition, or movement of locations proposed in the PDIWP are summarized in [Appendix 1-A](#).

2.2 Geophysical Surveys

Between September 20, 1999 and March 2, 2000, NAEVA Geophysics, Inc. conducted geophysical investigations on the Maywood Site. The purpose of these investigations was to delineate surface traces of detectable underground utilities in the vicinity of proposed exploratory boring sites. Equipment selected for this investigation included: a Fisher TW-6 Pipe and Cable Locator; a Radiodetection RD432PDL-2 Utility Locator; a Subsite 75 Utility Locator, a 3M Dynatel 2250 Cable Locator, and a GSSI SIR-3 ground penetrating radar (GPR) system with a 300 MHz antenna. Details of the surveys are presented in the NAEVA report (NAEVA, 2000).

2.3 Sample Locations

In October 1999, Garden State Engineering, Surveying, and Planning, Inc. performed a ground survey of the Maywood Site properties. Results of the ground survey were combined with aerial mapping prepared by GEOD Corporation to produce new base mapping for the Maywood Site. This new base mapping replaced the mapping used to generate the PDIWP drawings.

Sample points for the surface gamma survey, surface ISOCS measurements, direct push (Geoprobe[®]) sampling, and environmental sampling were located in the field using a Global Positioning System (GPS). A Trimble 4800 Site Surveyor system with a 4700 base receiver, GPS antenna, radio antenna, and ancillary equipment were used to perform GPS surveys. Base stations were set up and calibrated at specified bench-mark locations established by the surveyor. Following base receiver set up, sampling points were located. Field markings (spray paint, flags, and stakes) were used to identify intrusive sampling locations for radiological and environmental direct push mobile rigs, as well as surface ISOCS locations.

Coordinates for intrusive sample locations were determined from new PDI sample location maps which reflected updated base mapping and modified sample locations; surface ISOCS locations were identified based on original PDIWP mapping. For the surface gamma survey, GPS was used to record locations of gamma scan measurements. Where GPS instrumentation could not be utilized due to signal disruption (e.g., tree coverage, building interference, non-availability of satellites, or poor satellite reception due to weather conditions), sample locations were based on identification of site features and scaling off base mapping.

2.4 Surface Gamma Surveys

Surface gamma surveys for all of the Phase II properties were conducted from August 1999 to March 2000. Surveys were conducted to obtain distribution of surface radiological contamination for health and safety reasons, as well as to verify existing data. Measurements were collected by suspending a 1" x 1" NaI gamma scintillation detector coupled to a Ludlum Model 12 ratemeter within a few inches of the ground surface. A health physics technician walked transects (approximately four to six feet wide) covering the properties while slowly swinging the detector in a serpentine motion. Transects were spaced to assure full areal coverage with some overlap. Gamma count measurements were taken approximately every 15 to 20 feet; measurement frequency was increased in areas exhibiting elevated gamma counts. Minimum detectable concentrations (MDCs) for this detector for the radionuclides of concern (ROC) are approximately 4.7 picoCurie per gram (pCi/g) for Radium-226 (Ra-226), 3.0 pCi/g for Thorium-232 (Th-232), and 121.0 pCi/g for Uranium-238 (U-238), correcting for volume and distance from the source (Multi-Agency Radiation Survey and Site Investigation Manual, MARSSIM, 1997). Gamma count data were stored with associated locations in the GPS recorder. In some instances where locations could not be recorded with a GPS (as stipulated above), measurements were manually recorded on the PDI maps.

2.5 Surface ISOCS Measurements

Surface ISOCS measurements were collected at selected locations where environmental, geotechnical, and radiological shallow boreholes were proposed in the PDIWP. Surface ISOCS measurements were collected to identify and quantify radionuclide activity in surface soil, beneath shielded areas (e.g., areas covered with gravel, asphalt, and concrete), and in areas proposed for environmental borings.

Gamma spectroscopy measurements of surface soil were collected using the Canberra high-purity germanium ISOCS and assuming uniform radioactivity distribution in soil. The high-purity germanium detector was positioned in a "downward-looking" direction perpendicular to the ground surface at a height of three feet. The detector was collimated using a lead shield subtending a 90-degree angle, which provided a surface soil viewing area approximately six feet in diameter. The back and side of the detector were shielded with two-inch thick lead O-rings. The detector collimator and shielding were used to ensure that radioactivity detected by the probe originated only from the six-foot diameter area beneath the detector, hence minimizing one possible source of error in the measurements.

2.6 Direct Push Soil Probes

Direct push soil probes (using truck-mounted model 5400 Geoprob[®] or track-mounted model 54DT Geoprob[®]) were used to collect soil samples for radiological and environmental parameter analysis. Two types of direct push soil probes were used: a single rod system (i.e., Macro-Core[®]) and a dual tube (or cased) system. The latter system utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Samples were collected in four-foot soil cores within polyvinyl chloride/polyethylene terephthalate (PVC/PET) liners, marked with the appropriate field identification number, sealed with rubber end caps, and placed

into a two-inch inner diameter PVC container (including PVC end caps) for transport and storage.

For sample locations that were inaccessible to the mounted direct push rigs, soil cores were collected using a manual direct push method. Two-foot cores approximately one inch in diameter were collected using an electric powered hand-held vibratory hammer.

Prior to commencing intrusive sampling, underground utilities in the vicinity of the proposed boring locations were identified by reviewing PDI geophysical survey data, and by contacting the appropriate authorized parties (i.e., New Jersey One-Call System, and the property owner). In addition, a safe working distance from overhead utilities was maintained.

Sampling equipment (the rig, direct push soil probe casing and tools) was decontaminated prior to use and following each borehole installation using pressure or manual washing. Each soil probe hole was backfilled for the full length using Benseal[®] bentonite in accordance with project requirements. For areas covered by asphalt, cold patch was placed at the surface.

2.6.1 Downhole Gamma Logging

Measurements were taken with a Bicron[®] Model G1 1" x 1" NaI gamma detector sealed in a waterproof stainless steel container. The instrument MDCs are approximately 3.6 pCi/g for Ra-226, 2.3 pCi/g for Th-232, and 92.0 pCi/g for U-238, which are approximately 75% of the surface MDCs listed in Section 2.4. This estimate assumes a geometry factor of 0.50, where a four pi geometry (i.e., a sphere) when scanning downhole is approximately half of a two pi geometry (i.e., a hemisphere) when scanning the ground surface. However, this reduction in the MDCs is modified by the 0.3-inch steel casing in the hole, which results in an approximate 33% reduction in the gammas seen by the detector as calculated by the computer code Microshield[™]. The correction factor is therefore calculated by dividing the geometry factor (0.50) by the steel casing reduction factor (0.66), yielding approximately 0.75. The NaI detector was connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector[™] multi-channel analyzer/amplifier/high voltage power supply. The system was controlled, and the data stored, via notebook computer. Ten-second integrated gross gamma measurements were recorded at each 6-inch depth increment in the cased soil probe holes and data entered onto the PDI Soil Probe Log Sheets (see [Appendix 1-B](#)). In areas where samples were collected using the manual direct push method, a Bicron[®] 3/8" x 3/8" NaI gamma detector coupled to a Ludlum Model 2221 scaler/ratemeter was used to take 30 to 60-second gross gamma measurements in uncased soil probe holes. The MDCs for this instrument are estimated to be approximately 1.9 pCi/g for Ra-226 and 2.3 pCi/g for Th-232, as provided by the vendor. There is no correction factor for these MDCs.

2.6.2 Direct Push Core Screening/Sample Collection

Sealed PVC containers collected from direct push mobile and manual rigs were transported to the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation added to the PDI Soil Probe Log Sheets (see [Appendix 1-B](#)) included soil column description and soil screening data. Field screening for radiological activity was performed on soil cores contained in the PVC/PET liner. A collimated Eberline

SPA-3 2" x 2" NaI detector (or Ludlum Model 44-10) coupled to a Ludlum Model 2221 scaler/ratemeter was used to measure gamma activity. The detector was positioned approximately 0.5 inch above the soil core, on a guide, to ensure that this distance was maintained over the entire length of each soil core. Continuous scanning of the soil core was performed at an approximate rate of three inches per second. The instrument MDC, taken from MARSSIM, is estimated to be 2.8 pCi/g for Ra-226, 1.8 pCi/g for Th-232, and 80 pCi/g for U-238 (MARSSIM, 1997). Although the MARSSIM MDC values are based upon an open area, it was assumed that the slower scan time compensated for the different geometry. An indelible marker was used to mark the liner where elevated readings were identified during scanning. Total integrated gross gamma counts were accumulated over a 30-second interval and recorded.

Soil cores were also screened for total volatile organic vapors using a PID. A series of small perforations were made along the PVC/PET liner at 12-inch increments to expose soil to the PID. Perforations were sealed with tape after PID screening. Screening results were recorded on the PDI Soil Probe Logs.

Prior to obtaining samples, each core was photographed using a digital camera. A brief soil field classification description of each core was entered onto the PDI Soil Probe Log Sheet.

Soil samples were selected from each direct push location for analysis of the ROC: Th-232, Ra-226, and U-238. Samples were selected based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample was taken at the highest reading location (suspected FUSRAP waste, if present, as defined in the Federal Facilities Agreement dated November, 1991; DOE and USEPA, 1991); a second soil sample was collected where the readings approached a constant value (suspected transition zone, if present); and a third soil sample was collected within the zone of constant readings (below suspected transition zone). When soil cores exhibited uniform count rates (i.e., elevated gamma measurements were not identified), three samples per soil probe location were collected.

Selected samples were obtained from each core sufficient to fill a 300-milliliter sample container. Samples were labeled and capped at either end with plastic caps. Caps were color-coded for 'top' and 'bottom' of the original hole. Each extracted section of the soil core was replaced with a wooden spacer to indicate what portion of the soil core was sampled. The spacer was labeled with the sample identification number of the soil removed for testing. After screening and sample extraction, remaining portions of each soil core were placed back into the appropriate PVC container, with the wooden spacer in its appropriate location, and stored on-site for future reference. The section of core tube containing the sample was then transferred to the MISS on-site laboratory for sample preparation and analysis.

Evaluation of all gamma log data led to the archiving of selected samples. That is, a number of the direct push soil probes exhibited 'constant' count rates over the depth interval. In these cases, rather than having all samples analyzed at this time, the deepest prepared sample was not counted but archived. By doing this, as laboratory results confirm that radiological contamination does not exist at that soil probe location, unnecessary analytical work is

prevented. Samples that were archived are noted on the PDI Soil Logs in [Appendix 1-B](#) and on [Table 1-4](#).

As described above, a collimated Eberline SPA-3 or Ludlum Model 44-10 2" x 2" NaI detector was used to measure gamma activity for the soil cores, while a Bicron[®] Model G1 1" x 1" NaI gamma detector was used for the downhole measurements. The 2" x 2" NaI detector (Eberline SPA-3 or Ludlum Model 44-10) provided confirmation of downhole measurements and greater sensitivity for sample selection than the 1" x 1" NaI gamma detector.

2.6.3 Sample Preparation

Soil samples were screened to remove small debris and oven-dried to obtain moisture content and to facilitate grinding. Grinding assured sample homogenization. Samples were then transferred to a 300-milliliter commercially supplied metal can. Lids were secured on cans, after which they were shelved for 21 days. The 21-day period was required to allow radon and its daughter products to in-grow and establish secular equilibrium between Ra-226, Radon-222 (Rn-222), and the gamma-emitting daughters.

2.6.4 Laboratory Data

Analysis for ROC on selected samples was performed at the MISS on-site field laboratory using a Canberra high-purity germanium detector. All testing in the MISS on-site field laboratory was completed in accordance with the procedures outlined in the CDQMP. MISS on-site field laboratory data have been entered onto the PDI Soil Probe Log sheets (see [Appendix 1-B](#)).

The Project Chemist evaluated 10% of the MISS on-site field laboratory radiological data packages; the evaluation is included in the PDI Quality Control Summary Report (QCSR; Stone & Webster, 2000c). The laboratory qualified the reported data when the germanium detector measurement system fell outside of one of the control limits during quality control check runs. Data qualification procedures are described in the PDI QCSR.

Ten percent of the samples analyzed by the MISS on-site field laboratory were sent to a USACE-approved off-site laboratory (ThermoRetec) for confirmatory analysis of the ROC. Following analysis, all soil samples were returned to the Maywood Site for storage and future reference. Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the off-site confirmatory radiological data. Radiological data were evaluated using the USACE's Radiological Data Quality Evaluation Guidance, as presented in the CDQMP. The data validation reports for the radiological confirmatory sample results are provided in the PDI QCSR.

2.7 Environmental Sampling

A limited number of soil samples were collected for environmental analyses in order to identify potential chemical contamination commingled with the radioactive waste. This information would aid in assessing waste classification (i.e., whether hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), is commingled with radioactive waste) as well as provide data for worker health and safety. Samples for environmental analysis were

collected using direct push Macro-Core[®] methodology. Sampling depths were based on the anticipated depth of radiological contamination. Soils exhibiting the highest PID readings or visual contamination were collected and sent for laboratory analysis by a USACE and NJDEP certified laboratory (RECRA LabNet). Samples were analyzed for RCRA disposal characteristics (ignitability, reactivity, corrosivity, and toxicity characteristic leaching procedure TCLP), the Target Compound List (TCL) and the Target Analyte List (TAL) with chromium speciation.

During performance of environmental borings, environmental boring log sheets were completed for each boring. Copies of the completed log sheets are included in [Appendix 1-C](#).

Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the environmental data. Environmental data were evaluated using the USACE's Data Quality Evaluation Guidance, as presented in the CDQMP. In addition, the USEPA Region II SOP No. HW-24, Revision I, June 1999, was also applied. The data validation reports for the environmental sample results are provided in the PDI QCSR.

2.8 Geotechnical Sampling

Radiological cleanup criteria have yet to be finalized, therefore final assessment of the extent of radiological contamination cannot be made at this time. The geotechnical investigation program was therefore suspended from the PDI. Following approximate determination of limits of excavation during the design phase, existing geotechnical information will be evaluated for remedial design purposes. If it is decided that additional information is required, then the geotechnical program will be reinstated, as necessary.

2.9 Quality Assurance/Quality Control

Field and laboratory activities were completed in accordance with the CQCP and the CDQMP. Data reflecting adherence to the Quality Assurance / Quality Control (QA/QC) program was documented and presented in the PDI QCSR.

2.10 Health and Safety

All PDI investigation activities were conducted in compliance with the SSHP and associated protocols and directives. Field crews received daily briefings at 'Plan of the Day' meetings prior to any work activities. These meetings reviewed daily health and safety issues such as potential inclement weather, as well as reviews of general site health and safety directives.

3.0 CLUSTER DESCRIPTION AND PDI RESULTS

3.1 Cluster No. 1 Description

Cluster No. 1 is comprised of two lots within the Borough of Lodi: Block 164, Lots 1 and 5. The cluster is bounded to the south by New Jersey State Highway 46, Money Street (St.) to the west, Sidney St. to the north, and a commercial building to the east. The property is a topographically flat vacant lot of approximately half an acre, bordered by asphalt and a chain link fence (see [Figure 1-3](#)). The surface has scattered crushed stone, asphalt, and concrete with patches of weeds and bare soil. Previously, the property was utilized by Schenck Chevrolet, a used car dealership, as a parking area for their stock. A Sanborn map search revealed that in the 1950s the property was the site of a gas station.

A geophysical survey conducted prior to intrusive PDI field activities (see Section 2.0) detected underground features. A suspected underground storage tank (UST) and two minor sub-surface magnetic anomalies were identified (NAEVA, 2000). Located in the extreme west corner of the property, the UST is proximate to two BNI soil borings (2035R and 2038R) which indicate soil "...saturated in a liquid with strong fuel odor" at the 8 to 11 foot depth (BNI, 1989). Based on its apparent dimensions, the UST has an approximate capacity of 2,500 gallons. No further information is available regarding this UST or the two other minor magnetic anomalies.

Along the eastern edge of the site is an underground conduit which runs north-south. This pipe channels the Lodi Brook and local stormwater runoff to the Saddle River.

Refer to [Figure 1-3](#) for more specific details of site features.

3.2 Radiological Data

3.2.1 Surface Gamma Survey

A surface gamma survey was performed at Cluster No. 1. Data, recorded using GPS, was entered into the Groundwater Modeling System (GMS) software package and contoured to a two-dimensional grid using the natural neighbor contouring protocol. Natural neighbor interpolation is based on the Thiessen polygon network of the scatter point set. Data are interpolated based on distance as well as topological relationships (Boss International, Inc., 2000).

Results of the gamma scan survey for Cluster No. 1 are presented graphically on [Figure 1-4](#) and [Figure 1-A1](#) (Appendix 1-A). [Figure 1-4](#) presents surface gamma scan data in context of the Maywood Site: the upper limit of the contour range is the maximum gamma count measurement detected at the Maywood Site, and the lower contour range represents 1.5 times the background gamma count rate for Cluster No. 1 (background is approximately 1500 counts per minute for Cluster No. 1). [Figure 1-A1](#) provides a more detailed cluster-specific presentation of the gamma scan data, with contoured ranges corresponding to minimum and maximum measured gross gamma counts at Cluster No. 1.

3.2.2 *Surface ISOCS Measurements*

Surface ISOCS measurements were taken at 17 locations on Cluster No. 1; locations are shown on [Figure 1-3](#). The results of the surface ISOCS measurements are tabulated on [Table 1-3](#).

3.2.3 *Direct Push Soil Probes*

Fifteen direct push probes were performed at Cluster No. 1 for radiological purposes. Soil probe locations are shown on [Figure 1-3](#).

3.2.3.1 Downhole Gamma Logging

Results from downhole gamma logging measurements taken at the soil probe locations are presented on the PDI Soil Probe Logs included in [Appendix 1-B](#).

3.2.3.2 Direct Push Core Screening/Sample Collection

Results of soil core screening activities performed at the MISS radiological screening laboratory are recorded on PDI Soil Probe Logs included in [Appendix 1-B](#).

3.2.3.3 MISS On-Site Field Laboratory Data and ThermoRetec Confirmatory Data

Forty-eight (48) soil samples were collected for laboratory analysis from the 15 soil probe locations at Cluster No. 1. Thirty-seven of the 48 samples were sent to the MISS on-site field laboratory for analysis (including three duplicates); 11 were archived. Laboratory data consisting of soil concentrations of the ROC are presented on the soil probe logs in [Appendix 1-B](#), and summarized on [Table 1-4](#). Archived samples are also recorded on the logs and the table.

Three of the soil samples analyzed by the MISS on-site laboratory were sent to ThermoRetec for confirmatory analysis. Results of the confirmatory analyses performed by ThermoRetec are presented on [Table 1-4](#).

As part of the data quality objective process, a comparison study was performed between the MISS on-site field laboratory and the ThermoRetec laboratory data. The results of the comparison can be found under separate cover (Stone & Webster, 2000d).

3.3 Environmental Data

One environmental boring was drilled at Cluster No. 1, and one soil sample was collected for environmental analysis. A summary of the environmental analytical data is presented on [Table 1-5](#). [Figure 1-3](#) shows the location of the boring. In addition, the environmental boring log sheet is included in [Appendix 1-C](#).

4.0 REFERENCES

Bechtel National, Inc. Radiological Characterization Report for the Commercial Property at 72 Sidney Street, DOE/OR/20722-245; 1989.

Bechtel National, Inc. Remedial Investigation Report for the Maywood Site, December 1992.

Boss International, Inc. and Brigham Young University. Groundwater Modeling System (GMS) User's Manual; 2000.

Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM); EPA-402-R-97-016; NUREG-1575; December, 1997.

NAEVA Geophysics, Inc. Results of Subsurface Investigation for the FUSRAP Maywood Superfund Site; 2000.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Work Plan*, FUSRAP Maywood Superfund Site. Boston, MA; October 1999a.

Stone & Webster Environmental Technology & Services. *Final Contractor Quality Control Plan*, FUSRAP Maywood Superfund Site. Boston, MA; October 1999b.

Stone & Webster Environmental Technology & Services. *Final Site Safety and Health Plan*, FUSRAP Maywood Superfund Site. Boston, MA, August 1999c.

Stone & Webster Environmental Technology & Services. *Final General Environmental Protection Plan*, FUSRAP Maywood Superfund Site. Boston, MA; November 1999d.

Stone & Webster Environmental Technology & Services. *Chemical Data Quality Management Plan, Revision 1*, FUSRAP Maywood Superfund Site. Boston, MA; February 2000a.

Stone & Webster Environmental Technology & Services. *Materials Handling/Transportation and Disposal Plan*, FUSRAP Maywood Superfund Site. Boston, MA; January 2000b.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Quality Control Summary Report*, FUSRAP Maywood Superfund Site. Boston, MA; March 2000c.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Radiological Data Comparison Study*, FUSRAP Maywood Superfund Site. Boston, MA; December 2000d.

U.S. Department of Energy and U.S. Environmental Protection Agency. Federal Facility Agreement for the Maywood Interim Storage Site; November, 1991.

Table 1-1: Properties Comprising Each Cluster

Cluster No.	Property No.	Properties (occupant)	Township/Borough	Property Block & Lot
1	01A	72 Sidney St. (Vacant)	Lodi	Block 164, Lots 1 and 5
2	02A	100 Hancock Street (AT&T)	Lodi	Block 205.03, Lot 2.04
	02B	80 Hancock Street (Vacant)	Lodi	Block 205.03, Lot 2.03
	02C	80 Industrial Road (American Jewel Windows)	Lodi	Block 205.02, Lot 4.02
	02D	8 Mill St. (NJVIS)	Lodi	Block 205.02, Lot 1.05
3	03A	170 Gregg Street (Bergen Cable)	Lodi	Block 205, Lot 1.02
4	04A	160/174 Essex Street (Bank of New York)	Lodi	Block 186.01, Lot 1 and Block 174, Lot 1.02
	04B	I-80 Westbound Right-of-Way (NJDOT)	Lodi	Not Applicable
5	05A	99 Essex Street (Joseph Muscarelle, Inc.)	Maywood	Block 125, Lot 1
	05B	113 Essex Street (Bank of New York)	Maywood	Block 125, Lot 2
	05C	200 NJ Route 17 South (Sears Appliance Repair)	Maywood	Block 125, Lot 3
6	06A	85-101 NJ Route 17 North (Architectural Windows)	Maywood	Block 124, Lot 4
	06B	137 NJ Route 17 North (Ramsey Auto Group)	Maywood	Block 124, Lot 3
	06C	167 NJ Route 17 North (Sunoco Station - Inactive)	Maywood	Block 124, Lot 2
	06D	239 NJ Route 17 North (Gulf Station)	Maywood	Block 124, Lot 1
	06E	29 Essex Street (Federal Express Corporation)	Maywood	Block 124, Lot 5
7	07A	111 Essex Street (Scanel Company, Inc.)	Maywood	Block 131, Lots 1,2,3,4
	07B	New York, Susquehanna & Western Railway - Lodi Branch	Maywood	Block 131, Lot 8
8	08A	23 West Howcroft Road (Maywood Furniture, Inc.)	Maywood	Block 124, Lot 17
9	09A	149-151 Maywood Avenue (Sears Logistical Services)	Maywood; Rochelle Park	Block 124, Lot 30; Block 17.02, Lot 1
10	10A	100 West Hunter Avenue (Stepan Company)	Maywood; Rochelle Park	Block 124, Lot 10; Block 18.02, Lot 2
11	11A	205 Maywood Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
	11B	61 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 50
	11C	50 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
12	12A	New York, Susquehanna & Western Railway	Maywood; Rochelle Park	Block 124, Lot 55 and Block 110, Lot 1
	12B	100 West Hunter Avenue (MISS)	Maywood; Rochelle Park	Block 124, Lot 46 and Block 20.01, Lot 1
	12C	New Jersey Route 17 (NJDOT)	Rochelle Park	Not Applicable

Table 1-2: Summary of PDI Intrusive Field Activities

Cluster No.	Property No.	Property Address	Occupant	Planned			Actual			Schedule (Year 2000)
				Probe Locations	Depth (ft)	Footage (ft)	Probe Locations	Depth (ft)	Footage (ft)	
1	01A	72 Sydney Street	Vacant	13	12	156	15	12	188	Jan. 11, 12, Mar. 31
2	02A	100 Hancock Street	AT&T	17	16	272	17	6 - 12	194	Jan. 27, Feb. 1, 2, Mar. 16
	02B	80 Hancock Street	Vacant	18	16	288	Pending Right of Entry Agreement			
	02C	80 Industrial Road	American Jewel Windows	23	16	368	20	12	272	Jan. 21, 24, 28, Feb. 1
	02D	8 Mill Street	NJVIS	38	16	608	44	12 - 16	593	Jan. 13, 14, 18, 19, 20, 21
3	03A	170 Gregg Street	Bergen Cable	10	8	80	10	8	62	Jan. 12, 13
4	04A	160/174 Essex Street	Bank of New York	25	12	300	23	4 - 12	427	Feb. 2, 3, 4
	04B	I-80 Right-of-Way	NJDOT	7	12	84	7	8 - 12	69	Feb. 2, 4, Mar. 31
5	05A	99 Essex Street	Joseph Muscarelle, Inc.	38	8	304	38	8	318	Feb. 23, 24, Mar. 17
	05B	113 Essex Street	Bank of New York	18	8	144	21	4 - 16	171	Feb. 8, 10, 16
	05C	200 NJ Route 17 South	Sears Appliance Repair	23	8	184	16	8 - 10	129	Feb. 15, 16, Mar. 2
6	06A	85-101 NJ Route 17 North	Architectural Windows	17	12	204	17	8 - 18	196	Feb. 9, 10, 16, Mar. 16
	06B	137 NJ Route 17 North	Ramsey Auto Group	15	12	190	13	10 - 12	145	Feb. 9, 16, 25
	06C	167 NJ Route 17 North	Sunoco Station - Inactive	27	12	324	19	3 - 14	239	Feb. 11, Mar. 8
	06D	239 NJ Route 17 North	Gulf Station	19	12	228	2	11 - 12	23	Feb. 16
	06E	29 Essex Street	Federal Express Corporation	7	12	84	9	7 - 12	95	Feb. 16, Mar. 31
7	07A	111 Essex Street	Scanel Company, Inc.	12	16	192	12	12 - 22	161	Feb. 21, 22, 23
	07B	NYS&W - Lodi Branch	NYS&W - Lodi Branch	16	16	256	11	6 - 16	115	Feb. 21, 22
8	08A	23 West Howcroft Street	Maywood Furniture, Inc.	26	16	416	25	7 - 16	321	Feb. 17, 21
9	09A	149-151 Maywood Avenue	Sears Logistical Services	131	16	2096	72	4 - 16	574	Mar. 2, 3, 6, 7, 8, 9, 15
10	10A	100 West Hunter Avenue	Stepan Company	106	24	2544	92	4 - 24	1076	Feb. 25, 28, 29, Mar. 1, 2, 6, 7, 9, 16, 30
11	11A	205 Maywood Avenue	Myron Manufacturing	5	8	40	5	8 - 12	44	Feb. 16
	11B	61 West Hunter Avenue	Myron Manufacturing	9	8	72	10	8 - 16	87	Feb. 15, 21
	11C	50 West Hunter Avenue	Myron Manufacturing	1	8	8	1	8	8	Feb. 15
12	12A	NYS&W	NYS&W	31	24	744	27	12 - 27	335	Feb. 18, 22, 24, Mar. 16, 30
	12B	100 West Hunter Avenue	MISS	120	24	2880	100	7 - 26	1769	Feb. 4, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24, 25, 29, Mar. 1, 7, 8, 9
	12C	NJ Route 17	NJDOT	0	0	0	0	0	0	<i>No investigations planned.</i>
TOTALS:				772		13,066	626		7,611	

Table 1-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
1-SI001-SS-0-1	< 0.23	-----	0.23	0.28	37.0	0.01	<4.72	-----	4.72
1-SI002-SS-0-1	0.31	26.6	0.16	0.36	30.9	0.06	< 4.62	-----	4.62
1-SI003-SS-0-1	1.06	14.8	0.20	0.83	20.6	0.01	< 5.46	-----	5.46
1-SI004-SS-0-1	1.04	14.6	0.23	0.66	22.5	0.01	< 5.46	-----	5.46
1-SI005-SS-0-1	0.17	49.8	0.14	< 0.05	-----	0.05	< 3.70	-----	3.70
1-SI006-SS-0-1 (1)	0.22	31.8	0.14	0.27	36.0	0.01	< 3.83	-----	3.83
1-SI006-SS-1-1 (1)	< 0.18	-----	0.18	0.35	30.7	0.10	< 4.62	-----	4.62
1-SI007-SS-0-1	0.15	41.7	0.12	0.15	58.0	0.06	< 3.70	-----	3.70
1-SI008-SS-0-1	0.32	25.0	0.03	0.30	34.8	0.01	< 4.30	-----	4.30
1-SI009-SS-0-1	0.53	19.9	0.17	0.63	22.5	0.08	< 4.30	-----	4.30
1-SI010-SS-0-1	0.44	22.0	0.21	0.43	28.8	0.08	< 5.20	-----	5.20
1-SI011-SS-0-1	0.48	20.6	0.22	0.43	28.6	0.12	7.97	-----	5.20
1-SI012-SS-0-1 (1)	0.80	16.6	0.27	0.48	28.0	0.01	< 5.63	-----	5.63
1-SI012-SS-1-1 (1)	0.82	16.0	0.19	0.51	26.0	0.01	< 5.11	-----	5.11
1-SI013-SS-0-1	0.37	24.0	0.16	0.29	39.0	0.06	< 4.62	-----	4.62
1-SI014-SS-0-1	0.32	25.0	0.18	0.38	30.7	0.01	< 5.34	-----	5.34
1-SI015-SS-0-1	0.31	29.0	0.21	0.39	30.0	0.01	< 3.96	-----	3.96
1-SI016-SS-0-1	0.32	26.7	0.17	0.31	38.0	0.10	< 4.82	-----	4.82
1-SI017-SS-0-1	0.35	25.5	0.03	0.49	26.6	0.01	< 5.11	-----	5.11

* Reported data are taken from the Nuclide Identification Report

MDA : Minimum Detectable Activity

Error: 2 sigma (95% confidence interval)

< : Nuclide undetected or less than the MDA. The nuclide is assumed to be present at the MDA Value.

----- Not Applicable

(1) Sample (-0-1) and its duplicate (-1-1)

**Table 1-4: Summary of Radiological Laboratory Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
01A-001	1.50	01A02001		0.38	0.06	0.18	0.53	0.05	0.18	4.61	U	----	4.61		
01A-001	6.50	01A02002		0.49	0.06	0.15	0.32	U	----	0.32	5.89	U	----	5.89	
01A-001	8.50	01A02003		0.64	0.08	0.24	0.88	0.07	0.23	5.68	U	----	5.68		
01A-002	1.50	01A02004		1.12	0.09	0.18	1.06	0.07	0.24	5.84	U	----	5.84		
01A-002	5.50	01A02005		0.44	0.05	0.15	0.38	0.04	0.15	4.37	U	----	4.37		
01A-002	10.50	01A02006		ARCHIVED											
01A-003	2.00	01A02007		0.80	0.06	0.21	3.20	0.09	0.17	6.94	U	----	6.94		
01A-003	4.50	01A02008		0.69	0.06	0.24	1.66	0.08	0.23	5.86	U	----	5.86		
01A-003	10.50	01A02009		ARCHIVED											
01A-004	2.50	01A02010		0.87	0.07	0.24	3.30	0.10	0.28	7.05	U	----	7.05		
01A-004	4.50	01A02011		1.17	0.08	0.24	2.40	0.09	0.29	8.39		2.47	7.75		
01A-004	7.50	01A02012		ARCHIVED											
01A-005	2.00	01A02013		0.59	0.06	0.25	1.43	0.07	0.21	5.60	U	----	5.60		
		<i>ThermoRetec</i> ⁽²⁾		<i>01A02013</i>	<i>0.56</i>	<i>0.14</i>	<i>0.16</i>	<i>1.44</i>	<i>0.21</i>	<i>0.20</i>	<i>0.70</i>	<i>UJ</i>	<i>2.02</i>	<i>2.15</i>	
01A-005	2.00	01A02014	X	0.48	0.06	0.15	1.12	0.06	0.20	5.31	U	----	5.31		
		<i>ThermoRetec</i> ⁽²⁾		<i>01A02014</i>	<i>0.63</i>	<i>0.12</i>	<i>0.15</i>	<i>1.32</i>	<i>0.13</i>	<i>0.21</i>	<i>1.02</i>	<i>UJ</i>	<i>1.46</i>	<i>2.24</i>	
01A-005	4.50	01A02015		0.51	0.06	0.18	0.74	0.05	0.18	-0.09	U	1.39	4.80		
01A-005	7.00	01A02016		ARCHIVED											
01A-006	1.50	01A02017		0.69	0.07	0.28	2.08	0.09	0.27	6.83	U	----	6.83		
01A-006	7.00	01A02018		0.48	0.05	0.17	0.54	0.04	0.12	4.51	U	----	4.51		
01A-006	10.00	01A02019		0.45	0.06	0.17	0.59	0.05	0.17	4.73	U	----	4.73		
01A-007	1.50	01A02020		0.81	J	0.07	0.22	0.62	J	0.05	0.20	2.26	J	1.36	4.47
01A-007	5.00	01A02023		0.48	J	0.07	0.21	0.70	J	0.05	0.19	4.69	UJ	----	4.69
01A-007	9.50	01A02024		ARCHIVED											
01A-008	2.00	01A02025		0.65	J	0.06	0.26	1.73	J	0.07	0.15	5.57	UJ	----	5.57
01A-008	5.00	01A02026		0.39	J	0.05	0.16	0.22	UJ	----	0.22	4.01	UJ	----	4.01
01A-008	10.00	01A02027		ARCHIVED											
01A-009	2.00	01A02028		0.55	J	0.06	0.18	0.83	J	0.05	0.18	4.49	UJ	----	4.49
01A-009	5.50	01A02029		0.28	UJ	----	0.28	0.22	UJ	----	0.22	4.46	UJ	----	4.46
01A-009	10.00	01A02030		ARCHIVED											
01A-010	1.00	01A02031		0.95	J	0.06	0.20	0.79	J	0.06	0.22	5.45	UJ	----	5.45
		<i>ThermoRetec</i> ⁽²⁾		<i>01A02031</i>	<i>1.01</i>	<i>0.13</i>	<i>0.14</i>	<i>0.91</i>	<i>0.16</i>	<i>0.20</i>	<i>1.37</i>	<i>UJ</i>	<i>1.43</i>	<i>1.99</i>	
01A-010	1.00	01A02032	X	0.84	J	0.07	0.11	0.93	J	0.05	0.14	5.08	UJ	----	5.08
01A-010	5.50	01A02033		0.47	J	0.05	0.15	0.60	J	0.04	0.15	3.73	UJ	----	3.73
01A-010	8.50	01A02034		ARCHIVED											

**Table 1-4: Summary of Radiological Laboratory Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
01A-011	2.50	01A02035		1.01	J	0.06	0.23	3.26	J	0.10	0.17	6.71	UJ	---	6.71
01A-011	5.00	01A02036		0.60	J	0.07	0.19	0.86	J	0.05	0.19	-3.27	J	1.49	5.37
01A-011	10.00	01A02037		ARCHIVED											
01A-012	1.50	01A02038		0.80	J	0.07	0.16	0.79	J	0.05	0.15	0.99	J	1.47	4.98
01A-012	6.00	01A02039		0.39	J	0.06	0.17	0.39	J	0.05	0.20	4.48	UJ	---	4.48
01A-012	10.00	01A02040		ARCHIVED											
01A-013	0.50	01A02041		0.55	J	0.06	0.19	0.68	J	0.06	0.20	4.77	UJ	---	4.77
01A-013	5.50	01A02042		0.56	J	0.06	0.14	0.57	J	0.05	0.18	4.25	UJ	---	4.25
01A-013	5.50	01A02043	X	0.41	J	0.05	0.16	0.50	J	0.05	0.17	4.35	UJ	---	4.35
01A-013	11.50	01A02044		ARCHIVED											
01A-014	5.00	01A02045		0.83		0.09	0.29	1.42		0.07	0.19	7.41	U	---	7.41
01A-014	8.50	01A02046		0.45		0.08	0.26	0.65		0.06	0.24	8.32	U	---	8.32
01A-014	10.00	01A02047		0.26		0.04	0.14	0.22	U	---	0.22	3.50	U	---	3.50
01A-015	5.50	01A02048		0.67		0.06	0.24	1.61		0.08	0.25	8.70	U	---	8.70
01A-015	6.50	01A02049		0.38		0.06	0.20	0.50		0.05	0.18	4.64	U	---	4.64
01A-015	7.50	01A02050		0.71		0.07	0.21	0.86		0.05	0.17	7.97	U	---	7.97

Error: 2 sigma (95% confidence interval)

- Not Applicable
- U Undetected or Negative Concentration Less Than the MDA
- J Estimated
- MDA Minimum Detectable Activity

- (1) The sample marked with an "X" for duplicate is a duplicate of the sample listed directly above it. Duplicate samples are prepared by homogenizing soil above and below the centerpoint and then separating for analysis. The depth listed is the center point.
- (2) Approximately 10% of all radiological soil samples collected under the PDI Program were sent to ThermoRetec, an offsite laboratory, for confirmatory radiological analyses. Results from ThermoRetec are presented in this table in italicized font immediately below the MISS On-Site field laboratory result for that same sample.

Table 1-5: Summary of Environmental Analytical Data

Parameter	Sample ID	01A-020500
	Sample Location	01A-001
	Sample Depth (feet)	0 - 4
	Sample Date	03/27/00
Units		
<i>Miscellaneous</i>		
Chromium VI	mg/kg	0.45U
Corrosivity by pH	Soil pH	7.4
Cyanide, Reactive	mg/kg	0.50U
Cyanide, Total	mg/kg	0.62
Sulfide, Reactive	mg/kg	24.0U
<i>PCBs and Pesticides</i>		
4,4'-DDD	ug/kg	37U
4,4'-DDE	ug/kg	37U
4,4'-DDT	ug/kg	37U
Aldrin	ug/kg	19U
Alpha-BHC	ug/kg	19U
alpha-Chlordane	ug/kg	19U
Aroclor-1016	ug/kg	19U
Aroclor-1221	ug/kg	37U
Aroclor-1232	ug/kg	19U
Aroclor-1242	ug/kg	19U
Aroclor-1248	ug/kg	19U
Aroclor-1254	ug/kg	19U
Aroclor-1260	ug/kg	47
Beta-BHC	ug/kg	19U
Delta-BHC	ug/kg	19U
Dieldrin	ug/kg	37U
Endosulfan I	ug/kg	19U
Endosulfan II	ug/kg	37U
Endosulfan sulfate	ug/kg	37U
Endrin	ug/kg	37U
Endrin aldehyde	ug/kg	37U
Endrin ketone	ug/kg	37U
gamma-BHC (Lindane)	ug/kg	19U
gamma-Chlordane	ug/kg	19U
Heptachlor	ug/kg	19U
Heptachlor epoxide	ug/kg	19U
Methoxychlor	ug/kg	190U
Toxaphene	ug/kg	1900U

Table 1-5: Summary of Environmental Analytical Data

Parameter	Sample ID	01A-020500
	Sample Location	01A-001
	Sample Depth (feet)	0 - 4
	Sample Date	03/27/00
Units		
<i>Rare Earth Metals</i>		
Cerium, Total	mg/kg	12.9
Dysprosium, Total	mg/kg	0.85
Lanthanum, Total	mg/kg	6.3
Neodymium, Total	mg/kg	7.3
Yttrium, Total	mg/kg	3.4
<i>Semivolatile Organics</i>		
1,2,4-Trichlorobenzene	ug/kg	3700U
1,2-Dichlorobenzene	ug/kg	3700U
1,3-Dichlorobenzene	ug/kg	3700U
1,4-Dichlorobenzene	ug/kg	3700U
2,2'-oxybis(1-Chloropropane)	ug/kg	3700U
2,4,5-Trichlorophenol	ug/kg	9300U
2,4,6-Trichlorophenol	ug/kg	3700U
2,4-Dichlorophenol	ug/kg	3700U
2,4-Dimethylphenol	ug/kg	3700U
2,4-Dinitrophenol	ug/kg	9300U
2,4-Dinitrotoluene	ug/kg	3700U
2,6-Dinitrotoluene	ug/kg	3700U
2-Chloronaphthalene	ug/kg	3700U
2-Chlorophenol	ug/kg	3700U
2-Methylnaphthalene	ug/kg	240J
2-Methylphenol	ug/kg	3700U
2-Nitroaniline	ug/kg	9300U
2-Nitrophenol	ug/kg	3700U
3,3'-Dichlorobenzidine	ug/kg	3700U
3-Nitroaniline	ug/kg	9300U
4,6-Dinitro-2-methylphenol	ug/kg	9300U
4-Bromophenyl-phenylether	ug/kg	3700U
4-Chloro-3-methylphenol	ug/kg	3700U
4-Chloroaniline	ug/kg	3700U
4-Chlorophenyl-phenylether	ug/kg	3700U
4-Methylphenol	ug/kg	3700U
4-Nitroaniline	ug/kg	9300U
4-Nitrophenol	ug/kg	9300U
Acenaphthene	ug/kg	560J
Acenaphthylene	ug/kg	2800J
Anthracene	ug/kg	2400J
Benzo(a)anthracene	ug/kg	7200
Benzo(a)pyrene	ug/kg	6400
Benzo(b)fluoranthene	ug/kg	5400

Table 1-5: Summary of Environmental Analytical Data

Parameter	Sample ID	01A-020500
	Sample Location	01A-001
	Sample Depth (feet)	0 - 4
	Sample Date	03/27/00
Units		
<i>Semivolatile Organics (continued)</i>		
Benzo(g,h,i)perylene	ug/kg	4600
Benzo(k)fluoranthene	ug/kg	5800
bis(2-Chloroethoxy)methane	ug/kg	3700U
bis(2-Chloroethyl)ether	ug/kg	3700U
bis(2-Ethylhexyl)phthalate	ug/kg	3700U
Butylbenzylphthalate	ug/kg	3700U
Carbazole	ug/kg	570J
Chrysene	ug/kg	8600
Di-n-butylphthalate	ug/kg	3700U
Di-n-octyl phthalate	ug/kg	3700U
Dibenz(a,h)anthracene	ug/kg	3700U
Dibenzofuran	ug/kg	3700U
Diethylphthalate	ug/kg	3700U
Dimethylphthalate	ug/kg	3700U
Fluoranthene	ug/kg	15000
Fluorene	ug/kg	1400J
Hexachlorobenzene	ug/kg	3700U
Hexachlorobutadiene	ug/kg	3700U
Hexachlorocyclopentadiene	ug/kg	3700U
Hexachloroethane	ug/kg	3700U
Indeno(1,2,3-cd)pyrene	ug/kg	4100
Isophorone	ug/kg	3700U
N-Nitroso-di-n-propylamine	ug/kg	3700U
N-Nitrosodiphenylamine (1)	ug/kg	3700U
Naphthalene	ug/kg	3700U
Nitrobenzene	ug/kg	3700U
Pentachlorophenol	ug/kg	9300U
Phenanthrene	ug/kg	7300
Phenol	ug/kg	3700U
Pyrene	ug/kg	13000
<i>Total Metals</i>		
Aluminum, Total	mg/kg	4150
Antimony, Total	mg/kg	0.65
Arsenic, Total	mg/kg	2.2
Barium, Total	mg/kg	51.8
Beryllium, Total	mg/kg	0.14
Boron, Total	mg/kg	3.3
Cadmium, Total	mg/kg	0.37
Calcium, Total	mg/kg	2920
Chromium, Total	mg/kg	7.6

Table 1-5: Summary of Environmental Analytical Data

Parameter	Sample ID	01A-020500
	Sample Location	01A-001
	Sample Depth (feet)	0 - 4
	Sample Date	03/27/00
Units		
<i>Total Metals (continued)</i>		
Cobalt, Total	mg/kg	3.7
Copper, Total	mg/kg	47.8
Iron, Total	mg/kg	8420
Lead, Total	mg/kg	122
Lithium, Total	mg/kg	4
Magnesium, Total	mg/kg	2190
Manganese, Total	mg/kg	115
Nickel, Total	mg/kg	17.3
Potassium, Total	mg/kg	266
Selenium, Total	mg/kg	0.48
Silver, Total	mg/kg	0.09U
Sodium, Total	mg/kg	232
Thallium, Total	mg/kg	0.38U
Vanadium, Total	mg/kg	15.2
Zinc, Total	mg/kg	73.3
<i>Volatile Organics</i>		
1,1,1-Trichloroethane	ug/kg	670U
1,1,2,2-Tetrachloroethane	ug/kg	670U
1,1,2-Trichloroethane	ug/kg	670U
1,1-Dichloroethane	ug/kg	670U
1,1-Dichloroethene	ug/kg	670U
1,2-Dichloroethane	ug/kg	670U
1,2-Dichloroethene (total)	ug/kg	670U
1,2-Dichloropropane	ug/kg	670U
2-Butanone	ug/kg	1300U
2-Hexanone	ug/kg	1300U
4-Methyl-2-pentanone	ug/kg	1300U
Acetone	ug/kg	460BJ
Benzene	ug/kg	670U
Bromodichloromethane	ug/kg	670U
Bromoform	ug/kg	670U
Bromomethane	ug/kg	1300U
Carbon Disulfide	ug/kg	670U
Carbon Tetrachloride	ug/kg	670U
Chlorobenzene	ug/kg	670U
Chloroethane	ug/kg	1300U
Chloroform	ug/kg	670U

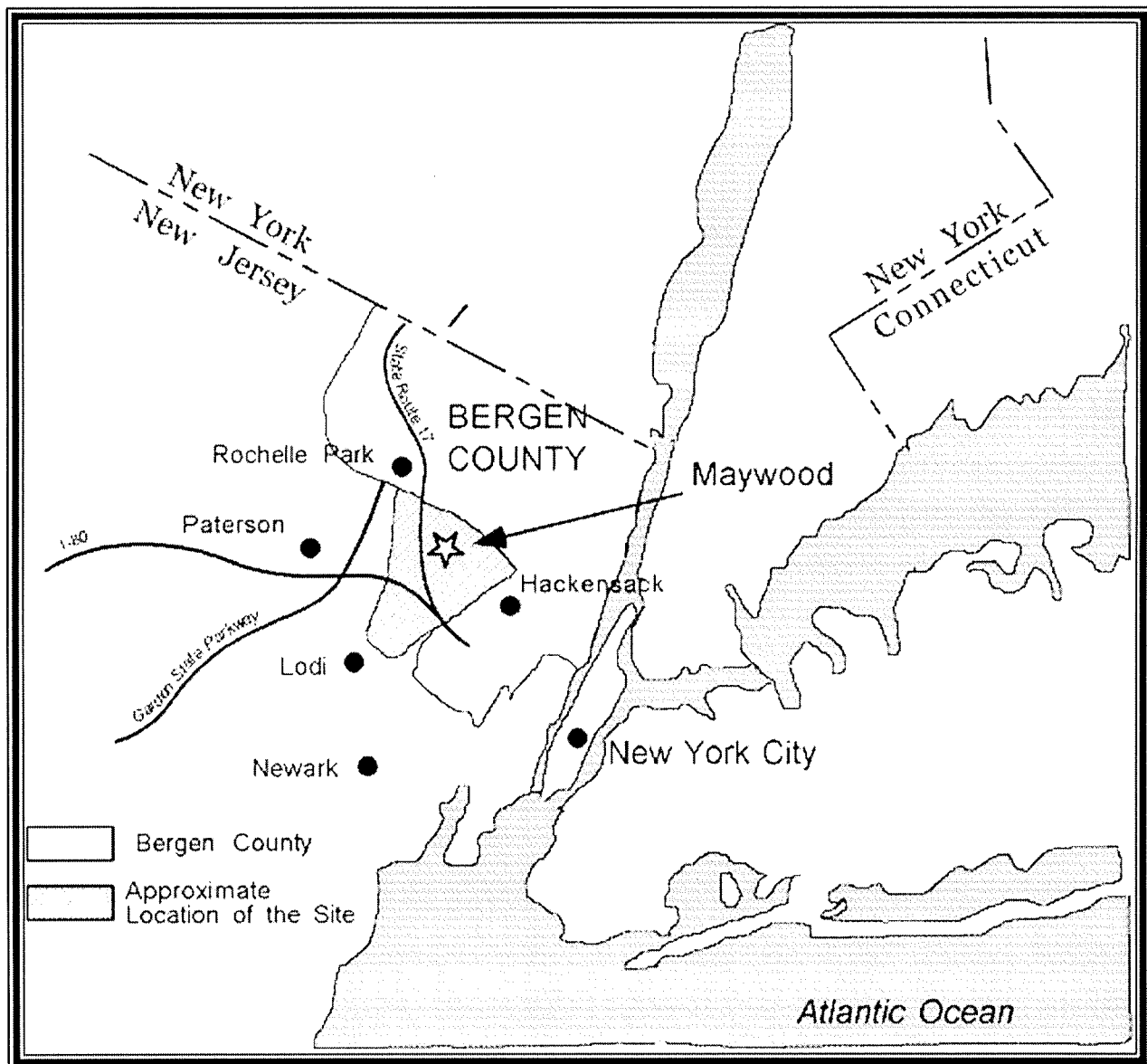
Table 1-5: Summary of Environmental Analytical Data

Parameter	Sample ID	01A-020500
	Sample Location	01A-001
	Sample Depth (feet)	0 - 4
	Sample Date	03/27/00
Units		
<i>Volatile Organics (continued)</i>		
Chloromethane	ug/kg	290J
cis-1,3-Dichloropropene	ug/kg	670U
Dibromochloromethane	ug/kg	670U
Ethylbenzene	ug/kg	670U
Methylene Chloride	ug/kg	620BJ
Styrene	ug/kg	670U
Tetrachloroethene	ug/kg	670U
Toluene	ug/kg	670U
Trans-1,3-Dichloropropene	ug/kg	670U
Trichloroethene	ug/kg	670U
Vinyl Chloride	ug/kg	1300U
Xylene (total)	ug/kg	670U
<i>TCLP Metals</i>		
Arsenic	ug/L	32.4U
Barium	ug/L	512
Cadmium	ug/L	4.3U
Chromium	ug/L	3.4U
Lead	ug/L	165
Mercury	ug/L	0.1U
Selenium	ug/L	49.7U
Silver	ug/L	3.7U
<i>TCLP Pesticides</i>		
Alpha-Chlordane	ug/L	0.50U
Endrin	ug/L	1.0U
Gamma-BHC (Lindane)	ug/L	0.50U
Gamma-Chlordane	ug/L	0.50U
Heptachlor	ug/L	0.50U
Heptachlor epoxide	ug/L	0.50U
Methoxychlor	ug/L	5.0U
Toxaphene	ug/L	50U
2,4,5-TP (Silvex)	ug/L	5.0U
2,4-D	ug/L	10U


Table 1-5: Summary of Environmental Analytical Data

Parameter	Sample ID	01A-020500
	Sample Location	01A-001
	Sample Depth (feet)	0 - 4
	Sample Date	03/27/00
Units		
<i>TCLP Volatiles</i>		
1,1-Dichloroethene	mg/L	0.025U
1,2-Dichloroethane	mg/L	0.025U
2-Butanone	mg/L	0.05U
Benzene	mg/L	0.025U
Carbon tetrachloride	mg/L	0.025U
Chlorobenzene	mg/L	0.025U
Chloroform	mg/L	0.025U
Tetrachloroethene	mg/L	0.025U
Trichloroethene	mg/L	0.025U
Vinyl Chloride	mg/L	0.05U
<i>TCLP Semi-Volatiles</i>		
1,4-Dichlorobenzene	mg/L	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U
2,4-Dinitrotoluene	mg/L	0.05U
2-Methylphenol	mg/L	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U
Hexachlorobenzene	mg/L	0.05U
Hexachlorobutadiene	mg/L	0.05U
Hexachloroethane	mg/L	0.05U
Nitrobenzene	mg/L	0.05U
Pentachlorophenol	mg/L	0.12U
Pyridine	mg/L	0.05U

U Undetected Values
 J Estimated Value
 BJ Found in Blank; is an Estimated Value



NOT TO SCALE

<p>U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS NEW YORK DISTRICT</p> <p>US ARMY CORPS OF ENGINEERS</p> <p>FUSRAP FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM</p>	<p> STONE & WEBSTER, INC.</p> <p>Prepared by: MALCOLM PIRNIE</p> <p>File Name: MPI-CH1</p>
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**LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY**

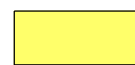
PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

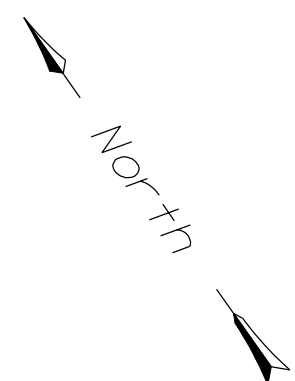
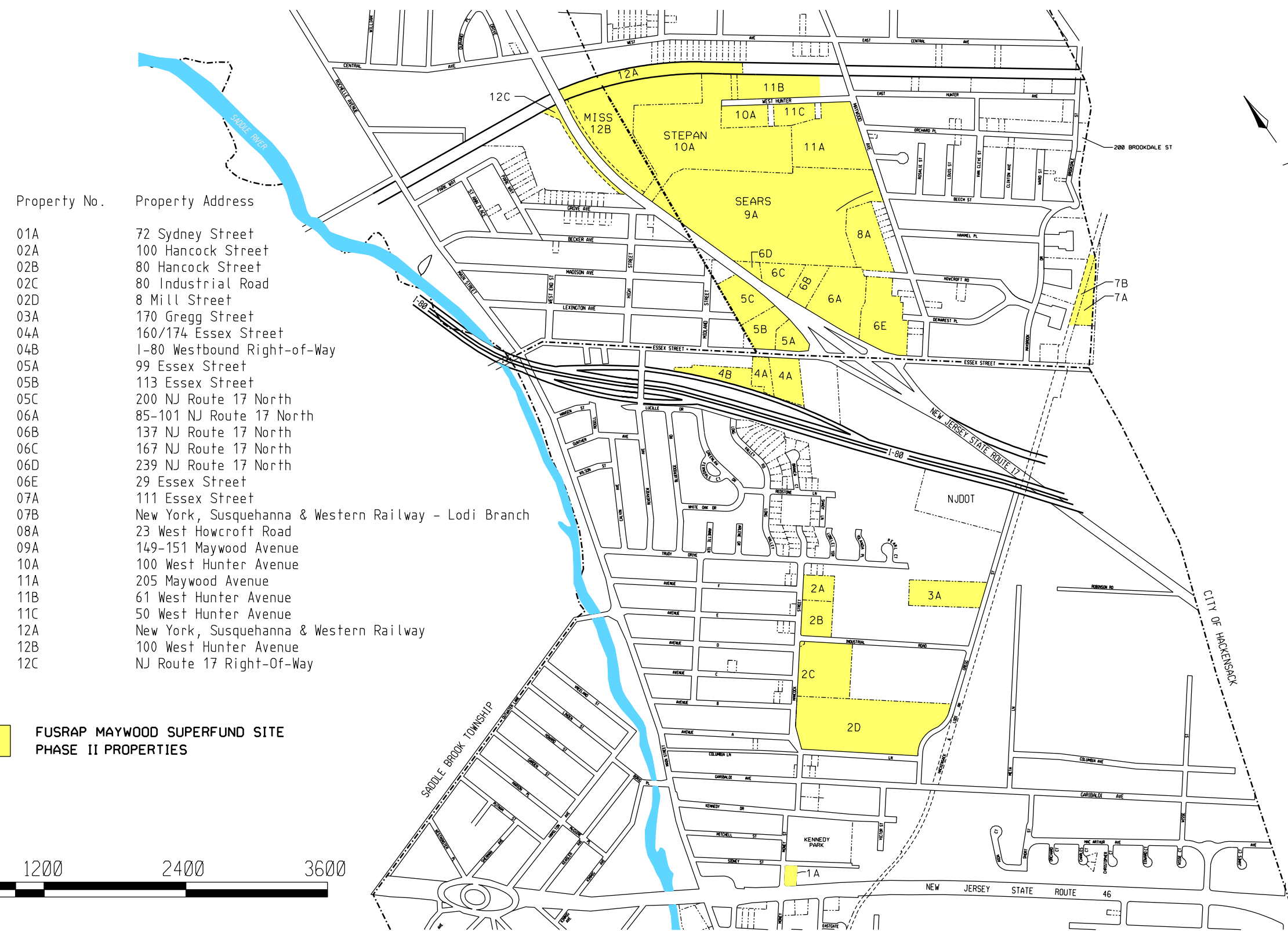
Contract Number:
DACW41-98-R-0034
Job Number 08575
WAD# 3

WBS# 18


Figure Number:
FIGURE 1-1

Cluster No.	Property No.	Property Address
1	01A	72 Sydney Street
2	02A	100 Hancock Street
	02B	80 Hancock Street
	02C	80 Industrial Road
	02D	8 Mill Street
3	03A	170 Gregg Street
4	04A	160/174 Essex Street
5	04B	1-80 Westbound Right-of-Way
	05A	99 Essex Street
6	05B	113 Essex Street
	05C	200 NJ Route 17 North
	06A	85-101 NJ Route 17 North
	06B	137 NJ Route 17 North
	06C	167 NJ Route 17 North
7	06D	239 NJ Route 17 North
	06E	29 Essex Street
8	07A	111 Essex Street
	07B	New York, Susquehanna & Western Railway - Lodi Branch
9	08A	23 West Howcroft Road
10	09A	149-151 Maywood Avenue
11	10A	100 West Hunter Avenue
	11A	205 Maywood Avenue
	11B	61 West Hunter Avenue
12	11C	50 West Hunter Avenue
	12A	New York, Susquehanna & Western Railway
	12B	100 West Hunter Avenue
	12C	NJ Route 17 Right-Of-Way


 FUSRAP MAYWOOD SUPERFUND SITE
PHASE II PROPERTIES



U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT



US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

 **STONE & WEBSTER, INC.**

Prepared by:
**MALCOLM
PIRNIE**

File Name:
\\MAYWOOD\TASK0318\CLUSTER REPORT\REV 1\FIGURE1-2.DGN

LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY

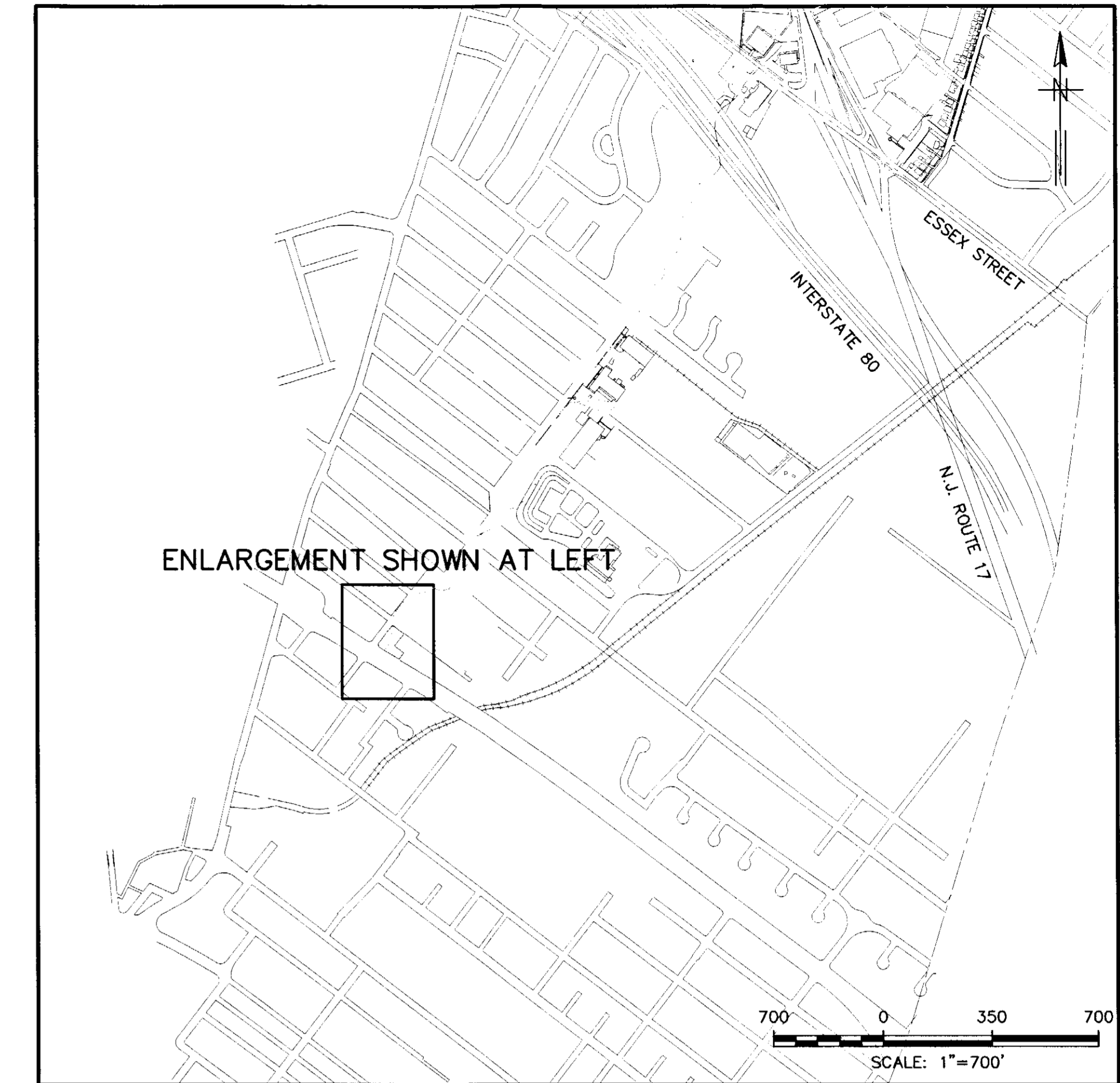
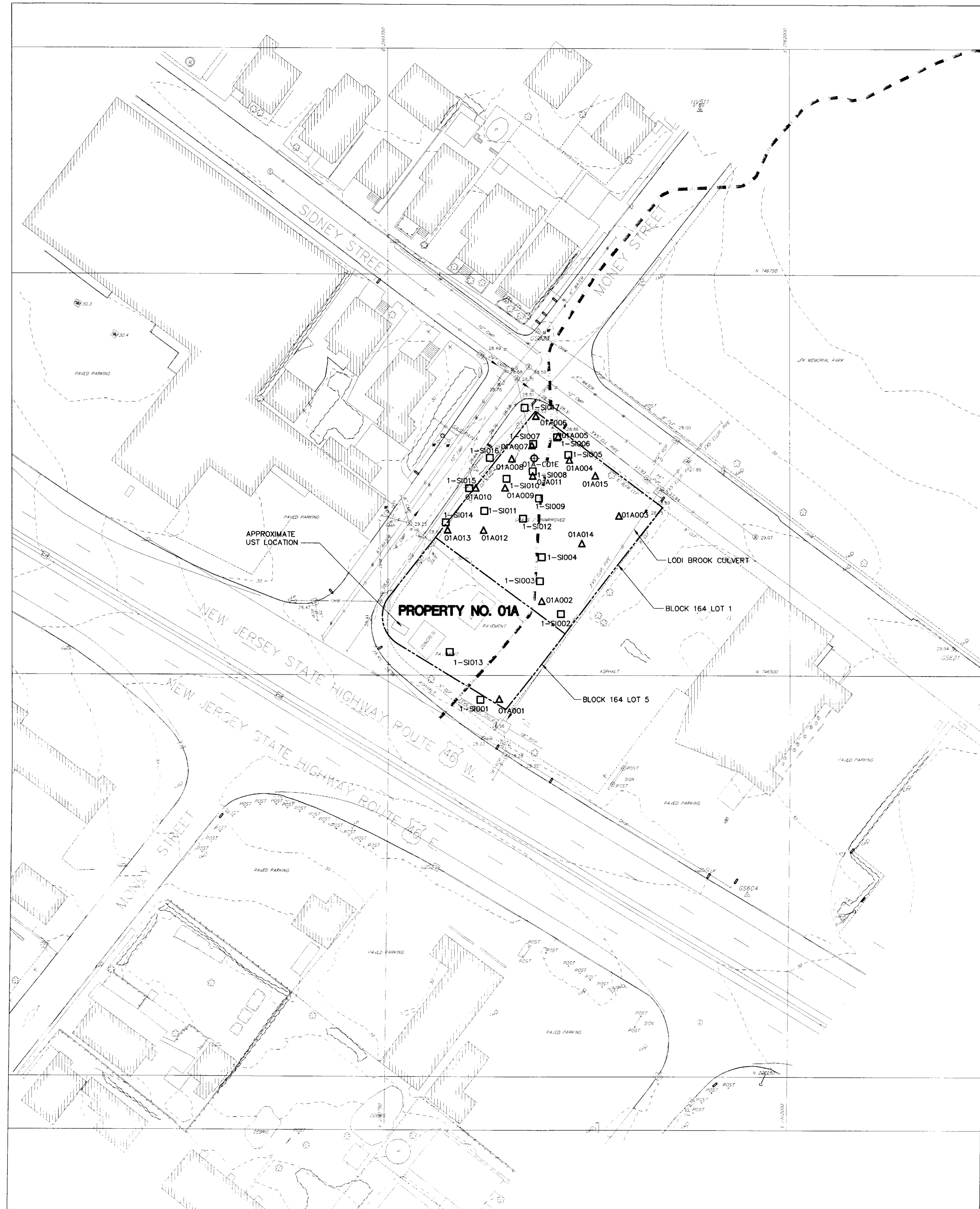
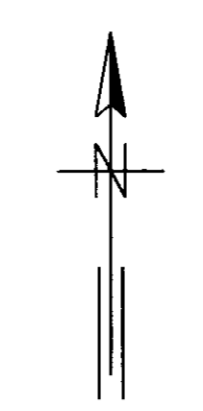
PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

Contract Number:
DACW41-99-D-9001

Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 1-2



ENLARGEMENT SHOWN AT LEFT

700 0 350 700
SCALE: 1"=700'

KEY MAP

LEGEND

	PROPERTY BOUNDARY
	EXISTING BUILDING
	EXISTING 1' CONTOUR
	APPROXIMATE LOCATION OF HISTORIC LODI BROOK CHANNEL

SAMPLE SYMBOL	SAMPLE TYPE	NUMBER OF SAMPLING LOCATIONS
▲	DIRECT PUSH SOIL PROBE LOCATIONS (RADIOLOGICAL)	15
□	SURFACE ISOCs LOCATIONS	17
⊕	DIRECT PUSH SOIL PROBE LOCATION (ENVIRONMENTAL)	1

- NOTES:**
1. THIS SURVEY SHOWS CONDITIONS AS OF OCTOBER 1999 BASED ON AERIAL MAPPING PREPARED BY GEOD CORP. AND GROUND SURVEY BY GARDEN STATE ENGINEERING SURVEYING AND PLANNING.
 2. VERTICAL DATUM IS REFERENCED TO NGVD 1929.
 3. HORIZONTAL DATUM IS REFERENCED TO NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 1927.
 4. THE LOCATION OF THE HISTORIC LODI BROOK SHOWN ON THIS SHEET WAS APPROXIMATED BASED UPON REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS FROM APRIL 6, 1940.

CLUSTER NO. 1 72 SIDNEY STREET (01A)

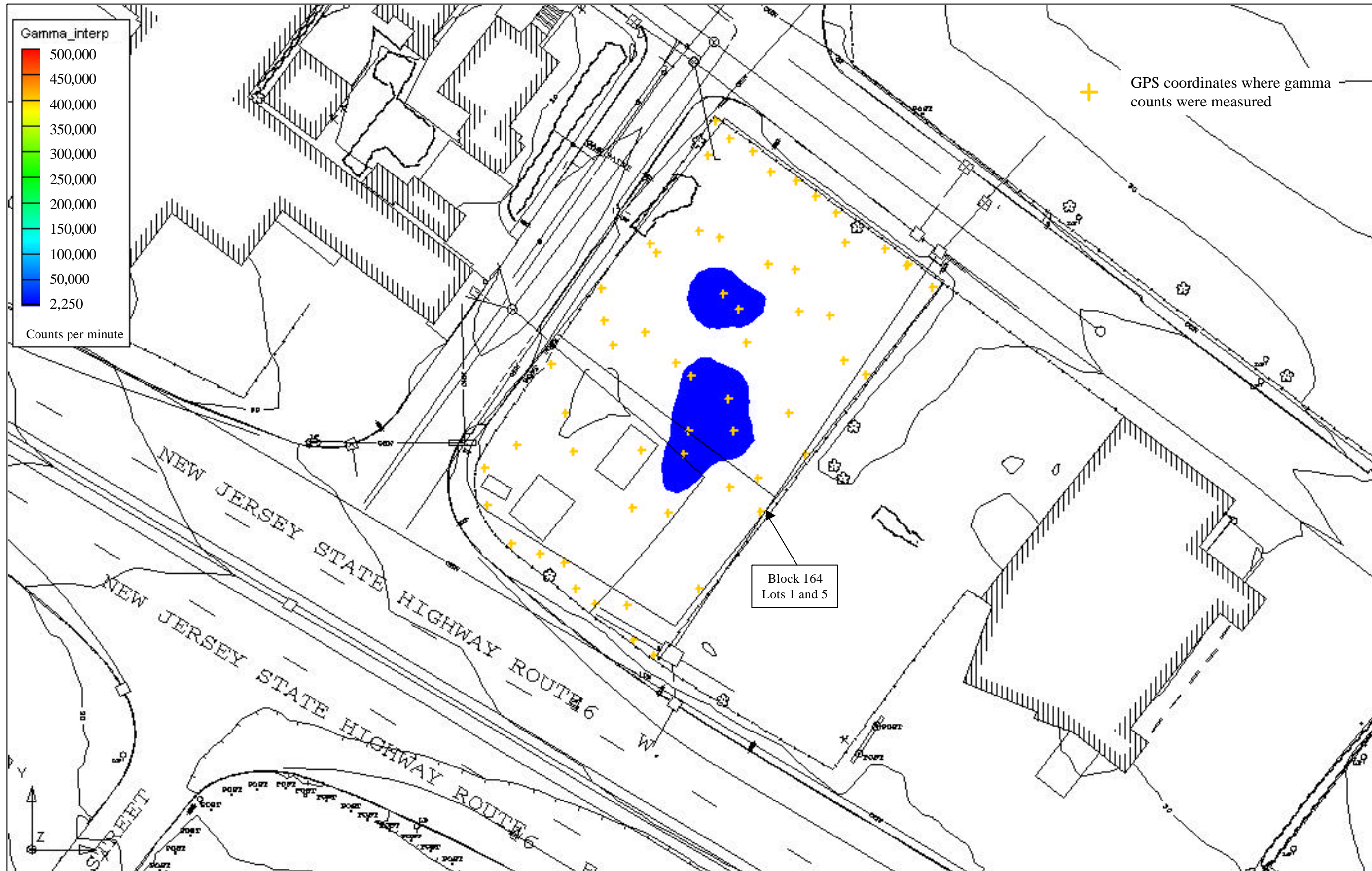
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SCALE: 1"=30'

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

STONE & WEBSTER, INC.
Proposed by: MALCOLM PIRNIE
Checked by: CS
Date: 7/21/00
Reviewed by: [blank]
Date: [blank]
Title: [blank]
Scale: [blank]

CLUSTER NO. 1
SAMPLE LOCATION MAP
PRE-DESIGN INVESTIGATION REPORT
FUSRAP, MAYWOOD SUPERFUND SITE
MAYWOOD, LOCK AND
ROCHELLE PARK, NEW JERSEY

Control Number: DACW41-99-D-9001
40 Number: 08575
MAP 3
MISC 10
Figure Number:
1-3



Lower Contour Limit = $1.5 \times \text{Background} = 1.5 \times 1500 = 2250$ counts per minute

Upper Contour Limit = Highest measurement across entire Maywood Site: approx. 500,000 counts per minute

Property Cluster No. 1: 72 Sidney St.
Surface Gamma Scan Using a 1" by 1" NaI Detector

Figure 1-4

APPENDIX 1-A

Variations from the PDI Work Plan

**Letters Informing EPA and NJDEP of Use of Geoprobes⁰
In Lieu of Downhole ISOCS**



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Angela Carpenter
Remedial Project Manager
Federal Facilities Section
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Dear Ms. Carpenter:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in your December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Donna Gaffigan, NJDEP



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Donna Gaffigan
Case Manager
Bureau of Case Management
New Jersey Department of Environmental Protection
401 E State St
Trenton, NJ 08625-0600

Dear Ms. Gaffigan:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in USEPA's December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Angela Carpenter, EPA

Revisions to Standard Operating Procedure No. SW-MWD-509-0



**STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION**

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE: 1 of 8 plus Attachment 1
	DATE: February 2000

APPROVED:

Prepared by:
Project Chemist
Reviewed by:
PDI Task Manager
Richard Skyness 2/29/00
Project Engineer
[Signature] 2/29/00
Project Manager

1.0 PURPOSE

This Stone & Webster Standard Operating Procedure (SOP), **Soil Probe Investigation** shall be employed when collecting subsurface soil samples using the direct push soil probe method at the FUSRAP Maywood Superfund Site (hereafter referred to as the Maywood Site) properties with known or suspected soil and/or groundwater contamination.

2.0 SCOPE

This procedure details the materials, equipment, and methods common to soil probe investigation activities. Consult the site-specific project plans and work plans for proposed soil probe locations. Always consult site-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Task Manager prior to implementation and shall be documented in project field logbooks.**

3.0 REFERENCES

Stone & Webster Maywood SOP 102 - Downhole Gamma Radiation Logging
Stone & Webster Maywood SOP 307 - Surface and Shallow Subsurface Soil Sampling
Stone & Webster Maywood SOP 308 - Soil Borings and Sampling
Stone & Webster Maywood SOP 401 - Photoionization Detector (PID)
Stone & Webster Maywood SOP 504 - Labeling, Packaging, and Shipping Environmental Samples
Stone & Webster Maywood SOP 505 - Cuttings and Fluids Management
Stone & Webster Maywood SOP 506 - Decontamination
Stone & Webster Maywood SOP 507 - Field Notebook Content and Control
U.S.E.P.A., A Compendium of Superfund Field Operation Methods, Document EPA/540/P-87/001, December, 1987.

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DEFINITIONS

Stone & Webster Team – personnel of the Stone & Webster Team that includes for this SOP: Stone & Webster, Malcolm Pirnie, Franklin Environmental Services, Inc., Safety & Ecology Corporation (SEC), and Garden State Surveying, Engineering and Planning, Inc. The Stone & Webster Team shall perform soil probe investigation activities, except those activities specified as performed by the Subcontractor.

Subcontractor – personnel of the direct push soil probe firm.

Direct Push Soil Probe – generic name for advancing media sampling piping/tubes with only direct mechanical force. They are typically hollow steel rods advanced using a percussive force (powered hammer) and driven directly into unconsolidated soil. There are two types of direct push soil probes. One is a single rod system (i.e., macrocore) and the other is a dual tube or cased system. The latter, which will be the method of choice for most Maywood Site investigations, utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Drive rods used with the cased system are usually made from a high-grade steel alloy and are retracted after sampling.

4.0 RESPONSIBILITIES

5.1 Project Manager - Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 Project Environmental Engineer - Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for direct push soil probe activities.

5.3 Project Superintendent - Designated by the Project Manager to supervise investigative activities by Stone & Webster Team and Subcontractor personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in monitoring soil probe investigation activities in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each workday. The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil probe investigation activities and deviations from this SOP.

5.4 Site Personnel (including the data logger) - Required to read and sign the Maywood Site Safety and Health Plan (SSHP), have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil probe investigation activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

5.5 Site Safety & Health Officer - Responsible for ensuring that all site workers (Stone & Webster and Subcontractor) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.6 Task Manager – Responsible to plan, implement, and closeout field work requiring direct push technology.

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5.7 Subcontractor - Required to read and sign the SSHP, have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. Subcontractors shall report directly to the Task Manager or his designee.

6.0 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS FOR SOIL PROBE INVESTIGATION

The following is a list of equipment and material that is commonly used on all projects when the direct push probe technique is performed in the unconsolidated soils. Refer also to related SOP equipment and material requirements to ensure completeness.

Items required by Subcontractor:

- Direct push probe equipment - of appropriate size and direct push probe and sampling capabilities; vehicle mounted; direct push probe sampling tools used to advance boring (i.e., direct push small diameter rods; and augers, if required) equipment, labor, and supplies to maintain optimal efficiency
- Environmentally-safe lubricants
- Backfill material for probe holes, as required
- Soil sample collection and logging supplies – **See Stone & Webster Maywood SOP 308, Soil Borings and Sampling**
- Decontamination supplies - **See Stone & Webster Maywood SOP 506, Decontamination**

Items carried by Stone & Webster Team on-site personnel

- **SSHP To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Clipboard
- Pencils
- Six-foot-ruler
- Pocket knife
- Camera (optional), check with Project Manager if required
- Volatile organic compound vapor meter equipped with photoionization detector (PID) and other air surveillance monitoring equipment, as required by the SSHP
- Radiation meter
- Site boring logs
- Blank soil probe logs
- Weighted measuring tape
- Water level measuring device - **See Stone & Webster Maywood SOP 410, Groundwater Level Measurement**, Interface probe, if needed
- Paper towels
- Chain of Custody forms

7.0 DIRECT PUSH PROBE ACTIVITIES

7.1 General Considerations

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Prior to selecting the direct push probe method for a specific property, the objectives of the field investigation must be established. These property-specific objectives shall include one or more of the following Maywood Pre-Design Investigation (PDI) program objectives:

- Soil classification/evaluation - the direct push soil probe technique will be able to accommodate the collection of soils for characterization purposes.
- Characterization of hydrogeologic conditions - the direct push soil probe technique shall allow for the characterization of each stratigraphic zone, and water level measurements.
- Evaluation of soil contamination - the direct push soil probe technique shall provide the appropriate sample collection methods, must not introduce contaminants into the probe hole or otherwise alter the existing soil or groundwater chemistry, and should not result in subsurface cross contamination during or after installation of direct push probe.

7.2 Direct Push Probe Activities

Prior to commencing direct push soil probe fieldwork, several activities should be performed. These activities, which include both pre-mobilization office tasks and pre-installation field tasks, are discussed below. Once the pre-installation activities are completed, direct push soil probe installation may commence.

7.2.1 Pre-Mobilization Tasks

1. The Stone & Webster Team and Subcontractor shall acquire as much geologic and hydrogeologic information about the site as possible. This information may include possible soil and groundwater contamination present, groundwater table depths and fluctuations, surficial and bedrock geology, approximate thickness of the unconsolidated zone, depth to top of weathered rock, depth to competent rock, and site access.
2. Soil probe locations shall be marked in the field by the Stone & Webster Team with either paint or flags/stakes during pre-mobilization tasks, and surveyed using a global positioning system (GPS). The Stone & Webster Team shall check and verify that the soil probe location corresponds to the location on the project plans. The Stone & Webster Team and Subcontractor shall check to see if visible structures will prevent the completion of proposed soil probes at specific locations.
3. The Stone & Webster Team shall communicate with the Subcontractor regarding the requirements of the direct push soil probe program and required geologic and environmental information. Inform the Subcontractor of the environmental sampling program that the project shall follow. This information includes sampling frequency, sampling depths, type of sample required (soil or groundwater), the length of casing, direct push soil probe method (i.e., macrocore, dual tube, etc.), number and type of soil samplers required, and special sampling techniques. Ensure that probe hole backfill is selected in accordance with the project specifications.
4. The Subcontractor shall ensure that all utilities in the vicinity of the proposed boring(s) have been cleared by the appropriate authorized parties (e.g., New Jersey One-Call System at 1-800-272-1000, owner, etc.) or, if utilities exist, are visibly marked on the ground surface in the area of the proposed boring. In addition, keep a safe working distance (pursuant to OSHA) from overhead utilities. **NOTE: The party responsible for having utilities cleared shall be identified. If the responsible party is not clearly identified then the Task Manager shall establish the responsible party. Ensure that utilities have been cleared prior to installation of soil probe.**

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7.2.2 Pre-Installation Field Tasks

Sampling equipment shall be decontaminated prior to use, using pressure or manual washing of the rig, direct push soil probe, and tools, as required to prevent introducing off-site contamination. The direct push soil probe related equipment shall be decontaminated on site prior to direct push soil probe activities. Refer to **Stone & Webster Maywood SOP 506, Decontamination** for specific instructions.

7.3 General Direct Push Soil Probe Method Procedures

The following sections outline general direct push soil probe procedures used in unconsolidated soil materials.

1. Assuming a vertical soil probe, the Subcontractor shall set the direct push rig over the proposed soil probe location. Level the direct push rig and ensure that the direct push rods used to advance the soil probe are in a vertical position directly above the hole.
2. The inspecting Stone & Webster Team shall obtain and record measurements of tools to be used for direct push probe operations. Down-hole measurements taken by the Subcontractors shall be to the nearest 0.1 foot.
3. The Subcontractor shall begin sampling or advancement of soil probe to the desired depth utilizing the direct push method described below. Samples shall be taken using the steps described in Section 8.1.1.
4. When the direct push advancement tools are lowered into the probe hole, the Stone & Webster Team shall keep track of tool lengths to check Subcontractor's stated depth of soil probe.
5. The Stone & Webster Team shall make certain that the Subcontractor is performing depth measurements with a ruler and known tool lengths and not visually judging ("eyeballing") casing and tool projections above the ground. The Stone & Webster Team shall maintain a mental note of depth to bottom of soil probe by keeping track of the linear feet of tools in and above the ground. By mentally subtracting the "stick-up" above the ground, the Stone & Webster Team can maintain a constant approximate check on the soil probe depth and Subcontractor's indicated depths.
6. The breathing zone shall be screened by a designee of the Stone & Webster Team Site Safety and Health Officer for total volatile organic vapors using an organic vapor analyzer as outlined in the SSHP. A lower explosive limit meter (LEL) shall be employed if required in SSHP. Record the measured readings at the depth and time of reading on the boring log.
7. During direct push probe activities, both the Stone & Webster Team and Subcontractor shall record production, mechanical and/or sampling difficulties and the sequence of activities. Also record rig mobilization time, rig set-up time, and probe commencement and completion times. This information should be recorded in a field log book. The Stone & Webster Team shall also record pertinent details on the soil probe log (See Attachment A for blank soil probe log).
8. Refusal of direct push probe advancement tools (i.e., casing refusal) is defined as when the probe hole cannot be advanced using regular advancement methods. Generally, refusal can be identified by the following characteristics:
 - Advancement of probe hole is not noticeable or is very slow
 - A change in the frequency/pitch of the direct push probe equipment
 - The direct push probe downpressure may be significantly higher than under "normal" conditions. The direct push rig may be lifted off the ground surface.
9. If refusal is encountered in the soil probe, refer to **Stone & Webster Maywood SOP 308, Soil Borings and Sampling** for specific instructions. If the probe hole cannot be advanced, relocate the probe hole within approximately 5 feet distant from the original location and start with the

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work in Section Paragraph 7.2.1. Measure the distance and direction from the original location, and record this information in the field logbook. The actual distance of movement necessary may be greater depending on the site conditions. If the required movement is greater than 5 feet, contact the Task Manager for direction.

10. Downhole gamma radiation logging will be performed, *where feasible* by the Stone & Webster Team as described in Section 8.1.1 below (**See Stone & Webster Maywood SOP 102, Downhole Gamma Radiation Logging**).
11. When the probe hole is completed and the area is cleaned up, all contaminated equipment, including down-hole tools, hand tools, and direct push rig shall be decontaminated by the Subcontractor (**See Stone & Webster Maywood SOP 506, Decontamination**) and as directed by the Radiation Safety Officer (RSO).
12. The Stone & Webster Team shall record the soil probe location on the project drawings.

8.0 METHOD-SPECIFIC SOIL SCREENING AND SAMPLING

In this section, the soil screening and sampling procedure for the direct push soil probe method is described.

8.1 Direct Push Probe Services

The direct push probe rig is a hydraulically powered percussion/direct push machine used for small diameter subsurface investigations. It can obtain continuous soil cores, discreet soil samples, groundwater samples and vapor samples along with installation of permanent sparge points.

8.1.1 Procedures for Screening and Sampling Direct Push Probe Soil Samples

Following is the procedure to be used at the Maywood Site for screening and sampling direct push probe soil cores.

1. Each 4-foot soil core sample will remain in the polyvinyl chloride/polyethylene terephthalate (PVC/PETG) liner and marked with the appropriate field identification number, sealed with rubber end caps for liners, and placed into a designated (2 inch ID) PVC container (including PVC end caps) supplied by the Subcontractor for storage. Pertinent sample data will also be marked on the PVC container.
2. Downhole gamma logging will be accomplished, *where feasible* by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.
3. Each soil probe hole will be backfilled for the full length, in accordance with project requirements.
4. The sealed PVC containers will be transported by the Stone & Webster Team to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. All Building 76 sample documentation, field screening, and sampling tasks shall be performed by the Stone & Webster Team. Sample documentation will include the preparation of a soil probe log containing the following pertinent field documentation: soil probe identification number and location; soil column description; soil screening data, and photo-documentation. **Stone & Webster Maywood SOP 507, Field Notebook Content and Control**, shall be followed. Sample documentation information shall be recorded electronically.
5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each

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soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integration taken at each marked location and recorded.

6. The soil cores will then be screened for total volatile organic vapors using a PID (see **Stone & Webster Maywood SOP 401, Photoionization Detector (PID)**). A series of small perforations will be made through the liner at 12-inch increments.
7. The soil cores will be described generally in accordance with the Unified Soil Classification system, based on visual observations through the liners and soil extracted from the small perforations. Prior to storage, these perforations will be sealed with tape. The soil descriptions developed will be marked with an "FC" note to define the description as a field classification.
8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.
9. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.
11. Extracted samples shall be prepared in accordance with the Safety and Ecology Corporation (SEC) on-site field laboratory soil preparation practice/SOP.
12. Analysis for ROC on extracted sections of the soil core will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector, or equivalent. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.
14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.
15. Sampling tools will be decontaminated before each boring, after collecting each soil sample, and after each boring.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term "blind duplicates"), thus eliminating potential bias in the test measurement.

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If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.

ATTACHMENT 1

PDI SOIL PROBE LOG SHEET				
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator		XXX		
Activity Designator		AAA		PDI
Field Measurement/Sample Collection Designator		VV		SP
Station Number		N N N		
Media		m m		SB
Sample Type		n		
Sequential Sample Number		#####		(see Below)
Location		Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
		Gamma Logging		Photoionization Detector (PID) Logging
		Down Hole	Core	
Date			Date	
Time			Time	
Logger			Logger	
Detector Model #		SPA-3	PID Model #	Multi-RAE
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		
Comments:				
1. MPI No. _____.				
2. Direct-push location grouted with BenSeal.				
		_____ Signature (Down Hole Gamma Logging)		_____ Date
		_____ Signature (Core Gamma Logging)		_____ Date
		_____ Signature (PID Logging)		_____ Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)									
					X	X	X	#	#	#	#	#	#	
0.0														
0.5														
1.0														
1.5														
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2.5														
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24.0														

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 G:\3674009\PDI Report\AppdxA\SOP509FINAL.doc

TABLE 1-A: REVISIONS TO SOP SW-MWD-509-0

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>Section 8.1.1 Procedures for Screening and Sampling Direct Push Soil Samples 2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a Bicon 3/8- inch x 3/8- inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. The detector shall be positioned below the bottom of the casing to allow gamma log readings in the uncased portion of the probe hole. The casing shall be extracted at 6-inch increments and a 30-second count reading shall be taken at each increment.</p>	<p>2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. The sodium iodide detector preamplifier is connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector™ multi-channel analyzer/amplifier/high voltage power supply. The system is controlled, and the data stored, via a notebook computer. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.</p>	<p>Cabrera Services, Inc. developed this procedure as a cost effective site characterization method. Better sensitivity of the 1-inch x 1-inch detector used by Cabrera Services, Inc. allows gross gamma measurements through the soil probe casings, thereby increasing soil probe production rates.</p>	<p>January 11, 2000, without waterproof container. Sealed solid casing installed following extraction of MacroCore or Dual Tube system. January 28, 2000, with waterproof container. Eliminated need of sealed solid casing.</p>
<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The acetate liner shall be marked off at 6-inch intervals. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Readings shall consist of 10-second integrations taken every six inches and recorded.</p>	<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the PVC/PET liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integrations taken at the marked locations and recorded.</p>	<p>Continuous scanning of the soil core provides complete coverage, longer counting time at the regions of interest, and minimizes redundancy of the downhole gamma measurements.</p>	<p>January 11, 2000</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>8. A minimum of three soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238 based on field radiological screening and gamma logging values. At a minimum, one soil sample will be taken at the highest reading location (suspected FUSRAP waste); a second soil sample shall be collected where the readings approach a constant value (suspected transition zone); and a third soil sample shall be collected within the zone of constant readings (below suspected transition zone). Additional samples may be taken based on the Task Manager's direction.</p>	<p>8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.</p>	<p>Suspected FUSRAP waste and suspected transition zones may not be present in each direct push location.</p>	<p>Selection of archived samples began February 21, 2000.</p>
<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored in Building 76 for future reference.</p>	<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.</p>	<p>Based on laboratory analysis there may be the need to collect additional samples from the stored soil cores.</p>	<p>January 11, 2000</p>
<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a USACE-certified off-site laboratory, for confirmatory ROC analysis. Soil samples shall be placed in labeled containers provided by the laboratory, then placed in coolers maintained at 4°C. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>Samples will be sealed in containers provided by the SEC on-site field laboratory.</p> <p>Preservation (i.e., 4°C) is not required for ROC analysis.</p>	<p>February 28, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>14. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.</p>	<p>14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.</p>	<p>Sample storage will be returned to the FUSRAP Maywood Superfund Site for future disposition.</p>	<p>January 11, 2000</p>
<p>9.0 QUALITY ASSURANCE/QUALITY CONTROL Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment rinsate blanks and duplicates. Equipment rinsate blanks must be collected each day that sampling occurs or each decontamination event, whichever is less, per matrix per parameter per field crew, per equipment type (assuming reusable sampling equipment is used). This QA/QC requirement may be modified based on conversations with USACE, USEPA, and NJDEP. Field duplicate samples must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement. Field duplicate samples must represent no less than 10 % of the total number of samples per matrix per parameter per area of study. Field duplicate gamma radiation readings shall also be recorded at a frequency of 10% of the total gamma radiation readings.</p> <p>Matrix spike/matrix duplicate (MS/MD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat</p>	<p>Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement.</p> <p>If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given</p>	<p>Swipe sample is a more representative QC check of loose surface alpha radioactivity than aqueous rinsate sample.</p> <p>Reduction from 10% to 5% duplicate samples based on large number of soil samples proposed for PDI. In addition, 5% is consistent with NJDEP Field Sampling Procedures Manual for field duplicates and EPA guidelines for MS/MSD analysis. Electronic mail sent to EPA and NJDEP regarding reduction in duplicate percentage on January 28, 2000.</p>	<p>Equipment blank revision implemented on January 11, 2000.</p> <p>Reduction from 10% to 5% duplicate samples implemented week of February 7, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
no less than 10% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.	method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.		

Revised PDI Work Plan Table 5-1

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

PROPERTY CLUSTER NUMBER ⁽⁸⁾	NUMBER OF SAMPLING LOCATIONS						NUMBER OF SAMPLES FOR ANALYSIS BY PARAMETER ⁽⁶⁾								
	RADIOLOGICAL SURVEY				GEOTECH	ENVIR	GEOTECHNICAL					CHEMICAL ANALYSES			
	SOIL PROBES ⁽¹⁾	SOIL PROBE DEPTHS (FT) (ESTIMATED)	SOIL PROBE RADIOLOGICAL ANALYSES ⁽²⁾	SURFACE SOIL RADIOLOGICAL ANALYSES ⁽³⁾	SOIL BORINGS ⁽⁴⁾	SOIL BORINGS ^(4,5)	SPECIFIC GRAVITY	ATTERBERG LIMITS	GRAIN SIZE	TRIAXIAL TESTS ⁽⁷⁾	CONSOLID. TESTS ⁽⁷⁾	WATER CONTENT	CHROMIUM SPECIATION	TCL/TAL	FULL RCRA CHAR.
1	13	12	39	5	3	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
2	96	16	288	50	22	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
3	10	8	30	5	2	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
4	32	12	96	15	4	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
5	79	8	237	40	8	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
6	85	16	255	40	12	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
7	28	16	84	15	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
8	26	16	78	15	6	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
9	131	16	393	65	17	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
10	106	24	318	55	16	6	TBD	TBD	TBD	TBD	TBD	TBD	6	6	6
11	16	8	48	10	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
12	151	24	453	75	17	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
TOTALS	773	N/A	2319	390	115	47	---	---	---	---	---	---	47	47	47

NOTES:

- 1 Soil probes installed using direct-push method, to the depth shown or refusal.
- 2 At a minimum, three separate soil samples (one soil sample from within the suspected FUSRAP waste, one in transition zone, and one below the transition zone) will be selected for analysis of the ROC by the on-site field laboratory. A total of 2319 subsurface soil samples (i.e., 3 X 773) will be selected for ROC analysis by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 3 Five surface soil samples will be randomly collected from up to 10% of the 773 soil probe locations for radiological analyses and comparative evaluation of surface ISOCs measurement. A total of 390 surface soil samples (i.e., 5 X 78) will be selected for ROC analyses by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 4 Depths and quantities to be determined in field based on radiological data, structure foundations depths, etc.
- 5 Advanced to depth of radiological contamination.
- 6 Sample Analyses Rationale:
 - 6a Chromium Speciation - Speciation of trivalent and hexavalent chromium for health and safety purposes.
 - 6b TCL/TAL - Detection of organic and inorganic constituents to assess the potential for the presence of commingled radiological and chemical contamination.

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

6c	RCRA Characteristics - To support transportation & disposal activities
6d	Geotechnical Parameters (Specific Gravity, Atterberg Limits, Grain Size, Water Content) - To characterize physical properties of soil for excavation and remediation.
7	Triaxial tests and consolidation tests will be performed on undisturbed tube samples to determine strength and consolidation parameters of fine-grained materials, where present. These parameters will be used to perform bearing capacity and settlement analyses where excavations are adjacent to structures.
8	Property Clusters are defined as follows: <i>PROPERTY CLUSTER NO. 1: 72 SIDNEY ST. (A.K.A 88 MONEY ST.)</i> <i>PROPERTY CLUSTER NO. 2: 100, 80 HANCOCK ST., 80 INDUSTRIAL RD., AND NJVIS</i> <i>PROPERTY CLUSTER NO. 3: 170 GREGG ST.</i> <i>PROPERTY CLUSTER NO. 4: 160/174 ESSEX ST., I-80 RIGHT-OF-WAY</i> <i>PROPERTY CLUSTER NO. 5: 99 ESSEX ST, 113 ESSEX ST., 200 ROUTE 17 SOUTH</i> <i>PROPERTY CLUSTER NO. 6: 29 ESSEX ST., 85-101 ROUTE 17 NORTH, 137 ROUTE 17 NORTH, 167 ROUTE 17 NORTH, 239 ROUTE 17 NORTH</i> <i>PROPERTY CLUSTER NO. 7: 111 ESSEX ST. - SCANEL/HACKENSACK AND LODI RAILROAD</i> <i>PROPERTY CLUSTER NO. 8: 23 WEST HOWCROFT RD.</i> <i>PROPERTY CLUSTER NO.9: 149-151 MAYWOOD AVE.</i> <i>PROPERTY CLUSTER NO.10: 100 W. HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.11: 205 MAYWOOD AVENUE AND 50 & 61 WEST HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.12: 100 W. HUNTER AVE., NY, SUSQUEHANNA AND WESTERN RAILROAD, AND NJ ROUTE 17</i>

Rationale of Intrusive Sample Location Relocations

PDI Soil Probe Variance Log

Cluster No.: 1

Property Addresses: Property No. 01A –72 Sidney St.

Sample Location Map: Figure 1-3

Number of Revised Soil Probe Locations: 2

Rationale for Revisions

- Location 01A-003 was moved about 5 feet to the west of the original location to investigate an area exhibiting elevated gamma counts
- Location 01A-008 (a site-wide location) was moved from the center of the southwest portion of the property which is within the historic Lodi Brook Area. This move was prompted by a review of BNI data, which indicated contamination in Kennedy Park. Given the historic contiguous nature of the properties (not withstanding the recent road), the potential for contaminant deposition on this cluster similar to that found in Kennedy Park warranted this relocation.

Notes:

1. This list provides specific rationale for the relocation/deletion/addition of intrusive radiological sampling locations due to revised understanding of anticipated radiological contamination. This revised understanding was based on further review of previous data collected by others, and review of surface gamma survey and ISOCS data collected by the Team under this PDI program.
2. Base mapping used in the PDIWP (Stone & Webster, 1999a) has been revised by the Team. Accordingly, a number of intrusive sample locations needed to be relocated due to previously unforeseen physical restrictions (i.e., presence of underground utilities, unacceptable proximity to buildings/roadways, revisions to previously mapped property limits). This table is not intended to provide detailed rationale for points moved due to new mapping.

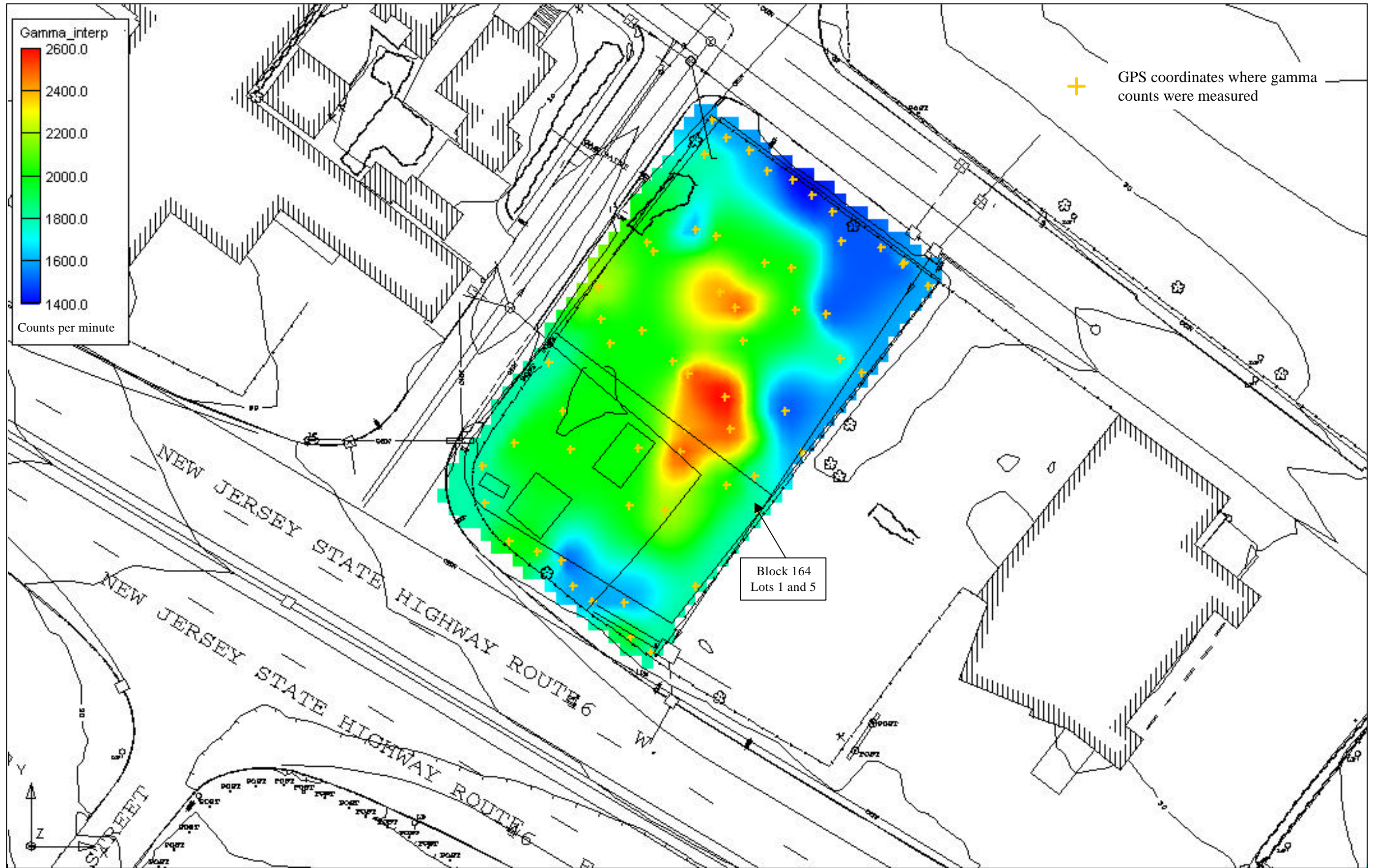
Outlier Protocol (Gamma Scan Anomalies)

Protocol for Addressing Gamma Scan Anomalies (Outliers)

Maywood FUSRAP Superfund Site

Pre-Design Investigation

1. Anomalous surface gamma scan measurements **greater than 2500 cpm for shielded areas (e.g. asphalt covered surfaces), or 3500 cpm for unshielded areas (e.g. bare soil) but, less than 6,000 cpm (1" x 1" NaI detector)** will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL. Note, these count rates are approximately one and one-half times background on shielded and unshielded surfaces.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization (i.e., eliminates the potential for elevated levels of radiological contamination at depth or provides adequate information on the existence of radiological contamination with depth) **will not be further investigated during the PDI.**
 - C. Anomalous areas that do not have previous data that are adequate for characterization **will only be investigated during the PDI if proposed soil probe locations can be moved to these locations without compromising the quality of the data from the proposed locations.** Additional soil probe locations **will not be added** to the program.
 - D. Anomalous areas where additional PDI investigations (based on 1.C) will be performed but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
2. Anomalous areas exhibiting a surface gamma count rate **greater than or equal to 6,000 cpm** (based on a 1" x 1" NaI detector) will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be as follows: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization **will not be further investigated during the PDI.**
 - C. Anomalous areas with previous data that are not adequate for characterization **will be investigated further during the PDI.** Proposed soil probe locations **will be moved** to these locations if possible, or additional soil probe locations **will be added** to the PDI program. These additional soil probes will be used to define the nature and extent of contamination within these previously unidentified areas; the quantity of additional borings is to be determined on a site-by-site basis.
 - D. Anomalous areas that require additional PDI investigations (based on 2.C) but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
3. All anomalous areas and their dispositions will be documented in the PDI.



Property Cluster No. 1: 72 Sidney St.

Surface Gamma Scan Using a 1" by 1" NaI Detector
 (counts per minute)

Figure 1-A1

Reduction in Field Duplicate and MS/MSD Frequency

Navon, Daria

Subject: FW: Reduction in field duplicate and MS/MSD frequency request

----- Forwarded by David Doyle/Environmental/SWEC on 01/28/2000
02:54 PM -----

"Shonkwiler, Glen D NWK" <Glen.D.Shonkwiler@nwk02.usace.army.mil> on 01/28/2000
02:00:15 PM

To: "carpenter.angela@epamail.epa.gov" <carpenter.angela@epamail.epa.gov>, "dgaffica@dep.state.nj.us" <dgaffica@dep.state.nj.us>
cc: "Roos, Allen D NAN02" <Allen.D.Roos@nan02.usace.army.mil>, "Medary, Richard T NWK" <Richard.T.Medary@nwk02.usace.army.mil>, "Mellema, Doug W NWK" <Doug.W.Mellema@nwk02.usace.army.mil>, "Speckin, Paul D NWK" <Paul.D.Speckin@nwk02.usace.army.mil> (bcc: David Doyle/Environmental/SWEC)

Subject: Reduction in field duplicate and MS/MSD frequency request

Angela/Donna, with this email, USACE is notifying EPA and NJDEP of our intent to reduce the number of field duplicates and MS/MSD samples required in the Maywood Chemical Site CDQMP for the PDI sampling from 10% to 5%. The 10% frequency is a USACE-internal QC standard which USACE plans to reduce based on the large number of soil samples collected during the Pre-Design Investigation (PDI). The reduction in frequency would affect field duplicate samples collected for radionuclides of concern (ROC) and analysis by the on-site field laboratory; field duplicate gamma radiation readings (both downhole and core sample); photoionization detector (PID) or flame ionization (FID) readings; and MS/MSD samples analyzed by the off-site laboratory. It is anticipated that greater than 2000 soil samples will be analyzed by the on-site field laboratory and gamma radiation and PID readings will exceed 10,000 measurements.

Five percent is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and EPA guidelines for MS/MSD analysis. EPA Region II does not have a specific QA/QC guideline for field duplicate samples. The guideline is therefore on a case-by-case basis, in accordance with the site-specific project plans.

Please note that the 10 percent of the samples analyzed by the on-site field laboratory will still be sent to a certified off-site laboratory for confirmatory ROC analysis.

We will continue to adhere to the current 10 percent until EPA and NJ notifies USACE of its concurrence with this deviation from the CDQMP (for the PDI only). Your attention to this matter is greatly appreciated, since reduction of this QA/QC guideline will help to increase production during the Pre-Design Investigation without, in the opinion of USACE, impacting

quality and usability of the data.

Thanks,
Glen Shonkwiler
Remedial Investigations & Remedial Design Manager
Hazardous, Toxic, & Radioactive Waste Branch
U. S. Army Corps of Engineers
CENWK-EC-EA RM 610
601 E 12th St
Kansas City, MO 64106
(816) 983-3561
(816) 426-5550/5949 (fax)
glen.d.shonkwiler@usace.army.mil

APPENDIX 1-B

**PDI Soil Probe Log Sheets
(Radiological Data)**

PDI Soil Probe Log Sheet
LEGEND

List of Abbreviations:

--- = not applicable	lt = light
blk = black	MDA = minimum detectable activity
bn = brown	med = medium
cl = clay	n/r = no recovery
cnts = counts	pCi/g = picoCuries per gram
Conc. = concentration	ppm = parts per million
dk = dark	SAA = same as above
DUP = duplicate	sc = clayey sand
f = fine	sec = seconds
gm = silty gravel	sm = silty sand
gp = poorly-graded gravel	sp = poorly-graded sand
gw = well-graded gravel	sw = well-graded sand
gy = gray	tr = trace
J = estimated	U = unidentified or negative conc. less than MDA
lg = large	wht = white

List of General Comments:

- 4x4 truck-mounted model 5400 and track-mounted model 54DT Geoprobe[®] were used to collect samples. Manual direct push methodology required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- Holes were grouted with BenSeal[®]
- Gamma measurements were taken at center point
- Duplicate samples marked with an "X" for duplicate were prepared by homogenizing soil above and below the center point and then separating for analysis.
- The depth listed is the center point
- Error: 2 sigma (95% confidence interval)

Tube Types

1-inch diameter = Dual Tube (actual 1.3-inch diameter)

2-inch diameter = Macro-Core[®] (actual 1.7-inch diameter)

Sample Intervals

Dual Tube – 13 inches

Macro-Core[®] – 8 inches

Manual Direct Push – 24 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746484	2161818	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/11/2000	01/12/2000	01/12/2000	9:05
Time	10:00	9:00		
Logger	J. Marsden	N. Azzam	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C443E	33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 1-inch diameter

Depth to groundwater at 7 feet

PID reading of 72.5 ppm at 7 feet

<i>Field Original Signed</i>	01/11/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	01/12/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	01/12/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)
Location	Northing (NAD 1927)	Easting (NAD 1927)
	746545	2161845

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	01/11/2000	01/12/2000	Date	01/12/2000
Time	15:15	10:00	Time	10:05
Logger	J. Marsden	N. Azzam	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

Depth to groundwater at 11 feet

Field Original Signed
 Signature (Down Hole Gamma Logging)

 01/11/2000
 Date

Field Original Signed
 Signature (Core Gamma Logging)

 01/12/2000
 Date

Field Original Signed
 Signature (PID Logging)

 01/12/2000
 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746598	2161893	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/11/2000	01/12/2000	01/12/2000	11:05
Time	14:00	11:00		
Logger	J. Marsden	N. Azzam	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C443E	33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

Depth to groundwater at 10.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/11/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/12/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/12/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
---	---

Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746633	2161862	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/11/2000	01/12/2000	01/12/2000	13:05
Time	14:50	13:00	13:05	
Logger	J. Marsden	N. Azzam	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C443E	33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
4 to 8 feet = 2-inch diameter
8 to 12 feet = 2-inch diameter

Field Original Signed
Signature (Down Hole Gamma Logging) 01/11/2000
Date

Field Original Signed
Signature (Core Gamma Logging) 01/12/2000
Date

Field Original Signed
Signature (PID Logging) 01/12/2000
Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746648	2161855	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/11/2000	01/12/2000	01/12/2000	13:45
Time	15:35	13:40	13:45	
Logger	J. Marsden	N. Azzam	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C443E	33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = diameter not recorded
 4 to 8 feet = diameter not recorded
 8 to 12 feet = diameter not recorded

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/11/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/12/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/12/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746661	2161841	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/11/2000	01/12/2000	01/12/2000	
Time	16:00	14:30	14:35	
Logger	J. Marsden	N. Azzam	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:
 0 to 4 feet = diameter not recorded
 4 to 8 feet = diameter not recorded
 8 to 12 feet = diameter not recorded

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/11/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/12/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/12/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
---	---

Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746642	2161839	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/11/2000	01/12/2000	01/12/2000	
Time	16:25	16:05	16:00	
Logger	J. Marsden	N. Azzam	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = diameter not recorded
4 to 8 feet = diameter not recorded
8 to 12 feet = diameter not recorded

Depth to groundwater at 4.5 feet

Laboratory sample ID: 010A0002021 and 010A0002022 are smears

<i>Field Original Signed</i>	01/11/2000
_____ Signature (Down Hole Gamma Logging)	_____ Date

<i>Field Original Signed</i>	01/13/2000
_____ Signature (Core Gamma Logging)	_____ Date

<i>Field Original Signed</i>	01/13/2000
_____ Signature (PID Logging)	_____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746634	2161826	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/11/2000	01/13/2000	01/13/2000	9:40
Time	16:40	9:20	J. Dekoskie	Multi Rae
Logger	J. Marsden	N. Azzam	PID Model #	N/A
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C443E	33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

Depth to groundwater at 5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/11/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746616	2161822	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/12/2000	01/13/2000	01/13/2000	
Time	8:30	9:40	10:00	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/12/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	746616	2161804

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	01/12/2000	01/13/2000	Date	01/13/2000
Time	9:00	10:10	Time	10:30
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

Depth to groundwater at 4.5 feet

<u>Field Original Signed</u> _____ Signature (Down Hole Gamma Logging)	<u>01/12/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (Core Gamma Logging)	<u>01/13/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (PID Logging)	<u>01/13/2000</u> _____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746623	2161839	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/12/2000	01/13/2000	01/13/2000	
Time	9:30	10:35	12:40	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

Depth to groundwater at 4.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/12/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
---	---

Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746589	2161809	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/12/2000	01/13/2000	01/13/2000	
Time	10:00	12:50	13:10	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
4 to 8 feet = 1-inch diameter
8 to 12 feet = 1-inch diameter

Depth to groundwater at 10.5 feet

Field Original Signed
Signature (Down Hole Gamma Logging) 01/12/2000
Date

Field Original Signed
Signature (Core Gamma Logging) 01/13/2000
Date

Field Original Signed
Signature (PID Logging) 01/13/2000
Date

PDI SOIL PROBE LOG SHEET				
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator			X X X	01A
Activity Designator			A A A	PDI
Field Measurement / Sample Collection Designator			V V	SP
Station Number			N N N	013
Media			m m	SB
Sample Type			n	0
Sequential Sample Number			# # # # #	(See Below)
Location		Northing (NAD 1927)	Easting (NAD 1927)	
		2161787	746590	
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	01/13/2000
Date	01/12/2000	01/13/2000	Date	
Time	10:25	13:05	Time	13:30
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		
Comments: <ul style="list-style-type: none"> 0 to 4 feet = 2-inch diameter 4 to 8 feet = 1-inch diameter 8 to 12 feet = 1-inch diameter <p style="padding-left: 40px;">Depth to groundwater at 11 feet</p>				
<i>Field Original Signed</i> <hr style="width: 40%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 20%; margin: 0 auto;"/> 01/12/2000 Date		
<i>Field Original Signed</i> <hr style="width: 40%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 20%; margin: 0 auto;"/> 01/13/2000 Date		
<i>Field Original Signed</i> <hr style="width: 40%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 20%; margin: 0 auto;"/> 01/13/2000 Date		

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	014
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746581.706	2161870.318	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/31/2000	04/03/2000	04/04/2000	
Time	8:05	13:55	10:00	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	C443E	44-10	PID Model #	Multi Rae
Detector Serial #	G 1	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter

Nat'l Mat'l: 4.5
 Depth to groundwater at 11.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/12/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	01A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	015
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746623.971	2161878.961	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/31/2000	04/03/2000	04/04/2000	10:25
Time	9:00	14:15	04/04/2000	10:25
Logger	C. Hales	S. Ng	J. Lincoln	J. Lincoln
Detector Model #	C443E	44-10	PID Model #	Multi Rae
Detector Serial #	G 1	33401	PID Serial #	CENAN21811
Scaler Model #	N/A	21779		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

Depth to groundwater at 11 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/12/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/13/2000 Date

APPENDIX 1-C

Environmental Boring Log Sheets

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: GWRI Job Number: 085750503 Activity: Direct-Push Sampling	
Site Designator	XXX	001A	
Activity Designator	AAA	GWR	
Field Measurement/Sample Collection Designator	VV	DP	
Station Number	NNN	001	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	#####	(see Below)	
Location		Northing (NAD 1927)	Easting (NAD 1927)
		746635.509	2161840.360
Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	
Date		3/15/00	Date 3/15/00
Time		10:30	Time 10:30
Logger		E. WIEDERKEHR	Logger E.W.
Detector Model #			PID Model # Multi-RAE
Detector Serial #			PID Serial # CENAN 21811
Scaler Model #			
Scaler Serial #			

Comments:

1. MPI No. ENV-01-1001.
2. Direct-push location grouted with BenSeal.

<u>E.R. Wiederkehr</u> Signature (Core Gamma Logging)	<u>3/15/00</u> Date
<u>E.R. Wiederkehr</u> Signature (Logging)	<u>3/15/00</u> Date

B.G. = ~4.5

START
10:30

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0				80% RECOVERY	0	1	A	0	2	0	5	0	0
0.5													
1.0													
1.5													
2.0				FILL, ROCK FRAGS									
2.5				WOOD, CONC. CHIPS. IN									
3.0				SILTY f-c SAND MATRIX									
3.5													
4.0		5.7	0.3										
4.5				75% REL - ~4" OF BLK									
5.0				CINDER MATERIAL.									
5.5													
6.0		B.G.	0.0	LT-MED BROWN									
6.5				SILTY f-SAND									
7.0													
7.5													
8.0													
8.5				GRAY/BROWN CLAYEY SILT									
9.0	N/A												
9.5		5.5											
10.0				GR/BR. SILTY f-m SAND									
10.5			1.1										
11.0													
11.5		B.G.											
12.0													
12.5				50% REC.									
13.0													
13.5													
14.0													
14.5		5.0-5.6	0.0										
15.0				RED/BROWN f-m SAND									
15.5				w/OCCASIONAL M-C GRANA.									
16.0													
16.5				75% REC.									
17.0													
17.5				SAME AS ABOVE (SAA)									
18.0													
18.5		4.5-5.0	0.0										
19.0													
19.5													
20.0													
20.5				REFUSAL @ 20.3'									
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

STOP
11:25

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
01A 020501
 Page 1 of 1

PROJECT: FUSRAP MAYWOOD	SITE: 01A
Project No: 08575053	Client: USACE
Contractor: TERRA PROBE	SAMPLE DEPTH: 10' - 14'
Start Date/Time: 3/15/00 1233	Completion Date/Time: 1305
Development Method/Equipment:	
Logged by: E. WIEDERKEHR	Water Level (ft bgs): 4.3'
Pre-development DTW (PVC) (ft): 4.5'	DTB (PVC) (ft): 14'
Protection Level: D	

Post-development DTW (PVC) (ft): **—**

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$ = **.25 GAL.**

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) = **NA**

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) = **NA**

Minimum Purge Volume (gal) (3 well volumes) = **.75 GAL**

Development Purge/Discharge Rate (gpm): **500 ml / min.**

imum Drawdown During Purging (ft): **—**

Total Quantity Purged: **4.5 GAL.**

Disposition of Purge Water:

Hours of Development: **20 min.**

Hours of Decon: **—**

Hours of Standby: **—**

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1140	—	—	—	—	—	—	—	DOWNTIME DUE TO PERISTALTIC PUMP FAILURE
1230	INITIAL	4.3	BROWN	13°	6.45	.521	7999	
	1		"	12.7°	6.59	.533	840	
	2		CLEARING	12.9°	6.46	.537	335	
	3			12.3°	6.4	.539	210	
	4			12.4°	6.36	.539	115	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

VOLUME	DO	SAL
1	2.25	.02
2	2.50	
3	2.70	

Pre-Design Investigation Report: Cluster No. 2 Revision 2

**New York District
Formerly Utilized Sites Remedial Action Program
Maywood Superfund Site
WAD 03, WBS 18**

Prepared by:
Stone & Webster, Inc.
100 West Hunter Ave.
Maywood, New Jersey 07607

for:
US Army Corps of Engineers - Kansas City District
Formerly Utilized Sites Remedial Action Program
Contract No. DACW41-99-D-9001



**US Army Corps
of Engineers**

January 2002

**PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 2 – REVISION 2**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18**

Submitted to:

Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
FUSRAP Project Office
26 Federal Plaza
New York, New York 10278

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Submitted by:

Stone & Webster, Inc.
100 West Hunter Ave.
Maywood, NJ 07607

Issued to: _____ Date: _____

Copy Number: _____ Controlled Uncontrolled

**PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 2 – REVISION 2**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
TASK ORDER 0001
WAD 03 WBS 18**

Submitted to:

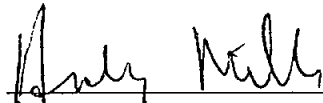
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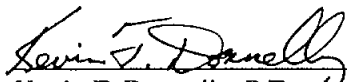

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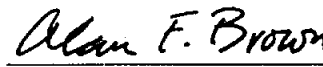

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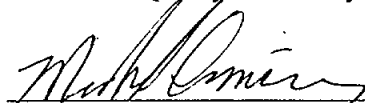

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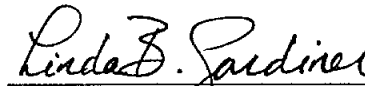

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**PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 2 – REVISION 2**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

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RECORD OF REVISIONS

Revision 0: Original Issue

Revision 1: The Final PDI Report (Revision 0) was submitted in July 2000. Revision 1 to the Final PDI Report incorporates the following significant changes: revision to text headers and footers; addition of results of confirmatory radiological analyses to Table 2-4; and addition of Toxicity Characteristic Leaching Procedure (TCLP) data to Table 2-5.

Revision 2: Revision 1 was submitted in May 2001. Revision 2 to the Final PDI Report incorporates the following significant changes: addition of direct-push soil probes for Property 2B to Table 2-2; radiological analytical data for Property 2B to Table 2-4; direct-push soil probe logs for Property 2B to Appendix 2-B; addition of Section 5 Limitation; and other edits to text.

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ACRONYMS AND ABBREVIATIONS

AT&T	American Telephone & Telegraph
BNI	Bechtel National, Inc.
°C	Degrees Centigrade
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
Conc.	Concentration
CQCP	Contractor Quality Control Plan
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
FMSS	FUSRAP Maywood Superfund Site
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	grams
GMS	Groundwater Modeling System
GPR	Ground Penetrating Radar
GPS	Global Positioning System
ID	Identification
ISOCS	In-Situ Object Counting System
keV	kilo electron volts
kg	kilogram
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCW	Maywood Chemical Works
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
mg	milligram
MHTDP	Materials Handling/Transportation and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJVIS	New Jersey Vehicle Inspection Station
NYS&W	New York, Susquehanna & Western Railway
ORNL	Oak Ridge National Laboratories
pCi	picoCurie
PDI	Pre-Design Investigation
PDIWP	Pre-Design Investigation Work Plan
PID	Photoionization Detector
PVC/PET	Polyvinyl Chloride/Polyethylene Teraphthalate
QA	Quality Assurance
QC	Quality Control
QCSR	Quality Control Summary Report

Ra-226	Radium-226
Rn-222	Radon-222
RCRA	Resource Conservation and Recovery Act
RESRAD	Department of Energy Computer Code; RESidual RADioactivity
ROC	Radionuclides of Concern
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
Th-232	Thorium-232
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
ug	microgram
U-238	Uranium-238
USACE	U.S. Army Corps of Engineers
UST	Underground Storage Tank

1.0 SITE BACKGROUND AND PHYSICAL SETTING

1.1 GENERAL SITE OVERVIEW

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (FMSS) is located in a highly developed area of Bergen County in northeastern New Jersey, in the Boroughs of Maywood and Lodi and the Township of Rochelle Park (Figure 2-1). Portions of the FMSS are radiologically impacted from process wastes and residues associated with the recovery and refining of thorium and thorium compounds from monazite ores by the former Maywood Chemical Works (MCW) from 1916 to 1956 (BNI 1992).

Waste produced at MCW was a fine sand-like material containing residual thorium with lesser amounts of uranium and its daughter products including radium. Wastes and residues were disposed in low-lying areas west of processing facilities. In the early 1930s, a portion of these wastes and residues was separated from the main property by construction of New Jersey State Highway 17 (NJ Route 17). Additionally, the former channel of Lodi Brook runs through the majority of the properties making up the FMSS. Some of the contaminated materials are assumed to have eroded from the facility area and were transported downstream via Lodi Brook (Figure 2-2). In addition, from 1928 to 1944, local residents were known to use process waste in their lawns and gardens and as fill material (BNI 1992). These are the major mechanisms for distribution of radiologically-contaminated materials on the FMSS.

The FMSS consists of 88 designated residential, commercial, municipal, and state or Federal properties. All 64 Phase I properties (including all residential and municipal properties) have either been remediated by the U.S. Department of Energy (DOE) or U.S. Army Corps of Engineers (USACE) or are currently being addressed under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). The remaining 24 Phase II properties are being addressed by the Stone & Webster Team (i.e., Team), under contract to USACE.

1.2 PRE-DESIGN INVESTIGATION SCOPE

On December 29, 1998, the USACE issued a Scope of Services for the design and remediation of the remaining 24 commercial and government properties. These properties potentially contain deposits of radioactive material in surface and subsurface soils resulting from operations of the former MCW. They have been designated as the Phase II properties.

A Pre-Design Investigation Work Plan (Stone & Webster 1999a) was submitted in October 1999 for the Phase II properties. The purpose of the PDIWP was to address data gaps necessary to complete remedial design efforts. In determining additional data needs, it was assumed that remediation of radiologically-impacted soils would be conducted on "accessible soils" only. Accessible soils are defined as soils not under permanent structures such as buildings and roadways. Data acquisition was limited to accessible soils only.

A preliminary evaluation was performed to determine the human health risk from leaving subsurface radiologically-impacted soils proximate to these structures. The RESidual RADioactivity (RESRAD) computer code was utilized to quantify the dose and risk under a number of assumed conditions. Based on the preliminary results, it was determined that any radioactive residues left adjacent to existing buildings, roadways, and railways would need a minimum of two feet of clean soil cover to be protective of human health. As such, it has been assumed that where radiologically-contaminated soils exist at depth adjacent to structures, at least the top two feet of radiologically-contaminated soil would be removed adjacent to the structure to a six foot horizontal setback, and then sloped at two horizontal to one vertical (2H:1V) to the required depth. However, it is recognized that site-specific calculations will need to be made during the remedial design phase in order to determine the actual depth of excavation adjacent to each structure, the horizontal setback, and the slope to final excavation depths (Stone & Webster 1999a).

In preparing the PDIWP, the 24 Phase II properties were sub-divided into 12 clusters. The purpose of the clustering was to take a 'collective' view of a set of contiguous properties to efficiently secure needed pre-design investigation (PDI) information for those properties. Table 2-1 lists the 12 clusters for the Phase II properties, from south to north. The reader is directed to the PDIWP for additional background information (Stone & Webster 1999a).

The purpose of this PDI Report is to present data collected during the PDI for Cluster No. 2 (See Figure 2-2). The evaluation of PDI data, along with data collected by others during previous investigations, is documented separately.

2.0 PDI FIELD ACTIVITIES

PDI activities were performed by the following Team members:

Stone & Webster, Inc.	Team leader and engineering services
Malcolm Pirnie, Inc.	Engineering services
Science & Ecology Corporation.....	Health physics services
Cabrera Services, Inc.	Radiological survey support
Canberra Industries, Inc.	Radiological survey support
Garden State Surveying, Engineering, and Planning, Inc.	Surveying and mapping
GEOD Corporation	Aerial mapping
NAEVA Geophysics, Inc.	Geophysical investigation
TerraProbe, Inc.	Direct push services
Franklin Environmental Services, Inc.....	Construction services
ThermoRetec	Radiological sample analysis
RECRA LabNet.....	Environmental sample analysis
Kestrel Environmental Technologies, Inc.....	Data validation

PDI activities involved non-intrusive surveys followed by intrusive investigations. The preliminary, non-intrusive PDI activities (including surface gamma scans, surface In-Situ Object Counting System (ISOCS) readings, geophysical surveys and field surveying) were initiated in August 1999. The intrusive portion of the PDI program began in January 2000 and was completed in August 2001. Table 2-2 presents a summary of PDI intrusive field activities. For logistical reasons, PDI environmental borings were performed at the outset of the Groundwater Remedial Investigation program during the latter part of March and beginning of April 2000.

PDI field activities were conducted in accordance with the PDIWP, and in compliance with procedures established in the following project documents: Contractor Quality Control Plan (CQCP), Site Safety and Health Plan (SSHP), General Environmental Protection Plan (EPP), Chemical Data Quality Management Plan (CDQMP), and the Materials Handling/Transportation and Disposal Plan (MHTDP), (Stone & Webster 1999b, c, and d, 2000a, 2001, respectively). Variances in methodology and sample locations between the PDIWP and the actual PDI execution are discussed below.

2.1 VARIANCES FROM PDIWP

This section discusses deviations in methodologies and sample locations from the approved PDIWP.

2.2 METHODOLOGY VARIANCES

Methodology variances from the PDIWP were as follows:

- The PDIWP called for the use of an ISOCS utilizing germanium gamma spectroscopy to quantify radionuclide activity in soil. Following approval of the PDIWP, regulatory concerns regarding the use of ISOCS for subsurface investigation were raised. The PDIWP was subsequently modified by replacing intrusive ISOCS sampling with conventional sample collection using direct push methods to collect soil cores for laboratory analysis. Due to this change, Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled “Soil Probe Investigation” was developed and followed. Refer to the USACE letters dated December 8, 1999 from the Project Manager, Mr. Allen Roos, informing the U.S. Environmental Protection Agency (USEPA) Project Manager, Ms. Angela Carpenter, and the New Jersey Department of Environmental Protection (NJDEP) Case Manager, Ms. Donna Gaffigan, of the modification, as presented in Appendix 2-A. The USEPA approved use of SOP-SW-MWD-509-0 on December 29, 1999 and NJDEP approved it on January 20, 2000.
- A Bicon® Model G1 one-inch by one-inch (1” x 1”) sodium iodide (NaI) detector was substituted for the originally proposed 3/8” x 3/8” NaI detector for downhole gamma logging. This substitution was needed to provide greater detector sensitivity through the soil probe casing. Due to the addition of this detector, SOP number SW-MWD-509-0 entitled “Soil Probe Investigation” was revised. These revisions are outlined in Table 1-A in Appendix 2-A. The 3/8” x 3/8” NaI detector was used only when the manual direct push method was employed. Manual direct push methodology was required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- The CDQMP originally specified a frequency of 10% for field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. This corresponds to the USACE internal quality control standard. However, due to the significant number of samples to be collected as part of the PDI program (totaling approximately 2000 soil samples and in excess of 10,000 gamma count rate and photoionization detector (PID) readings), the USACE agreed to reduce the frequency to 5%, which is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and USEPA guidelines for MS/MSD analysis. USEPA Region II does not have a specific guideline for field duplicate samples. Refer to the USACE and USEPA/NJDEP correspondence in Appendix 2-A.
- The PDIWP stipulates that geotechnical borings with associated laboratory testing may be required in order to provide design parameters in locations where excavation may impact adjacent structures. Since radiological clean-up criteria have yet to be finalized, final assessment of limits of radiological contamination cannot be made at this time. The geotechnical investigation program was suspended from the PDI. During the design process, existing geotechnical information will be evaluated for design and a determination will be made if supplemental data are needed.

2.2.1 Sample Location Variances

The PDIWP was developed with the intent that proposed sample locations would be deleted, added, or moved as additional information regarding site features and contamination distribution became available during the course of the PDI implementation. In accordance with this approach, sample locations as proposed in the PDIWP were deleted, added, or moved for the following reasons:

- Base mapping developed subsequent to completion of the PDIWP provided additional information regarding underground utility locations and other site features. Proposed sample locations proximate to these utilities and site features were moved in order to minimize impacts.
- Review of surface gamma survey data collected as part of the PDI, coupled with additional review of data from previous investigations performed by BNI and ORNL, indicated that certain proposed intrusive locations should either be moved or could be deleted. To address potential areas of surface radiological contamination not previously identified as areas of concern, a protocol was established for determining the need for additional intrusive sampling locations. Refer to “Protocol For Addressing Gamma Scan Anomalies” in Appendix 2-A.

Specific rationale for the deletion, addition, or movement of locations proposed in the PDIWP are summarized in Appendix 2-A.

2.3 GEOPHYSICAL SURVEYS

Between September 20, 1999 and March 2, 2000, NAEVA Geophysics, Inc. conducted geophysical investigations on the FMSS. The purpose of these investigations was to delineate surface traces of detectable underground utilities in the vicinity of proposed exploratory boring sites. Equipment selected for this investigation included: a Fisher TW-6 Pipe and Cable Locator; a Radiodetection RD432PDL-2 Utility Locator; a Subsite 75 Utility Locator, a 3M Dynatel 2250 Cable Locator, and a GSSI SIR-3 ground penetrating radar (GPR) system with a 300 MHz antenna. Details of the surveys are presented in the NAEVA report (NAEVA 2000).

2.4 SAMPLE LOCATIONS

In October 1999, Garden State Engineering, Surveying, and Planning, Inc. performed a ground survey of the FMSS properties. Results of the ground survey were combined with aerial mapping prepared by GEOD Corporation to produce new base mapping for the FMSS. This new base mapping replaced the mapping used to generate the PDIWP drawings.

Sample points for the surface gamma survey, surface ISOCS measurements, direct push (Geoprobe[®]) sampling (except Property 2B), and environmental sampling were located in the field using a Global Positioning System (GPS) (except Property 2B). A Trimble 4800 Site Surveyor system with a 4700 base receiver, GPS antenna, radio antenna, and ancillary equipment were used to perform GPS surveys. Base stations were set up and calibrated at specified benchmark locations established by the surveyor. Following base receiver set up, sampling points

were located. Field markings (spray paint, flags, and stakes) were used to identify intrusive sampling locations for radiological and environmental direct push mobile rigs, as well as surface ISOCS locations. At Property 2B, direct-push and environmental sampling locations were located by standard survey methods.

Coordinates for intrusive sample locations were determined from new PDI sample location maps which reflected updated base mapping and modified sample locations; surface ISOCS locations were identified based on original PDIWP mapping. For the surface gamma survey, GPS was used to record locations of gamma scan measurements. Where GPS instrumentation could not be utilized due to signal disruption (e.g., tree coverage, building interference, non-availability of satellites, or poor satellite reception due to weather conditions), sample locations were based on identification of site features and scaling off base mapping.

2.5 SURFACE GAMMA SURVEYS

Surface gamma surveys for all of the Phase II properties were conducted from August 1999 to March 2000. Surveys were conducted to obtain distribution of surface radiological contamination for health and safety reasons, as well as to verify existing data. Measurements were collected by suspending a 1" x 1" NaI gamma scintillation detector coupled to a Ludlum Model 12 ratemeter within a few inches of the ground surface. A health physics technician walked transects (approximately four to six feet wide) covering the properties while slowly swinging the detector in a serpentine motion. Transects were spaced to assure full areal coverage with some overlap. Gamma count measurements were taken approximately every 15 to 20 feet; measurement frequency was increased in areas exhibiting elevated gamma counts. Minimum detectable concentrations (MDCs) for this detector for the radionuclides of concern (ROC) are approximately 4.7 picoCurie per gram (pCi/g) for Radium-226 (Ra-226), 3.0 pCi/g for Thorium-232 (Th-232), and 121.0 pCi/g for Uranium-238 (U-238), correcting for volume and distance from the source (MARSSIM 1997). Gamma count data were stored with associated locations in the GPS recorder. In some instances where locations could not be recorded with a GPS (as stipulated above), measurements were manually recorded on the PDI maps.

2.6 SURFACE ISOCS MEASUREMENTS

Surface ISOCS measurements were collected at selected locations where environmental, geotechnical, and radiological shallow boreholes were proposed in the PDIWP. Surface ISOCS measurements were collected to identify and quantify radionuclide activity in surface soil, beneath shielded areas (e.g., areas covered with gravel, asphalt, and concrete), and in areas proposed for environmental borings.

Gamma spectroscopy measurements of surface soil were collected using the Canberra high-purity germanium ISOCS and assuming uniform radioactivity distribution in soil. The high-purity germanium detector was positioned in a "downward-looking" direction perpendicular to the ground surface at a height of three feet. The detector was collimated using a lead shield subtending a 90-degree angle, which provided a surface soil viewing area approximately six feet in diameter. The back and side of the detector were shielded with two-inch thick lead O-rings. The detector collimator and shielding were used to ensure that radioactivity detected by the

probe originated only from the six-foot diameter area beneath the detector, hence minimizing one possible source of error in the measurements.

2.7 DIRECT PUSH SOIL PROBES

Direct push soil probes (using truck-mounted model 5400 Geoprob[®] or track-mounted model 54DT Geoprob[®]) were used to collect soil samples for radiological and environmental parameter analysis. Two types of direct push soil probes were used: a single rod system (i.e., Macro-Core[®]) and a dual tube (or cased) system. The latter system utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Samples were collected in four-foot soil cores within polyvinyl chloride/polyethylene terephthalate (PVC/PET) liners, marked with the appropriate field identification number, sealed with rubber end caps, and placed into a two-inch inner diameter PVC container (including PVC end caps) for transport and storage.

For sample locations that were inaccessible to the mounted direct push rigs, soil cores were collected using a manual direct push method. Two-foot cores approximately one inch in diameter were collected using an electric powered hand-held vibratory hammer.

Prior to commencing intrusive sampling, underground utilities in the vicinity of the proposed boring locations were identified by reviewing PDI geophysical survey data, and by contacting the appropriate authorized parties (i.e., New Jersey One-Call System, and the property owner). In addition, a safe working distance from overhead utilities was maintained.

Sampling equipment (the rig, direct push soil probe casing and tools) was decontaminated prior to use and following each borehole installation using pressure or manual washing. Each soil probe hole was backfilled for the full length using Benseal[®] bentonite in accordance with project requirements. For areas covered by asphalt, cold patch was placed at the surface.

2.7.1 Downhole Gamma Logging

Measurements were taken with a Bicon[®] Model G1 1" x 1" NaI gamma detector sealed in a waterproof stainless steel container. The instrument MDCs are approximately 3.6 pCi/g for Ra-226, 2.3 pCi/g for Th-232, and 92.0 pCi/g for U-238, which are approximately 75% of the surface MDCs listed in Section 2.4. This estimate assumes a geometry factor of 0.50, where a four pi geometry (i.e., a sphere) when scanning downhole is approximately half of a two pi geometry (i.e., a hemisphere) when scanning the ground surface. However, this reduction in the MDCs is modified by the 0.3-inch steel casing in the hole, which results in an approximate 33% reduction in the gammas seen by the detector as calculated by the computer code Microshield[™]. The correction factor is therefore calculated by dividing the geometry factor (0.50) by the steel casing reduction factor (0.66), yielding approximately 0.75. The NaI detector was connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector[™] multi-channel analyzer/amplifier/high voltage power supply (except for property 2B). The system was controlled, and the data stored, via notebook computer. Ten-second

integrated gross gamma measurements were recorded at each 6-inch depth increment in the cased soil probe holes and data entered onto the PDI Soil Probe Log Sheets (see Appendix 2-B). For property 2B the NaI detector was connected to a Ludlum Model 2221 scaler/ratemeter. Twelve-second integrated gross gamma measurements were recorded at each 6-inch depth increment.

In areas where samples were collected using the manual direct push method, a Bicon® 3/8" x 3/8" NaI gamma detector coupled to a Ludlum Model 2221 scaler/ratemeter was used to take 30 to 60-second gross gamma measurements in uncased soil probe holes. The MDCs for this instrument are estimated to be approximately 1.9 pCi/g for Ra-226 and 2.3 pCi/g for Th-232, as provided by the vendor. There is no correction factor for these MDCs.

2.7.2 Direct Push Core Screening/Sample Collection

Sealed PVC containers collected from direct push mobile and manual rigs were transported to the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation added to the PDI Soil Probe Log Sheets (see Appendix 2-B) included soil column description and soil screening data. Field screening for radiological activity was performed on soil cores contained in the PVC/PET liner. A collimated Eberline SPA-3 2" x 2" NaI detector (or Ludlum Model 44-10) coupled to a Ludlum Model 2221 scaler/ratemeter was used to measure gamma activity. The detector was positioned approximately 0.5 inch above the soil core, on a guide, to ensure that this distance was maintained over the entire length of each soil core. Continuous scanning of the soil core was performed at an approximate rate of three inches per second. The instrument MDC, taken from MARSSIM, is estimated to be 2.8 pCi/g for Ra-226, 1.8 pCi/g for Th-232, and 80 pCi/g for U-238 (MARSSIM 1997). Although the MARSSIM MDC values are based upon an open area, it was assumed that the slower scan time compensated for the different geometry. An indelible marker was used to mark the liner where elevated readings were identified during scanning. Total integrated gross gamma counts were accumulated over a 30-second interval and recorded.

Soil cores were also screened for total volatile organic vapors using a PID. A series of small perforations were made along the PVC/PET liner at 12-inch increments to expose soil to the PID. Perforations were sealed with tape after PID screening. Screening results were recorded on the PDI Soil Probe Logs.

In accordance with S&W SOP 509 and regulator requests, prior to obtaining samples, cores were photographed using a digital camera. A brief soil field classification description of each core was entered onto the PDI Soil Probe Log Sheet.

Soil samples were selected from each direct push location for analysis of the ROC: Th-232, Ra-226, and U-238. Samples were selected based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample was taken at the highest reading location (suspected FUSRAP waste, if present, as defined in the Federal Facilities Agreement dated November, 1991; DOE and USEPA 1991); a second soil sample was collected where the readings approached a constant value (suspected transition zone, if present); and a third soil sample was collected within the zone of constant

readings (below suspected transition zone). When soil cores exhibited uniform count rates (i.e., elevated gamma measurements were not identified), three samples per soil probe location were collected.

Selected samples were obtained from each core sufficient to fill a 300-milliliter sample container. Samples were labeled and capped at either end with plastic caps. Caps were color-coded for 'top' and 'bottom' of the original hole. Each extracted section of the soil core was replaced with a wooden spacer to indicate what portion of the soil core was sampled. The spacer was labeled with the sample identification number of the soil removed for testing. After screening and sample extraction, remaining portions of each soil core were placed back into the appropriate PVC container, with the wooden spacer in its appropriate location, and stored on-site for future reference. The section of core tube containing the sample was then transferred to the MISS on-site laboratory for sample preparation and analysis.

Evaluation of all gamma log data led to the archiving of selected samples. That is, a number of the direct push soil probes exhibited 'constant' count rates over the depth interval. In these cases, rather than having all samples analyzed at this time, the deepest prepared sample was not counted but archived. By doing this, as laboratory results confirm that radiological contamination does not exist at that soil probe location, unnecessary analytical work is prevented. Samples that were archived are noted on the PDI Soil Logs in Appendix 2-B and on Table 2-4.

As described above, a collimated Eberline SPA-3 or Ludlum Model 44-10 2" x 2" NaI detector was used to measure gamma activity for the soil cores, while a Bicron[®] Model G1 1" x 1" NaI gamma detector was used for the downhole measurements. The 2" x 2" NaI detector (Eberline SPA-3 or Ludlum Model 44-10) provided confirmation of downhole measurements and greater sensitivity for sample selection than the 1" x 1" NaI gamma detector.

2.7.3 Sample Preparation

Soil samples were screened to remove small debris and oven-dried to obtain moisture content and to facilitate grinding. Grinding assured sample homogenization. Samples were then transferred to a 300-milliliter commercially supplied metal can. Lids were secured on cans, after which they were shelved for 21 days. The 21-day in-growth period was required to allow radon and its daughter products to establish secular equilibrium between Ra-226, Radon-222 (Rn-222), and the gamma-emitting daughters.

2.7.4 Laboratory Data

Analysis for ROC on selected samples was performed at the MISS on-site field laboratory using a Canberra high-purity germanium detector. All testing in the MISS on-site field laboratory was completed in accordance with the procedures outlined in the CDQMP. MISS on-site field laboratory data have been entered onto the PDI Soil Probe Log sheets (see Appendix 2-B).

The Project Chemist evaluated 10% of the MISS on-site field laboratory radiological data packages; the evaluation is included in the PDI Quality Control Summary Report (Stone &

Webster 2000b). The laboratory qualified the reported data when the germanium detector measurement system fell outside of one of the control limits during quality control check runs. Data qualification procedures are described in the PDI QCSR.

Ten percent of the samples analyzed by the MISS on-site field laboratory were sent to a USACE-approved off-site laboratory (ThermoRetec) for confirmatory analysis of the ROC. Following analysis, all soil samples were returned to the FMSS for storage and future reference. Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the off-site confirmatory radiological data. Radiological data were evaluated using the USACE's Radiological Data Quality Evaluation Guidance, as presented in the CDQMP. The data validation reports for the radiological confirmatory sample results are provided in the PDI QCSR.

2.8 ENVIRONMENTAL SAMPLING

A limited number of soil samples were collected for environmental analyses in order to identify potential chemical contamination commingled with the radioactive waste. This information would aid in assessing waste classification (i.e., whether hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), is commingled with FUSRAP waste) as well as provide data for worker health and safety. Samples for environmental analysis were collected using direct push Macro-Core[®] methodology. Sampling depths were based on the anticipated depth of radiological contamination. Soils exhibiting the highest PID readings or visual contamination were collected and sent for laboratory analysis by a USACE and NJDEP certified laboratory (RECRA LabNet). Samples were analyzed for RCRA disposal characteristics (ignitability, reactivity, corrosivity, and toxicity characteristic leaching procedure TCLP), the Target Compound List (TCL) and the Target Analyte List (TAL) with chromium speciation.

During performance of environmental borings, environmental boring log sheets were completed for each boring. Copies of the completed log sheets are included in Appendix 2-C.

Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the environmental data. Environmental data were evaluated using the USACE's Data Quality Evaluation Guidance, as presented in the CDQMP (Stone & Webster 1999b). In addition, the USEPA Region II SOP No. HW-24, Revision I, (EPA 1999), was also applied. The data validation reports for the environmental sample results are provided in the PDI QCSR.

2.9 GEOTECHNICAL SAMPLING

Radiological cleanup criteria have yet to be finalized, therefore final assessment of the extent of radiological contamination cannot be made at this time. The geotechnical investigation program was therefore suspended from the PDI. Following approximate determination of limits of excavation during the design phase, existing geotechnical information will be evaluated for remedial design purposes. If it is decided that additional information is required, then the geotechnical program will be reinstated, as necessary.

2.10 QUALITY ASSURANCE/QUALITY CONTROL

Field and laboratory activities were completed in accordance with the CQCP and the CDQMP. Data reflecting adherence to the Quality Assurance / Quality Control (QA/QC) program was documented and presented in the PDI QCSR.

2.11 HEALTH AND SAFETY

All PDI investigation activities were conducted in compliance with the SSHP and associated protocols and directives. Field crews received daily briefings at 'Plan of the Day' meetings prior to any work activities. These meetings reviewed daily health and safety issues such as potential inclement weather, as well as reviews of general site health and safety directives.

3.0 CLUSTER DESCRIPTION AND PDI RESULTS

3.1 CLUSTER NO. 2 DESCRIPTION

Cluster No. 2 consists of four properties in the Borough of Lodi:

- Property No. 02A – 100 Hancock Street (AT&T)
- Property No. 02B – 80 Hancock Street (Vacant)
- Property No. 02C – 80 Industrial Road (American Jewel Windows)
- Property No. 02D – 8 Mill Street (NJVIS)

The paragraphs below provide detailed descriptions of each property.

3.1.1 Property No. 02A – 100 Hancock Street

Property No. 02A occupies Block 205.03, Lot 2.04 in the Borough of Lodi, and is approximately 1.3 acres in area. The property is currently owned by a real estate brokerage, Hancock Realty, and leased by AT&T Wireless (Stone & Webster 1999e). The property contains a one-story concrete block building with a grassy area and an asphalt-paved parking lot to the front of the building. An inactive railroad spur is located adjacent to the northeast wall of the building. There is a drainage swale immediately north of the railroad spur parallel to the northern property boundary. The property owner recently performed excavation activities in the swale. Please refer to the Team's Record of Community Contact, No. 082 for more information (Stone & Webster 2000c). A buried concrete pipe containing the present-day channel of Lodi Brook runs parallel to Hancock Street on the western side of the property. Prior to realignment, Lodi Brook ran across the property in a southwesterly direction. This former channel is the suspected transport mechanism for the radiological contamination found on-site.

AT&T Wireless hours of operation are 6:00 am to 6:00 pm with janitorial staff leaving at 7:00-8:00 pm. There is sporadic weekend activity and also 24 hour/day emergency personnel on call (Stone & Webster 1999e). The property is situated in a densely populated residential neighborhood; however, other commercial properties are located in close proximity. The property is bounded to the west by Hancock Street, to the north by residential properties; to the south by Property No. 02B, and to the east by a commercial building.

3.1.2 Property No. 02B – 80 Hancock Street

Property No. 02B occupies Block 205.03, Lot 2.03 in the Borough of Lodi, and is approximately 1.8 acres in area. The site is currently vacant. There is a 1-story cinder block building on the property. The building is bordered on three sides by an asphalt-paved parking/shipping area. There is a grassy area at the front entrance of the building (facing Hancock Street). The south

side of the building has a loading dock. A small block building approximately 750 square feet in area is located on the east corner of the site. There is a semi-trailer and a small fenced area adjacent to the small block building. A buried concrete pipe containing the present-day channel of Lodi Brook runs parallel to Hancock Street on the western side of the property. Prior to realignment, Lodi Brook ran across the property in a southwesterly direction. This former channel is the suspected transport mechanism for the radiological contamination found on-site. The property is bordered by Property No. 02A to the north, a commercial property to the east; Industrial Road to the south, and by Hancock Street to the west.

An underground storage tank (UST) has recently been removed from the vicinity of the toolshed, and a groundwater solvent plume is currently being monitored by Killam Associates. The monitoring system extends approximately 50 feet around the toolshed. Depth to groundwater is less than 10 feet (Stone & Webster 1999e). The property owner is currently pursuing a No Further Action decision from the NJDEP under the Industrial Site Recovery Act (Stone & Webster 2000d).

3.1.3 Property No. 02C – 80 Industrial Road

Property No. 02C occupies Block 205.02, Lot 4.02 in the Borough of Lodi, and is approximately 3.6 acres in area. The property is currently owned and occupied by American Jewel Windows (Stone & Webster 1999e). A one-story cinder block building covers approximately one quarter of the property. There is an asphalt-paved parking lot along the western side and an asphalt-paved parking/loading area along the eastern side of the property. There are grassy areas on the northern and southern sides of the building and along the western property boundary. The east side of the property currently consists of an employee parking lot (for about 25-30 cars). On the west side is a parking lot, a portion (about 70%) of which is rented to a Volvo dealer for storage of approximately 75-100 vehicles. An inactive rail spur is located adjacent to the south wall of the building. The owner has plans to expand (three 10,000 square feet units) once remediation is complete and restoration is underway (Stone & Webster 1999e).

A buried conduit containing the present-day channel of Lodi Brook runs parallel to Hancock Street through this property. Prior to realignment during property development, Lodi Brook ran across the property in a southwesterly direction through the area where the building now stands. This former channel is the suspected transport mechanism for the radiological contamination found at the site. The property is bordered to the north by Industrial Road, to the west by Hancock Street, the east by a commercial building, and to the south by Property No. 02D.

3.1.4 Property No. 02D – 8 Mill Street

Property No. 02D occupies Block 205.02, Lot 1.05 in the Borough of Lodi, and is approximately 13.6 acres in area. The property is currently occupied by a New Jersey Vehicle Inspection Station (NJVIS). Approximately half of the property is covered with asphalt pavement, and the other half with grassy islands. There is a one-story cinder block/brick veneer building that houses offices for inspection station personnel and personnel employed by the licensing agency.

The facility serves three roles: the motor vehicle bureau handles titles, licenses, and registration; the New Jersey Department of Transportation (NJDOT) gives written and driving tests; and Parsons Technology runs the state vehicle inspection program (Stone & Webster 1999e). NJDOT and the motor vehicle bureau operate from 8 a.m. to 4:30 p.m. Monday through Friday, with extended hours on Wednesday until 7:30 p.m. Parsons Technology operates from 7:30 a.m. to 5:30 p.m. on Monday to Friday and 8 a.m. to 12:00 p.m. on Saturday (Stone & Webster 1999e). The western portion of the property is used for driving tests and for vehicle inspections. The remainder of the property and the northeast portion of the building are used for licensing and driver testing. Primary access to the building is via the northern entrance. Typically, several hundred people are present on the property daily for vehicle inspections, licensing and driver testing.

A buried conduit containing the present-day channel of Lodi Brook runs through the western portion of this property. Prior to realignment during property development, Lodi Brook ran across the property in a southwesterly direction. This former channel is the suspected transport mechanism for the radiological contamination found at the site. The property is bordered on the north by Property No. 02C and by other commercial properties, on the south by Columbia Lane, on the east by Gregg Street and on the west by Hancock Street.

Refer to Figure 2-3 for more specific details of site features. Inspection bays shown on Figure 2-3 were constructed in 2000 on radiologically-impacted soil. At the time of this construction, the 15 pCi soil criteria was assumed to apply.

3.2 RADIOLOGICAL DATA

3.2.1 Surface Gamma Survey

A surface gamma survey was performed at Cluster No. 2. Data, recorded using GPS, was entered into the Groundwater Modeling System (GMS) software package and contoured to a two-dimensional grid using the "Natural Neighbor" contouring protocol. Natural Neighbor interpolation is based on the Thiessen polygon network of the scatter point set. Data are interpolated based on distance as well as topological relationships (Boss International, Inc., 2000).

Results of the gamma scan survey for Cluster No. 2 are presented graphically on Figure 2-4 and Figure 2-A1 (Appendix 2-A). Figure 2-4 presents surface gamma scan data in context of the FMSS: the upper limit of the contour range is the maximum gamma count measurement detected at the FMSS, and the lower contour range represents 1.5 times the background gamma count rate for Cluster No. 2 (background is approximately 2,000 counts per minute for Cluster No. 2). Figure 2-A1 provides a more detailed, cluster-specific, presentation of the gamma scan data, with contoured ranges corresponding to actual minimum and maximum measured gross gamma counts recorded at Cluster No. 2.

3.2.2 Surface ISOCS Measurements

Surface ISOCS measurements were taken at 44 locations on Cluster No. 2; locations are shown on Figure 2-3. Results of surface ISOCS measurements are tabulated on Table 2-3.

3.2.3 Direct Push Soil Probes

Eighty-eight (88) direct push soil probes were performed at Cluster No. 2 for radiological purposes. Direct push soil probe locations are shown on Figure 2-3.

3.2.3.1 Downhole Gamma Logging

Results from downhole gamma logging measurements taken at direct push soil probe locations are presented on the PDI Soil Probe Logs included in Appendix 2-B.

3.2.3.2 Direct Push Core Screening/Sample Collection

Results of soil core screening activities performed at the MISS on-site field laboratory are recorded on PDI Soil Probe Logs included in Appendix 2-B.

3.2.3.3 MISS On-Site Field Laboratory Data and ThermoRetec Confirmatory Data

Three-hundred and sixteen (316) soil samples were collected for laboratory analysis from the 88 soil probe locations at Cluster No. 2. Two hundred forty four (244) of the 316 samples were sent for analysis (including 24 duplicates); 72 were archived. Laboratory data consisting of soil concentrations of the ROC are presented on the soil probe logs in Appendix 2-B, and summarized on Table 2-4. Archived samples are also recorded on the logs and the table.

Seventeen of the soil samples analyzed by the MISS on-site field laboratory were sent to ThermoRetec for confirmatory analysis. Results of the confirmatory analyses performed by ThermoRetec are shown in Table 2-4.

As part of the data quality objective process, a comparison study was performed between the MISS on-site field laboratory and the ThermoRetec laboratory data. The results of the comparison can be found under separate cover (Stone & Webster 2000e).

3.3 ENVIRONMENTAL DATA

Eight environmental borings were drilled at Cluster No. 2, and eight soil samples were collected for environmental analysis. A summary of the environmental analytical data is presented on Table 2-5. Figure 2-3 shows the location of the borings. In addition, the environmental boring log sheets are included in Appendix 2-C.

4.0 REFERENCES

Bechtel National, Inc (BNI) 1992. Remedial Investigation Report for the Maywood Site, December.

Boss International, Inc. and Brigham Young University. Groundwater Modeling System (GMS) User's Manual; 2000.

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Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) 1997. EPA-402-R-97-016; NUREG-1575; December, 1997.

NAEVA Geophysics, Inc (NAEVA) 2000. Results of Subsurface Investigation for the FUSRAP Maywood Superfund Site

Stone & Webster Environmental Technology & Services (Stone & Webster) 1999a. *Pre-Design Investigation Work Plan*, FUSRAP Maywood Superfund Site. Boston, MA; October.

Stone & Webster 1999b. *Final Contractor Quality Control Plan*, FUSRAP Maywood Superfund Site. Boston, MA, October.

Stone & Webster 1999c. *Final Site Safety and Health Plan*, FUSRAP Maywood Superfund Site. Boston, MA, August.

Stone & Webster 1999d. *Final General Environmental Protection Plan*, FUSRAP Maywood Superfund Site. Boston, MA; November.

Stone & Webster 1999e. *Notes on Trip Reports*, FUSRAP Maywood Superfund Site. Boston, MA, April.

Stone & Webster 2000a. *Chemical Data Quality Management Plan, Revision 1*, FUSRAP Maywood Superfund Site. Boston, MA, February.

Stone & Webster 2000b. *Pre-Design Investigation Quality Control Summary Report*, FUSRAP Maywood Superfund Site. Boston, MA, March.

Stone & Webster 2000c. Record of Community Contact, Maywood FUSRAP Community Relations, Tracking Number 082. Boston, MA, May.

Stone & Webster 2000d. Record of Community Contact, Maywood FUSRAP Community Relations, Tracking Number 069. Boston, MA, February.

Stone & Webster 2000e. *Pre-Design Investigation Radiological Data Comparison Study*, FUSRAP Maywood Superfund Site. Boston, MA; December.

Stone & Webster 2001. *Materials Handling/Transportation and Disposal Plan*, FUSRAP Maywood Superfund Site, Rev 2. Boston, MA, December.

U.S. Department of Energy and U.S. Environmental Protection Agency 1991. Federal Facility Agreement for the Maywood Interim Storage Site; November.

5.0 LIMITATIONS

The findings and conclusions presented in this report are based on data collected by others and by Stone & Webster for Cluster 2. Any other data that becomes available related to Cluster 2 should be submitted to Stone & Webster for review. The review of additional data may require modifications to the findings and conclusions presented herein.

This report was prepared for the exclusive use of the USACE. No other party can rely on the findings and conclusions presented herein without the expressed written consent of Stone & Webster.

Table 2-1: Properties Comprising Each Cluster

Cluster No.	Property No.	Properties (occupant)	Township/Borough	Property Block & Lot
1	01A	72 Sidney St. (Vacant)	Lodi	Block 164, Lots 1 and 5
2	02A	100 Hancock Street (AT&T)	Lodi	Block 205.03, Lot 2.04
	02B	80 Hancock Street (Vacant)	Lodi	Block 205.03, Lot 2.03
	02C	80 Industrial Road (American Jewel Windows)	Lodi	Block 205.02, Lot 4.02
	02D	8 Mill St. (NJVIS)	Lodi	Block 205.02, Lot 1.05
3	03A	170 Gregg Street (Noble Packaging)	Lodi	Block 205, Lot 1.02
4	04A	160/174 Essex Street (Bank of New York)	Lodi	Block 186.01, Lot 1 and Block 174, Lot 1.02
	04B	I-80 Westbound Right-of-Way (NJDOT)	Lodi	Not Applicable
5	05A	99 Essex Street (Joseph Muscarelle, Inc.)	Maywood	Block 125, Lot 1
	05B	113 Essex Street (Bank of New York)	Maywood	Block 125, Lot 2
	05C	200 NJ Route 17 South (Sears Appliance Repair)	Maywood	Block 125, Lot 3
6	06A	85-101 NJ Route 17 North (Architectural Windows)	Maywood	Block 124, Lot 4
	06B	137 NJ Route 17 North (Ramsey Auto Group)	Maywood	Block 124, Lot 3
	06C	167 NJ Route 17 North (Sunoco Station - Inactive)	Maywood	Block 124, Lot 2
	06D	239 NJ Route 17 North (Gulf Station)	Maywood	Block 124, Lot 1
	06E	29 Essex Street (FedEx)	Maywood	Block 124, Lot 5
7	07A	111 Essex Street (Scanel Company, Inc.)	Maywood	Block 131, Lots 1,2,3,4
	07B	New York, Susquehanna & Western Railway - Lodi Branch	Maywood	Block 131, Lot 8
8	08A	23 West Howcroft Road (Maywood Furniture, Inc.)	Maywood	Block 124, Lot 17
9	09A	149-151 Maywood Avenue (Sears Logistical Services)	Maywood; Rochelle Park	Block 124, Lot 30; Block 17.02, Lot 1
10	10A	100 West Hunter Avenue (Stepan Company)	Maywood; Rochelle Park	Block 124, Lot 10; Block 18.02, Lot 2
11	11A	205 Maywood Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
	11B	61 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 50
	11C	50 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
12	12A	New York, Susquehanna & Western Railway	Maywood; Rochelle Park	Block 124, Lot 55 and Block 110, Lot 1
	12B	100 West Hunter Avenue (MISS)	Maywood; Rochelle Park	Block 124, Lot 46 and Block 20.01, Lot 1
	12C	New Jersey Route 17 (NJDOT)	Rochelle Park	Not Applicable

Table 2-2: Summary of PDI Intrusive Field Activities

Cluster No.	Property No.	Property Address	Occupant	Planned			Actual			Schedule (Year 2000 unless noted otherwise)
				Probe Locations	Depth (ft)	Footage (ft)	Probe Locations	Depth (ft)	Footage (ft)	
1	01A	72 Sydney Street	Vacant	13	12	156	15	12	188	Jan. 11, 12, Mar. 31
2	02A	100 Hancock Street	AT&T	17	16	272	17	6 - 12	194	Jan. 27, Feb. 1, 2, Mar. 16
	02B	80 Hancock Street	Vacant	18	16	288	7	12	84	Sept. 21, 2001
	02C	80 Industrial Road	American Jewel Windows	23	16	368	20	12	272	Jan. 21, 24, 28, Feb. 1
	02D	8 Mill Street	NJVIS	38	16	608	44	12 - 16	593	Jan. 13, 14, 18, 19, 20, 21
3	03A	170 Gregg Street	Noble Packaging	10	8	80	10	8	62	Jan. 12, 13
4	04A	160/174 Essex Street	Bank of New York	25	12	300	23	4 - 12	427	Feb. 2, 3, 4
	04B	I-80 Right-of-Way	NJDOT	7	12	84	7	8 - 12	69	Feb. 2, 4, Mar. 31
5	05A	99 Essex Street	Joseph Muscarelle, Inc.	38	8	304	38	8	318	Feb. 23, 24, Mar. 17
	05B	113 Essex Street	Bank of New York	18	8	144	21	4 - 16	171	Feb. 8, 10, 16
	05C	200 NJ Route 17 South	Sears Appliance Repair	23	8	184	16	8 - 10	129	Feb. 15, 16, Mar. 2
6	06A	85-101 NJ Route 17 North	Architectural Windows	17	12	204	17	8 - 18	196	Feb. 9, 10, 16, Mar. 16
	06B	137 NJ Route 17 North	Ramsey Auto Group	15	12	190	13	10 - 12	145	Feb. 9, 16, 25
	06C	167 NJ Route 17 North	Sunoco Station - Inactive	27	12	324	19	3 - 14	239	Feb. 11, Mar. 8
	06D	239 NJ Route 17 North	Gulf Station	19	12	228	2	11 - 12	23	Feb. 16
	06E	29 Essex Street	FedEx	7	12	84	9	7 - 12	95	Feb. 16, Mar. 31
7	07A	111 Essex Street	Scanel Company, Inc.	12	16	192	12	12 - 22	161	Feb. 21, 22, 23
	07B	NYS&W - Lodi Branch	NYS&W - Lodi Branch	16	16	256	11	6 - 16	115	Feb. 21, 22
8	08A	23 West Howcroft Street	Maywood Furniture, Inc.	26	16	416	25	7 - 16	321	Feb. 17, 21
9	09A	149-151 Maywood Avenue	Sears Logistical Services	131	16	2096	72	4 - 16	574	Mar. 2, 3, 6, 7, 8, 9, 15
10	10A	100 West Hunter Avenue	Stepan Company	106	24	2544	92	4 - 24	1076	Feb. 25, 28, 29, Mar. 1, 2, 6, 7, 9, 16, 30
11	11A	205 Maywood Avenue	Myron Manufacturing	5	8	40	5	8 - 12	44	Feb. 16
	11B	61 West Hunter Avenue	Myron Manufacturing	9	8	72	10	8 - 16	87	Feb. 15, 21
	11C	50 West Hunter Avenue	Myron Manufacturing	1	8	8	1	8	8	Feb. 15
12	12A	NYS&W	NYS&W	31	24	744	27	12 - 27	335	Feb. 18, 22, 24, Mar. 16, 30
	12B	100 West Hunter Avenue	MISS	120	24	2880	100	7 - 26	1769	Feb. 4, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24, 25, 29, Mar. 1, 7, 8, 9
	12C	NJ Route 17	NJDOT	0	0	0	0	0	0	<i>No investigations planned.</i>
TOTALS:				772		13,066	640		7,779	

Table 2-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
2A-SI-001-SS-0-1	0.26	29.0	0.15	0.34	40.3	0.08	< 4.15	----	4.15
2A-SI-002-SS-0-1 (1)	0.31	25.9	0.16	< 0.07	----	0.07	< 4.61	----	4.61
2A-SI-002-SS-1-1 (1)	0.35	24.0	0.19	0.32	33.6	0.01	< 3.70	----	3.70
2A-SI-003-SS-0-1	0.21	32.8	0.03	0.29	37.5	0.01	< 3.57	----	3.57
2A-SI004-SS-0-1	0.51	20.5	0.23	1.59	13.8	0.01	< 6.11	----	6.11
2A-SI005-SS-0-1	0.46	20.2	0.24	1.56	13.8	0.01	< 5.73	----	5.73
2A-SI006-SS-0-1	0.31	24.5	0.18	0.58	24.9	0.01	< 4.78	----	4.78
2A-SI007-SS-0-1	0.57	17.5	0.24	1.15	16.4	0.10	< 5.65	----	5.65
2B-SI001-SS-0-1	0.25	27.0	0.02	11.00	42.0	0.01	< 4.08	----	4.08
2B-SI002-SS-0-1	0.24	30.5	0.03	0.17	51.7	0.01	< 4.81	----	4.81
2B-SI003-SS-0-1	0.29	30.0	0.18	0.14	63.9	0.14	< 4.91	----	4.91
2B-SI004-SS-0-1	0.21	31.0	0.17	0.25	38.7	0.06	< 4.30	----	4.30
2B-SI005-SS-0-1 (1)	0.39	24.5	0.19	0.97	18.5	0.07	< 5.20	----	5.20
2B-SI005-SS-1-1 (1)	0.46	22.0	0.03	0.78	21.0	0.01	< 5.29	----	5.29
2B-SI006-SS-0-1	0.30	30.0	0.26	0.65	23.0	0.07	< 6.02	----	6.02
2B-SI007-SS-0-1	0.41	23.0	0.20	0.63	22.0	0.06	< 5.11	----	5.11
2C-SI001-SS-0-1	0.30	29.7	0.24	0.61	24.0	0.01	< 5.87	----	5.87
2C-SI002-SS-0-1	0.45	20.6	0.17	0.73	20.6	0.01	< 5.32	----	5.32
2C-SI003-SS-0-1	0.78	23.7	0.45	1.19	23.8	0.02	< 7.96	----	7.96
2C-SI004-SS-0-1 (1)	0.77	17.9	0.45	6.18	8.0	0.12	< 7.55	----	7.55
2C-SI004-SS-1-1 (1)	0.74	18.0	0.38	5.90	8.0	0.01	< .761	----	7.61
2C-SI006-SS-0-1	0.61	37.4	0.14	0.63	23.3	0.10	< 5.71	----	5.71
2C-SI007-SS-0-1 (1)	0.41	24.8	0.20	0.67	23.0	0.07	< 5.79	----	5.79
2C-SI007-SS-1-1 (1)	0.69	17.0	0.20	0.64	23.0	0.06	< 5.54	----	5.54
2D-SI001-SS-0-1	< .31	38.0	0.31	2.56	11.8	0.12	< 6.39	----	6.39
2D-SI002-SS-0-1 (1)	0.47	23.5	0.34	4.18	9.9	0.13	< 7.50	----	7.50

Table 2-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
2D-SI002-SS-1-1 (1)	0.35	30.5	0.29	4.21	9.9	0.09	< 6.67	----	6.67
2D-SI003-SS-0-1	0.44	25.9	0.37	4.10	9.7	0.11	< 6.94	----	6.94
2D-SI004-SS-0-1	0.49	20.7	0.25	2.43	11.3	0.12	< 6.19	----	6.19
2D-SI005-SS-0-1	0.40	24.9	0.26	3.30	10.2	0.09	< 6.33	----	6.33
2D-SI006-SS-0-1	0.58	22.4	0.35	7.94	7.5	0.15	< 7.49	----	7.49
2D-SI007-SS-0-1	0.84	26.5	0.59	3.88	12.7	0.13	< 11.40	----	11.40
2D-SI008-SS-0-1	0.55	22.0	0.29	3.21	10.9	0.15	< 7.44	----	7.44
2D-SI009-SS-0-1	0.44	27.7	0.42	3.59	10.6	0.10	< 7.74	----	7.74
2D-SI010-SS-0-1	0.66	20.9	0.30	3.75	10.0	0.12	< 7.13	----	7.13
2D-SI011-SS-0-1	0.59	23.0	0.34	4.03	10.0	0.17	< 7.50	----	7.50
2D-SI012-SS-0-1	0.61	20.6	0.28	2.90	11.0	0.10	< 6.67	----	6.67
2D-SI013-SS-0-1 (1)	0.61	21.0	0.32	4.06	10.0	0.12	< 7.13	----	7.13
2D-SI013-SS-1-1 (1)	0.69	19.7	0.33	4.06	10.1	0.01	< 7.13	----	7.13
2D-SI014-SS-0-1	0.48	24.0	0.37	2.85	11.0	0.07	< 6.80	----	6.80
2D-SI015-SS-0-1	0.45	24.0	0.24	2.77	11.6	0.01	< 7.25	----	7.25
2D-SI016-SS-0-1	0.48	22.0	0.22	1.71	14.0	0.11	< 5.63	----	5.63
2D-SI017-SS-0-1	0.43	25.0	0.29	2.44	12.0	0.11	< 6.10	----	6.10
2D-SI018-SS-0-1	0.67	20.0	0.40	4.46	9.9	0.14	< 7.74	----	7.74
2D-SI019-SS-0-1	0.41	23.8	0.22	0.66	23.5	0.01	< 4.62	----	4.62
2D-SI020-SS-0-1	0.64	23.0	0.42	6.47	8.7	0.19	< 8.92	----	8.92
2D-SI021-SS-0-1	0.08	19.7	0.49	7.17	8.5	0.14	< 8.66	----	8.66
2D-SI022-SS-0-1 (1)	0.47	20.7	0.16	0.36	32.6	0.12	< 5.44	----	5.44
2D-SI022-SS-1-1 (1)	0.47	22.0	0.25	0.28	38.0	0.01	< 5.40	----	5.40
2D-SI023-SS-0-1	0.53	22.0	0.41	2.68	11.6	0.08	< 6.53	----	6.53
2D-SI024-SS-0-1	0.68	18.5	0.26	1.01	18.7	0.01	< 4.92	----	4.92

* Reported data are taken from the Nuclide Identification Report

MDA : Minimum Detectable Activity

Error: 2 sigma (95% confidence interval)

< : Nuclide undetected or less than the MDA. The nuclide is assumed to be present at the MDA Value.

---- Not Applicable

(1) Sample (-0-1) and its duplicate (-1-1)

**Table 2-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
02A-001	3.00	02A02200		5.25	0.16	0.52	13.82	0.26	0.39	15.30	J	4.12	17.60		
<i>ThermoRetec</i> ⁽²⁾		01A02013		4.55	0.38	0.31	12.76	0.64	0.47	9.80		3.95	4.81		
02A-001	5.00	02A02201		4.61	0.17	0.53	14.63	0.28	0.39	16.94		4.95	15.80		
02A-001	7.00	02A02202		0.58	0.06	0.18	0.46	0.05	0.20	6.02	U	---	6.02		
02A-001	8.50	02A02203		ARCHIVED											
02A-002	5.00	02A02204		9.22	0.26	0.81	44.25	0.62	0.60	27.18		5.93	24.40		
<i>ThermoRetec</i> ⁽²⁾		02A02204		8.06	0.61	0.48	44.37	1.83	0.74	23.67		6.64	8.07		
02A-002	6.50	02A02205		0.76	0.06	0.19	0.69	0.04	0.14	5.04	U	---	5.04		
02A-002	7.00	02A02206		ARCHIVED											
02A-003	4.50	02A02207		3.58	0.11	0.29	4.61	0.11	0.22	24.19		3.11	11.60		
<i>ThermoRetec</i> ⁽²⁾		02A02207		2.91	0.24	0.16	4.06	0.24	0.24	21.05		3.63	3.82		
02A-003	5.00	02A02208		0.71	0.07	0.22	0.67	0.04	0.15	5.40	U	---	5.40		
02A-003	6.00	02A02209		ARCHIVED											
02A-004	4.50	02A02210		6.92	0.21	0.55	7.78	0.19	0.37	36.73		4.52	15.50		
02A-004	5.50	02A02211		1.13	0.07	0.20	0.98	0.05	0.15	8.32	U	---	8.32		
02A-004	5.50	02A02212	X	1.04	0.06	0.19	0.73	0.05	0.14	5.44	U	---	5.44		
02A-004	7.00	02A02213		ARCHIVED											
02A-005	2.50	02A02214		0.74	0.07	0.17	1.02	0.06	0.22	7.89	U	---	7.89		
02A-005	4.50	02A02215		1.35	0.07	0.22	1.82	0.07	0.17	8.84	U	---	8.84		
02A-005	6.00	02A02216		ARCHIVED											
02A-006	1.50	02A02217		1.32	0.07	0.25	3.57	0.10	0.21	10.30	U	---	10.30		
02A-006	2.50	02A02218		0.88	0.06	0.20	2.03	0.08	0.24	6.30	U	---	6.30		
02A-006	6.50	02A02219		10.60	0.26	0.60	38.90	0.56	0.63	29.45	J	7.16	29.80		
<i>ThermoRetec</i> ⁽²⁾		02A02219		8.14	0.66	0.52	35.35	1.55	0.73	24.84		7.30	9.09		
02A-006	8.50	02A02220		0.72	0.08	0.16	0.78	0.06	0.21	5.64	U	---	5.64		
02A-006	9.00	02A02221		ARCHIVED											
02A-007	1.50	02A02222		4.43	0.15	0.41	10.74	0.22	0.34	18.60	U	---	18.60		
02A-007	2.00	02A02223		1.35	0.08	0.25	2.08	0.09	0.29	7.19	U	---	7.19		
02A-007	5.50	02A02224		60.77	1.01	1.69	132.59	1.62	1.33	133.10		14.99	61.30		
<i>ThermoRetec</i> ⁽²⁾		02A02224		51.35	2.78	0.96	116.90	4.57	1.43	119.50		17.54	17.80		
02A-007	6.50	02A02225		1.21	0.08	0.18	0.92	0.05	0.16	7.92	U	---	7.92		
02A-007	7.00	02A02226		ARCHIVED											
02A-008	2.00	02A02233		1.83	0.08	0.26	3.73	0.10	0.22	7.75	J	2.33	9.45		
02A-008	4.50	02A02234		1.15	J	0.06	0.21	1.74	J	0.07	0.15	6.54	U	---	6.54
02A-008	5.50	02A02235		ARCHIVED											
02A-008	5.50	02A02236	X	ARCHIVED											
02A-008	6.50	02A02237		ARCHIVED											

**Table 2-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
02A-009	1.50	02A02238		0.67	J	0.06	0.19	0.93	J	0.05	0.15	5.85	U	---	5.85
02A-009	2.50	02A02239		0.64		0.07	0.21	1.24		0.07	0.22	7.71	U	---	7.71
02A-009	5.50	02A02240		ARCHIVED											
02A-010	4.50	02A02241		0.66	J	0.06	0.21	0.92	J	0.05	0.14	5.05	U	---	5.05
02A-010	5.50	02A02242		0.75		0.07	0.20	0.98		0.05	0.16	7.32	U	---	7.32
02A-010	6.50	02A02243		ARCHIVED											
02A-011	5.00	02A02244		4.34	J	0.15	0.42	7.77	J	0.17	0.28	22.84	J	3.51	12.60
02A-011	6.00	02A02245		0.70	J	0.07	0.19	0.72	J	0.06	0.22	5.24	U	---	5.24
02A-011	6.00	02A02246	X	0.83		0.06	0.21	0.88		0.06	0.26	7.80	U	---	7.80
02A-011	7.50	02A02247		ARCHIVED											
02A-012	2.00	02A02248		0.83	J	0.08	0.21	2.16	J	0.08	0.25	6.51	U	---	6.51
02A-012	4.50	02A02249		0.72		0.07	0.21	1.27		0.07	0.24	7.91	U	---	7.91
02A-012	7.00	02A02250		ARCHIVED											
02A-013	5.00	02A02251		1.69	J	0.10	0.40	6.98	J	0.16	0.25	10.40	U	---	10.40
02A-013	6.50	02A02252		0.64	J	0.06	0.18	0.58	J	0.06	0.21	5.16	U	---	5.16
02A-013	7.00	02A02253		1.55		0.08	0.27	3.59		0.10	0.22	12.40	U	---	12.40
02A-013	8.50	02A02254		0.68		0.08	0.21	0.92		0.07	0.23	5.89	U	---	5.89
02A-014	5.50	02A02255		11.45		0.32	1.02	74.41		0.96	0.80	26.55	J	4.85	28.30
<i>ThermoRetec</i> ⁽²⁾		02A02255		9.78		0.81	0.70	72.74		2.95	1.07	25.23		7.49	11.76
02A-014	6.50	02A02256		2.06	J	0.09	0.23	1.85	J	0.08	0.19	2.75	J	2.42	8.02
<i>ThermoRetec</i> ⁽²⁾		02A02256		1.80		0.20	0.16	1.54		0.27	0.25	8.12		2.47	3.29
02A-014	6.50	02A02257	X	1.59	J	0.09	0.24	1.20	J	0.06	0.16	7.20	U	---	7.20
<i>ThermoRetec</i> ⁽²⁾		02A02257		1.28		0.15	0.14	1.24		0.28	0.45	9.52		2.12	2.57
02A-014	8.50	02A02258		ARCHIVED											
02A-015	3.00	02A02259		3.29		0.13	0.42	11.04		0.22	0.32	18.50	U	---	18.50
02A-015	4.50	02A02260		0.66		0.06	0.20	1.08		0.07	0.21	5.49	U	---	5.49
02A-016	1.50	02A02261		1.89		0.09	0.33	3.40		0.11	0.25	12.60	U	---	12.60
02A-016	2.50	02A02262		1.63		0.09	0.23	1.42		0.08	0.28	5.89	J	2.12	6.75
02A-016	5.00	02A02263		0.93		0.06	0.22	0.85		0.06	0.25	7.98	U	---	7.98
02A-017	1.50	02A02264		0.57		0.07	0.16	0.84		0.06	0.22	2.04	J	1.43	4.71
02A-017	2.50	02A02265		0.51		0.06	0.17	0.61		0.05	0.20	4.96	U	---	4.96
02A-017	5.00	02A02266		0.50		0.06	0.16	0.69		0.05	0.19	6.58	U	---	6.58
02B-001	0.50	02B002401		2.62		0.08	0.19	2.53		0.06	0.15	0.33	J	3.08	9.30
02B-001	1.25	02B002402		1.16		0.05	0.13	1.26		0.05	0.11	1.83	J	0.69	4.67
02B-001	2.08	02B002403		0.71		0.04	0.13	0.78		0.04	0.09	0.00	J	0.00	5.12
02B-001	4.42	02B002434		0.47		0.04	0.13	0.59		0.03	0.08	2.14	J	0.86	3.71
02B-001	5.25	02B002435	X	1.00		0.05	0.11	1.06		0.04	0.09	0.54	J	0.95	2.27

**Table 2-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
02B-002	0.46	02B002404		0.54	0.03	0.08	0.40	0.02	0.07	1.70	J	0.27	2.79
02B-002	1.38	02B002405		0.83	0.05	0.12	0.97	0.04	0.10	2.70	J	0.73	4.39
02B-002	2.25	02B002406		1.17	0.04	0.17	1.12	0.03	0.12	0.63	J	2.31	5.67
02B-003	0.46	02B002407		0.49	0.03	0.08	0.55	0.02	0.08	1.18	J	0.63	1.80
02B-003	1.38	02B002408		1.01	0.05	0.14	1.01	0.04	0.10	2.09	J	0.42	3.69
02B-003	2.25	02B002409		1.04	0.05	0.13	1.20	0.04	0.11	0.05	J	1.95	2.71
02B-003	4.58	02B002410		1.45	0.07	0.19	1.35	0.05	0.14	6.85		1.05	5.57
02B-003	5.58	02B002411		0.63	0.04	0.13	0.65	0.03	0.08	1.80	J	0.56	3.13
02B-003	6.92	02B002412		0.41	0.03	0.12	0.50	0.02	0.07	1.49	J	0.46	2.19
02B-004	0.46	02B002413		0.82	0.04	0.10	0.65	0.03	0.09	1.13	J	1.51	2.08
02B-004	1.38	02B002414		0.91	0.05	0.13	1.06	0.04	0.12	4.31		0.22	5.75
02B-004	2.25	02B002415		1.29	0.06	0.14	1.23	0.05	0.12	0.76	J	1.19	5.11
02B-004	4.58	02B002416		2.49	0.09	0.17	2.53	0.07	0.16	9.41		1.30	6.22
02B-004	5.58	02B002417		1.00	0.05	0.13	0.84	0.04	0.10	2.01	J	0.73	3.06
02B-004	6.92	02B002418		0.79	0.05	0.15	0.94	0.04	0.11	0.00	J	0.00	5.66
02B-005	2.50	02B002419		1.16	0.06	0.16	2.00	0.06	0.14	1.29	J	2.02	7.09
02B-005	4.50	02B002420		0.79	0.05	0.15	1.71	0.05	0.11	2.68		0.64	3.67
02B-005	5.50	02B002421		1.13	0.07	0.24	5.56	0.12	0.17	3.78		1.06	7.15
02B-005	6.50	02B002422		0.79	0.06	0.20	4.25	0.10	0.15	3.18	J	1.98	3.38
02B-005	8.50	02B002423		1.69	0.10	0.33	15.50	0.26	0.27	2.72	J	3.15	5.97
02B-006	1.75	02B002424		0.85	0.05	0.15	1.74	0.06	0.11	2.10	J	1.17	2.94
02B-006	2.92	02B002425		1.19	0.06	0.18	4.20	0.10	0.16	5.28		1.03	6.88
02B-006	4.54	02B002426		1.28	0.07	0.20	3.30	0.09	0.15	3.48		0.92	5.04
02B-006	5.96	02B002427		1.36	0.08	0.22	2.99	0.09	0.15	4.14	J	0.98	5.54
02B-006	7.33	02B002428		0.74	0.05	0.14	0.98	0.04	0.09	2.99		0.66	4.48
02B-007	1.50	02B002429		1.00	0.05	0.16	1.27	0.05	0.10	1.80	J	0.60	3.93
02B-007	2.50	02B002430		1.16	0.06	0.19	3.05	0.08	0.14	3.13		0.85	4.50
02B-007	4.54	02B002431		1.50	0.07	0.21	4.76	0.11	0.16	5.44		0.75	6.05
02B-007	5.83	02B002432		4.39	0.15	0.42	22.60	0.35	0.34	27.40		2.42	12.10
02B-007	7.04	02B002433		0.70	0.04	0.12	0.82	0.03	0.08	2.02	J	0.80	2.41
02C-001	4.50	02C02600		0.78	0.06	0.22	1.64	0.07	0.16	6.60	U	---	6.60
02C-001	6.50	02C02601		0.72	0.07	0.21	0.86	0.07	0.26	7.75	U	---	7.75
02C-001	6.50	02C02602	X	0.89	0.07	0.21	1.04	0.05	0.16	8.14	U	---	8.14
02C-001	9.00	02C02603		ARCHIVED									
02C-002	1.50	02C02604		0.58	0.07	0.21	0.98	0.06	0.23	5.55	U	---	5.55
02C-002	2.50	02C02605		0.59	0.07	0.21	0.78	0.06	0.22	5.86	U	---	5.86
02C-002	6.00	02C02606		ARCHIVED									

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 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
02C-003	6.00	02C02607		2.02	0.09	0.27	2.24	0.09	0.22	8.74	J	2.21	9.25
02C-003	8.50	02C02608		0.56	0.07	0.20	0.55	0.05	0.20	4.83	U	---	4.83
02C-003	10.00	02C02609		ARCHIVED									
02C-004	5.00	02C02610		2.20	0.10	0.33	5.15	0.14	0.25	9.60		3.21	10.30
		<i>ThermoRetec</i> ⁽²⁾		2.16	0.22	0.22	5.51	0.33	0.34	11.16		3.03	3.97
02C-004	6.00	02C02611		0.66	0.06	0.17	0.58	0.05	0.21	4.60	U	---	4.60
02C-004	6.00	02C02612	X	0.78	0.06	0.19	0.68	0.04	0.13	4.66	U	---	4.66
02C-004	8.50	02C02613		ARCHIVED									
02C-005	5.50	02C02614		1.35	0.09	0.25	1.72	0.08	0.20	4.27	J	2.49	8.14
02C-005	6.50	02C02615		0.94	0.07	0.25	0.74	0.05	0.16	7.62	U	---	7.62
02C-005	10.00	02C02616		ARCHIVED									
02C-006	2.00	02C02617		0.62	0.06	0.20	1.28	0.06	0.21	5.16	U	---	5.16
02C-006	4.50	02C02618		0.62	0.07	0.19	0.78	0.05	0.20	6.71	U	---	6.71
02C-006	5.50	02C02619		ARCHIVED									
02C-007	2.00	02C02620		2.35	0.14	0.65	32.30	0.47	0.50	25.40	U	---	25.40
		<i>ThermoRetec</i> ⁽²⁾		1.56	0.28	0.38	31.64	1.37	0.55	4.98	J	4.59	6.25
02C-007	4.50	02C02621		0.64	0.06	0.18	1.66	0.07	0.22	5.71	U	---	5.71
02C-007	6.50	02C02622		ARCHIVED									
02C-008	2.50	02C02623		1.42	0.09	0.39	11.00	0.21	0.29	-3.27	U	4.61	15.50
02C-008	4.50	02C02624		0.85	0.07	0.28	2.93	0.10	0.20	10.30	U	---	10.30
02C-008	5.50	02C02625		1.74	0.09	0.42	12.26	0.22	0.26	10.40	U	---	10.40
02C-008	6.50	02C02626		0.50	0.06	0.19	1.26	0.06	0.18	4.23	U	---	4.23
02C-008	8.50	02C02627		ARCHIVED									
02C-009	1.00	02C02628		0.90	0.07	0.20	1.04	0.06	0.25	8.15	U	---	8.15
02C-009	1.00	02C02629	X	0.87	0.07	0.22	0.96	0.05	0.14	5.98	U	---	5.98
02C-009	2.00	02C02630		0.59	0.06	0.09	0.75	0.05	0.20	6.91	U	---	6.91
02C-009	5.00	02C02631		ARCHIVED									
02C-010	1.00	02C02632		0.49	0.05	0.14	0.70	0.05	0.17	4.20	U	---	4.20
02C-010	3.00	02C02633		0.61	0.05	0.13	0.71	0.05	0.17	6.03	U	---	6.03
02C-010	4.50	02C02634		ARCHIVED									
02C-011	1.00	02C02635		1.81	0.11	0.42	10.49	0.22	0.31	6.22	J	3.79	12.40
02C-011	2.00	02C02636		0.36	0.05	0.15	0.45	0.04	0.18	6.04	U	---	6.04
02C-011	3.00	02C02637		ARCHIVED									
02C-012	1.50	02C02638		0.76	0.06	0.23	2.50	0.08	0.17	7.14	U	---	7.14
02C-012	2.50	02C02639		0.76	0.08	0.37	3.67	0.12	0.32	11.90	U	---	11.90
02C-012	5.00	02C02640		0.20	0.05	0.17	0.35	0.05	0.17	4.41	U	---	4.41

**Table 2-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
02C-013	1.50	02C02641		0.51	0.06	0.21	1.08	0.07	0.21	5.91	U	---	5.91
<i>ThermoRetec</i> ⁽²⁾		02C02641		0.63	0.13	0.14	1.06	0.12	0.22	1.35	UJ	1.97	2.12
02C-013	1.50	02C02642	X	0.60	0.08	0.29	1.62	0.08	0.27	8.76	U	---	8.76
<i>ThermoRetec</i> ⁽²⁾		02C02642		0.40	0.12	0.15	1.28	0.18	0.20	3.49		1.75	2.07
02C-013	2.50	02C02643		0.65	0.07	0.17	0.63	0.06	0.23	5.36	U	---	5.36
02C-013	5.00	02C02644		ARCHIVED									
02C-014	4.50	02C02645		1.24	0.08	0.28	4.35	0.12	0.34	11.70	U	---	11.70
02C-014	5.00	02C02646		0.81	0.08	0.26	1.40	0.07	0.18	6.84	U	---	6.84
02C-014	6.50	02C02647		ARCHIVED									
02C-014	6.50	02C02648	X	0.69	0.07	0.19	0.79	0.05	0.18	6.71	U	---	6.71
02C-015	4.50	02C02649		1.56	0.09	0.34	6.09	0.15	0.26	14.40	U	---	14.40
02C-015	5.00	02C02650		0.78	0.07	0.23	1.31	0.07	0.25	8.62	U	---	8.62
02C-015	6.00	02C02651		0.52	0.06	0.15	0.61	0.05	0.18	4.60	U	---	4.60
02C-016	2.50	02C02652		0.94	0.09	0.25	3.60	0.11	0.29	10.80	U	---	10.80
02C-016	4.50	02C02653		0.56	0.08	0.25	0.63	0.06	0.23	5.81	U	---	5.81
02C-016	5.50	02C02654		ARCHIVED									
02C-017	8.50	02C02655		1.43	0.09	0.34	5.75	0.15	0.25	9.74	U	---	9.74
02C-017	9.50	02C02656		0.52	0.09	0.27	0.91	0.07	0.25	1.94		1.79	5.99
02C-017	10.50	02C02657		ARCHIVED									
02C-018	3.00	02C02658		0.72	0.07	0.19	1.04	0.06	0.22	4.82	U	---	4.82
02C-018	5.50	02C02659		0.79	0.06	0.22	1.29	0.07	0.22	4.60		1.86	5.98
02C-018	5.50	02C02660	X	0.57	0.07	0.21	1.13	0.06	0.22	5.91	U	---	5.91
02C-018	7.00	02C02661		ARCHIVED									
02C-019	1.00	02C02662		0.94	0.07	0.24	1.54	0.08	0.28	9.14	U	---	9.14
02C-019	2.00	02C02663		0.90	0.08	0.21	0.77	0.07	0.29	9.61	U	---	9.61
02C-019	4.50	02C02664		ARCHIVED									
02C-020	1.50	02C02665		0.60	0.07	0.20	0.82	0.05	0.19	5.01	U	---	5.01
02C-020	4.50	02C02666		0.65	0.07	0.19	0.65	0.05	0.21	7.23	U	---	7.23
02C-020	4.50	02C02667	X	0.48	0.07	0.18	0.51	0.05	0.20	5.06	U	---	5.06
02C-020	6.50	02C02668		ARCHIVED									
02D-001	0.50	02D02800		0.73	0.07	0.17	0.79	0.05	0.20	4.96	U	---	4.96
02D-001	2.00	02D02801		1.63	0.10	0.35	7.11	0.17	0.28	10.90	U	---	10.90
<i>ThermoRetec</i> ⁽²⁾		02D02801		1.42	0.23	0.26	7.21	0.50	0.40	6.50		2.98	4.47
02D-001	2.00	02D02802	X	0.54	0.07	0.19	0.55	0.05	0.21	5.04	U	---	5.04
02D-001	5.00	02D02803		0.66	0.05	0.15	0.77	0.04	0.12	4.30	U	---	4.30

**Table 2-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
02D-002	0.50	02D02804		1.02	0.08	0.26	3.26	0.11	0.30	7.99	U	---	7.99		
02D-002	2.00	02D02805		0.66	0.07	0.23	0.67	0.06	0.22	5.45	U	---	5.45		
02D-002	5.00	02D02806		ARCHIVED											
02D-003	1.00	02D02807		1.08	0.08	0.26	2.17	0.09	0.28	7.20	U	---	7.20		
02D-003	2.00	02D02808		0.70	0.08	0.21	0.85	0.06	0.23	5.26	U	---	5.26		
02D-003	5.00	02D02809		ARCHIVED											
02D-004	1.00	02D02810		1.57	0.09	0.31	4.27	0.12	0.22	3.58		2.56	8.45		
<i>ThermoRetec</i> ⁽²⁾		02D02810		1.50	0.18	0.18	4.81	0.29	0.26	3.71		2.46	3.16		
02D-004	1.00	02D02811	X	1.48	0.08	0.31	4.23	0.12	0.23	8.74	U	---	8.74		
<i>ThermoRetec</i> ⁽²⁾		02D02811		1.59	0.21	0.22	4.51	0.38	0.28	8.18		3.13	3.55		
02D-004	3.00	02D02812		0.85	0.07	0.18	0.81	0.06	0.22	5.27	U	---	5.27		
02D-004	5.00	02D02813		ARCHIVED											
02D-005	1.00	02D02814		0.36	U	---	0.36	1.31	0.07	0.23	6.32	U	---	6.32	
02D-005	2.00	02D02815		ARCHIVED											
02D-005	5.00	02D02816		0.40	0.06	0.20	0.65	0.05	0.18	1.86		1.27	4.21		
02D-006	1.00	02D02817		0.72	0.07	0.27	1.98	0.09	0.25	6.84	U	---	6.84		
02D-006	2.50	02D02818		0.62	0.07	0.17	0.84	0.06	0.22	4.93	U	---	4.93		
02D-006	5.00	02D02819		ARCHIVED											
02D-007	0.50	02D02820		0.99	0.07	0.22	2.73	0.09	0.19	5.48		2.25	7.22		
<i>ThermoRetec</i> ⁽²⁾		02D02820		0.91	0.16	0.15	2.35	0.25	0.22	3.18		1.96	2.66		
02D-007	0.50	02D02821	X	0.98	0.07	0.24	2.89	0.10	0.19	7.57	U	---	7.57		
02D-007	3.00	02D02822		0.67	0.07	0.18	0.70	0.06	0.20	5.05	U	---	5.05		
02D-007	6.00	02D02823		ARCHIVED											
02D-008	0.50	02D02824		0.86	0.08	0.34	2.94	0.10	0.20	8.21	U	---	8.21		
02D-008	1.50	02D02825		0.32	0.07	0.24	0.49	0.05	0.16	4.49	U	---	4.49		
02D-008	5.00	02D02826		ARCHIVED											
02D-009	1.00	02D02827		1.93	0.10	0.29	6.57	0.16	0.25	3.37		3.24	10.80		
02D-009	2.00	02D02828		0.27	J	0.05	0.16	0.43	J	0.06	0.21	6.83	UJ	---	6.83
02D-009	4.50	02D02829		0.26	U	---	0.26	0.30	0.05	0.17	4.08	U	---	4.08	
02D-010	0.50	02D02830		1.27	0.11	0.48	6.52	0.18	0.29	11.80	U	---	11.80		
02D-010	2.00	02D02831		0.50	0.06	0.15	0.47	0.05	0.18	4.48	U	---	4.48		
02D-010	2.00	02D02832	X	0.47	0.06	0.14	0.51	0.05	0.18	4.61	U	---	4.61		
02D-010	5.00	02D02833		ARCHIVED											
02D-011	0.50	02D02834		1.32	0.09	0.32	4.50	0.13	0.21	8.82	U	---	8.82		
02D-011	1.50	02D02835		0.33	0.06	0.21	0.57	0.05	0.18	4.63	U	---	4.63		
02D-011	3.00	02D02836		ARCHIVED											

**Table 2-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results										
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g				
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA		
02D-012	0.50	02D02839		0.91	0.08	0.32	3.32	0.11	0.30	8.50	U	---	8.50	
02D-012	3.00	02D02840		0.23	U	---	0.23	0.28	0.03	0.12	3.29	U	---	3.29
02D-012	5.50	02D02841		ARCHIVED										
02D-012	10.50	02D02842		0.28	0.05	0.13	0.50	0.04	0.16	3.85	U	---	3.85	
02D-013	0.50	02D02843		1.10	0.07	0.24	3.14	0.09	0.18	6.97	U	---	6.97	
02D-013	2.00	02D02844		0.48	0.07	0.21	0.46	0.05	0.21	5.11	U	---	5.11	
02D-013	2.00	02D02845	X	0.43	0.06	0.19	0.49	0.05	0.17	4.26	U	---	4.26	
02D-013	4.50	02D02846		ARCHIVED										
02D-014	1.00	02D02847		0.70	0.08	0.22	0.96	0.06	0.23	5.54	U	---	5.54	
02D-014	3.00	02D02848		0.30	0.07	0.22	0.57	0.05	0.19	4.84	U	---	4.84	
02D-014	5.00	02D02849		ARCHIVED										
02D-015	1.00	02D02850		0.90	0.09	0.32	2.78	0.10	0.29	7.59	U	---	7.59	
02D-015	3.00	02D02851		0.32	U	---	0.32	0.53	0.05	0.18	5.06	U	---	5.06
02D-015	5.50	02D02852		ARCHIVED										
02D-016	0.50	02D02853		0.88	0.09	0.31	3.40	0.12	0.35	9.25	U	---	9.25	
02D-016	1.50	02D02854		0.54	0.05	0.14	0.45	0.04	0.11	4.42	U	---	4.42	
02D-016	3.00	02D02855		ARCHIVED										
02D-017	0.50	02D02856		1.67	0.11	0.42	7.61	0.18	0.28	6.68		3.77	12.30	
02D-017	2.00	02D02857		0.32	0.05	0.14	0.48	0.04	0.15	4.14	U	---	4.14	
02D-017	5.50	02D02858		ARCHIVED										
02D-018	0.50	02D02859		0.98	0.09	0.37	4.08	0.14	0.38	9.90	U	---	9.90	
02D-018	1.50	02D02860		0.31	0.05	0.15	0.56	0.04	0.16	3.99	U	---	3.99	
02D-018	3.00	02D02861		ARCHIVED										
02D-019	1.00	02D02862		1.16	0.08	0.29	4.83	0.12	0.21	8.57	U	---	8.57	
02D-019	4.50	02D02863		ARCHIVED										
02D-019	6.00	02D02864		0.24	U	---	0.24	0.37	0.04	0.14	4.05	U	---	4.05
02D-020	0.50	02D02865		1.44	0.15	0.36	4.37	0.16	0.46	12.30	U	---	12.30	
02D-020	1.50	02D02866		0.65	0.08	0.23	0.82	0.06	0.24	6.03	U	---	6.03	
02D-020	4.50	02D02867		2.00	0.11	0.39	4.20	0.13	0.25	16.32		3.52	10.70	
02D-020	5.50	02D02868		0.68	0.07	0.24	0.66	0.05	0.14	3.40		1.74	5.64	
02D-020	8.50	02D02869		ARCHIVED										
02D-021	1.50	02D02870		1.60	0.09	0.32	6.85	0.16	0.25	10.80	U	---	10.80	
02D-021	5.00	02D02871		0.31	0.06	0.20	0.47	0.05	0.17	4.61	U	---	4.61	
02D-021	5.00	02D02872	X	0.47	0.06	0.14	0.43	0.05	0.17	4.34	U	---	4.34	
02D-021	6.50	02D02873		ARCHIVED										

**Table 2-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
02D-022	1.00	02D02874		1.31	0.08	0.29	4.23	0.12	0.22	8.76	U	---	8.76		
02D-022	2.50	02D02875		0.34	0.05	0.16	0.39	0.05	0.16	4.04	U	---	4.04		
02D-022	5.00	02D02876		ARCHIVED											
02D-023	0.50	02D02877		0.75	J	0.12	0.38	3.13	J	0.13	0.34	9.74	UJ	---	9.74
02D-023	3.00	02D02878		0.39	J	0.06	0.17	0.54	J	0.05	0.17	4.29	UJ	---	4.29
02D-023	7.00	02D02879		ARCHIVED											
02D-024	2.50	02D02880		1.51	J	0.09	0.34	8.67	J	0.18	0.26	4.29	J	3.41	11.30
02D-024	5.00	02D02881		1.99	J	0.10	0.28	5.37	J	0.14	0.23	17.41	J	2.75	10.20
02D-024	6.00	02D02882		0.45	J	0.05	0.16	0.40	J	0.04	0.17	4.12	UJ	---	4.12
02D-024	7.00	02D02883		ARCHIVED											
02D-025	1.00	02D02884		1.10	J	0.09	0.35	5.61	J	0.15	0.27	11.10	UJ	---	11.10
02D-025	3.00	02D02885		0.91	J	0.07	0.29	4.44	J	0.12	0.19	8.12	UJ	---	8.12
02D-025	6.00	02D02886		0.55		0.07	0.20	0.67		0.05	0.20	6.35	U	---	6.35
02D-025	9.50	02D02887		ARCHIVED											
02D-026	1.00	02D02888		0.62		0.08	0.21	1.10		0.06	0.22	7.80	U	---	7.80
02D-026	1.00	02D02889	X	0.70		0.07	0.21	1.21		0.06	0.16	8.38	U	---	8.38
02D-026	4.50	02D02890		0.64		0.07	0.10	0.89		0.06	0.23	7.14	U	---	7.14
02D-026	6.50	02D02891		ARCHIVED											
02D-027	5.00	02D02892		2.87		0.12	0.38	3.98		0.12	0.26	2.02		4.99	16.60
02D-027	7.50	02D02893		0.27		0.05	0.18	0.42		0.04	0.19	5.67	U	---	5.67
02D-027	9.00	02D02894		ARCHIVED											
02D-028	1.00	02D02895		1.95		0.11	0.45	9.71		0.20	0.32	17.70	U	---	17.70
02D-028	2.50	02D02896		0.51		0.06	0.15	0.54		0.05	0.22	6.52	U	---	6.52
02D-028	5.00	02D02897		ARCHIVED											
02D-029	0.50	02D02898		0.64		0.11	0.36	4.94		0.16	0.46	15.30	U	---	15.30
02D-029	5.00	02D02899		0.51		0.06	0.16	1.05		0.06	0.25	6.59	U	---	6.59
02D-029	8.50	02D02900		0.98		0.08	0.30	1.37		0.07	0.17	9.61	U	---	9.61
02D-029	10.00	02D02901		ARCHIVED											
02D-030	5.50	02D02902		0.58		0.06	0.26	1.02		0.05	0.15	8.22	U	---	8.22
02D-030	5.50	02D02903	X	0.71		0.08	0.26	1.14		0.07	0.27	8.13	U	---	8.13
02D-030	8.50	02D02904		0.50		0.06	0.20	0.61		0.06	0.22	6.46	U	---	6.46
02D-030	10.00	02D02905		ARCHIVED											
02D-031	2.50	02D02906		0.66		0.10	0.30	0.71		0.07	0.30	9.25	U	---	9.25
02D-031	4.50	02D02907		0.45	U	---	0.45	0.43		0.09	0.37	10.50	U	---	10.50
02D-031	6.50	02D02908		ARCHIVED											

**Table 2-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
02D-032	1.00	02D02909		2.19	0.13	0.58	14.07	0.28	0.38	21.20	U	---	21.20		
02D-032	2.50	02D02910		0.42	J	0.06	0.19	0.68	J	0.05	0.18	4.23	UJ	---	4.23
02D-032	5.50	02D02911		ARCHIVED											
02D-033	1.00	02D02912		2.07	J	0.13	0.46	11.36	J	0.24	0.34	14.10	UJ	---	14.10
02D-033	2.50	02D02913		0.29		0.06	0.20	0.52		0.06	0.19	5.07	U	---	5.07
02D-033	2.50	02D02914	X	0.38		0.05	0.16	0.38		0.04	0.16	4.21	U	---	4.21
02D-033	6.00	02D02915		ARCHIVED											
02D-034	1.00	02D02916		1.42		0.08	0.33	4.29		0.12	0.24	12.20	U	---	12.20
02D-034	2.00	02D02917		0.51		0.06	0.22	0.87		0.06	0.21	7.05	U	---	7.05
02D-034	6.50	02D02918		0.95		0.07	0.35	4.72		0.12	0.21	11.50	U	---	11.50
02D-034	8.50	02D02919		0.70		0.08	0.21	0.76		0.06	0.27	7.87	U	---	7.87
02D-034	10.00	02D02920		ARCHIVED											
02D-035	1.50	02D02921		2.79		0.14	0.54	10.19		0.23	0.37	15.70	U	---	15.70
02D-035	5.00	02D02922		0.54		0.07	0.22	0.64		0.06	0.25	7.05	U	---	7.05
02D-035	6.00	02D02923		ARCHIVED											
02D-036	0.50	02D02924		1.28		0.12	0.54	8.41		0.22	0.34	13.90	U	---	13.90
02D-036	1.50	02D02925		0.48		0.05	0.18	0.70		0.06	0.23	6.81	U	---	6.81
02D-036	5.00	02D02926		ARCHIVED											
02D-037	0.50	02D02927		1.31		0.11	0.36	5.03		0.17	0.46	11.40	U	---	11.40
<i>ThermoRetec</i> ⁽²⁾		02D02927		1.23		0.25	0.31	5.18		0.50	0.45	4.58		4.27	4.46
02D-037	2.00	02D02928		0.51		0.07	0.27	0.85		0.07	0.27	7.86	U	---	7.86
02D-037	2.00	02D02929	X	0.64		0.08	0.25	0.73		0.07	0.26	8.19	U	---	8.19
02D-037	3.00	02D02930		ARCHIVED											
02D-038	0.50	02D02931		0.66		0.08	0.31	1.36		0.08	0.26	6.92	U	---	6.92
02D-038	2.00	02D02932		0.42		0.05	0.16	0.25	U	---	0.25	4.56	U	---	4.56
02D-038	5.00	02D02933		ARCHIVED											
02D-039	1.50	02D02934		0.97		0.09	0.27	2.50		0.09	0.19	10.30	U	---	10.30
02D-039	2.00	02D02935		0.54		0.07	0.22	0.67		0.06	0.24	7.15	U	---	7.15
02D-039	3.00	02D02936		ARCHIVED											
02D-040	2.00	02D02937		0.75		0.07	0.25	2.43		0.09	0.19	7.10	U	---	7.10
02D-040	3.00	02D02938		0.29		0.06	0.19	0.48		0.04	0.17	4.39	U	---	4.39
02D-040	5.00	02D02939		ARCHIVED											
02D-041	1.50	02D02940		1.05		0.07	0.28	1.56		0.07	0.15	8.28	U	---	8.28
02D-041	1.50	02D02941	X	0.83		0.07	0.19	1.10		0.06	0.22	5.72	U	---	5.72
02D-041	4.50	02D02942		0.83		0.06	0.18	1.35		0.06	0.15	7.49	U	---	7.49
02D-041	5.50	02D02943		ARCHIVED											

**Table 2-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
<i>02D-042</i>	1.50	02D02944		0.79	0.07	0.22	0.86	0.06	0.24	7.12	U	---	7.12
<i>02D-042</i>	2.50	02D02945		0.49	0.07	0.20	0.46	0.05	0.20	4.71	U	---	4.71
<i>02D-042</i>	5.50	02D02946		0.33	0.06	0.19	0.57	0.06	0.22	6.92	U	---	6.92
<i>02D-043</i>	0.50	02D02947		0.65	0.08	0.19	0.76	0.07	0.23	6.50	U	---	6.50
<i>02D-043</i>	5.50	02D02948		0.76	0.07	0.21	0.79	0.07	0.31	8.75	U	---	8.75
<i>02D-043</i>	9.50	02D02949		0.25	0.05	0.17	0.33	0.04	0.17	4.03	U	---	4.03
<i>02D-044</i>	3.00	02D02950		0.69	0.08	0.23	0.88	0.06	0.24	6.15	U	---	6.15
<i>02D-044</i>	4.50	02D02951		0.71	0.07	0.16	1.05	0.06	0.22	5.12	U	---	5.12
<i>02D-044</i>	6.50	02D02952		0.60	0.07	0.13	0.95	0.06	0.23	5.46	U	---	5.46

Error: 2 sigma (95% confidence interval)

- Not Applicable
- U Undetected or Negative Concentration Less Than the MDA
- J Estimated
- MDA Minimum Detectable Activity

- (1) The sample marked with an "X" for duplicate is a duplicate of the sample listed directly above it. Duplicate samples are prepared by homogenizing soil above and below the centerpoint and then separating for analysis. The depth listed is the center point.
- (2) Approximately 10% of all radiological soil samples collected under the PDI Program were sent to ThermoRetec, an off-site laboratory, for confirmatory radiological analyses. Results from ThermoRetec are presented in this table in italicized font immediately below the MISS On-Site field laboratory result for that same sample.

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID	02A-020502	02A-020504	02C-020510
	Sample Location	02A-001	02A-002	02C-001
	Sample Depth (feet)	5 - 8	5 - 8	0 - 4
	Sample Date	03/31/00	04/03/00	03/15/00
Units				
<i>Miscellaneous</i>				
Chromium VI	mg/kg	48.1U	49.3U	0.48U
Corrosivity by pH	Soil pH	6.8	6.8	7.3
Cyanide, Reactive	mg/kg	0.50U	0.50U	0.50U
Cyanide, Total	mg/kg	0.59U	0.62U	0.34U
Sulfide, Reactive	mg/kg	24.0U	24.0U	24.0U
<i>PCBs/Pesticides</i>				
4,4'-DDD	ug/kg	4.0U	4.4	92
4,4'-DDE	ug/kg	4.0U	4.0U	15J
4,4'-DDT	ug/kg	4.0U	4.0U	16U
Aldrin	ug/kg	2.0U	2.0U	7.9U
Alpha-BHC	ug/kg	2.0U	2.0U	7.9U
alpha-Chlordane	ug/kg	2.0U	2.0U	7.9U
Aroclor-1016	ug/kg	40U	40U	7.7U
Aroclor-1221	ug/kg	80U	80U	15U
Aroclor-1232	ug/kg	40U	40U	7.7U
Aroclor-1242	ug/kg	40U	40U	7.7U
Aroclor-1248	ug/kg	40U	40U	7.7U
Aroclor-1254	ug/kg	40U	40U	7.7U
Aroclor-1260	ug/kg	40U	40U	8.4
Beta-BHC	ug/kg	2.0U	2.0U	7.9U
Delta-BHC	ug/kg	2.0U	2.0U	7.9U
Dieldrin	ug/kg	4.0U	4.0U	16U
Endosulfan I	ug/kg	2.0U	2.0U	7.9U
Endosulfan II	ug/kg	4.0U	4.0U	16U
Endosulfan sulfate	ug/kg	4.0U	4.0U	16U
Endrin	ug/kg	4.0U	4.0U	16U
Endrin aldehyde	ug/kg	4.0U	4.0U	16U
Endrin ketone	ug/kg	4.0U	4.0U	16U
gamma-BHC (Lindane)	ug/kg	2.0U	2.0U	7.9U
gamma-Chlordane	ug/kg	2.0U	2.0U	7.9U
Heptachlor	ug/kg	2.0U	2.0U	7.9U
Heptachlor epoxide	ug/kg	2.0U	2.0U	7.9U
Methoxychlor	ug/kg	20U	20U	79U
Toxaphene	ug/kg	200U	200U	790U

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID	02A-020502	02A-020504	02C-020510
	Sample Location	02A-001	02A-002	02C-001
	Sample Depth (feet)	5 - 8	5 - 8	0 - 4
	Sample Date	03/31/00	04/03/00	03/15/00
Units				
<i>Rare Earth Metals</i>				
Cerium, Total	mg/kg	85.6	575	43
Dysprosium, Total	mg/kg	2.9	6.9	1.6
Lanthanum, Total	mg/kg	50.3	393	23.1
Neodymium, Total	mg/kg	43.4	320	24.6
Yttrium, Total	mg/kg	12.6	25	8.3
<i>Semivolatile Organics</i>				
1,2,4-Trichlorobenzene	ug/kg	400U	800U	780U
1,2-Dichlorobenzene	ug/kg	400U	800U	780U
1,3-Dichlorobenzene	ug/kg	400U	800U	780U
1,4-Dichlorobenzene	ug/kg	400U	800U	780U
2,2'-oxybis(1-Chloropropane)	ug/kg	400U	800U	780U
2,4,5-Trichlorophenol	ug/kg	1000U	2000U	2000U
2,4,6-Trichlorophenol	ug/kg	400U	800U	780U
2,4-Dichlorophenol	ug/kg	400U	800U	780U
2,4-Dimethylphenol	ug/kg	400U	800U	780U
2,4-Dinitrophenol	ug/kg	1000U	2000U	2000U
2,4-Dinitrotoluene	ug/kg	400U	800U	780U
2,6-Dinitrotoluene	ug/kg	400U	800U	780U
2-Chloronaphthalene	ug/kg	400U	800U	780U
2-Chlorophenol	ug/kg	400U	800U	780U
2-Methylnaphthalene	ug/kg	400U	800U	780U
2-Methylphenol	ug/kg	400U	800U	780U
2-Nitroaniline	ug/kg	1000U	2000U	2000U
2-Nitrophenol	ug/kg	400U	800U	780U
3,3'-Dichlorobenzidine	ug/kg	400U	800U	780U
3-Nitroaniline	ug/kg	1000U	2000U	2000U
4,6-Dinitro-2-methylphenol	ug/kg	1000U	2000U	2000U
4-Bromophenyl-phenylether	ug/kg	400U	800U	780U
4-Chloro-3-methylphenol	ug/kg	400U	800U	780U
4-Chloroaniline	ug/kg	400U	800U	780U
4-Chlorophenyl-phenylether	ug/kg	400U	800U	780U
4-Methylphenol	ug/kg	400U	800U	780U
4-Nitroaniline	ug/kg	1000U	2000U	2000U
4-Nitrophenol	ug/kg	1000U	2000U	2000U
Acenaphthene	ug/kg	400U	800U	780U
Acenaphthylene	ug/kg	400U	55J	53J
Anthracene	ug/kg	400U	57J	60J
Benzo(a)anthracene	ug/kg	40J	140J	140J
Benzo(a)pyrene	ug/kg	45J	160J	130J
Benzo(b)fluoranthene	ug/kg	46J	150J	100J

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID	02A-020502	02A-020504	02C-020510
	Sample Location	02A-001	02A-002	02C-001
	Sample Depth (feet)	5 - 8	5 - 8	0 - 4
	Sample Date	03/31/00	04/03/00	03/15/00
Units				
<i>Semivolatile Organics (continued)</i>				
Benzo(g,h,i)perylene	ug/kg	400U	140J	110J
Benzo(k)fluoranthene	ug/kg	41J	170J	130J
bis(2-Chloroethoxy)methane	ug/kg	400U	800U	780U
bis(2-Chloroethyl)ether	ug/kg	400U	800U	780U
bis(2-Ethylhexyl)phthalate	ug/kg	33JB	100BJ	96J
Butylbenzylphthalate	ug/kg	400U	800U	780U
Carbazole	ug/kg	400U	800U	780U
Chrysene	ug/kg	57J	220J	180J
Di-n-butylphthalate	ug/kg	400U	800U	780U
Di-n-octyl phthalate	ug/kg	400U	800U	140J
Dibenz(a,h)anthracene	ug/kg	400U	44J	780U
Dibenzofuran	ug/kg	400U	800U	780U
Diethylphthalate	ug/kg	400U	800U	780U
Dimethylphthalate	ug/kg	400U	800U	780U
Fluoranthene	ug/kg	66J	290J	340J
Fluorene	ug/kg	400U	800U	780U
Hexachlorobenzene	ug/kg	400U	800U	780U
Hexachlorobutadiene	ug/kg	400U	800U	780U
Hexachlorocyclopentadiene	ug/kg	400U	800U	780U
Hexachloroethane	ug/kg	400U	800U	780U
Indeno(1,2,3-cd)pyrene	ug/kg	400U	120J	87J
Isophorone	ug/kg	400U	800U	780U
N-Nitroso-di-n-propylamine	ug/kg	400U	800U	780U
N-Nitrosodiphenylamine (1)	ug/kg	400U	800U	780U
Naphthalene	ug/kg	400U	800U	780U
Nitrobenzene	ug/kg	400U	800U	780U
Pentachlorophenol	ug/kg	1000U	2000U	2000U
Phenanthrene	ug/kg	52J	210J	240J
Phenol	ug/kg	400U	800U	780U
Pyrene	ug/kg	84J	310J	330J
<i>Total Metals</i>				
Aluminum, Total	mg/kg	5950	6650	5140
Antimony, Total	mg/kg	0.2U	0.2U	0.18U
Arsenic, Total	mg/kg	9	13.8	3.3
Barium, Total	mg/kg	142	174	58.2
Beryllium, Total	mg/kg	0.44	0.56	0.26
Boron, Total	mg/kg	2.5	3.3	3.5
Cadmium, Total	mg/kg	0.03U	0.03U	0.03U
Calcium, Total	mg/kg	3390	2190	10000
Chromium, Total	mg/kg	31.1	111	10.7

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID	02A-020502	02A-020504	02C-020510
	Sample Location	02A-001	02A-002	02C-001
	Sample Depth (feet)	5 - 8	5 - 8	0 - 4
	Sample Date	03/31/00	04/03/00	03/15/00
Units				
<i>Total Metals (continued)</i>				
Cobalt, Total	mg/kg	4	5.8	4.6
Copper, Total	mg/kg	15.3	55.4	9.4
Iron, Total	mg/kg	12000	13900	13500
Lead, Total	mg/kg	29.2	105	9.3
Lithium, Total	mg/kg	10.5	18.5	8.8
Magnesium, Total	mg/kg	1520	1950	2790
Manganese, Total	mg/kg	164	187	451
Mercury, Total	mg/kg	0.07	1.9	0.04
Nickel, Total	mg/kg	8	11.5	8.8
Potassium, Total	mg/kg	376	623	876
Selenium, Total	mg/kg	0.5U	0.48U	0.43U
Silver, Total	mg/kg	0.1U	0.41U	0.09U
Sodium, Total	mg/kg	74.3	90.3	106
Thallium, Total	mg/kg	0.42U	0.62	0.36U
Vanadium, Total	mg/kg	25.9	26.4	14.9
Zinc, Total	mg/kg	32.7	98.4	26.7
<i>Volatile Organics</i>				
1,1,1-Trichloroethane	ug/kg	590U	760U	750U
1,1,2,2-Tetrachloroethane	ug/kg	590U	760U	750U
1,1,2-Trichloroethane	ug/kg	590U	760U	750U
1,1-Dichloroethane	ug/kg	590U	760U	750U
1,1-Dichloroethene	ug/kg	590U	760U	750U
1,2-Dichloroethane	ug/kg	590U	760U	750U
1,2-Dichloroethene (total)	ug/kg	590U	760U	750U
1,2-Dichloropropane	ug/kg	590U	760U	750U
2-Butanone	ug/kg	1200U	1500U	1500U
2-Hexanone	ug/kg	1200U	1500U	1500U
4-Methyl-2-pentanone	ug/kg	1200U	1500U	1500U
Acetone	ug/kg	1200U	1500U	990BJ
Benzene	ug/kg	590U	760U	750U
Bromodichloromethane	ug/kg	590U	760U	750U
Bromoform	ug/kg	590U	760U	750U
Bromomethane	ug/kg	1200U	1500U	1500U
Carbon Disulfide	ug/kg	590U	760U	750U
Carbon Tetrachloride	ug/kg	590U	760U	750U
Chlorobenzene	ug/kg	590U	760U	750U
Chloroethane	ug/kg	1200U	1500U	1500U
Chloroform	ug/kg	590U	760U	750U

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID	02A-020502	02A-020504	02C-020510
	Sample Location	02A-001	02A-002	02C-001
	Sample Depth (feet)	5 - 8	5 - 8	0 - 4
	Sample Date	03/31/00	04/03/00	03/15/00
Units				
<i>Volatile Organics (continued)</i>				
Chloromethane	ug/kg	1200U	1500U	1500U
cis-1,3-Dichloropropene	ug/kg	590U	760U	750U
Dibromochloromethane	ug/kg	590U	760U	750U
Ethylbenzene	ug/kg	590U	760U	750U
Methylene Chloride	ug/kg	590U	760U	750U
Styrene	ug/kg	590U	760U	750U
Tetrachloroethene	ug/kg	590U	760U	750U
Toluene	ug/kg	590U	760U	750U
Trans-1,3-Dichloropropene	ug/kg	590U	760U	750U
Trichloroethene	ug/kg	590U	760U	750U
Vinyl Chloride	ug/kg	1200U	1500U	1500U
Xylene (total)	ug/kg	590U	760U	750U
<i>TCLP Metals</i>				
Arsenic	ug/L	22.9U	136U	23.2U
Barium	ug/L	944J	913J	980
Cadmium	ug/L	4.1U	4.1U	4.1U
Chromium	ug/L	3.4U	10.5	4.7U
Lead	ug/L	26.6U	31.5	63.4U
Mercury	ug/L	0.1U	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U	49.7U
Silver	ug/L	3.7U	3.7U	3.7U
<i>TCLP Pesticides</i>				
Alpha-Chlordane	ug/L	0.5UJ	0.5U	0.5U
Endrin	ug/L	1UJ	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5UJ	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5UJ	0.5U	0.5U
Heptachlor	ug/L	0.5UJ	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5UJ	0.5U	0.5U
Methoxychlor	ug/L	5UJ	5U	5U
Toxaphene	ug/L	50UJ	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U	5U
2,4-D	ug/L	10U	10U	10U

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID	02A-020502	02A-020504	02C-020510
	Sample Location	02A-001	02A-002	02C-001
	Sample Depth (feet)	5 - 8	5 - 8	0 - 4
	Sample Date	03/31/00	04/03/00	03/15/00
Units				
<i>TCLP Volatiles</i>				
1,1-Dichloroethene	mg/L	0.025U	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U	0.05U
Benzene	mg/L	0.025U	0.025U	0.047
Carbon tetrachloride	mg/L	0.025U	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>				
1,4-Dichlorobenzene	mg/L	0.05U	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U	0.05U

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID	02B-020506	02B-020508
	Sample Location	02B-001	02B-002
	Sample Depth (feet)	12-14	6 -8
	Sample Date	08/22/01	08/28/01
Units			
<i>Miscellaneous</i>			
Chromium VI	mg/kg	NA	NA
Corrosivity by pH	Soil pH	8.9	5.5
Cyanide, Reactive	mg/kg	NA	0.48U
Cyanide, Total	mg/kg	0.38U	NA
Sulfide, Reactive	mg/kg	NA	38.3U
Silicon, Total	mg/kg	1520	1520
<i>PCBs/Pesticides</i>			
4,4'-DDD	ug/kg	3.8U	3.9U
4,4'-DDE	ug/kg	3.8U	3.9U
4,4'-DDT	ug/kg	3.8U	3.9U
Aldrin	ug/kg	1.9U	1.9U
Alpha-BHC	ug/kg	1.9U	1.9U
alpha-Chlordane	ug/kg	1.9U	1.9U
Aroclor-1016	ug/kg	38U	39U
Aroclor-1221	ug/kg	76U	78U
Aroclor-1232	ug/kg	38U	40U
Aroclor-1242	ug/kg	38U	40U
Aroclor-1248	ug/kg	38U	40U
Aroclor-1254	ug/kg	38U	40U
Aroclor-1260	ug/kg	38U	40U
Beta-BHC	ug/kg	1.9U	1.9U
Delta-BHC	ug/kg	1.9U	1.9U
Dieldrin	ug/kg	3.8U	3.9U
Endosulfan I	ug/kg	1.9U	1.9U
Endosulfan II	ug/kg	3.8U	3.9U
Endosulfan sulfate	ug/kg	3.8U	3.9U
Endrin	ug/kg	3.8U	3.9U
Endrin aldehyde	ug/kg	3.8U	3.9U
Endrin ketone	ug/kg	3.8U	3.9U
gamma-BHC (Lindane)	ug/kg	1.9U	1.9U
gamma-Chlordane	ug/kg	1.9U	1.9U
Heptachlor	ug/kg	1.9U	1.9U
Heptachlor epoxide	ug/kg	1.9U	1.9U
Methoxychlor	ug/kg	19U	19U

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID Sample Location Sample Depth (feet) Sample Date	02B-020506 02B-001 12-14 08/22/01	02B-020508 02B-002 6 -8 08/28/01
Units			
Toxaphene	ug/kg	190U	190U
<i>Rare Earth Metals</i>			
Cerium, Total	mg/kg	8.9	188
Dysprosium, Total	mg/kg	0.33	3
Lanthanum, Total	mg/kg	4.5	119
Neodymium, Total	mg/kg	4.3	44.4
Yttrium, Total	mg/kg	3.4	17.3
<i>Semivolatile Organics</i>			
1,2,4-Trichlorobenzene	ug/kg	380U	390U
1,2-Dichlorobenzene	ug/kg	380U	390U
1,3-Dichlorobenzene	ug/kg	380U	390U
1,4-Dichlorobenzene	ug/kg	380U	390U
2,2'-oxybis(1-Chloropropane)	ug/kg	380U	390U
2,4,5-Trichlorophenol	ug/kg	950U	980U
2,4,6-Trichlorophenol	ug/kg	380U	390U
2,4-Dichlorophenol	ug/kg	380U	390U
2,4-Dimethylphenol	ug/kg	380U	390U
2,4-Dinitrophenol	ug/kg	950U	980U
2,4-Dinitrotoluene	ug/kg	380U	390U
2,6-Dinitrotoluene	ug/kg	380U	390U
2-Chloronaphthalene	ug/kg	380U	390U
2-Chlorophenol	ug/kg	380U	390U
2-Methylnaphthalene	ug/kg	380U	390U
2-Methylphenol	ug/kg	380U	390U
2-Nitroaniline	ug/kg	950U	980U
2-Nitrophenol	ug/kg	380U	390U
3,3'-Dichlorobenzidine	ug/kg	380U	390U
3-Nitroaniline	ug/kg	950U	980U
4,6-Dinitro-2-methylphenol	ug/kg	950U	980U
4-Bromophenyl-phenylether	ug/kg	380U	390U
4-Chloro-3-methylphenol	ug/kg	380U	390U
4-Chloroaniline	ug/kg	380U	390U
4-Chlorophenyl-phenylether	ug/kg	380U	390U
4-Methylphenol	ug/kg	380U	390U
4-Nitroaniline	ug/kg	950U	980U
4-Nitrophenol	ug/kg	950U	980U
Acenaphthene	ug/kg	380U	390U
Acenaphthylene	ug/kg	380U	390U
Anthracene	ug/kg	380U	390U
Benzo(a)anthracene	ug/kg	380U	390U
Benzo(a)pyrene	ug/kg	380U	390U

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID Sample Location Sample Depth (feet) Sample Date	02B-020506 02B-001 12-14 08/22/01	02B-020508 02B-002 6 -8 08/28/01
Units			
Benzo(b)fluoranthene	ug/kg	380U	390U
<i>Semivolatile Organics (continued)</i>			
Benzo(g,h,i)perylene	ug/kg	380U	390U
Benzo(k)fluoranthene	ug/kg	380U	390U
bis(2-Chloroethoxy)methane	ug/kg	380U	390U
bis(2-Chloroethyl)ether	ug/kg	380U	390U
bis(2-Ethylhexyl)phthalate	ug/kg	380U	390U
Butylbenzylphthalate	ug/kg	380U	390U
Carbazole	ug/kg	380U	390U
Chrysene	ug/kg	380U	390U
Di-n-butylphthalate	ug/kg	380U	390U
Di-n-octyl phthalate	ug/kg	380U	390U
Dibenz(a,h)anthracene	ug/kg	380U	390U
Dibenzofuran	ug/kg	380U	390U
Diethylphthalate	ug/kg	380U	390U
Dimethylphthalate	ug/kg	380U	390U
Fluoranthene	ug/kg	380U	390U
Fluorene	ug/kg	380U	390U
Hexachlorobenzene	ug/kg	380U	390U
Hexachlorobutadiene	ug/kg	380U	390U
Hexachlorocyclopentadiene	ug/kg	380U	390U
Hexachloroethane	ug/kg	380U	390U
Indeno(1,2,3-cd)pyrene	ug/kg	380U	390U
Isophorone	ug/kg	380U	390U
N-Nitroso-di-n-propylamine	ug/kg	380U	390U
N-Nitrosodiphenylamine (1)	ug/kg	380U	390U
Naphthalene	ug/kg	380U	390U
Nitrobenzene	ug/kg	380U	390U
Pentachlorophenol	ug/kg	950U	980U
Phenanthrene	ug/kg	380U	390U
Phenol	ug/kg	380U	390U
Pyrene	ug/kg	380U	390U
<i>Total Metals</i>			
Aluminum, Total	mg/kg	1880	5020
Antimony, Total	mg/kg	0.26U	0.26U
Arsenic, Total	mg/kg	1.3	6.7
Barium, Total	mg/kg	56.1	97.3
Beryllium, Total	mg/kg	0.13	0.33
Boron, Total	mg/kg	1.9	2
Cadmium, Total	mg/kg	0.03U	0.03U
Calcium, Total	mg/kg	4230J	979J

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID Sample Location Sample Depth (feet) Sample Date	02B-020506 02B-001 12-14 08/22/01	02B-020508 02B-002 6 -8 08/28/01
Units			
Chromium, Total	mg/kg	3.5	42.2
<i>Total Metals (continued)</i>			
Cobalt, Total	mg/kg	2	4.5
Copper, Total	mg/kg	4.4J	17.5J
Iron, Total	mg/kg	4810	8420
Lead, Total	mg/kg	2	15.8
Lithium, Total	mg/kg	3.3	12.8
Magnesium, Total	mg/kg	1110	1110
Manganese, Total	mg/kg	156J	158J
Mercury, Total	mg/kg	0.02U	0.31
Nickel, Total	mg/kg	4	7.1
Potassium, Total	mg/kg	438	413
Selenium, Total	mg/kg	0.36U	0.36U
Silver, Total	mg/kg	0.06U	0.06U
Sodium, Total	mg/kg	109UB	126U
Thallium, Total	mg/kg	0.39U	0.39U
Vanadium, Total	mg/kg	5.7	15.3
Zinc, Total	mg/kg	10.6J	23.3J
<i>Volatile Organics</i>			
1,1,1-Trichloroethane	ug/kg	5U	6U
1,1,2,2-Tetrachloroethane	ug/kg	5U	6U
1,1,2-Trichloroethane	ug/kg	5U	6U
1,1-Dichloroethane	ug/kg	5U	6U
1,1-Dichloroethene	ug/kg	5U	6U
1,2-Dichloroethane	ug/kg	5U	6U
1,2-Dichloroethene (total)	ug/kg	5U	6U
1,2-Dichloropropane	ug/kg	5U	6U
2-Butanone	ug/kg	10U	12U
2-Hexanone	ug/kg	10U	12U
4-Methyl-2-pentanone	ug/kg	10U	12U
Acetone	ug/kg	10U	12U
Benzene	ug/kg	5U	6U
Bromodichloromethane	ug/kg	5U	6U
Bromoform	ug/kg	5U	6U
Bromomethane	ug/kg	10U	12U
Carbon Disulfide	ug/kg	5U	6U
Carbon Tetrachloride	ug/kg	5U	6U
Chlorobenzene	ug/kg	5U	6U
Chloroethane	ug/kg	10U	12U

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID Sample Location Sample Depth (feet) Sample Date	02B-020506 02B-001 12-14 08/22/01	02B-020508 02B-002 6 -8 08/28/01
Units			
Chloroform	ug/kg	5U	6U
<i>Volatile Organics (continued)</i>			
Chloromethane	ug/kg	10U	12U
cis-1,3-Dichloropropene	ug/kg	5U	6U
Dibromochloromethane	ug/kg	5U	6U
Ethylbenzene	ug/kg	5U	6U
Methylene Chloride	ug/kg	5U	6U
Styrene	ug/kg	5U	6U
Tetrachloroethene	ug/kg	5U	6U
Toluene	ug/kg	5U	6U
Trans-1,3-Dichloropropene	ug/kg	5U	6U
Trichloroethene	ug/kg	5U	6U
Vinyl Chloride	ug/kg	10U	12U
Xylene (total)	ug/kg	5U	6U
<i>TCLP Metals</i>			
Arsenic	ug/L	23.4U	23.4U
Barium	ug/L	1410	742
Cadmium	ug/L	1.8	1.8
Chromium	ug/L	8.4U	8.4U
Lead	ug/L	14.4U	14.4U
Mercury	ug/L	0.1U	0.1U
Selenium	ug/L	19.2U	19.2U
Silver	ug/L	3U	3U
<i>TCLP Pesticides</i>			
Alpha-Chlordane	ug/L	0.5J	0.5J
Endrin	ug/L	1J	1J
Gamma-BHC (Lindane)	ug/L	0.5J	0.5J
Gamma-Chlordane	ug/L	0.5J	0.5J
Heptachlor	ug/L	0.5J	0.5J
Heptachlor epoxide	ug/L	0.5J	0.5J
Methoxychlor	ug/L	5J	5J
Toxaphene	ug/L	50J	50J
2,4,5-TP (Silvex)	ug/L	5U	5U

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID Sample Location Sample Depth (feet) Sample Date	02B-020506 02B-001 12-14 08/22/01	02B-020508 02B-002 6 -8 08/28/01
Units			
2,4-D	ug/L	10U	10U
<i>TCLP Volatiles</i>			
1,1-Dichloroethene	mg/L	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U
Benzene	mg/L	0.025U	0.025U
Carbon tetrachloride	mg/L	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>			
1,4-Dichlorobenzene	mg/L	0.05U	NA
2,4,5-Trichlorophenol	mg/L	0.12U	NA
2,4,6-Trichlorophenol	mg/L	0.05U	NA
2,4-Dinitrotoluene	mg/L	0.05U	NA
2-Methylphenol	mg/L	0.05U	NA
3- and/or 4-Methylphenol	mg/L	0.05U	NA
Hexachlorobenzene	mg/L	0.05U	NA
Hexachlorobutadiene	mg/L	0.05U	NA
Hexachloroethane	mg/L	0.05U	NA
Nitrobenzene	mg/L	0.05U	NA
Pentachlorophenol	mg/L	0.12U	NA
Pyridine	mg/L	0.05U	NA

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID	02D-020512	02D-020514	02D-020516
	Sample Location	02D-001	02D-002	02D-003
	Sample Depth (feet)	0 - 4	0 - 4	0 - 4
	Sample Date	03/15/00	03/15/00	03/15/00
	Units			
<i>Miscellaneous</i>				
Chromium VI	mg/kg	0.45U	0.47U	0.48U
Corrosivity by pH	Soil pH	8.3	6.7	7.6
Cyanide, Reactive	mg/kg	0.50U	0.50U	0.50U
Cyanide, Total	mg/kg	0.36U	0.39U	0.41
Sulfide, Reactive	mg/kg	24.0U	24.0U	24.0U
<i>PCBs/Pesticides</i>				
4,4'-DDD	ug/kg	0.9	9	8.0U
4,4'-DDE	ug/kg	0.75U	12	6.5J
4,4'-DDT	ug/kg	0.68J	6.8	8.0U
Aldrin	ug/kg	0.38U	2.0U	4.0U
Alpha-BHC	ug/kg	0.38U	2.0U	4.0U
alpha-Chlordane	ug/kg	0.38U	2.0U	4.0U
Aroclor-1016	ug/kg	7.5U	7.9U	80U
Aroclor-1221	ug/kg	15U	16U	160U
Aroclor-1232	ug/kg	7.5U	7.9U	80U
Aroclor-1242	ug/kg	7.5U	7.9U	80U
Aroclor-1248	ug/kg	7.5U	7.9U	80U
Aroclor-1254	ug/kg	7.5U	7.9U	350
Aroclor-1260	ug/kg	7.5U	7.9	80U
Beta-BHC	ug/kg	0.38U	2.0U	4.0U
Delta-BHC	ug/kg	0.38U	2.0U	4.0U
Dieldrin	ug/kg	0.75U	3.9U	8.0U
Endosulfan I	ug/kg	0.38U	2.0U	4.0U
Endosulfan II	ug/kg	0.75U	3.9U	8.0U
Endosulfan sulfate	ug/kg	0.75U	3.9U	8.0U
Endrin	ug/kg	0.75U	3.9U	8.0U
Endrin aldehyde	ug/kg	0.75U	3.9U	8.0U
Endrin ketone	ug/kg	0.75U	3.9U	8.0U
gamma-BHC (Lindane)	ug/kg	0.38U	2.0U	4.0U
gamma-Chlordane	ug/kg	0.38U	2.0U	4.0U
Heptachlor	ug/kg	0.38U	2.0U	4.0U
Heptachlor epoxide	ug/kg	0.38U	2.0U	4.0U
Methoxychlor	ug/kg	3.8U	20U	40U
Toxaphene	ug/kg	38U	200U	400U

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID	02D-020512	02D-020514	02D-020516
	Sample Location	02D-001	02D-002	02D-003
	Sample Depth (feet)	0 - 4	0 - 4	0 - 4
	Sample Date	03/15/00	03/15/00	03/15/00
Units				
<i>Rare Earth Metals</i>				
Cerium, Total	mg/kg	20.1	174	53.4
Dysprosium, Total	mg/kg	1.1	3.5	1.6
Lanthanum, Total	mg/kg	9.7	122	34
Neodymium, Total	mg/kg	9.9	87.2	27.8
Yttrium, Total	mg/kg	6.3	17.3	8.3
<i>Semivolatile Organics</i>				
1,2,4-Trichlorobenzene	ug/kg	380U	790U	800U
1,2-Dichlorobenzene	ug/kg	380U	790U	800U
1,3-Dichlorobenzene	ug/kg	380U	790U	800U
1,4-Dichlorobenzene	ug/kg	380U	790U	800U
2,2'-oxybis(1-Chloropropane)	ug/kg	380U	790U	800U
2,4,5-Trichlorophenol	ug/kg	940U	2000U	2000U
2,4,6-Trichlorophenol	ug/kg	380U	790U	800U
2,4-Dichlorophenol	ug/kg	380U	790U	800U
2,4-Dimethylphenol	ug/kg	380U	790U	800U
2,4-Dinitrophenol	ug/kg	940U	2000U	2000U
2,4-Dinitrotoluene	ug/kg	380U	790U	800U
2,6-Dinitrotoluene	ug/kg	380U	790U	800U
2-Chloronaphthalene	ug/kg	380U	790U	800U
2-Chlorophenol	ug/kg	380U	790U	800U
2-Methylnaphthalene	ug/kg	380U	790U	800U
2-Methylphenol	ug/kg	380U	790U	800U
2-Nitroaniline	ug/kg	940U	2000U	2000U
2-Nitrophenol	ug/kg	380U	790U	800U
3,3'-Dichlorobenzidine	ug/kg	380U	790U	800U
3-Nitroaniline	ug/kg	940U	2000U	2000U
4,6-Dinitro-2-methylphenol	ug/kg	940U	2000U	2000U
4-Bromophenyl-phenylether	ug/kg	380U	790U	800U
4-Chloro-3-methylphenol	ug/kg	380U	790U	800U
4-Chloroaniline	ug/kg	380U	790U	800U
4-Chlorophenyl-phenylether	ug/kg	380U	790U	800U
4-Methylphenol	ug/kg	380U	790U	800U
4-Nitroaniline	ug/kg	940U	2000U	2000U
4-Nitrophenol	ug/kg	940U	2000U	2000U
Acenaphthene	ug/kg	380U	42J	42J
Acenaphthylene	ug/kg	380U	92J	800U
Anthracene	ug/kg	19J	190J	130J
Benzo(a)anthracene	ug/kg	40J	310J	290J
Benzo(a)pyrene	ug/kg	39J	320J	280J
Benzo(b)fluoranthene	ug/kg	37J	270J	220J

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID	02D-020512	02D-020514	02D-020516
	Sample Location	02D-001	02D-002	02D-003
	Sample Depth (feet)	0 - 4	0 - 4	0 - 4
	Sample Date	03/15/00	03/15/00	03/15/00
Units				
<i>Semivolatile Organics (continued)</i>				
Benzo(g,h,i)perylene	ug/kg	25J	220J	190J
Benzo(k)fluoranthene	ug/kg	37J	280J	270J
bis(2-Chloroethoxy)methane	ug/kg	380U	790U	800U
bis(2-Chloroethyl)ether	ug/kg	380U	790U	800U
bis(2-Ethylhexyl)phthalate	ug/kg	41J	790U	230J
Butylbenzylphthalate	ug/kg	380U	790U	800U
Carbazole	ug/kg	380U	68J	800U
Chrysene	ug/kg	48J	370J	340J
Di-n-butylphthalate	ug/kg	60J	790U	800U
Di-n-octyl phthalate	ug/kg	380U	790U	800U
Dibenz(a,h)anthracene	ug/kg	380U	790U	800U
Dibenzofuran	ug/kg	380U	790U	800U
Diethylphthalate	ug/kg	25J	790U	800U
Dimethylphthalate	ug/kg	380U	790U	800U
Fluoranthene	ug/kg	100J	870	610J
Fluorene	ug/kg	380U	64J	46J
Hexachlorobenzene	ug/kg	380U	790U	800U
Hexachlorobutadiene	ug/kg	380U	790U	800U
Hexachlorocyclopentadiene	ug/kg	380U	790U	800U
Hexachloroethane	ug/kg	380U	790U	800U
Indeno(1,2,3-cd)pyrene	ug/kg	24J	200J	170J
Isophorone	ug/kg	380U	790U	800U
N-Nitroso-di-n-propylamine	ug/kg	380U	790U	800U
N-Nitrosodiphenylamine (1)	ug/kg	380U	790U	800U
Naphthalene	ug/kg	380U	790U	41J
Nitrobenzene	ug/kg	380U	790U	800U
Pentachlorophenol	ug/kg	940U	2000U	2000U
phenanthrene	ug/kg	58J	660J	450J
phenol	ug/kg	380U	790U	800U
Pyrene	ug/kg	78J	730J	550J
<i>Total Metals</i>				
Aluminum, Total	mg/kg	4460	9150	6950
Antimony, Total	mg/kg	0.19U	0.21U	0.67
Arsenic, Total	mg/kg	1.4	10.6	6.6
Barium, Total	mg/kg	29.8	130	121
Beryllium, Total	mg/kg	0.22	0.44	0.36
Boron, Total	mg/kg	3.4	3	3.4
Cadmium, Total	mg/kg	0.03U	0.16	0.5
Calcium, Total	mg/kg	1550	1740	4050
Chromium, Total	mg/kg	8.2	72.4	24.1

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID	02D-020512	02D-020514	02D-020516
	Sample Location	02D-001	02D-002	02D-003
	Sample Depth (feet)	0 - 4	0 - 4	0 - 4
	Sample Date	03/15/00	03/15/00	03/15/00
Units				
<i>Total Metals (continued)</i>				
Cobalt, Total	mg/kg	5.7	4.2	4.3
Copper, Total	mg/kg	8.7	24.9	41.1
Iron, Total	mg/kg	9070	10600	11700
Lead, Total	mg/kg	6.9	59.6	170
Lithium, Total	mg/kg	4.2	16.5	9.4
Magnesium, Total	mg/kg	1290	1370	1400
Manganese, Total	mg/kg	343	165	230
Mercury, Total	mg/kg	0.02U	0.21	0.48
Nickel, Total	mg/kg	7.3	9.7	9.8
Potassium, Total	mg/kg	437	452	494
Selenium, Total	mg/kg	0.47U	0.61	0.91
Silver, Total	mg/kg	0.1U	0.10U	0.11U
Sodium, Total	mg/kg	166	96.7	122
Thallium, Total	mg/kg	0.41	0.46	0.44U
Vanadium, Total	mg/kg	13.7	23.4	19.8
Zinc, Total	mg/kg	17.3	61.8	144
<i>Volatile Organics</i>				
1,1,1-Trichloroethane	ug/kg	640U	710U	860U
1,1,2,2-Tetrachloroethane	ug/kg	640U	710U	860U
1,1,2-Trichloroethane	ug/kg	640U	710U	860U
1,1-Dichloroethane	ug/kg	640U	710U	860U
1,1-Dichloroethene	ug/kg	640U	710U	860U
1,2-Dichloroethane	ug/kg	640U	710U	860U
1,2-Dichloroethene (total)	ug/kg	640U	710U	860U
1,2-Dichloropropane	ug/kg	640U	710U	860U
2-Butanone	ug/kg	1300U	1400U	1700U
2-Hexanone	ug/kg	1300U	1400U	1700U
4-Methyl-2-pentanone	ug/kg	1300U	1400U	1700U
Acetone	ug/kg	610BJ	380BJ	630BJ
Benzene	ug/kg	640U	710U	860U
Bromodichloromethane	ug/kg	640U	710U	860U
Bromoform	ug/kg	640U	710U	860U
Bromomethane	ug/kg	1300U	1400U	1700U
Carbon Disulfide	ug/kg	640U	710U	860U
Carbon Tetrachloride	ug/kg	640U	180J	860U
Chlorobenzene	ug/kg	640U	710U	860U
Chloroethane	ug/kg	1300U	1400U	1700U
Chloroform	ug/kg	640U	710U	860U

Table 2-5: Summary of Environmental Analytical Data

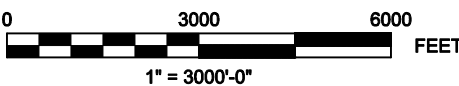
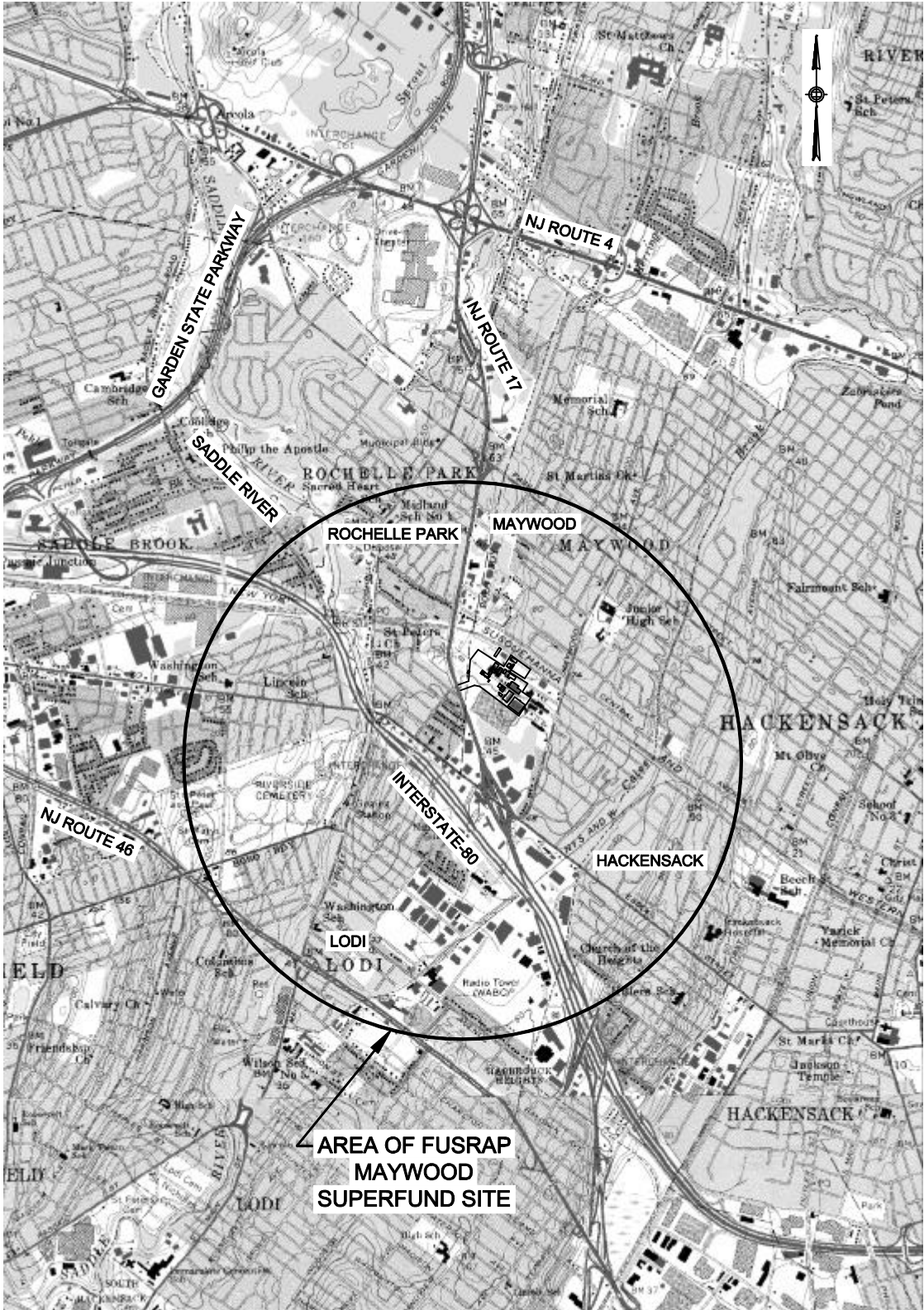
Parameter	Sample ID	02D-020512	02D-020514	02D-020516
	Sample Location	02D-001	02D-002	02D-003
	Sample Depth (feet)	0 - 4	0 - 4	0 - 4
	Sample Date	03/15/00	03/15/00	03/15/00
Units				
<i>Volatile Organics (continued)</i>				
Chloromethane	ug/kg	270J	1700	1700U
cis-1,3-Dichloropropene	ug/kg	640U	710U	860U
Dibromochloromethane	ug/kg	640U	710U	860U
Ethylbenzene	ug/kg	640U	710U	860U
Methylene Chloride	ug/kg	510BJ	530BJ	610BJ
Styrene	ug/kg	640U	710U	860U
Tetrachloroethene	ug/kg	640U	710U	860U
Toluene	ug/kg	640U	710U	860U
Trans-1,3-Dichloropropene	ug/kg	640U	710U	860U
Trichloroethene	ug/kg	640U	710U	860U
Vinyl Chloride	ug/kg	1300U	1400U	1700U
Xylene (total)	ug/kg	640U	710U	860U
<i>TCLP Metals</i>				
Arsenic	ug/L	22.9U	23.2U	22.9U
Barium	ug/L	271	538	703
Cadmium	ug/L	4.1U	4.1U	4.5U
Chromium	ug/L	3.4U	9.8U	5.1U
Lead	ug/L	26.6U	44.1U	49.8U
Mercury	ug/L	0.1U	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U	49.7U
Silver	ug/L	3.7U	3.7U	3.7U
<i>TCLP Pesticides</i>				
Alpha-Chlordane	ug/L	0.5U	0.5U	0.5U
Endrin	ug/L	1U	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5U	0.5U	0.5U
Heptachlor	ug/L	0.5U	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5U	0.5U	0.5U
Methoxychlor	ug/L	5U	5U	5U
Toxaphene	ug/L	50U	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U	5U
2,4-D	ug/L	10U	10U	10U

Table 2-5: Summary of Environmental Analytical Data

Parameter	Sample ID	02D-020512	02D-020514	02D-020516
	Sample Location	02D-001	02D-002	02D-003
	Sample Depth (feet)	0 - 4	0 - 4	0 - 4
	Sample Date	03/15/00	03/15/00	03/15/00
Units				
<i>TCLP Volatiles</i>				
1,1-Dichloroethene	mg/L	0.025U	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U	0.05U
Benzene	mg/L	0.035	0.025U	0.007J
Carbon tetrachloride	mg/L	0.025U	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>				
1,4-Dichlorobenzene	mg/L	0.05U	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U	0.05U

B (inorganics) Value Between Method Detection Limit and Reporting Limit
 B (organics) Found in Associated Blank
 U Undetected Values
 J Estimated Value
 BJ Found in Blank; is an Estimated Value

6
5
4
3
2
1



 STONE & WEBSTER, INC.	Designed by: K PRIM-TAN	Date: 10/29/01	Approved: M CIMINERA	Date: 01/08/02
	Drawn by: K PRIM-TAN	Date: 12/11/01	File Name: SITE.DWG	
	Reviewed by: M MARCUCCI	Date: 01/08/02		

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
MAYWOOD, NEW JERSEY

FUSRAP

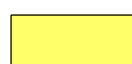
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

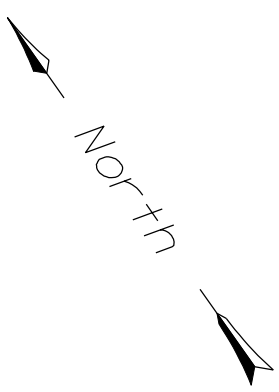
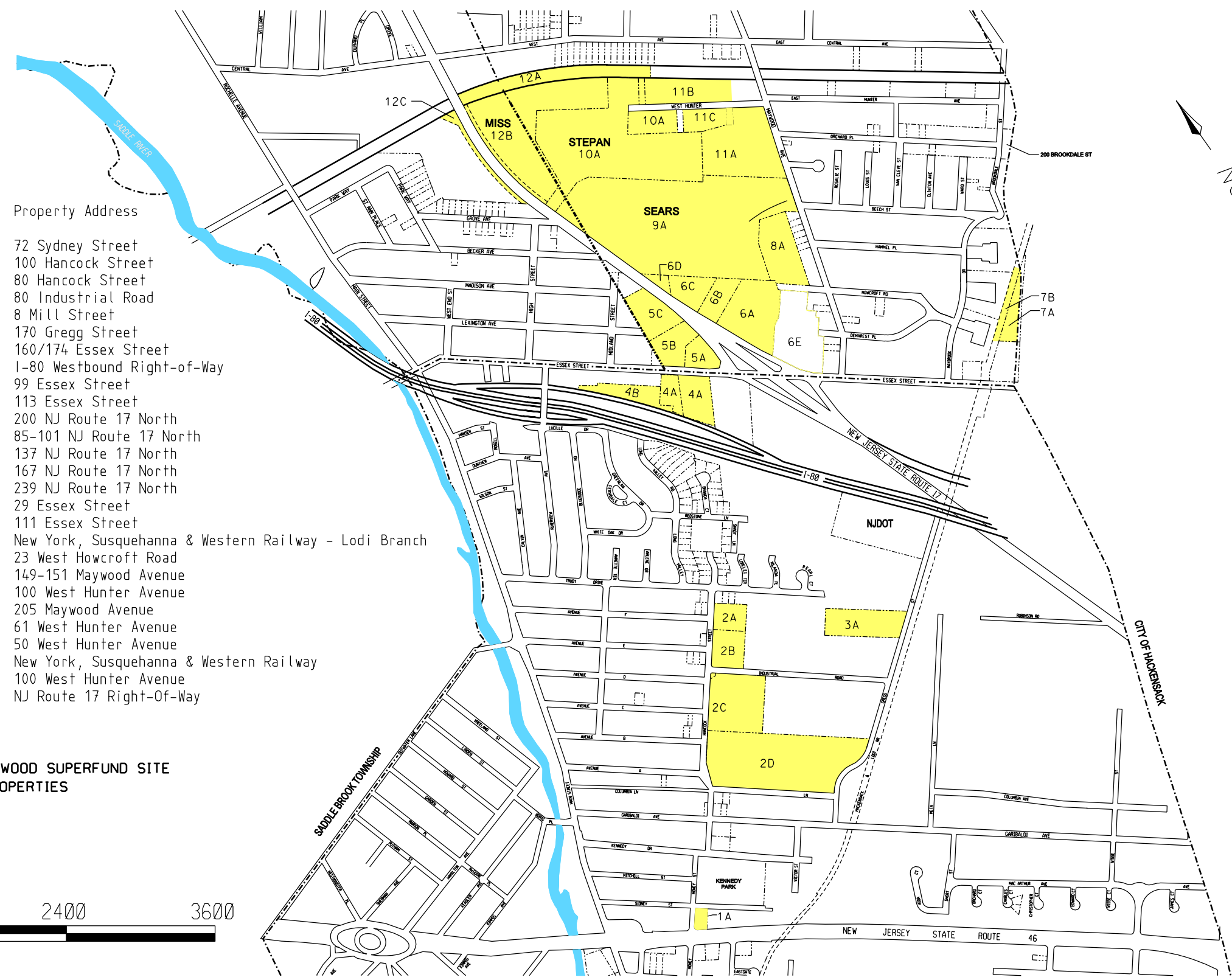
FIGURE 2-1

SITE LOCATION PLAN

Contract Number: Delivery Order Number: Project Number: 08575 Drawing Number: SITE
--

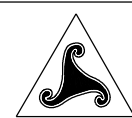
Cluster No.	Property No.	Property Address
1	01A	72 Sydney Street
2	02A	100 Hancock Street
	02B	80 Hancock Street
	02C	80 Industrial Road
3	02D	8 Mill Street
	03A	170 Gregg Street
	04A	160/174 Essex Street
4	04B	1-80 Westbound Right-of-Way
	05A	99 Essex Street
5	05B	113 Essex Street
	05C	200 NJ Route 17 North
	06A	85-101 NJ Route 17 North
6	06B	137 NJ Route 17 North
	06C	167 NJ Route 17 North
	06D	239 NJ Route 17 North
7	06E	29 Essex Street
	07A	111 Essex Street
	07B	New York, Susquehanna & Western Railway - Lodi Branch
8	08A	23 West Howcroft Road
9	09A	149-151 Maywood Avenue
10	10A	100 West Hunter Avenue
11	11A	205 Maywood Avenue
	11B	61 West Hunter Avenue
	11C	50 West Hunter Avenue
12	12A	New York, Susquehanna & Western Railway
	12B	100 West Hunter Avenue
	12C	NJ Route 17 Right-Of-Way

 FUSRAP MAYWOOD SUPERFUND SITE
PHASE II PROPERTIES



U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT

US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

 **STONE & WEBSTER, INC.**

Prepared by:
**MALCOLM
PIRNIE**

File Name:
\\MAYWOOD\TASK0318\CLUSTER REPORT\REV 1\FIGURE2-2DGN

LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY

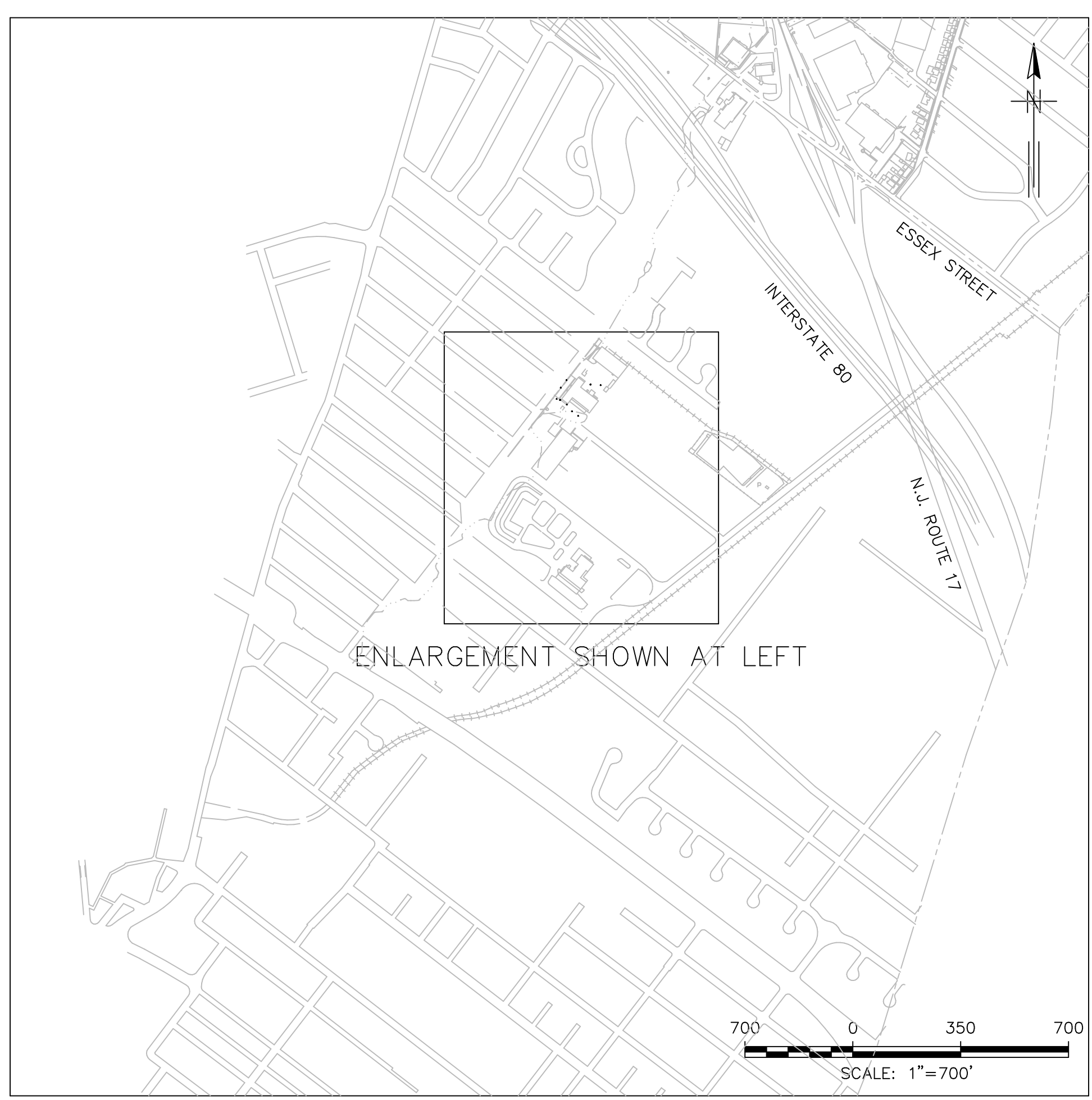
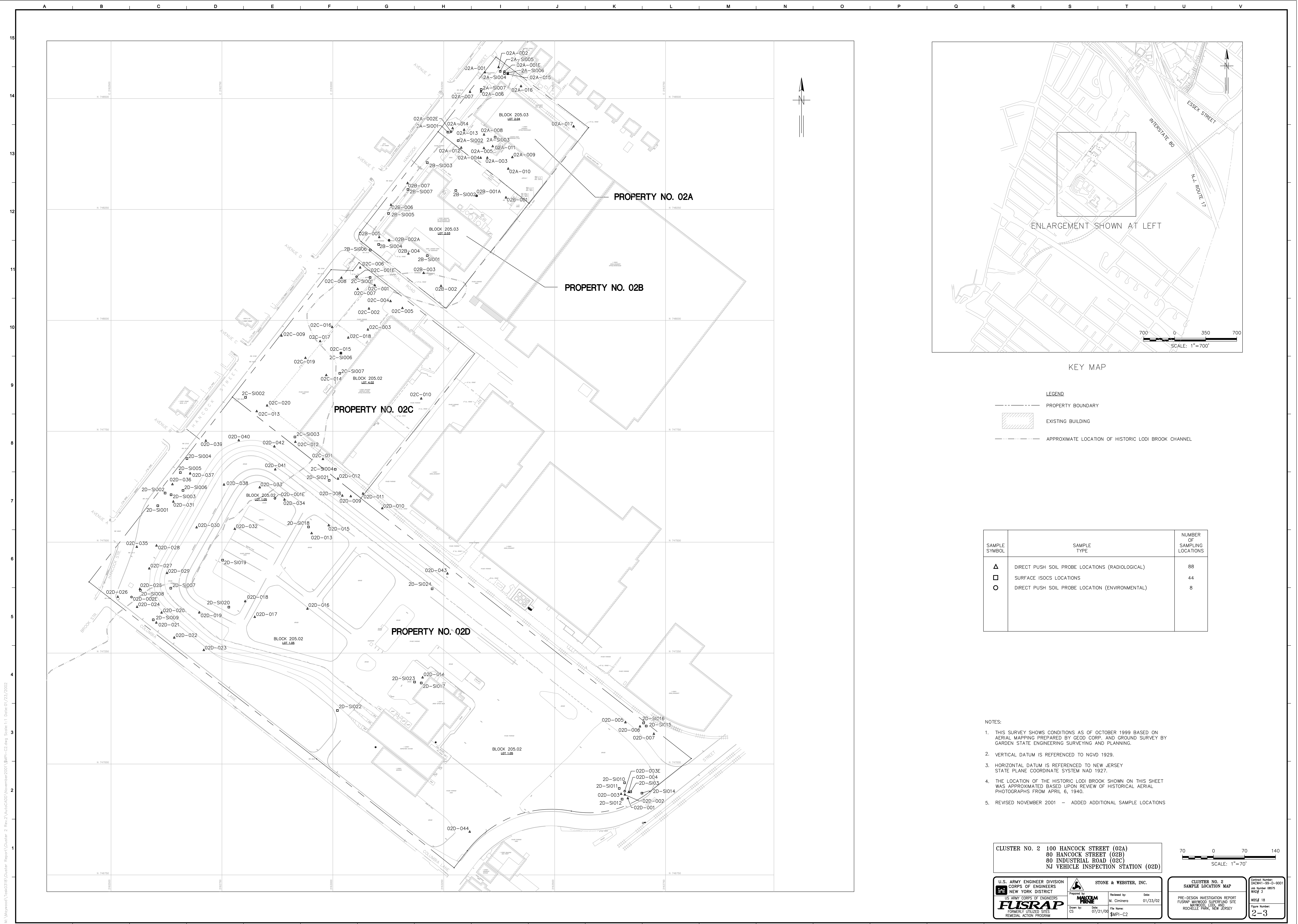
PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

Contract Number:
DACW41-99-D-9001

Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 2-2



KEY MAP

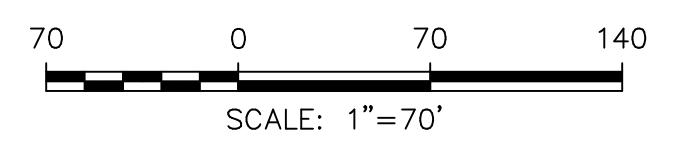
LEGEND

- PROPERTY BOUNDARY
- EXISTING BUILDING
- APPROXIMATE LOCATION OF HISTORIC LODI BROOK CHANNEL

SAMPLE SYMBOL	SAMPLE TYPE	NUMBER OF SAMPLING LOCATIONS
▲	DIRECT PUSH SOIL PROBE LOCATIONS (RADIOLOGICAL)	88
□	SURFACE ISOCs LOCATIONS	44
○	DIRECT PUSH SOIL PROBE LOCATION (ENVIRONMENTAL)	8

- NOTES:**
- THIS SURVEY SHOWS CONDITIONS AS OF OCTOBER 1999 BASED ON AERIAL MAPPING PREPARED BY GEOD CORP. AND GROUND SURVEY BY GARDEN STATE ENGINEERING SURVEYING AND PLANNING.
 - VERTICAL DATUM IS REFERENCED TO NGVD 1929.
 - HORIZONTAL DATUM IS REFERENCED TO NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 1927.
 - THE LOCATION OF THE HISTORIC LODI BROOK SHOWN ON THIS SHEET WAS APPROXIMATED BASED UPON REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS FROM APRIL 6, 1940.
 - REVISED NOVEMBER 2001 - ADDED ADDITIONAL SAMPLE LOCATIONS

**CLUSTER NO. 2 100 HANCOCK STREET (02A)
80 HANCOCK STREET (02B)
80 INDUSTRIAL ROAD (02C)
NJ VEHICLE INSPECTION STATION (02D)**



U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT

STONE & WEBSTER, INC.

Prepared by: M. Cimera
Date: 01/23/02

Checked by: M. Cimera
Date: 07/21/02

Drawn by: M. Cimera
Date: 07/21/02

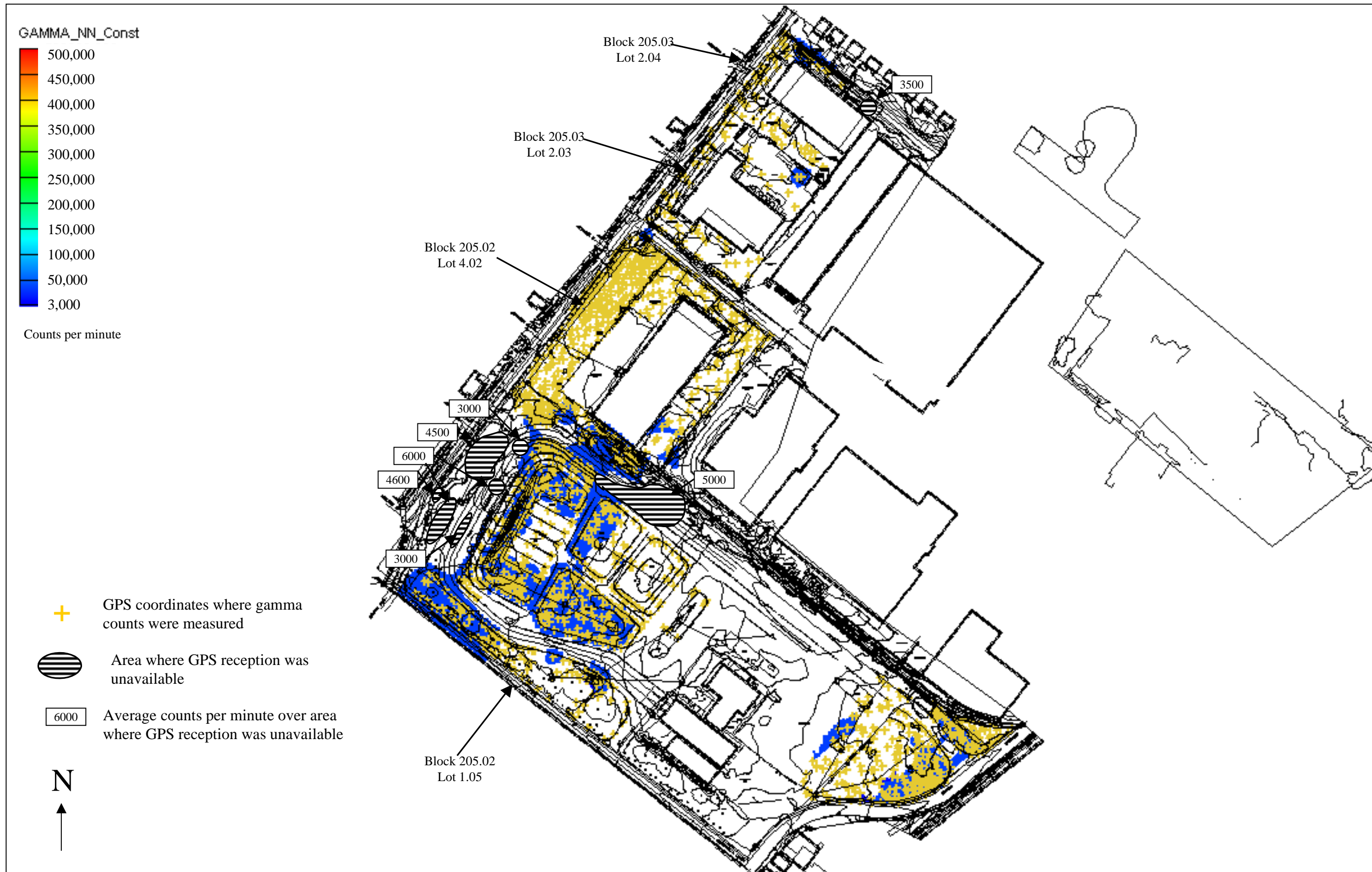
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**CLUSTER NO. 2
SAMPLE LOCATION MAP**

PRE-DESIGN INVESTIGATION REPORT
FUSRAP MAHWOOD SUPERFUND SITE
MAHWOOD, IOL, AND
ROCHELLE PARK, NEW JERSEY

Figure Number: **2-3**

M:\Vetwood\1040318\Cluster Report\Cluster 2 Rev2\Misc\ADD November 2001\BMP-C2.dwg Scale: 1"= 70' Date: 07/23/2002



Lower Contour Limit = 1.5 X Background = 1.5 X 2000 = 3000 counts per minute
Upper Contour Limit = Highest measurement across entire Maywood Site: approx. 500,000 counts per minute

Property Cluster No. 2: 100 Hancock St. (AT&T); 80 Hancock St. (CGI, Inc.); 80 Industrial Road (American Jewel Windows); 8 Mill St. (New Jersey Vehicle Inspection Station)
Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 2-4

APPENDIX 2-A

Variations from the PDI Work Plan

**Letters Informing EPA and NJDEP of Use of Geoprobes⁰
In Lieu of Downhole ISOCS**



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Angela Carpenter
Remedial Project Manager
Federal Facilities Section
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Dear Ms. Carpenter:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in your December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Donna Gaffigan, NJDEP



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

December 8, 1999

REPLY TO
ATTENTION OF

Programs and Project Management Division

Ms. Donna Gaffigan
Case Manager
Bureau of Case Management
New Jersey Department of Environmental Protection
401 E State St
Trenton, NJ 08625-0600

Dear Ms. Gaffigan:

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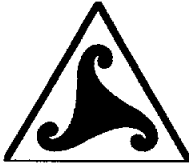
ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Angela Carpenter, EPA

Revisions to Standard Operating Procedure No. SW-MWD-509-0



**STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION**

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE: 1 of 8 plus Attachment 1
	DATE: February 2000

APPROVED:

Prepared by:
Project Chemist
Reviewed by:
PDI Task Manager
Richard Skyness 2/29/00
Project Engineer
[Signature] 2/29/00
Project Manager

1.0 PURPOSE

This Stone & Webster Standard Operating Procedure (SOP), **Soil Probe Investigation** shall be employed when collecting subsurface soil samples using the direct push soil probe method at the FUSRAP Maywood Superfund Site (hereafter referred to as the Maywood Site) properties with known or suspected soil and/or groundwater contamination.

2.0 SCOPE

This procedure details the materials, equipment, and methods common to soil probe investigation activities. Consult the site-specific project plans and work plans for proposed soil probe locations. Always consult site-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Task Manager prior to implementation and shall be documented in project field logbooks.**

3.0 REFERENCES

Stone & Webster Maywood SOP 102 - Downhole Gamma Radiation Logging
Stone & Webster Maywood SOP 307 - Surface and Shallow Subsurface Soil Sampling
Stone & Webster Maywood SOP 308 - Soil Borings and Sampling
Stone & Webster Maywood SOP 401 - Photoionization Detector (PID)
Stone & Webster Maywood SOP 504 - Labeling, Packaging, and Shipping Environmental Samples
Stone & Webster Maywood SOP 505 - Cuttings and Fluids Management
Stone & Webster Maywood SOP 506 - Decontamination
Stone & Webster Maywood SOP 507 - Field Notebook Content and Control
U.S.E.P.A., A Compendium of Superfund Field Operation Methods, Document EPA/540/P-87/001, December, 1987.

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	2 of 8

DEFINITIONS

Stone & Webster Team – personnel of the Stone & Webster Team that includes for this SOP: Stone & Webster, Malcolm Pirnie, Franklin Environmental Services, Inc., Safety & Ecology Corporation (SEC), and Garden State Surveying, Engineering and Planning, Inc. The Stone & Webster Team shall perform soil probe investigation activities, except those activities specified as performed by the Subcontractor.

Subcontractor – personnel of the direct push soil probe firm.

Direct Push Soil Probe – generic name for advancing media sampling piping/tubes with only direct mechanical force. They are typically hollow steel rods advanced using a percussive force (powered hammer) and driven directly into unconsolidated soil. There are two types of direct push soil probes. One is a single rod system (i.e., macrocore) and the other is a dual tube or cased system. The latter, which will be the method of choice for most Maywood Site investigations, utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Drive rods used with the cased system are usually made from a high-grade steel alloy and are retracted after sampling.

4.0 RESPONSIBILITIES

5.1 Project Manager - Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 Project Environmental Engineer - Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for direct push soil probe activities.

5.3 Project Superintendent - Designated by the Project Manager to supervise investigative activities by Stone & Webster Team and Subcontractor personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in monitoring soil probe investigation activities in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each workday. The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil probe investigation activities and deviations from this SOP.

5.4 Site Personnel (including the data logger) - Required to read and sign the Maywood Site Safety and Health Plan (SSHP), have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil probe investigation activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

5.5 Site Safety & Health Officer - Responsible for ensuring that all site workers (Stone & Webster and Subcontractor) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.6 Task Manager – Responsible to plan, implement, and closeout field work requiring direct push technology.

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE 3 of 8

5.7 Subcontractor - Required to read and sign the SSHP, have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. Subcontractors shall report directly to the Task Manager or his designee.

6.0 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS FOR SOIL PROBE INVESTIGATION

The following is a list of equipment and material that is commonly used on all projects when the direct push probe technique is performed in the unconsolidated soils. Refer also to related SOP equipment and material requirements to ensure completeness.

Items required by Subcontractor:

- Direct push probe equipment - of appropriate size and direct push probe and sampling capabilities; vehicle mounted; direct push probe sampling tools used to advance boring (i.e., direct push small diameter rods; and augers, if required) equipment, labor, and supplies to maintain optimal efficiency
- Environmentally-safe lubricants
- Backfill material for probe holes, as required
- Soil sample collection and logging supplies – **See Stone & Webster Maywood SOP 308, Soil Borings and Sampling**
- Decontamination supplies - **See Stone & Webster Maywood SOP 506, Decontamination**

Items carried by Stone & Webster Team on-site personnel

- **SSHP To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Clipboard
- Pencils
- Six-foot-ruler
- Pocket knife
- Camera (optional), check with Project Manager if required
- Volatile organic compound vapor meter equipped with photoionization detector (PID) and other air surveillance monitoring equipment, as required by the SSHP
- Radiation meter
- Site boring logs
- Blank soil probe logs
- Weighted measuring tape
- Water level measuring device - **See Stone & Webster Maywood SOP 410, Groundwater Level Measurement**, Interface probe, if needed
- Paper towels
- Chain of Custody forms

7.0 DIRECT PUSH PROBE ACTIVITIES

7.1 General Considerations

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Prior to selecting the direct push probe method for a specific property, the objectives of the field investigation must be established. These property-specific objectives shall include one or more of the following Maywood Pre-Design Investigation (PDI) program objectives:

- Soil classification/evaluation - the direct push soil probe technique will be able to accommodate the collection of soils for characterization purposes.
- Characterization of hydrogeologic conditions - the direct push soil probe technique shall allow for the characterization of each stratigraphic zone, and water level measurements.
- Evaluation of soil contamination - the direct push soil probe technique shall provide the appropriate sample collection methods, must not introduce contaminants into the probe hole or otherwise alter the existing soil or groundwater chemistry, and should not result in subsurface cross contamination during or after installation of direct push probe.

7.2 Direct Push Probe Activities

Prior to commencing direct push soil probe fieldwork, several activities should be performed. These activities, which include both pre-mobilization office tasks and pre-installation field tasks, are discussed below. Once the pre-installation activities are completed, direct push soil probe installation may commence.

7.2.1 Pre-Mobilization Tasks

1. The Stone & Webster Team and Subcontractor shall acquire as much geologic and hydrogeologic information about the site as possible. This information may include possible soil and groundwater contamination present, groundwater table depths and fluctuations, surficial and bedrock geology, approximate thickness of the unconsolidated zone, depth to top of weathered rock, depth to competent rock, and site access.
2. Soil probe locations shall be marked in the field by the Stone & Webster Team with either paint or flags/stakes during pre-mobilization tasks, and surveyed using a global positioning system (GPS). The Stone & Webster Team shall check and verify that the soil probe location corresponds to the location on the project plans. The Stone & Webster Team and Subcontractor shall check to see if visible structures will prevent the completion of proposed soil probes at specific locations.
3. The Stone & Webster Team shall communicate with the Subcontractor regarding the requirements of the direct push soil probe program and required geologic and environmental information. Inform the Subcontractor of the environmental sampling program that the project shall follow. This information includes sampling frequency, sampling depths, type of sample required (soil or groundwater), the length of casing, direct push soil probe method (i.e., macrocore, dual tube, etc.), number and type of soil samplers required, and special sampling techniques. Ensure that probe hole backfill is selected in accordance with the project specifications.
4. The Subcontractor shall ensure that all utilities in the vicinity of the proposed boring(s) have been cleared by the appropriate authorized parties (e.g., New Jersey One-Call System at 1-800-272-1000, owner, etc.) or, if utilities exist, are visibly marked on the ground surface in the area of the proposed boring. In addition, keep a safe working distance (pursuant to OSHA) from overhead utilities. **NOTE: The party responsible for having utilities cleared shall be identified. If the responsible party is not clearly identified then the Task Manager shall establish the responsible party. Ensure that utilities have been cleared prior to installation of soil probe.**

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7.2.2 Pre-Installation Field Tasks

Sampling equipment shall be decontaminated prior to use, using pressure or manual washing of the rig, direct push soil probe, and tools, as required to prevent introducing off-site contamination. The direct push soil probe related equipment shall be decontaminated on site prior to direct push soil probe activities. Refer to **Stone & Webster Maywood SOP 506, Decontamination** for specific instructions.

7.3 General Direct Push Soil Probe Method Procedures

The following sections outline general direct push soil probe procedures used in unconsolidated soil materials.

1. Assuming a vertical soil probe, the Subcontractor shall set the direct push rig over the proposed soil probe location. Level the direct push rig and ensure that the direct push rods used to advance the soil probe are in a vertical position directly above the hole.
2. The inspecting Stone & Webster Team shall obtain and record measurements of tools to be used for direct push probe operations. Down-hole measurements taken by the Subcontractors shall be to the nearest 0.1 foot.
3. The Subcontractor shall begin sampling or advancement of soil probe to the desired depth utilizing the direct push method described below. Samples shall be taken using the steps described in Section 8.1.1.
4. When the direct push advancement tools are lowered into the probe hole, the Stone & Webster Team shall keep track of tool lengths to check Subcontractor's stated depth of soil probe.
5. The Stone & Webster Team shall make certain that the Subcontractor is performing depth measurements with a ruler and known tool lengths and not visually judging ("eyeballing") casing and tool projections above the ground. The Stone & Webster Team shall maintain a mental note of depth to bottom of soil probe by keeping track of the linear feet of tools in and above the ground. By mentally subtracting the "stick-up" above the ground, the Stone & Webster Team can maintain a constant approximate check on the soil probe depth and Subcontractor's indicated depths.
6. The breathing zone shall be screened by a designee of the Stone & Webster Team Site Safety and Health Officer for total volatile organic vapors using an organic vapor analyzer as outlined in the SSHP. A lower explosive limit meter (LEL) shall be employed if required in SSHP. Record the measured readings at the depth and time of reading on the boring log.
7. During direct push probe activities, both the Stone & Webster Team and Subcontractor shall record production, mechanical and/or sampling difficulties and the sequence of activities. Also record rig mobilization time, rig set-up time, and probe commencement and completion times. This information should be recorded in a field log book. The Stone & Webster Team shall also record pertinent details on the soil probe log (See Attachment A for blank soil probe log).
8. Refusal of direct push probe advancement tools (i.e., casing refusal) is defined as when the probe hole cannot be advanced using regular advancement methods. Generally, refusal can be identified by the following characteristics:
 - Advancement of probe hole is not noticeable or is very slow
 - A change in the frequency/pitch of the direct push probe equipment
 - The direct push probe downpressure may be significantly higher than under "normal" conditions. The direct push rig may be lifted off the ground surface.
9. If refusal is encountered in the soil probe, refer to **Stone & Webster Maywood SOP 308, Soil Borings and Sampling** for specific instructions. If the probe hole cannot be advanced, relocate the probe hole within approximately 5 feet distant from the original location and start with the

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work in Section Paragraph 7.2.1. Measure the distance and direction from the original location, and record this information in the field logbook. The actual distance of movement necessary may be greater depending on the site conditions. If the required movement is greater than 5 feet, contact the Task Manager for direction.

10. Downhole gamma radiation logging will be performed, *where feasible* by the Stone & Webster Team as described in Section 8.1.1 below (**See Stone & Webster Maywood SOP 102, Downhole Gamma Radiation Logging**).
11. When the probe hole is completed and the area is cleaned up, all contaminated equipment, including down-hole tools, hand tools, and direct push rig shall be decontaminated by the Subcontractor (**See Stone & Webster Maywood SOP 506, Decontamination**) and as directed by the Radiation Safety Officer (RSO).
12. The Stone & Webster Team shall record the soil probe location on the project drawings.

8.0 METHOD-SPECIFIC SOIL SCREENING AND SAMPLING

In this section, the soil screening and sampling procedure for the direct push soil probe method is described.

8.1 Direct Push Probe Services

The direct push probe rig is a hydraulically powered percussion/direct push machine used for small diameter subsurface investigations. It can obtain continuous soil cores, discreet soil samples, groundwater samples and vapor samples along with installation of permanent sparge points.

8.1.1 Procedures for Screening and Sampling Direct Push Probe Soil Samples

Following is the procedure to be used at the Maywood Site for screening and sampling direct push probe soil cores.

1. Each 4-foot soil core sample will remain in the polyvinyl chloride/polyethylene terephthalate (PVC/PETG) liner and marked with the appropriate field identification number, sealed with rubber end caps for liners, and placed into a designated (2 inch ID) PVC container (including PVC end caps) supplied by the Subcontractor for storage. Pertinent sample data will also be marked on the PVC container.
2. Downhole gamma logging will be accomplished, *where feasible* by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.
3. Each soil probe hole will be backfilled for the full length, in accordance with project requirements.
4. The sealed PVC containers will be transported by the Stone & Webster Team to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. All Building 76 sample documentation, field screening, and sampling tasks shall be performed by the Stone & Webster Team. Sample documentation will include the preparation of a soil probe log containing the following pertinent field documentation: soil probe identification number and location; soil column description; soil screening data, and photo-documentation. **Stone & Webster Maywood SOP 507, Field Notebook Content and Control**, shall be followed. Sample documentation information shall be recorded electronically.
5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each

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soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integration taken at each marked location and recorded.

6. The soil cores will then be screened for total volatile organic vapors using a PID (see **Stone & Webster Maywood SOP 401, Photoionization Detector (PID)**). A series of small perforations will be made through the liner at 12-inch increments.
7. The soil cores will be described generally in accordance with the Unified Soil Classification system, based on visual observations through the liners and soil extracted from the small perforations. Prior to storage, these perforations will be sealed with tape. The soil descriptions developed will be marked with an "FC" note to define the description as a field classification.
8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.
9. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.
11. Extracted samples shall be prepared in accordance with the Safety and Ecology Corporation (SEC) on-site field laboratory soil preparation practice/SOP.
12. Analysis for ROC on extracted sections of the soil core will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector, or equivalent. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.
14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.
15. Sampling tools will be decontaminated before each boring, after collecting each soil sample, and after each boring.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term "blind duplicates"), thus eliminating potential bias in the test measurement.

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If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.

ATTACHMENT 1

PDI SOIL PROBE LOG SHEET				
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator		XXX		
Activity Designator		AAA		PDI
Field Measurement/Sample Collection Designator		VV		SP
Station Number		N N N		
Media		m m		SB
Sample Type		n		
Sequential Sample Number		#####		(see Below)
Location		Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
		Gamma Logging		Photoionization Detector (PID) Logging
		Down Hole	Core	
Date			Date	
Time			Time	
Logger			Logger	
Detector Model #		SPA-3	PID Model #	Multi-RAE
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		
Comments:				
1. MPI No. _____. 2. Direct-push location grouted with BenSeal.				
		_____ Signature (Down Hole Gamma Logging)		_____ Date
		_____ Signature (Core Gamma Logging)		_____ Date
		_____ Signature (PID Logging)		_____ Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)									
					X	X	X	#	#	#	#	#	#	
0.0														
0.5														
1.0														
1.5														
2.0														
2.5														
3.0														
3.5														
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¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 G:\3674009\PDI Report\AppdxA\SOP509FINAL.doc

TABLE 1-A: REVISIONS TO SOP SW-MWD-509-0

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>Section 8.1.1 Procedures for Screening and Sampling Direct Push Soil Samples 2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a Bicon 3/8- inch x 3/8- inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. The detector shall be positioned below the bottom of the casing to allow gamma log readings in the uncased portion of the probe hole. The casing shall be extracted at 6-inch increments and a 30-second count reading shall be taken at each increment.</p>	<p>2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. The sodium iodide detector preamplifier is connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector™ multi-channel analyzer/amplifier/high voltage power supply. The system is controlled, and the data stored, via a notebook computer. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.</p>	<p>Cabrera Services, Inc. developed this procedure as a cost effective site characterization method. Better sensitivity of the 1-inch x 1-inch detector used by Cabrera Services, Inc. allows gross gamma measurements through the soil probe casings, thereby increasing soil probe production rates.</p>	<p>January 11, 2000, without waterproof container. Sealed solid casing installed following extraction of MacroCore or Dual Tube system. January 28, 2000, with waterproof container. Eliminated need of sealed solid casing.</p>
<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The acetate liner shall be marked off at 6-inch intervals. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Readings shall consist of 10-second integrations taken every six inches and recorded.</p>	<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the PVC/PET liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integrations taken at the marked locations and recorded.</p>	<p>Continuous scanning of the soil core provides complete coverage, longer counting time at the regions of interest, and minimizes redundancy of the downhole gamma measurements.</p>	<p>January 11, 2000</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>8. A minimum of three soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238 based on field radiological screening and gamma logging values. At a minimum, one soil sample will be taken at the highest reading location (suspected FUSRAP waste); a second soil sample shall be collected where the readings approach a constant value (suspected transition zone); and a third soil sample shall be collected within the zone of constant readings (below suspected transition zone). Additional samples may be taken based on the Task Manager's direction.</p>	<p>8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.</p>	<p>Suspected FUSRAP waste and suspected transition zones may not be present in each direct push location.</p>	<p>Selection of archived samples began February 21, 2000.</p>
<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored in Building 76 for future reference.</p>	<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.</p>	<p>Based on laboratory analysis there may be the need to collect additional samples from the stored soil cores.</p>	<p>January 11, 2000</p>
<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a USACE-certified off-site laboratory, for confirmatory ROC analysis. Soil samples shall be placed in labeled containers provided by the laboratory, then placed in coolers maintained at 4°C. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>Samples will be sealed in containers provided by the SEC on-site field laboratory.</p> <p>Preservation (i.e., 4°C) is not required for ROC analysis.</p>	<p>February 28, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>14. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.</p>	<p>14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.</p>	<p>Sample storage will be returned to the FUSRAP Maywood Superfund Site for future disposition.</p>	<p>January 11, 2000</p>
<p>9.0 QUALITY ASSURANCE/QUALITY CONTROL Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment rinsate blanks and duplicates. Equipment rinsate blanks must be collected each day that sampling occurs or each decontamination event, whichever is less, per matrix per parameter per field crew, per equipment type (assuming reusable sampling equipment is used). This QA/QC requirement may be modified based on conversations with USACE, USEPA, and NJDEP. Field duplicate samples must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement. Field duplicate samples must represent no less than 10 % of the total number of samples per matrix per parameter per area of study. Field duplicate gamma radiation readings shall also be recorded at a frequency of 10% of the total gamma radiation readings.</p> <p>Matrix spike/matrix duplicate (MS/MD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat</p>	<p>Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement.</p> <p>If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given</p>	<p>Swipe sample is a more representative QC check of loose surface alpha radioactivity than aqueous rinsate sample.</p> <p>Reduction from 10% to 5% duplicate samples based on large number of soil samples proposed for PDI. In addition, 5% is consistent with NJDEP Field Sampling Procedures Manual for field duplicates and EPA guidelines for MS/MSD analysis. Electronic mail sent to EPA and NJDEP regarding reduction in duplicate percentage on January 28, 2000.</p>	<p>Equipment blank revision implemented on January 11, 2000.</p> <p>Reduction from 10% to 5% duplicate samples implemented week of February 7, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
no less than 10% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.	method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.		

Revised PDI Work Plan Table 5-1

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

PROPERTY CLUSTER NUMBER ⁽⁸⁾	NUMBER OF SAMPLING LOCATIONS						NUMBER OF SAMPLES FOR ANALYSIS BY PARAMETER ⁽⁶⁾								
	RADIOLOGICAL SURVEY				GEOTECH	ENVIR	GEOTECHNICAL					CHEMICAL ANALYSES			
	SOIL PROBES ⁽¹⁾	SOIL PROBE DEPTHS (FT) (ESTIMATED)	SOIL PROBE RADIOLOGICAL ANALYSES ⁽²⁾	SURFACE SOIL RADIOLOGICAL ANALYSES ⁽³⁾	SOIL BORINGS ⁽⁴⁾	SOIL BORINGS ^(4,5)	SPECIFIC GRAVITY	ATTERBERG LIMITS	GRAIN SIZE	TRIAXIAL TESTS ⁽⁷⁾	CONSOLID. TESTS ⁽⁷⁾	WATER CONTENT	CHROMIUM SPECIATION	TCL/TAL	FULL RCRA CHAR.
1	13	12	39	5	3	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
2	96	16	288	50	22	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
3	10	8	30	5	2	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
4	32	12	96	15	4	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
5	79	8	237	40	8	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
6	85	16	255	40	12	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
7	28	16	84	15	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
8	26	16	78	15	6	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
9	131	16	393	65	17	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
10	106	24	318	55	16	6	TBD	TBD	TBD	TBD	TBD	TBD	6	6	6
11	16	8	48	10	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
12	151	24	453	75	17	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
TOTALS	773	N/A	2319	390	115	47	---	---	---	---	---	---	47	47	47

NOTES:

- 1 Soil probes installed using direct-push method, to the depth shown or refusal.
- 2 At a minimum, three separate soil samples (one soil sample from within the suspected FUSRAP waste, one in transition zone, and one below the transition zone) will be selected for analysis of the ROC by the on-site field laboratory. A total of 2319 subsurface soil samples (i.e., 3 X 773) will be selected for ROC analysis by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 3 Five surface soil samples will be randomly collected from up to 10% of the 773 soil probe locations for radiological analyses and comparative evaluation of surface ISOCs measurement. A total of 390 surface soil samples (i.e., 5 X 78) will be selected for ROC analyses by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 4 Depths and quantities to be determined in field based on radiological data, structure foundations depths, etc.
- 5 Advanced to depth of radiological contamination.
- 6 Sample Analyses Rationale:
 - 6a Chromium Speciation - Speciation of trivalent and hexavalent chromium for health and safety purposes.
 - 6b TCL/TAL - Detection of organic and inorganic constituents to assess the potential for the presence of commingled radiological and chemical contamination.

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

6c	RCRA Characteristics - To support transportation & disposal activities
6d	Geotechnical Parameters (Specific Gravity, Atterberg Limits, Grain Size, Water Content) - To characterize physical properties of soil for excavation and remediation.
7	Triaxial tests and consolidation tests will be performed on undisturbed tube samples to determine strength and consolidation parameters of fine-grained materials, where present. These parameters will be used to perform bearing capacity and settlement analyses where excavations are adjacent to structures.
8	Property Clusters are defined as follows: <i>PROPERTY CLUSTER NO. 1: 72 SIDNEY ST. (A.K.A 88 MONEY ST.)</i> <i>PROPERTY CLUSTER NO. 2: 100, 80 HANCOCK ST., 80 INDUSTRIAL RD., AND NJVIS</i> <i>PROPERTY CLUSTER NO. 3: 170 GREGG ST.</i> <i>PROPERTY CLUSTER NO. 4: 160/174 ESSEX ST., I-80 RIGHT-OF-WAY</i> <i>PROPERTY CLUSTER NO. 5: 99 ESSEX ST, 113 ESSEX ST., 200 ROUTE 17 SOUTH</i> <i>PROPERTY CLUSTER NO. 6: 29 ESSEX ST., 85-101 ROUTE 17 NORTH, 137 ROUTE 17 NORTH, 167 ROUTE 17 NORTH, 239 ROUTE 17 NORTH</i> <i>PROPERTY CLUSTER NO. 7: 111 ESSEX ST. - SCANEL/HACKENSACK AND LODI RAILROAD</i> <i>PROPERTY CLUSTER NO. 8: 23 WEST HOWCROFT RD.</i> <i>PROPERTY CLUSTER NO.9: 149-151 MAYWOOD AVE.</i> <i>PROPERTY CLUSTER NO.10: 100 W. HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.11: 205 MAYWOOD AVENUE AND 50 & 61 WEST HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.12: 100 W. HUNTER AVE., NY, SUSQUEHANNA AND WESTERN RAILROAD, AND NJ ROUTE 17</i>

Rationale of Intrusive Sample Location Relocations

PDI Soil Probe Variance Log

Cluster No.: 2

Property Addresses: Property No. 02A -100 Hancock Street (AT&T)
Property No. 02B -80 Hancock Street (CGI)
Property No. 02C -80 Industrial Road (American Jewel Windows)
Property No. 02D -8 Mill Street (NJVIS)

Sample Location Map: Figure 2-3

Number of Revised Soil Probe Locations: 20

Rationale for Revisions

- Sample location 02A-001 was moved about 35 feet north to the “edge” of the historic Lodi Brook channel to better locate the boundary of potential contamination.
- Sample location 02A-005 was moved 10 feet west as the original location was inaccessible.
- Sample location 02A-007 was moved 15 feet northwest to the “edge” of the historic Lodi Brook channel to better locate the boundary of potential contamination.
- Sample location 02A-008 was moved 10 feet west as the original location was inaccessible.
- Sample location 02A-010, a background point, was inaccessible and moved about 35 feet southwest.
- Sample location 02C-017, in the Volvo parking lot, was inaccessible and was moved about 55 feet northwest.
- Sample location 02C-019, in the Volvo parking lot, was inaccessible and was moved 60 feet southwest.
- Sample location 02C-020, in the Volvo parking lot, was inaccessible and was moved approximately 35 feet west.
- Sample location 02D-020 was moved southwest about 10 feet to investigate an area exhibiting elevated gamma counts.
- Sample location 02D-028 was moved southeast about 40 feet to investigate an area exhibiting elevated gamma counts.
- Locations 76, 80, 82, 83, 84, 85, 86, 88, 89, 90 originally proposed in the PDIWP on Property No. 2B were deleted as redundant to prior BNI data, data on the adjacent property, or currently selected locations.

Notes:

1. This list provides specific rationale for the relocation/deletion/addition of intrusive radiological sampling locations due to revised understanding of anticipated radiological contamination. This revised understanding was based on further review of previous data collected by others, and review of surface gamma survey and ISOCS data collected by the Team under this PDI program.
2. Base mapping used in the PDIWP (Stone & Webster, 1999a) has been revised by the Team. Accordingly, a number of intrusive sample locations needed to be relocated due to previously unforeseen physical restrictions (i.e., presence of underground utilities, unacceptable proximity to buildings/roadways, revisions to previously mapped property limits). This table is not intended to provide detailed rationale for points moved due to new mapping.

Outlier Protocol (Gamma Scan Anomalies)

Protocol for Addressing Gamma Scan Anomalies (Outliers)

Maywood FUSRAP Superfund Site

Pre-Design Investigation

1. Anomalous surface gamma scan measurements **greater than 2500 cpm for shielded areas (e.g. asphalt covered surfaces), or 3500 cpm for unshielded areas (e.g. bare soil) but, less than 6,000 cpm (1" x 1" NaI detector)** will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL. Note, these count rates are approximately one and one-half times background on shielded and unshielded surfaces.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization (i.e., eliminates the potential for elevated levels of radiological contamination at depth or provides adequate information on the existence of radiological contamination with depth) **will not be further investigated during the PDI.**
 - C. Anomalous areas that do not have previous data that are adequate for characterization **will only be investigated during the PDI if proposed soil probe locations can be moved to these locations without compromising the quality of the data from the proposed locations.** Additional soil probe locations **will not be added** to the program.
 - D. Anomalous areas where additional PDI investigations (based on 1.C) will be performed but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
2. Anomalous areas exhibiting a surface gamma count rate **greater than or equal to 6,000 cpm** (based on a 1" x 1" NaI detector) will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be as follows: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization **will not be further investigated during the PDI.**
 - C. Anomalous areas with previous data that are not adequate for characterization **will be investigated further during the PDI.** Proposed soil probe locations **will be moved** to these locations if possible, or additional soil probe locations **will be added** to the PDI program. These additional soil probes will be used to define the nature and extent of contamination within these previously unidentified areas; the quantity of additional borings is to be determined on a site-by-site basis.
 - D. Anomalous areas that require additional PDI investigations (based on 2.C) but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
3. All anomalous areas and their dispositions will be documented in the PDI.



Property Cluster No. 2: 100 Hancock St. (AT&T); 80 Hancock St. (CGI, Inc.); 80 Industrial Road (American Jewel Windows); 8 Mill St. (New Jersey Vehicle Inspection Station)
Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure A2-1

Reduction in Field Duplicate and MS/MSD Frequency

Navon, Daria

Subject: FW: Reduction in field duplicate and MS/MSD frequency request

----- Forwarded by David Doyle/Environmental/SWEC on 01/28/2000
02:54 PM -----

"Shonkwiler, Glen D NWK" <Glen.D.Shonkwiler@nwk02.usace.army.mil> on 01/28/2000
02:00:15 PM

To: "carpenter.angela@epamail.epa.gov" <carpenter.angela@epamail.epa.gov>, "dgaffica@dep.state.nj.us" <dgaffica@dep.state.nj.us>
cc: "Roos, Allen D NAN02" <Allen.D.Roos@nan02.usace.army.mil>, "Medary, Richard T NWK" <Richard.T.Medary@nwk02.usace.army.mil>, "Mellema, Doug W NWK" <Doug.W.Mellema@nwk02.usace.army.mil>, "Speckin, Paul D NWK" <Paul.D.Speckin@nwk02.usace.army.mil> (bcc: David Doyle/Environmental/SWEC)

Subject: Reduction in field duplicate and MS/MSD frequency request

Angela/Donna, with this email, USACE is notifying EPA and NJDEP of our intent to reduce the number of field duplicates and MS/MSD samples required in the Maywood Chemical Site CDQMP for the PDI sampling from 10% to 5%. The 10% frequency is a USACE-internal QC standard which USACE plans to reduce based on the large number of soil samples collected during the Pre-Design Investigation (PDI). The reduction in frequency would affect field duplicate samples collected for radionuclides of concern (ROC) and analysis by the on-site field laboratory; field duplicate gamma radiation readings (both downhole and core sample); photoionization detector (PID) or flame ionization (FID) readings; and MS/MSD samples analyzed by the off-site laboratory. It is anticipated that greater than 2000 soil samples will be analyzed by the on-site field laboratory and gamma radiation and PID readings will exceed 10,000 measurements.

Five percent is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and EPA guidelines for MS/MSD analysis. EPA Region II does not have a specific QA/QC guideline for field duplicate samples. The guideline is therefore on a case-by-case basis, in accordance with the site-specific project plans.

Please note that the 10 percent of the samples analyzed by the on-site field laboratory will still be sent to a certified off-site laboratory for confirmatory ROC analysis.

We will continue to adhere to the current 10 percent until EPA and NJ notifies USACE of its concurrence with this deviation from the CDQMP (for the PDI only). Your attention to this matter is greatly appreciated, since reduction of this QA/QC guideline will help to increase production during the Pre-Design Investigation without, in the opinion of USACE, impacting

quality and usability of the data.

Thanks,
Glen Shonkwiler
Remedial Investigations & Remedial Design Manager
Hazardous, Toxic, & Radioactive Waste Branch
U. S. Army Corps of Engineers
CENWK-EC-EA RM 610
601 E 12th St
Kansas City, MO 64106
(816) 983-3561
(816) 426-5550/5949 (fax)
glen.d.shonkwiler@usace.army.mil

APPENDIX 2-B

**PDI Soil Probe Log Sheets
(Radiological Data)**

PDI Soil Probe Log Sheet
LEGEND

List of Abbreviations:

--- = not applicable	lt = light
blk = black	MDA = minimum detectable activity
bn = brown	med = medium
cl = clay	n/r = no recovery
cnts = counts	pCi/g = picoCuries per gram
Conc. = concentration	ppm = parts per million
dk = dark	SAA = same as above
DUP = duplicate	sc = clayey sand
f = fine	sec = seconds
gm = silty gravel	sm = silty sand
gp = poorly-graded gravel	sp = poorly-graded sand
gw = well-graded gravel	sw = well-graded sand
gy = gray	tr = trace
J = estimated	U = unidentified or negative conc. less than MDA
lg = large	wht = white

List of General Comments:

- 4x4 truck-mounted model 5400 and track-mounted model 54DT Geoprobe[®] were used to collect samples. Manual direct push methodology required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- Holes were grouted with BenSeal[®]
- Gamma measurements were taken at center point
- Duplicate samples marked with an "X" for duplicate were prepared by homogenizing soil above and below the center point and then separating for analysis.
- The depth listed is the center point
- Error: 2 sigma (95% confidence interval)

Tube Types

1-inch diameter = Dual Tube (actual 1.3-inch diameter)

2-inch diameter = Macro-Core[®] (actual 1.7-inch diameter)

Sample Intervals

Dual Tube – 13 inches

Macro-Core[®] – 8 inches

Manual Direct Push – 24 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748559	2163343	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/27/2000	01/27/2000	01/27/2000	
Time	11:45	13:55	14:20	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/27/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/27/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/27/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748571	2163374	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/27/2000	01/27/2000	01/28/2000	8:15
Time	14:44	15:00	01/28/2000	8:15
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C443E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/27/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748366	2163348	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/27/2000	01/27/2000	01/27/2000	14:10
Time	12:36	14:25	14:10	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C443E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/27/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/27/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/27/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748366	2163333	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/27/2000	01/27/2000	01/28/2000	
Time	13:13	15:35	9:15	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/27/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748388	2163341	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/27/2000	01/28/2000	Date	01/28/2000
Time	14:00	9:15	Time	9:50
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/27/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748516	2163334	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/27/2000	01/28/2000	01/28/2000	
Time	16:12	9:55	11:10	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C443E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/27/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748515	2163309	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/27/2000	01/28/2000	01/28/2000	
Time	15:30	10:20	11:40	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/27/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748419	2163341	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/01/2000	02/01/2000	02/02/2000	8:15
Time	12:15	15:55	J. Dekoskie	Multi Rae
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/02/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748368	2163405	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/01/2000	02/01/2000	02/02/2000	8:50
Time	13:20	15:30	J. Dekoskie	Multi Rae
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/02/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748342	2163395	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/01/2000	02/01/2000	02/02/2000	9:25
Time	14:05	16:25	02/02/2000	9:25
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/02/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748392	2163360	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/01/2000	02/02/2000	02/02/2000	
Time	15:00	8:40	9:40	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/02/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748389	2163289	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/02/2000	02/03/2000	02/03/2000	8:55
Time	8:05	8:15	8:55	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/03/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748429	2163296	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/02/2000	02/03/2000	02/03/2000	9:30
Time	8:45	9:05	J. Dekoskie	Multi Rae
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/03/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	014
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748433	2163270	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/02/2000	02/03/2000	02/03/2000	
Time	9:30	9:30	9:55	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/03/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	02A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	015	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748555	2163394	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/16/2000		Date 03/16/2000
Time	9:00		Time 13:15
Logger	S. Ng		Logger J. Dekoskie
Detector Model #	SPA-3		PID Model # Multi Rae
Detector Serial #	CENAN 33401		PID Serial # CENAN 21811
Scaler Model #	2224		
Scaler Serial #	132842		
Comments: 0 to 2 feet = 3/4 inch diameter 2 to 4 feet = 3/4 inch diameter 4 to 6 feet = 3/4 inch diameter Native @ 2.0 feet			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/15/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/16/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/16/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	016
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748528	2163424	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		03/16/2000	03/16/2000	
Time		10:30	13:45	
Logger		S. Ng	J. Dekoskie	
Detector Model #		SPA-3	PID Model #	Multi Rae
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 2 feet = 3/4 inch diameter
 2 to 4 feet = 3/4 inch diameter
 4 to 6 feet = 3/4 inch diameter

Native @ 3.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	017
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748437	2163543	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		03/16/2000	03/16/2000	
Time		10:40	14:00	
Logger		S. Ng	J. Dekoskie	
Detector Model #		SPA-3	PID Model #	Multi Rae
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

- 0 to 2 feet = 3/4 inch diameter
- 2 to 4 feet = 3/4 inch diameter
- 4 to 6 feet = 3/4 inch diameter

Native @ 1.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X		02B	
Activity Designator	A A A		PDI	
Field Measurement / Sample Collection Designator	V V		SP	
Station Number	N N N		001	
Media	m m		SB	
Sample Type	n		0	
Sequential Sample Number	# # # # #		(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)		
	748276.7551	2163390.2261		
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	08/21/2001	08/24/2001	Date	08/24/2001
Time	9:15	8:00	Time	8:00
Logger	M.Williamson	C.G.Moyer	Logger	C.G.Moyer
Detector Model #	G1 Bicon	44-10	PID Model #	Multi Rae
Detector Serial #	13583	CENAN 21783	PID Serial #	CENAN 21807
Scaler Model #	Ludlum 2221	2241-2		
Scaler Serial #	97841	21788		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	08/21/2001 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	08/24/2001 Date
<i>Field Original Signed</i> Signature (PID Logging)	08/24/2001 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	02B		
Activity Designator	A A A	PDI		
Field Measurement / Sample Collection Designator	V V	SP		
Station Number	N N N	002		
Media	m m	SB		
Sample Type	n	0		
Sequential Sample Number	#####	(See Below)		
Location	Northing (NAD 1927)	Easting (NAD 1927)		
	748077.4140	2163243.8819		
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	08/21/2001	08/24/2001	Date	08/24/2001
Time	10:00	8:20	Time	8:20
Logger	M.Williamson	C.G.Moyer	Logger	C.G.Moyer
Detector Model #	G1 Bicron	44-10	PID Model #	Multi Rae
Detector Serial #	13583	CENAN 21783	PID Serial #	CENAN 21807
Scaler Model #	Ludlum 2221	2241-2		
Scaler Serial #	97841	21788		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

Field Original Signed

 Signature (Down Hole Gamma Logging)

08/21/2001
 Date

Field Original Signed

 Signature (Core Gamma Logging)

08/24/2001
 Date

Field Original Signed

 Signature (PID Logging)

08/24/2001
 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226			Thorium-232			Uranium-238			
	X	X	X	#	#	#	#	#	#	DUP	pCi/g			pCi/g			pCi/g			
Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA												
0.0																				
0.5	0	2	B	0	0	2	4	0	4		0.54	0.03	0.08	0.40	0.02	0.07	1.70	J	0.27	2.79
1.0																				
1.5	0	2	B	0	0	2	4	0	5		0.83	0.05	0.12	0.97	0.04	0.10	2.70	J	0.73	4.39
2.0	0	2	B	0	0	2	4	0	6		1.17	0.04	0.17	1.12	0.03	0.12	0.63	J	2.31	5.67
2.5																				
3.0																				
3.5																				
4.0																				
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24.0																				

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X		02B	
Activity Designator	A A A		PDI	
Field Measurement / Sample Collection Designator	V V		SP	
Station Number	N N N		003	
Media	m m		SB	
Sample Type	n		0	
Sequential Sample Number	# # # # #		(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)		
	748106.6564	2163204.7322		
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	08/24/2001
Date	08/21/2001	08/24/2001	Date	08/24/2001
Time	10:39	8:40	Time	8:40
Logger	M.Williamson	C.G.Moyer	Logger	C.G.Moyer
Detector Model #	G1 Bicron	44-10	PID Model #	Multi Rae
Detector Serial #	13583	CENAN 21783	PID Serial #	CENAN 21807
Scaler Model #	Ludlum 2221	2241-2		
Scaler Serial #	97841	21788		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

<i>Field Original Signed</i>	08/21/2001
_____ Signature (Down Hole Gamma Logging)	_____ Date
<i>Field Original Signed</i>	08/24/2001
_____ Signature (Core Gamma Logging)	_____ Date
<i>Field Original Signed</i>	08/24/2001
_____ Signature (PID Logging)	_____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X		02B	
Activity Designator	A A A		PDI	
Field Measurement / Sample Collection Designator	V V		SP	
Station Number	N N N		004	
Media	m m		SB	
Sample Type	n		0	
Sequential Sample Number	# # # # #		(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)		
	748150.4249	2163170.3792		
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	08/21/2001	08/24/2001	Date	08/24/2001
Time	11:15	9:10	Time	9:10
Logger	M. Williamson	C.G. Moyer	Logger	C.G. Moyer
Detector Model #	G1 Bicron	44-10	PID Model #	Multi Rae
Detector Serial #	13583	CENAN 21783	PID Serial #	CENAN 21807
Scaler Model #	Ludlum 2221	2241-2		
Scaler Serial #	97841	21788		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	08/21/2001 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	08/24/2001 Date
<i>Field Original Signed</i> Signature (PID Logging)	08/24/2001 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator		X X X	02B
Activity Designator		A A A	PDI
Field Measurement / Sample Collection Designator		V V	SP
Station Number		N N N	005
Media		m m	SB
Sample Type		n	0
Sequential Sample Number		# # # # #	(See Below)
Location		Northing (NAD 1927)	Easting (NAD 1927)
		748187.3889	2163104.5782
		Gamma Logging	
		Down Hole	Core
		Photoionization Detector (PID) Logging	
Date	08/21/2001	08/24/2001	Date
Time	12:15	9:30	Time
Logger	M.Williamson	C.G.Moyer	Logger
Detector Model #	G1 Bicron	44-10	PID Model #
Detector Serial #	13583	CENAN 21783	PID Serial #
Scaler Model #	Ludlum 2221	2241-2	
Scaler Serial #	97841	21788	

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

<i>Field Original Signed</i>	08/21/2001
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	08/24/2001
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	08/24/2001
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X		02B
Activity Designator	A A A		PDI
Field Measurement / Sample Collection Designator	V V		SP
Station Number	N N N		006
Media	m m		SB
Sample Type	n		0
Sequential Sample Number	# # # # #		(See Below)
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748260.3205	2163131.0985	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	08/21/2001	08/24/2001	Date
Time	13:30	9:50	Time
Logger	M. Williamson	C.G. Moyer	Logger
Detector Model #	G1 Bicron	44-10	PID Model #
Detector Serial #	13583	CENAN 21783	PID Serial #
Scaler Model #	Ludlum 2221	2241-2	
Scaler Serial #	97841	21788	

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	08/21/2001 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	08/24/2001 Date
<i>Field Original Signed</i> Signature (PID Logging)	08/24/2001 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/12sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	203	157.0				0.0 - 2.5: Miscellaneous Fill														
0.5	229				2.5															
1.0	384				2.5															
1.5	438				3.6		0	2	B	0	0	2	4	2	4					
2.0	465				3.3															
2.5	705				4.4	2.5 - Bottom: Natural Material	0	2	B	0	0	2	4	2	5					
3.0	873		1550		4.8															
3.5	812	834																		
4.0	769																			
4.5	1060				5.0		0	2	B	0	0	2	4	2	6					
5.0	897				3.5															
5.5	458				1.0		0	2	B	0	0	2	4	2	7					
6.0	334	323			1.0															
6.5	246		1700		0.6															
7.0	247				0.6		0	2	B	0	0	2	4	2	8					
7.5	277				0.6															
8.0	300																			
8.5	257		1120		0.6															
9.0	273																			
9.5	259																			
10.0	233	285																		
10.5	246																			
11.0	207																			
11.5	130	130																		
12.0																				
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
15.0																				
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21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 42.5 inches

4-8 feet: 46 inches

8-12 feet: 40 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X		02B	
Activity Designator	A A A		PDI	
Field Measurement / Sample Collection Designator	V V		SP	
Station Number	N N N		007	
Media	m m		SB	
Sample Type	n		0	
Sequential Sample Number	# # # # #		(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)		
	748309.1893	2163168.4722		
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	08/21/2001	08/24/2001	Date	08/24/2001
Time	13:55	10:10	Time	10:10
Logger	M.Williamson	C.G.Moyer	Logger	C.G.Moyer
Detector Model #	G1 Bicron	44-10	PID Model #	Multi Rae
Detector Serial #	13583	CENAN 21783	PID Serial #	CENAN 21807
Scaler Model #	Ludlum 2221	2241-2		
Scaler Serial #	97841	21788		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

Field Original Signed

 Signature (Down Hole Gamma Logging)

08/21/2001

 Date

Field Original Signed

 Signature (Core Gamma Logging)

08/24/2001

 Date

Field Original Signed

 Signature (PID Logging)

08/24/2001

 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748079	2163095	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/21/2000	01/25/2000	01/26/2000	
Time	10:13	9:20	10:00	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/26/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	748026	2163081

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	01/21/2000	01/25/2000	01/26/2000	
Time	10:25	9:40	10:15	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:
 0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/26/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747979	2163079	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/21/2000	01/25/2000	01/26/2000	
Time	11:20	10:05	10:35	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/26/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748043	2163130	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/21/2000	01/25/2000	01/26/2000	
Time	11:45	11:25	10:45	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/26/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	02C	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	005	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748027	2163157	
	Gamma Logging		
	Down Hole	Core	
Date	01/21/2000	01/25/2000	
Time	12:28	11:40	
Logger	J. Marsden	S. Ng	
Detector Model #	G1	SPA-3	
Detector Serial #	C443E	CENAN 33401	
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
	Photoionization Detector (PID) Logging		
Date	01/26/2000		
Time	11:05		
Logger	J. Dekoskie		
PID Model #	Multi Rae		
PID Serial #	CENAN 21811		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

<i>Field Original Signed</i> <hr style="border: none; border-top: 1px solid black; margin: 5px 0;"/> Signature (Down Hole Gamma Logging)	<hr style="border: none; border-top: 1px solid black; margin: 5px 0;"/> 01/21/2000 Date
<i>Field Original Signed</i> <hr style="border: none; border-top: 1px solid black; margin: 5px 0;"/> Signature (Core Gamma Logging)	<hr style="border: none; border-top: 1px solid black; margin: 5px 0;"/> 01/25/2000 Date
<i>Field Original Signed</i> <hr style="border: none; border-top: 1px solid black; margin: 5px 0;"/> Signature (PID Logging)	<hr style="border: none; border-top: 1px solid black; margin: 5px 0;"/> 01/26/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748119	2163062	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/24/2000	01/25/2000	01/26/2000	
Time	10:00	12:00	11:20	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

<i>Field Original Signed</i> _____ Signature (Down Hole Gamma Logging)	01/24/2000 _____ Date
<i>Field Original Signed</i> _____ Signature (Core Gamma Logging)	01/25/2000 _____ Date
<i>Field Original Signed</i> _____ Signature (PID Logging)	01/26/2000 _____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748070	2163056	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/24/2000	01/25/2000	01/26/2000	
Time	10:42	12:20	12:45	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/26/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748096	2163020	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/24/2000	01/25/2000	01/26/2000	
Time	11:35	14:25	13:10	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/26/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747965	2162884	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/24/2000	01/25/2000	01/26/2000	
Time	11:42	14:45	13:35	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/26/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	02C	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	010	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747824	2163199	
	Gamma Logging	Photoionization Detector (PID) Logging	
	Down Hole	Core	
Date	01/24/2000	01/25/2000	Date 01/26/2000
Time	12:29	15:05	Time 13:55
Logger	J. Marsden	S. Ng	Logger J. Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/26/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	02C	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	011	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747687	2162978	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	01/24/2000	01/25/2000	Date 01/26/2000
Time	13:30	15:20	Time 14:15
Logger	E. Barbour	S. Ng	Logger J. Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2 inch diameter 4 to 8 feet = 2 inch diameter 8 to 12 feet = 2 inch diameter			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 01/24/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 01/25/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 01/26/2000 Date	

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results								
												Radium-226			Thorium-232			Uranium-238		
												pCi/g			pCi/g			pCi/g		
											Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0	0	2	C	0	0	2	6	3	5		1.81	0.11	0.42	10.49	0.22	0.31	6.22	J	3.79	12.40
1.5																				
2.0	0	2	C	0	0	2	6	3	6		0.36	0.05	0.15	0.45	0.04	0.18	6.04	U	---	6.04
2.5																				
3.0	0	2	C	0	0	2	6	3	7		ARCHIVED									
3.5																				
4.0																				
4.5																				
5.0																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747726	2162916	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/24/2000	01/25/2000	01/26/2000	
Time	14:01	15:35	14:40	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/26/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747795	2162828	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/24/2000	01/25/2000	01/26/2000	
Time	14:50	15:50	14:59	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/26/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	014
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747876	2162985	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/28/2000	01/28/2000	01/31/2000	
Time	9:24	13:25	10:15	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/31/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	015
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747926	2163018	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		01/28/2000	01/31/2000	
Time		13:50	10:50	
Logger		S. Ng	J. Dekoskie	
Detector Model #		SPA-3	PID Model #	Multi Rae
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

Down hole gamma logging not performed due to weather

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	01/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	01/31/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	016
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747985	2162998	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/01/2000	02/02/2000	02/02/2000	
Time	8:50	9:15	10:05	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/02/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	017
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747953	2162971	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/01/2000	02/02/2000	02/02/2000	
Time	10:25	10:05	11:25	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/02/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	018
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747961	2163035	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/01/2000	02/02/2000	02/02/2000	
Time	9:45	11:05	11:45	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/02/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	019
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747915	2162938	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/01/2000	02/02/2000	02/02/2000	
Time	11:05	11:30	13:30	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/02/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results									
												Radium-226			Thorium-232			Uranium-238			
												pCi/g			pCi/g			pCi/g			
											Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA		
0.0																					
0.5																					
1.0	0	2	C	0	0	2	6	6	2			0.94	0.07	0.24	1.54	0.08	0.28	9.14	U	---	9.14
1.5																					
2.0	0	2	C	0	0	2	6	6	3			0.90	0.08	0.21	0.77	0.07	0.29	9.61	U	---	9.61
2.5																					
3.0																					
3.5																					
4.0																					
4.5	0	2	C	0	0	2	6	6	4			ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	020
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747808	2162852	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/01/2000	02/02/2000	02/02/2000	
Time	11:40	13:35	14:20	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/02/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746923	2163665	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/13/2000	01/14/2000	01/14/2000	
Time	9:25	15:15	12:00	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 1 inch diameter
- 8 to 12 feet = 1 inch diameter
- 12 to 16 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/17/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results									
												Radium-226			Thorium-232			Uranium-238			
												pCi/g			pCi/g			pCi/g			
											Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA		
0.0																					
0.5	0	2	D	0	0	2	8	0	0			0.73	0.07	0.17	0.79	0.05	0.20	4.96	U	---	4.96
1.0																					
1.5																					
2.0	0	2	D	0	0	2	8	0	1			1.63	0.10	0.35	7.11	0.17	0.28	10.90	U	---	10.90
2.5	0	2	D	0	0	2	8	0	2	X	0.54	0.07	0.19	0.55	0.05	0.21	5.04	U	---	5.04	
3.0																					
3.5																					
4.0																					
4.5																					
5.0	0	2	D	0	0	2	8	0	3			0.66	0.05	0.15	0.77	0.04	0.12	4.30	U	---	4.30
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746931	2163658	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/13/2000	01/17/2000	Date	01/17/2000
Time	10:30	9:20	Time	12:50
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 1 inch diameter
- 8 to 12 feet = 1 inch diameter
- 12 to 16 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/17/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results										
												Radium-226			Thorium-232			Uranium-238				
												pCi/g			pCi/g			pCi/g				
											Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	0	2	D	0	0	2	8	0	4		1.02	0.08	0.26	3.26	0.11	0.30	7.99	U	---	7.99		
1.0																						
1.5																						
2.0	0	2	D	0	0	2	8	0	5		0.66	0.07	0.23	0.67	0.06	0.22	5.45	U	---	5.45		
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746932	2163650	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/13/2000	01/17/2000	Date	01/17/2000
Time	11:30	10:25	Time	14:48
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 1 inch diameter
- 8 to 12 feet = 1 inch diameter
- 12 to 16 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746937	2163667	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/13/2000	01/17/2000	01/17/2000	
Time	12:50	14:25	15:40	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 1 inch diameter
- 8 to 12 feet = 1 inch diameter
- 12 to 16 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747094	2163660	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/13/2000	01/17/2000	01/18/2000	
Time	13:37	15:05	8:10	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

<i>Field Original Signed</i>	01/13/2000
_____ Signature (Down Hole Gamma Logging)	_____ Date

<i>Field Original Signed</i>	01/17/2000
_____ Signature (Core Gamma Logging)	_____ Date

<i>Field Original Signed</i>	01/18/2000
_____ Signature (PID Logging)	_____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747084	2163692	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/13/2000	01/18/2000	01/18/2000	
Time	14:13	7:50	9:00	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C443E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 1 inch diameter
- 8 to 12 feet = 1 inch diameter
- 12 to 16 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/18/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747068	2163724	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/13/2000	01/18/2000	01/18/2000	
Time	15:14	8:35	10:15	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 1 inch diameter
- 8 to 12 feet = 1 inch diameter
- 12 to 16 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/18/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747605	2163021	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/14/2000	01/18/2000	Date	01/18/2000
Time	9:35	10:30	Time	12:30
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/18/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results								
												Radium-226			Thorium-232			Uranium-238		
												pCi/g			pCi/g			pCi/g		
											Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	2	D	0	0	2	8	2	4		0.86	0.08	0.34	2.94	0.10	0.20	8.21	U	---	8.21
1.0																				
1.5																				
2.0	0	2	D	0	0	2	8	2	5		0.32	0.07	0.24	0.49	0.05	0.16	4.49	U	---	4.49
2.5																				
3.0																				
3.5																				
4.0																				
4.5																				
5.0	0	2	D	0	0	2	8	2	6		ARCHIVED									
5.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747603	2163040	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/14/2000	01/18/2000	Date	01/18/2000
Time	10:22	12:35	Time	13:10
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/18/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747576	2163111	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/14/2000	01/18/2000	01/18/2000	
Time	11:13	13:15	14:00	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/18/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747609	2163068	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/14/2000	01/18/2000	01/18/2000	
Time	13:24	13:50	14:20	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/18/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results								
												Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	2	D	0	0	2	8	3	4		1.32	0.09	0.32	4.50	0.13	0.21	8.82	U	---	8.82
1.0																				
1.5	0	2	D	0	0	2	8	3	5		0.33	0.06	0.21	0.57	0.05	0.18	4.63	U	---	4.63
2.0																				
2.5																				
3.0	0	2	D	0	0	2	8	3	6		ARCHIVED									
3.5																				
4.0																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747643	2163012	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/18/2000	01/20/2000	01/20/2000	
Time	9:06	7:55	8:15	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/20/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)														
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP					
0.0	---					0.0-1.5: dk bn sm & gp															
0.5	404	426	616				0	2	D	0	0	2	8	3	9						
1.0	258				0.0																
1.5	223		525			1.5-3.4: bn/gy sm															
2.0	292				0.0																
2.5	245																				
3.0	221		558		0.0	3.4-4.0: no recovery	0	2	D	0	0	2	8	4	0						
3.5	209																				
4.0	186																				
4.5	203					4.0-5.0: bn/gy sm															
5.0	154	155	513		0.0																
5.5	146		487				0	2	D	0	0	2	8	4	1						
6.0	177				0.0																
6.5	171		504																		
7.0	194				0.0																
7.5	209																				
8.0	220					8.0-12.0: red bn sm															
8.5	203		467																		
9.0	220				0.0																
9.5	199																				
10.0	231	199	520		0.0																
10.5	193		524	578		0	2	D	0	0	2	8	4	2							
11.0	181				0.0																
11.5	172																				
12.0	144				0.0																
12.5	142																				
13.0	109																				
13.5	103																				
14.0	83																				
14.5	179																				
15.0	191	219																			
15.5																					
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24.0																					

Recovery

0-4 feet: 40 inches
 4-8 feet: 38 inches
 8-12 feet: 42 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747520	2162952	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/18/2000	01/20/2000	01/20/2000	9:15
Time	9:56	8:30	9:15	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/20/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	014
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747195	2163202	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/18/2000	01/20/2000	Date	01/20/2000
Time	10:36	9:20	Time	10:30
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/20/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	015
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747538	2162991	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/18/2000	01/20/2000	01/20/2000	
Time	11:30	10:40	11:25	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/20/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	016
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747350	2162943	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/18/2000	01/20/2000	01/20/2000	
Time	12:38	11:25	13:20	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/20/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results								
												Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	2	D	0	0	2	8	5	3		0.88	0.09	0.31	3.40	0.12	0.35	9.25	U	---	9.25
1.0																				
1.5	0	2	D	0	0	2	8	5	4		0.54	0.05	0.14	0.45	0.04	0.11	4.42	U	---	4.42
2.0																				
2.5																				
3.0	0	2	D	0	0	2	8	5	5		ARCHIVED									
3.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	017
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747331	2162824	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/18/2000	01/20/2000	Date	01/20/2000
Time	13:40	11:55	Time	13:50
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/20/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results								
												Radium-226			Thorium-232			Uranium-238		
												pCi/g			pCi/g			pCi/g		
											Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	2	D	0	0	2	8	5	6		1.67	0.11	0.42	7.61	0.18	0.28	6.68	3.77	12.30	
1.0																				
1.5																				
2.0	0	2	D	0	0	2	8	5	7		0.32	0.05	0.14	0.48	0.04	0.15	4.14	U	---	4.14
2.5																				
3.0																				
3.5																				
4.0																				
4.5																				
5.0																				
5.5	0	2	D	0	0	2	8	5	8		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	018
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747367	2162802	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/18/2000	01/20/2000	Date	01/20/2000
Time	14:08	13:45	Time	14:30
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/20/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results								
												Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	2	D	0	0	2	8	5	9		0.98	0.09	0.37	4.08	0.14	0.38	9.90	U	---	9.90
1.0																				
1.5	0	2	D	0	0	2	8	6	0		0.31	0.05	0.15	0.56	0.04	0.16	3.99	U	---	3.99
2.0																				
2.5																				
3.0	0	2	D	0	0	2	8	6	1		ARCHIVED									
3.5																				
4.0																				
4.5																				
5.0																				
5.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	019
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747341	2162699	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/18/2000	01/20/2000	01/20/2000	15:30
Time	15:15	14:20	15:30	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/20/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	020
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747341	2162614	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/19/2000	01/20/2000	01/21/2000	
Time	8:28	15:35	7:50	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	021
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747319	2162602	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/19/2000	01/21/2000	01/21/2000	8:35
Time	9:00	7:55	J. Dekoskie	Multi Rae
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C436E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	022
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747285	2162643	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/19/2000	01/21/2000	01/21/2000	
Time	10:13	8:40	9:35	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	023
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747257	2162709	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/19/2000	01/21/2000	01/21/2000	10:05
Time	10:30	9:05	10:05	10:05
Logger	E. Barbour	S. Ng	J. Dekoskie	J. Dekoskie
Detector Model #	G1	SPA-3	Multi Rae	Multi Rae
Detector Serial #	C436E	CENAN 33401	CENAN 21811	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results											
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	0	2	D	0	0	2	8	7	7		0.75	J	0.12	0.38	3.13	J	0.13	0.34	9.74	UJ	---	9.74
1.0																						
1.5																						
2.0																						
2.5																						
3.0	0	2	D	0	0	2	8	7	8		0.39	J	0.06	0.17	0.54	J	0.05	0.17	4.29	UJ	---	4.29
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4.0																						
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6.0																						
6.5																						
7.0	0	2	D	0	0	2	8	7	9		ARCHIVED											
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	024
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747354	2162559	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/19/2000	01/21/2000	01/21/2000	
Time	11:18	9:45	10:30	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	025
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747395	2162565	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/19/2000	01/21/2000	01/21/2000	
Time	11:45	10:35	11:05	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	026
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747377	2162515	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/19/2000	01/21/2000	01/21/2000	
Time	12:31	11:00	11:55	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	027
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747441	2162586	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/19/2000	01/21/2000	01/21/2000	
Time	13:31	11:35	13:30	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	028
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747492	2162603	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/19/2000	01/21/2000	01/21/2000	
Time	13:47	13:25	14:00	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	02D	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	029	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747430	2162626	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	01/19/2000	01/21/2000	Date 01/21/2000
Time	15:03	13:55	Time 14:35
Logger	J. Marsden	S. Ng	Logger J. Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2 inch diameter 4 to 8 feet = 2 inch diameter 8 to 12 feet = 2 inch diameter			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 01/19/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 01/21/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 01/21/2000 Date	

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results									
												Radium-226			Thorium-232			Uranium-238			
												pCi/g			pCi/g			pCi/g			
											Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA		
0.0																					
0.5	0	2	D	0	0	2	8	9	8			0.64	0.11	0.36	4.94	0.16	0.46	15.30	U	---	15.30
1.0																					
1.5																					
2.0																					
2.5																					
3.0																					
3.5																					
4.0																					
4.5																					
5.0	0	2	D	0	0	2	8	9	9			0.51	0.06	0.16	1.05	0.06	0.25	6.59	U	---	6.59
5.5																					
6.0																					
6.5																					
7.0																					
7.5																					
8.0																					
8.5	0	2	D	0	0	2	9	0	0			0.98	0.08	0.30	1.37	0.07	0.17	9.61	U	---	9.61
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10.0	0	2	D	0	0	2	9	0	1			ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	030
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747533	2162693	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/19/2000	01/21/2000	01/24/2000	
Time	14:40	14:25	7:45	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter
- 12 to 16 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	031
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747591	2162641	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/20/2000	01/24/2000	01/24/2000	8:30
Time	8:10	7:50	8:30	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	032
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747530	2162779	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/20/2000	01/24/2000	01/24/2000	8:50
Time	8:49	8:30	8:50	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C443E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator		X X X	02D
Activity Designator		A A A	PDI
Field Measurement / Sample Collection Designator		V V	SP
Station Number		N N N	033
Media		m m	SB
Sample Type		n	0
Sequential Sample Number		# # # # #	(See Below)
Location		Northing (NAD 1927)	Easting (NAD 1927)
		747623	2162835
		Photoionization Detector (PID) Logging	
		Gamma Logging	
	Down Hole	Core	
Date	01/20/2000	01/24/2000	Date
Time	9:10	8:55	Time
Logger	E. Barbour	S. Ng	Logger
Detector Model #	G1	SPA-3	PID Model #
Detector Serial #	C436E	CENAN 33401	PID Serial #
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2 inch diameter 4 to 8 feet = 2 inch diameter 8 to 12 feet = 2 inch diameter			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 01/19/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 01/21/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 01/21/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	034
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747596	2162891	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/20/2000	01/24/2000	01/24/2000	9:55
Time	9:44	9:15	9:55	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C443E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	035
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747489	2162558	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/20/2000	01/24/2000	01/24/2000	
Time	10:30	9:45	11:17	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Tel: (201) 226-6600 FAX: (201) 226-6660			
Site Designator	X X X	02D	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	036	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	#####	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747630	2162638	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	01/20/2000	01/24/2000	Date
Time	11:04	10:15	Time
Logger	J. Marsden	S. Ng	Logger
Detector Model #	G1	SPA-3	PID Model #
Detector Serial #	C443E	CENAN 33401	PID Serial #
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments:			
_____ Signature (Down Hole Gamma Logging)		_____ Date	
_____ Signature (Core Gamma Logging)		_____ Date	
_____ Signature (PID Logging)		_____ Date	

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results								
												Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	2	D	0	0	2	9	2	4		1.28	0.12	0.54	8.41	0.22	0.34	13.90	U	---	13.90
1.0																				
1.5	0	2	D	0	0	2	9	2	5		0.48	0.05	0.18	0.70	0.06	0.23	6.81	U	---	6.81
2.0																				
2.5																				
3.0																				
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4.5																				
5.0	0	2	D	0	0	2	9	2	6		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	037
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747655	2162678	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/20/2000	01/24/2000	01/24/2000	
Time	11:45	11:05	12:25	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results								
												Radium-226			Thorium-232			Uranium-238		
												pCi/g			pCi/g			pCi/g		
											Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	2	D	0	0	2	9	2	7		1.31	0.11	0.36	5.03	0.17	0.46	11.40	U	---	11.40
1.0																				
1.5																				
2.0	0	2	D	0	0	2	9	2	8		0.51	0.07	0.27	0.85	0.07	0.27	7.86	U	---	7.86
2.5	0	2	D	0	0	2	9	2	9	X	0.64	0.08	0.25	0.73	0.07	0.26	8.19	U	---	8.19
3.0	0	2	D	0	0	2	9	3	0		ARCHIVED									
3.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	02D	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	038	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747630	2162755	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	01/20/2000	01/24/2000	Date 01/24/2000
Time	12:09	11:45	Time 13:15
Logger	J. Marsden	S. Ng	Logger J. Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2 inch diameter 4 to 8 feet = 2 inch diameter 8 to 12 feet = 2 inch diameter			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 01/19/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 01/21/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 01/21/2000 Date	

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results											
												Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA				
0.0																							
0.5	0	2	D	0	0	2	9	3	1		0.66	0.08	0.31	1.36	0.08	0.26	6.92	U	---	6.92			
1.0																							
1.5																							
2.0	0	2	D	0	0	2	9	3	2		0.42	0.05	0.16	0.25	U	---	0.25	U	---	4.56	U	---	4.56
2.5																							
3.0																							
3.5																							
4.0																							
4.5																							
5.0	0	2	D	0	0	2	9	3	3		ARCHIVED												
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	039
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747728	2162714	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/20/2000	01/24/2000	01/24/2000	13:45
Time	13:35	13:20		
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results									
												Radium-226			Thorium-232			Uranium-238			
												pCi/g			pCi/g			pCi/g			
											Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA		
0.0																					
0.5																					
1.0																					
1.5	0	2	D	0	0	2	9	3	4			0.97	0.09	0.27	2.50	0.09	0.19	10.30	U	---	10.30
2.0	0	2	D	0	0	2	9	3	5			0.54	0.07	0.22	0.67	0.06	0.24	7.15	U	---	7.15
2.5																					
3.0	0	2	D	0	0	2	9	3	6			ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	040
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747729	2162788	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/20/2000	01/24/2000	01/24/2000	
Time	14:10	13:45	14:25	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C443E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	041
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747664	2162870	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/20/2000	01/24/2000	01/24/2000	14:50
Time	14:50	14:15	14:50	14:50
Logger	J. Marsden	S. Ng	J. Dekoskie	J. Dekoskie
Detector Model #	G1	SPA-3	Multi Rae	Multi Rae
Detector Serial #	C443E	CENAN 33401	CENAN 21811	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	042
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	747716	2162868

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/21/2000	01/24/2000	01/24/2000	
Time	8:00	15:00		15:20
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	043
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747429	2163258	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/21/2000	01/24/2000	01/26/2000	
Time	8:28	15:25	9:15	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C443E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	02D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	044
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	746847	2163309	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/21/2000	01/25/2000	01/26/2000	
Time	9:25	8:25	9:40	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 2 inch diameter
- 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/19/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/21/2000 Date

APPENDIX 2-C

Environmental Boring Log Sheets

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	02A
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	mm	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)

	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	748560.887	2163386.66	

Gamma Logging		Photoionization Detector (PID) Logging	
Date	Down Hole	Date	Core
		3/31	
		1345	
		9 MARKS	
Detector Model #		PID Model #	Multi-RAE
Detector Serial #		PID Serial #	CENAN 21811
Scaler Model #			
Scaler Serial #			

Comments:

- MPI No. ENV-02-2073
- Direct-push location grouted with BenSeal.

1345 - 1415 - SOIL SAMPLE 5' => 8'
 1400 - 1505 - H2O SAMPLE

George H. Market
 Signature (Core Gamma Logging)

3/31/00
 Date

George H. Market
 Signature (Logging)

3/31/00
 Date

H₂O
@ 3.5'

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)											
					X	X	X	#	#	#	#	#				
0.0		↑	↑	60% Rew SC (top soil)	0	2	10	20	50	2						
0.5				54R 3/1												
1.0																
1.5																
2.0		0.0	0.0	SM 54R 4/4												
2.5				↓												
3.0				SMS 54R 4/4												
3.5																
4.0																
4.5																
5.0		0.0														
5.5			0.0													
6.0		2														
6.5																
7.0		0.0		COBBLE FRAGMENTS												
7.5				SC 2 GLEY 2.5/106												
8.0																
8.5																
9.0																
9.5		0.0	0.0													
10.0				SC 54R 5/4												
10.5				↓												
11.0				SP 54R 4/4 coarse												
11.5				SAND (wet)												
12.0																
12.5		0.0	0.0													
13.0				GC 54R 4/4												
13.5				↓												
14.0				REFUSAL @ 13.7'												
14.5																
15.0																
15.5																
16.0																
16.5																
17.0																
17.5																
18.0																
18.5																
19.0																
19.5																
20.0																
20.5																
21.0																
21.5																
22.0																
22.5																
23.0																
23.5																
24.0																

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
02A 020503
 Page 1 of 1

PROJECT: **FUSRAP MAYWOOD** SITE: **02A**
 Project No: **08750503** Client: **USACE**
 Contractor: **TERRA PROBE INC -** SAMPLE DEPTH: **10' - 14'**
 Start Date/Time: **3/31 1400** Completion Date/Time: Well Diameter:

Development Method/Equipment:
 Logged by: **G. MARKT** Water Level (ft bgs): **3.5** Protection Level: **D**

Pre-development DTW (PVC) (ft): 3.5 DTB (PVC) (ft): _____

Post-development DTW (PVC) (ft):
 Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.10 \text{ gal}$
 (2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ —
 (2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ —
 Minimum Purge Volume (gal) (3 well volumes) = **0.30 gal**
 Development Purge/Discharge Rate (gpm):
 Maximum Drawdown During Purging (ft):
 Total Quantity Purged: _____
 Disposition of Purge Water: **~ 1 #/min**
 Hours of Development: _____
 Hours of Decon: _____
 Hours of Standby: _____

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1415		3.5	-	11.8	6.93	1.01	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

$d_o = 2.22$

flow rate $\Rightarrow 58 \frac{\text{gal}}{\text{min}}$

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: GWRI Job Number: 085750503 Activity: Direct-Push Sampling
---	---

Site Designator	XXX	02A
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
----------	---------------------	--------------------	-----------------------

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		4/3	Date	4/3
Time		0800	Time	0800
Logger		G MARKT	Logger	G MARKT
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

1. MPI No. ENV-02-2072
2. Direct-push location grouted with BenSeal.

0800 - 0845 - SOIL SAMPLE 5' → 8'

0845 - 0930 - H₂O SAMPLE

<u>George H. Markt</u> Signature (Core Gamma Logging)	<u>4/3/2000</u> Date
<u>George H. Markt</u> Signature (Logging)	<u>4/3/2000</u> Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	95% Recv.	0	2	A	0	2	0	5	0	4
0.5		↑	↑	GM 2 GLEY 5/5B (processed									
1.0		↑	↑	STONE)									
1.5		0.0	0.0	GM 5YR 4/4									
2.0													
2.5		↓	↓	SM 5YR 4/3									
3.0			0.1										
3.5		↓	0.0	GRASS (marsh depos.)									
4.0		↑	↑	100% Recv.									
4.5		0.0	↑	SC 5YR 4/4									
5.0		↓	↓										
5.5		↓	0.0										
6.0		3											
6.5		0.0	↓										
7.0													
7.5		↓	↓										
8.0		↑	↑										
8.5		↑	↑										
9.0													
9.5		0.0	0.0										
10.0													
10.5		↓	↓										
11.0													
11.5		↓	↓										
12.0		↑	↑										
12.5		0.0	0.0										
13.0				SP 5YR 4/4									
13.5		↓	↓										
14.0													
14.5													
15.0													
15.5													
16.0													
16.5													
17.0				NOTE: 1 st DRILLED TO 4' NG - CUTTER HEAD BROKE									
17.5				MOVED TO SECOND HOLE									
18.0				DRILLED TO 16', Pushed to 18'									
18.5				FOR GW SAMPLING									
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

H₂O @ 5.7'

NOTE: 1st DRILLED TO 4' NG - CUTTER HEAD BROKE
 MOVED TO SECOND HOLE
 DRILLED TO 16', Pushed to 18'
 FOR GW SAMPLING

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 A:\GWRI Soil Probe Log Sheet.doc

**WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.**

SAMPLE ID:
02A020504

PROJECT: FUSRAP MAYWOOD	SITE: 02A	Page 1 of 1
Project No:	Client: USACE	
Contractor: TERRA PROBE INC	SAMPLE DEPTH: 14' → 18'	
Start Date/Time: 04/03 0845	Completion Date/Time: 0930	Well Diameter:
Development Method/Equipment:		
Logged by: G. MARKT	Water Level (ft bgs): 5.7	Protection Level: D
Pre-development DTW (PVC) (ft): 5.7	DTB (PVC) (ft):	

Post-development DTW (PVC) (ft):
 Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$
 (2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$
 (2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$
 Minimum Purge Volume (gal) (3 well volumes) =
 Development Purge/Discharge Rate (gpm):
 Maximum Drawdown During Purging (ft):
 Total Quantity Purged:

Disposition of Purge Water:
 Hours of Development:
 Hours of Decon:
 Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
0845		5.7		14.7	5.11	195	876	*

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

$d_0 = 3.11$ Flow Rate = 4 min/lt
 * ER3 ERROR DISPLAYED DURING CALIBRATION -

80 HANCOCK

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER SB-1

PROJECT MAYWOOD

LOCATION I DEKOSKIE

DATE 1 1 1

DEPTH	DESCRIPTION OF MATERIALS	WATER CONTENT	SHRINKAGE	LIQUIDITY INDEX	PLASTICITY INDEX	UNSATURATED WATER CONTENT	REMARKS
0-0.8	GY/BLK GP AND SM, PARKING LOT SUBSTRATE						
0.8-2.0	BN SM tr GP	4.5 K _{sp}					
2.0-4.0	REN/BN SM tr GP						
4-4.2	SAA						
4.2-5.9	GY CLAYEY SILT, tr f sand MOIST to WET.						
5.9-8.0	LT BN SM, VERY SILTY, DRY VARVED/INTERBEDDED w/ LT GY SM						
8-12	SAA - WET MED TO FINE SP IN TIP OF SAMPLER						DTW ~ 8.5'
12-14	BN SP, tr SM SATURATED						12 ft: SWITCH TO DISCREET SAMPLER
14-15.5	RED/BN SM tr SC & GP, WEATHERED BEDROCK CHIPS.						
15.5 ft	REFUSAL						

PROJECT MAYWOOD

HOLE NO. 80 HANCOCK SB-1

Figure 4-2 (Concluded)

80 HANCOCK

HTRW DRILLING LOG (CONTINUATION SHEET)

WELL NUMBER SB-2

PROJECT Maywood

OPERATOR J. DEKOSKIE

DATE

DEPTH	DESCRIPTION OF MATERIALS	LOG	REMARKS
0-0.5	BN SM + ORGANICS, TOPSOIL		
0.5-1.5	BN SM & GP DRY		
1.5-1.7	GY SP F TO M SAND, DRY	28K cpm	
1.7-4.0	BN/RED SM w/ GP		
4.0-6.4	SAA, MOIST		
6.4-7.2	GY SP & SM MOIST TO WET	64-7.2- ~10K CPM	
7.2-8	BN/GY SM VERY SILTY, MOIST		
8-12	SAA, lt clay		
12-14	SAA, lt clay BN, SP, LOOSE, WET	28K CPM	DOWN 10ft 12 ft - DISCREET SAMPLER
14-16	BN, SM, WET		
16 ft	REFUSAL		

PROJECT Maywood

WELL NO. 80 HANCOCK SB-2

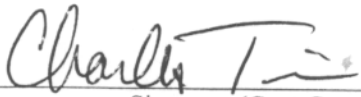
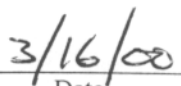
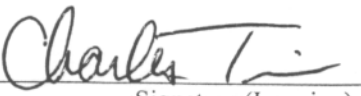
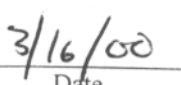
Figure 4-2 (Concluded)

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: GWRI Job Number: 085750503 Activity: Direct-Push Sampling	
Site Designator	XXX		02C
Activity Designator	AAA		GWR
Field Measurement/Sample Collection Designator	VV		DP
Station Number	NNN		001
Media	mm		SB
Sample Type	n		
Sequential Sample Number	#####		(see Below)
Location		Northing (NAD 1927) 748098.431	Easting (NAD 1927) 2163053451
		Elevation (NGVD 1929)	
		Photoionization Detector (PID) Logging	
Gamma Logging			
	Down Hole	Core	
Date		3/16	Date
Time		1410	Time
Logger			Logger
Detector Model #			PID Model #
Detector Serial #			PID Serial #
Scaler Model #			
Scaler Serial #			

Comments:

1. MPI No. ENV-02-2025
2. Direct-push location grouted with BenSeal.

 _____ Signature (Core Gamma Logging)	 _____ Date
 _____ Signature (Logging)	 _____ Date

START
1405

STOP
1415

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	100% RECV.	0	2	C	0	2	0	5	1	0
0.5		↑	↑	SM ms 54R4\2									
1.0		0.0	0.0	SAND trace SILT									
1.5													
2.0													
2.5		↓	↓										
3.0													
3.5		↓	↓										
4.0		↑	↑	75% RECV.									
4.5				SAA									
5.0		0.0	0.0										
5.5													
6.0		↓	↓										
6.5													
7.0		↓	↓										
7.5		↓	↓										
8.0		END OF SAMPLING @ 8.0'											
8.5		OVERDRILLED TO 16' TO											
9.0		FACILITATE GW COLLECTION											
9.5													
10.0													
10.5													
11.0													
11.5													
12.0													
12.5													
13.0													
13.5													
14.0													
14.5													
15.0													
15.5													
16.0													
16.5													
17.0													
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID. 020511
 Page 1 of 1

PROJECT: FUSRAP MAYWOOD SITE: OJC
 Project No: 08575053 Client: USACE
 Contractor: TERRA PROBE SAMPLE DEPTH: 12-16'
 Start Date/Time: 3/16/00-1445 Completion Date/Time: 3/16/00 1530 Well Diameter:

Development Method/Equipment:

Logged by: C. TRIONE Water Level (ft bgs): 8.7' Protection Level: D

Pre-development DTW (PVC) (ft): 8.7' DTB (PVC) (ft): 16'

Post-development DTW (PVC) (ft): ✓

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$.183 GAL

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) = NA

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) = NA

Minimum Purge Volume (gal) (3 well volumes) = .55 GAL

Development Purge/Discharge Rate (gpm): ~250 ml/min

Minimum Drawdown During Purging (ft): —

Total Quantity Purged: .55 gal

Disposition of Purge Water: Returned to MISS

Hours of Development: —

Hours of Decon: —

Hours of Standby: —

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1447		8.7'	—	13.0°	7.29	.484	888	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

1445 STARTS H₂O SAMPLING

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: GWRI Job Number: 085750503 Activity: Direct-Push Sampling
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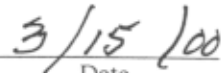

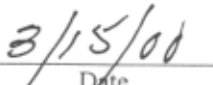
Site Designator	XXX	02D
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)

	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	747598.748	2162869.494	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		3/15/00	Date	3/15/00
Time		1435	Time	1435
Logger		E. WIEDERKEMR	Logger	E.W.
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

1. MPI No. ENV 02-2003
2. Direct-push location grouted with BenSeal.

 Signature (Core Gamma Logging)	 Date
 Signature (Logging)	 Date

START
14:35



NOT APP.

STOP
15:03

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0				75% REC.	0	2	D	0	2	0	5	1	2
0.5				DRK BROWN TOP SOIL									
1.0				GRADING TO DRK.BR.									
1.5				SILTY f-m sand									
2.0		B.G.	0.0	OCCASIONAL FRAGMENTED									
2.5				ROCK, QRTZ & GRAVEL.									
3.0													
3.5													
4.0													
4.5				100% RECOVERY									
5.0				VERY DRK GRAY SILTY									
5.5				SAND.									
6.0				VERY DRK GRAY									
6.5		B.G.	0.0	YELLOWISH RED SILTY									
7.0				VERY f-SAND									
7.5													
8.0													
8.5				80% REC.									
9.0				RED/BROWN									
9.5				CLAYEY SILT									
10.0													
10.5		B.G.	0.0										
11.0													
11.5													
12.0													
12.5				50% REC.									
13.0													
13.5				RED/BROWN f-m SAND									
14.0				W/LENSES OF									
14.5		B.G.	0.0	CLAYEY SILT									
15.0													
15.5													
16.0													
16.5													
17.0				40%									
17.5													
18.0				DRK RED/GRAY m-SAND									
18.5		B.G.	0.0	GRADING TO f-SAND									
19.0				@ 19'									
19.5													
20.0													
20.5				REFUSAL @ 20'									
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID:
02D020513

PROJECT: 0857 MAYWOOD	SITE: 02D	Page <u>1</u> of <u>1</u>
Project No: 08575053	Client: USACE	
Contractor: TERRA PROBE	SAMPLE DEPTH: 6'-10'	
Start Date/Time: 1505 3/15/00	Completion Date/Time: 1540	Well Diameter:
Development Method/Equipment:		
Logged by: E. WIEDERKEHR	Water Level (ft bgs): ~ 4'	Protection Level: D

Pre-development DTW (PVC) (ft): 4' DTB (PVC) (ft): 10'

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow .15 \text{ GAL.}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) = \text{---}$)

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) = \text{---}$)

Minimum Purge Volume (gal) (3 well volumes) = **.45 GAL**

Development Purge/Discharge Rate (gpm): **250 ml/min**

Minimum Drawdown During Purging (ft): **---**

Total Quantity Purged: **2.5 GAL**

Disposition of Purge Water: **---**

Hours of Development: **30 min.**

Hours of Decon: **---**

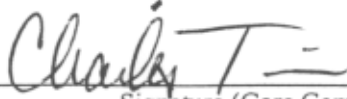

Hours of Standby: **---**

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1505	INITIAL	4'	BROWN CLOUDY	13.8	7.63	2.46	> 999	
	1		"	13.6	7.66	2.46	> 999	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
DTW = depth to water gpm = gallons per minute

VOL	DO	SAL
D	2.47	.11
1	2.74	.11

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: GWRI Job Number: 085750503 Activity: Direct-Push Sampling	
Site Designator	XXX	02D	
Activity Designator	AAA	GWR	
Field Measurement/Sample Collection Designator	VV	DP	
Station Number	NNN	002	
Media	m m	SB	
Sample Type	n		
Sequential Sample Number	#####	(see Below)	
	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	747376.427	2162546.223	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date		3/16	Date
Time		0923	Time
Logger			Logger
Detector Model #			PID Model #
Detector Serial #			PID Serial #
Scaler Model #			Multi-RAE
Scaler Serial #			CENAN 21811
Comments: 1. MPI No. <u>ENV-02-2109</u> 2. Direct-push location grouted with BenSeal.			
 _____ Signature (Core Gamma Logging)		<u>3/16/00</u> _____ Date	
 _____ Signature (Logging)		<u>3/16/00</u> _____ Date	

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/M Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0				40% RECOV.	1	2	1	0	2	0	5	1	4
0.5	↑	↑	↑	SM m-f 54R 3\1 SAND									
1.0				SOME SILT									
1.5	NA	0.0	0.0										
2.0													
2.5													
3.0													
3.5	↓	↓	↓										
4.0		↑	↑	SP-OF 54R 5A SAND									
4.5				100% RECOV.									
5.0				ML 2.543\1 SILT									
5.5				Trace SAND Trace CLAY									
6.0		0.0	0.0	poor Elasticity									
6.5				SP of 2.543\1 SAND									
7.0				Trace SILT									
7.5		↓	↓										
8.0													
8.5													
9.0													
9.5													
10.0													
10.5													
11.0													
11.5													
12.0													
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19.5													
20.0													
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21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

START
9:15a

▽

STOP
9:23a

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 E:\Maywood\Task0501\Forms\GWRI Soil Probe Log Sheet.doc

ELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
02A020515
Page 1 of 1

PROJECT: <u>FUSRAP INHYWOOD</u>	SITE: <u>02d</u>	Page <u>1</u> of <u>1</u>
Project No: <u>08575053</u>	Client: <u>USACE</u>	
Contractor: <u>TERRA PROBE</u>	SAMPLE DEPTH: <u>4-8'</u>	
Start Date/Time: <u>3/16</u>	Completion Date/Time: <u>3/16 11:35</u>	Well Diameter:

Development Method/Equipment:

Logged by: <u>A. TRIONE</u>	Water Level (ft bgs): <u>6.0'</u>	Protection Level: <u>D</u>
Pre-development DTW (PVC) (ft): <u>6.0'</u>	DTB (PVC) (ft): <u>8'</u>	

Post-development DTW (PVC) (ft): —
 Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$.15 GAL
 (2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) = NA
 (2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) = NA
 Minimum Purge Volume (gal) (3 well volumes) = .15 GAL
 Development Purge/Discharge Rate (gpm): 250-500 ml/min
 Maximum Drawdown During Purging (ft): —

al Quantity Purged: 1 gal
 Disposition of Purge Water: Returned to Miss
 Hours of Development: —
 Hours of Decon: —
 Hours of Standby: —

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
<u>10:07</u>				<u>13.5°</u>	<u>7.18</u>	<u>1568</u>	<u>78</u>	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

10:20 START H₂O SAMPLING

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660


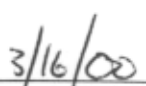


Site Designator	XXX	02d
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	003
Media	mm	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)

	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	746938.769	2163657.928	

Gamma Logging		Photoionization Detector (PID) Logging	
Date	Down Hole	Date	Core
	3/16	3/16	
	11:38	11:33	
Logger		Logger	
Detector Model #		PID Model #	Multi-RAE
Detector Serial #		PID Serial #	CENAN 21811
Scaler Model #			
Scaler Serial #			

Comments:

1. MPI No. ENV-02-2004
2. Direct-push location grouted with BenSeal.

 _____ Signature (Core Gamma Logging)	 _____ Date
 _____ Signature (Logging)	 _____ Date

START
11:30

↓

~~---~~

STOP
11:40

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	40% RECOV.	0	2	d	0	2	0	5	1	6
0.5		↑	↑	SP CF 54R3\2 SAND									
1.0		0.0	0.0	SOME SILT SOME GRAVEL									
1.5													
2.0													
2.5		↓	↓										
3.0		↓	↓	5m of BLK SAND									
3.5				SOME SILT									
4.0		↑	↑	100% RECOV.									
4.5		↑	↑										
5.0		↑	↑	SP CF 54R4\4									
5.5		0.0	0.0	SAND SOME GRAVEL									
6.0				TRACE SILT									
6.5													
7.0		↓	↓										
7.5		↓	↓										
8.0		↑	↑										
8.5		↑	↑										
9.0		↑	↑										
9.5		2.0	0.0										
10.0													
10.5		↓	↓										
11.0		↓	↓										
11.5		↓	↓										
12.0													
12.5													
13.0													
13.5													
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23.0													
23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 E:\Maywood\Task0501\Forms\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
02d020517

PROJECT: FUSRAP MAYWOOD SITE: 02d Page 1 of 1

Project No: 08575053 Client: USACE

Contractor: TERRA PROBE SAMPLE DEPTH: 8-12'

Start Date/Time: 3/16-1200 Completion Date/Time: 3/16 Well Diameter:

Development Method/Equipment:

Logged by: C. TRIONE Water Level (ft bgs): 4.5' Protection Level: D

Pre-development DTW (PVC) (ft): 4.5' DTB (PVC) (ft): 12'

Post-development DTW (PVC) (ft): —

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$. 189 GAL

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) = NA

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) = NA

Minimum Purge Volume (gal) (3 well volumes) = .56 GAL

Development Purge/Discharge Rate (gpm): — 250-500 in 2/mi-

Maximum Drawdown During Purging (ft): —

al Quantity Purged: 3 gal

Disposition of Purge Water: Returned to Miss

Hours of Development: —

Hours of Decon: —

Hours of Standby: —

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1200		4.5'	—	11.1°	7.17	.96	663	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
DTW = depth to water gpm = gallons per minute

205 START H₂O SAMPLING

PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 3 – Revision 1

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

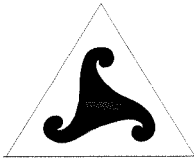
SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18

Submitted to:

Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
FUSRAP Project Office
26 Federal Plaza
New York, New York 10278

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Submitted by:



Stone & Webster, Inc.
100 West Hunter Ave.
Maywood, NJ 07607
May 2001

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Michael Ciminera

Michael Ciminera
Field Operations Leader

Date: 5-30-2001

**PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 3 – Revision 1**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18**

RECORD OF REVISIONS

Revision 0: Original Issue

Revision 1: The Final PDI Report (Revision 0) was submitted in July 2000. Revision 1 to the Final PDI Report incorporates the following significant changes: revision to text headers and footers; addition of results of confirmatory radiological analyses to [Table 3-4](#); and addition of Toxicity Characteristic Leaching Procedure (TCLP) data to [Table 3-5](#).

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- Appendix 3-A: Variances from the PDI Work Plan**
- Appendix 3-B: PDI Soil Probe Log Sheets**
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- 3-1 Properties Comprising Each Cluster**
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- 3-5 Summary of Environmental Analytical Data**

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- 3-3 Cluster No. 3 Sample Location Map and Data from Previous Investigations**
- 3-4 Cluster No. 3 Gamma Scan Survey Results**

ACRONYMS AND ABBREVIATIONS

AT&T	American Telephone & Telegraph
BNI	Bechtel National, Inc.
C	Degrees Centigrade
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
Conc.	Concentration
CQCP	Contractor Quality Control Plan
DOE	U.S. Department of Energy
EPP	Environmental Protection Plan
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	grams
GMS	Groundwater Modeling System
GPR	Ground Penetrating Radar
GPS	Global Positioning System
ID	Identification
ISOCS	In Situ Object Counting System
keV	kilo electron volts
kg	kilogram
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCW	Maywood Chemical Works
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
mg	milligram
MHTDP	Materials Handling, Transportation and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJVIS	New Jersey Vehicle Inspection Station
NYS&W	New York, Susquehanna & Western Railway
ORNL	Oak Ridge National Laboratories
pCi	picoCurie
PDI	Pre-Design Investigation
PDIWP	Pre-Design Investigation Work Plan
PID	Photoionization Detector
PVC/PET	Polyvinyl Chloride/Polyethylene Teraphthalate
QA	Quality Assurance
QC	Quality Control
QCSR	Quality Control Summary Report
Ra-226	Radium-226
Rn-222	Radon-222

RCRA	Resource Conservation and Recovery Act
RESRAD	Department of Energy Computer Code; RESidual RADioactivity
ROC	Radionuclides of Concern
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
St.	Street
Th-232	Thorium-232
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
ug	microgram
U-238	Uranium-238
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank

1.0 SITE BACKGROUND AND PHYSICAL SETTING

1.1 General Site Overview

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (hereafter referred to as the Maywood Site) is located in a highly developed area of Bergen County in northeastern New Jersey, in the Boroughs of Maywood and Lodi and the Township of Rochelle Park (Figure 3-1). Portions of the Maywood Site are radiologically impacted from process wastes and residues associated with the recovery and refining of thorium and thorium compounds from monazite ores by the Maywood Chemical Works (MCW) from 1916 to 1956 (Bechtel National, Inc., BNI, 1992).

Waste produced at MCW was a fine sand-like material containing residual thorium with lesser amounts of uranium and its daughter products including radium. Wastes and residues were disposed in low-lying areas west of processing facilities. In the early 1930s, a portion of these wastes and residues was separated from the main property by construction of New Jersey State Highway 17 (NJ Route 17). Additionally, the former channel of Lodi Brook runs through the majority of the properties making up the Maywood Site. Some of the contaminated materials are assumed to have eroded from the facility area and were transported downstream via Lodi Brook (Figure 3-2). In addition, from 1928 to 1944, local residents were known to use process waste in their lawns and gardens and as fill material (BNI, 1992). These are the major mechanisms for distribution of radiologically-contaminated materials on the Maywood Site.

The Maywood Site consists of 88 designated residential, commercial, municipal, and state or federal properties. All 64 Phase I properties (including all residential and municipal properties) have either been remediated by the U.S. Department of Energy (DOE) or U.S. Army Corps of Engineers (USACE) or are currently being addressed under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). The remaining 24 Phase II properties are being addressed by the Stone & Webster Team (i.e., Team).

1.2 Pre-Design Investigation Scope

On December 29, 1998, the USACE issued a Scope of Services for the design and remediation of the remaining 24 commercial and government properties. These properties potentially contain deposits of radioactive material in surface and subsurface soils resulting from operations of the former MCW. They have been designated as the Phase II properties.

A Pre-Design Investigation Work Plan (PDIWP, Stone & Webster, 1999a) was submitted in October 1999 for the Phase II properties. The purpose of the PDIWP was to address data gaps necessary to complete remedial design efforts. In determining additional data needs, it was assumed that remediation of radiologically-impacted soils would be conducted on “accessible soils” only. Accessible soils are defined as soils not under permanent structures such as buildings and roadways. Data acquisition was limited to accessible soils only.

A preliminary evaluation was performed to determine the human health risk from leaving subsurface radiologically-impacted soils proximate to these structures. The RESidual RADioactivity (RESRAD) computer code was utilized to quantify the dose and risk under a

number of assumed conditions. Based on the preliminary results, it was determined that any radioactive residues left adjacent to existing buildings, roadways, and railways would need a minimum of two feet of clean soil cover to be protective of human health. As such, it has been assumed that where radiologically-contaminated soils exist at depth adjacent to structures, at least the top two feet of radiologically-contaminated soil would be removed adjacent to the structure to a six foot horizontal setback, and then sloped at two horizontal to one vertical (2H:1V) to the required depth. However, it is recognized that site-specific calculations will need to be made during the remedial design phase in order to determine the actual depth of excavation adjacent to each structure, the horizontal setback, and the slope to final excavation depths (Stone & Webster, 1999a).

In preparing the PDIWP, the 24 Phase II properties were sub-divided into 12 clusters. The purpose of the clustering was to take a 'collective' view of a set of contiguous properties to efficiently secure needed pre-design investigation (PDI) information for those properties. [Table 3-1](#) lists the 12 clusters for the Phase II properties, from south to north. The reader is directed to the PDIWP for additional background information (Stone & Webster, 1999a).

The purpose of this PDI Report is to present data collected during the PDI for Cluster No. 3. The evaluation of PDI data, along with data collected by others during previous investigations, is documented separately.

2.0 PDI FIELD ACTIVITIES

PDI activities were performed by the following Team members:

Stone & Webster, Inc.	Team leader and engineering services
Malcolm Pirnie, Inc.	Engineering services
Science & Ecology Corporation.....	Health physics services
Cabrera Services, Inc.	Radiological survey support
Canberra Industries, Inc.	Radiological survey support
Garden State Surveying, Engineering, and Planning, Inc.	Surveying and mapping
NAEVA Geophysics, Inc.	Geophysical investigation
TerraProbe, Inc.	Direct push services
Franklin Environmental Services, Inc.	Construction services
ThermoRetec	Radiological sample analysis
RECRA LabNet.....	Environmental sample analysis
Kestrel Environmental Technologies, Inc.	Data validation

PDI activities involved non-intrusive surveys followed by intrusive investigations. The preliminary, non-intrusive PDI activities (including surface gamma scans, surface In-Situ Object Counting System (ISOCS) readings, geophysical surveys and field surveying) were initiated in August 1999. The intrusive portion of the PDI program began in January 2000 and was completed in April 2000. [Table 3-2](#) presents a summary of PDI intrusive field activities. For logistical reasons, PDI environmental borings were performed at the outset of the Groundwater Remedial Investigation program during the latter part of March and beginning of April 2000.

PDI field activities were conducted in accordance with the PDIWP, and in compliance with procedures established in the following project documents: Contractor Quality Control Plan (CQCP), Site Safety and Health Plan (SSHP), General Environmental Protection Plan (EPP), Chemical Data Quality Management Plan (CDQMP), and the Materials Handling, Transportation and Disposal Plan (MHTDP), (Stone & Webster, 1999b, c, and d, 2000a, 2000b, respectively). Variances in methodology and sample locations between the PDIWP and the actual PDI execution are discussed below.

2.1 Variances from PDIWP

This section discusses deviations in methodologies and sample locations from the approved PDIWP.

2.1.1 Methodology Variances

Methodology variances from the PDIWP were as follows:

- The PDIWP called for the use of an ISOCS utilizing germanium gamma spectroscopy to quantify radionuclide activity in soil. Following approval of the PDIWP, regulatory concerns regarding the use of ISOCS for subsurface investigation were raised. The PDIWP was subsequently modified by replacing intrusive ISOCS sampling with conventional sample

collection using direct push methods to collect soil cores for laboratory analysis. Due to this change, Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled “Soil Probe Investigation” was developed and followed. Refer to the USACE letters dated December 8, 1999 from the Project Manager, Mr. Allen Roos, informing the U.S. Environmental Protection Agency (USEPA) Project Manager, Ms. Angela Carpenter, and the New Jersey Department of Environmental Protection (NJDEP) Case Manager, Ms. Donna Gaffigan, of the modification, as presented in [Appendix 3-A](#). The USEPA approved use of SOP-SW-MWD-509-0 on December 29, 1999 and NJDEP approved it on January 20, 2000.

- A Bicron[®] Model G1 one-inch by one-inch (1” x 1”) sodium iodide (NaI) detector was substituted for the originally proposed 3/8” x 3/8” NaI detector for downhole gamma logging. This substitution was needed to provide greater detector sensitivity through the soil probe casing. Due to the addition of this detector, SOP number SW-MWD-509-0 entitled “Soil Probe Investigation” was revised. These revisions are outlined in [Table 1-A](#) in [Appendix 3-A](#). The 3/8” x 3/8” NaI detector was used only when the manual direct push method was employed. Manual direct push methodology was required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- The CDQMP originally specified a frequency of 10% for field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. This corresponds to the USACE internal quality control standard. However, due to the significant number of samples to be collected as part of the PDI program (totaling approximately 2000 soil samples and in excess of 10,000 gamma count rate and photoionization detector (PID) readings), the USACE agreed to reduce the frequency to 5%, which is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and USEPA guidelines for MS/MSD analysis. USEPA Region II does not have a specific guideline for field duplicate samples. Refer to the USACE and USEPA/NJDEP correspondence in [Appendix 3-A](#).
- The PDIWP stipulates that geotechnical borings with associated laboratory testing may be required in order to provide design parameters in locations where excavation may impact adjacent structures. Since radiological clean-up criteria have yet to be finalized, final assessment of limits of radiological contamination cannot be made at this time. The geotechnical investigation program was suspended from the PDI. During the design process, existing geotechnical information will be evaluated for design and a determination will be made if supplemental data are needed.

2.1.2 Sample Location Variances

The PDIWP was developed with the intent that proposed sample locations would be deleted, added, or moved as additional information regarding site features and contamination distribution became available during the course of the PDI implementation. In accordance with this approach, sample locations as proposed in the PDIWP were deleted, added, or moved for the following reasons:

- Base mapping developed subsequent to completion of the PDIWP provided additional information regarding underground utility locations and other site features. Proposed sample

locations proximate to these utilities and site features were moved in order to minimize impacts.

- Review of surface gamma survey data collected as part of the PDI, coupled with additional review of data from previous investigations performed by BNI and ORNL, indicated that certain proposed intrusive locations should either be moved or could be deleted. To address potential areas of surface radiological contamination not previously identified as areas of concern, a protocol was established for determining the need for additional intrusive sampling locations. Refer to “Protocol For Addressing Gamma Scan Anomalies” in [Appendix 3-A](#).

Specific rationale for the deletion, addition, or movement of locations proposed in the PDIWP are summarized in [Appendix 3-A](#).

2.2 Geophysical Surveys

Between September 20, 1999 and March 2, 2000, NAEVA Geophysics, Inc. conducted geophysical investigations on the Maywood Site. The purpose of these investigations was to delineate surface traces of detectable underground utilities in the vicinity of proposed exploratory boring sites. Equipment selected for this investigation included: a Fisher TW-6 Pipe and Cable Locator; a Radiodetection RD432PDL-2 Utility Locator; a Subsite 75 Utility Locator, a 3M Dynatel 2250 Cable Locator, and a GSSI SIR-3 ground penetrating radar (GPR) system with a 300 MHz antenna. Details of the surveys are presented in the NAEVA report (NAEVA, 2000).

2.3 Sample Locations

In October 1999, Garden State Engineering, Surveying, and Planning, Inc. performed a ground survey of the Maywood Site properties. Results of the ground survey were combined with aerial mapping prepared by GEOD Corporation to produce new base mapping for the Maywood Site. This new base mapping replaced the mapping used to generate the PDIWP drawings.

Sample points for the surface gamma survey, surface ISOCS measurements, direct push (Geoprobe[®]) sampling, and environmental sampling were located in the field using a Global Positioning System (GPS). A Trimble 4800 Site Surveyor system with a 4700 base receiver, GPS antenna, radio antenna, and ancillary equipment were used to perform GPS surveys. Base stations were set up and calibrated at specified bench-mark locations established by the surveyor. Following base receiver set up, sampling points were located. Field markings (spray paint, flags, and stakes) were used to identify intrusive sampling locations for radiological and environmental direct push mobile rigs, as well as surface ISOCS locations.

Coordinates for intrusive sample locations were determined from new PDI sample location maps which reflected updated base mapping and modified sample locations; surface ISOCS locations were identified based on original PDIWP mapping. For the surface gamma survey, GPS was used to record locations of gamma scan measurements. Where GPS instrumentation could not be utilized due to signal disruption (e.g., tree coverage, building interference, non-availability of satellites, or poor satellite reception due to weather conditions), sample locations were based on identification of site features and scaling off base mapping.

2.4 Surface Gamma Surveys

Surface gamma surveys for all of the Phase II properties were conducted from August 1999 to March 2000. Surveys were conducted to obtain distribution of surface radiological contamination for health and safety reasons, as well as to verify existing data. Measurements were collected by suspending a 1" x 1" NaI gamma scintillation detector coupled to a Ludlum Model 12 ratemeter within a few inches of the ground surface. A health physics technician walked transects (approximately four to six feet wide) covering the properties while slowly swinging the detector in a serpentine motion. Transects were spaced to assure full areal coverage with some overlap. Gamma count measurements were taken approximately every 15 to 20 feet; measurement frequency was increased in areas exhibiting elevated gamma counts. Minimum detectable concentrations (MDCs) for this detector for the radionuclides of concern (ROC) are approximately 4.7 picoCurie per gram (pCi/g) for Radium-226 (Ra-226), 3.0 pCi/g for Thorium-232 (Th-232), and 121.0 pCi/g for Uranium-238 (U-238), correcting for volume and distance from the source (Multi-Agency Radiation Survey and Site Investigation Manual, MARSSIM, 1997). Gamma count data were stored with associated locations in the GPS recorder. In some instances where locations could not be recorded with a GPS (as stipulated above), measurements were manually recorded on the PDI maps.

2.5 Surface ISOCS Measurements

Surface ISOCS measurements were collected at selected locations where environmental, geotechnical, and radiological shallow boreholes were proposed in the PDIWP. Surface ISOCS measurements were collected to identify and quantify radionuclide activity in surface soil, beneath shielded areas (e.g., areas covered with gravel, asphalt, and concrete), and in areas proposed for environmental borings.

Gamma spectroscopy measurements of surface soil were collected using the Canberra high-purity germanium ISOCS and assuming uniform radioactivity distribution in soil. The high-purity germanium detector was positioned in a "downward-looking" direction perpendicular to the ground surface at a height of three feet. The detector was collimated using a lead shield subtending a 90-degree angle, which provided a surface soil viewing area approximately six feet in diameter. The back and side of the detector were shielded with two-inch thick lead O-rings. The detector collimator and shielding were used to ensure that radioactivity detected by the probe originated only from the six-foot diameter area beneath the detector, hence minimizing one possible source of error in the measurements.

2.6 Direct Push Soil Probes

Direct push soil probes (using truck-mounted model 5400 Geoprob[®] or track-mounted model 54DT Geoprob[®]) were used to collect soil samples for radiological and environmental parameter analysis. Two types of direct push soil probes were used: a single rod system (i.e., Macro-Core[®]) and a dual tube (or cased) system. The latter system utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Samples were collected in four-foot soil cores within polyvinyl chloride/polyethylene terephthalate (PVC/PET) liners, marked with the appropriate field identification number, sealed with rubber end caps, and placed

into a two-inch inner diameter PVC container (including PVC end caps) for transport and storage.

For sample locations that were inaccessible to the mounted direct push rigs, soil cores were collected using a manual direct push method. Two-foot cores approximately one inch in diameter were collected using an electric powered hand-held vibratory hammer.

Prior to commencing intrusive sampling, underground utilities in the vicinity of the proposed boring locations were identified by reviewing PDI geophysical survey data, and by contacting the appropriate authorized parties (i.e., New Jersey One-Call System, and the property owner). In addition, a safe working distance from overhead utilities was maintained.

Sampling equipment (the rig, direct push soil probe casing and tools) was decontaminated prior to use and following each borehole installation using pressure or manual washing. Each soil probe hole was backfilled for the full length using Benseal[®] bentonite in accordance with project requirements. For areas covered by asphalt, cold patch was placed at the surface.

2.6.1 Downhole Gamma Logging

Measurements were taken with a Bicron[®] Model G1 1" x 1" NaI gamma detector sealed in a waterproof stainless steel container. The instrument MDCs are approximately 3.6 pCi/g for Ra-226, 2.3 pCi/g for Th-232, and 92.0 pCi/g for U-238, which are approximately 75% of the surface MDCs listed in Section 2.4. This estimate assumes a geometry factor of 0.50, where a four pi geometry (i.e., a sphere) when scanning downhole is approximately half of a two pi geometry (i.e., a hemisphere) when scanning the ground surface. However, this reduction in the MDCs is modified by the 0.3-inch steel casing in the hole, which results in an approximate 33% reduction in the gammas seen by the detector as calculated by the computer code Microshield[™]. The correction factor is therefore calculated by dividing the geometry factor (0.50) by the steel casing reduction factor (0.66), yielding approximately 0.75. The NaI detector was connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector[™] multi-channel analyzer/amplifier/high voltage power supply. The system was controlled, and the data stored, via notebook computer. Ten-second integrated gross gamma measurements were recorded at each 6-inch depth increment in the cased soil probe holes and data entered onto the PDI Soil Probe Log Sheets (see [Appendix 3-B](#)). In areas where samples were collected using the manual direct push method, a Bicron[®] 3/8" x 3/8" NaI gamma detector coupled to a Ludlum Model 2221 scaler/ratemeter was used to take 30 to 60-second gross gamma measurements in uncased soil probe holes. The MDCs for this instrument are estimated to be approximately 1.9 pCi/g for Ra-226 and 2.3 pCi/g for Th-232, as provided by the vendor. There is no correction factor for these MDCs.

2.6.2 Direct Push Core Screening/Sample Collection

Sealed PVC containers collected from direct push mobile and manual rigs were transported to the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation added to the PDI Soil Probe Log Sheets (see [Appendix 3-B](#)) included soil column description and soil screening data. Field screening for radiological activity was performed on soil cores contained in the PVC/PET liner. A collimated Eberline

SPA-3 2" x 2" NaI detector (or Ludlum Model 44-10) coupled to a Ludlum Model 2221 scaler/ratemeter was used to measure gamma activity. The detector was positioned approximately 0.5 inch above the soil core, on a guide, to ensure that this distance was maintained over the entire length of each soil core. Continuous scanning of the soil core was performed at an approximate rate of three inches per second. The instrument MDC, taken from MARSSIM, is estimated to be 2.8 pCi/g for Ra-226, 1.8 pCi/g for Th-232, and 80 pCi/g for U-238 (MARSSIM, 1997). Although the MARSSIM MDC values are based upon an open area, it was assumed that the slower scan time compensated for the different geometry. An indelible marker was used to mark the liner where elevated readings were identified during scanning. Total integrated gross gamma counts were accumulated over a 30-second interval and recorded.

Soil cores were also screened for total volatile organic vapors using a PID. A series of small perforations were made along the PVC/PET liner at 12-inch increments to expose soil to the PID. Perforations were sealed with tape after PID screening. Screening results were recorded on the PDI Soil Probe Logs.

Prior to obtaining samples, each core was photographed using a digital camera. A brief soil field classification description of each core was entered onto the PDI Soil Probe Log Sheet.

Soil samples were selected from each direct push location for analysis of the ROC: Th-232, Ra-226, and U-238. Samples were selected based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample was taken at the highest reading location (suspected FUSRAP waste, if present, as defined in the Federal Facilities Agreement dated November, 1991; DOE and USEPA, 1991); a second soil sample was collected where the readings approached a constant value (suspected transition zone, if present); and a third soil sample was collected within the zone of constant readings (below suspected transition zone). When soil cores exhibited uniform count rates (i.e., elevated gamma measurements were not identified), three samples per soil probe location were collected.

Selected samples were obtained from each core sufficient to fill a 300-milliliter sample container. Samples were labeled and capped at either end with plastic caps. Caps were color-coded for 'top' and 'bottom' of the original hole. Each extracted section of the soil core was replaced with a wooden spacer to indicate what portion of the soil core was sampled. The spacer was labeled with the sample identification number of the soil removed for testing. After screening and sample extraction, remaining portions of each soil core were placed back into the appropriate PVC container, with the wooden spacer in its appropriate location, and stored on-site for future reference. The section of core tube containing the sample was then transferred to the MISS on-site laboratory for sample preparation and analysis.

Evaluation of all gamma log data led to the archiving of selected samples. That is, a number of the direct push soil probes exhibited 'constant' count rates over the depth interval. In these cases, rather than having all samples analyzed at this time, the deepest prepared sample was not counted but archived. By doing this, as laboratory results confirm that radiological contamination does not exist at that soil probe location, unnecessary analytical work is

prevented. Samples that were archived are noted on the PDI Soil Logs in [Appendix 3-B](#) and on [Table 3-4](#).

As described above, a collimated Eberline SPA-3 or Ludlum Model 44-10 2" x 2" NaI detector was used to measure gamma activity for the soil cores, while a Bicron[®] Model G1 1" x 1" NaI gamma detector was used for the downhole measurements. The 2" x 2" NaI detector (Eberline SPA-3 or Ludlum Model 44-10) provided confirmation of downhole measurements and greater sensitivity for sample selection than the 1" x 1" NaI gamma detector.

2.6.3 Sample Preparation

Soil samples were screened to remove small debris and oven-dried to obtain moisture content and to facilitate grinding. Grinding assured sample homogenization. Samples were then transferred to a 300-milliliter commercially supplied metal can. Lids were secured on cans, after which they were shelved for 21 days. The 21-day period was required to allow radon and its daughter products to in-grow and establish secular equilibrium between Ra-226, Radon-222 (Rn-222), and the gamma-emitting daughters.

2.6.4 Laboratory Data

Analysis for ROC on selected samples was performed at the MISS on-site field laboratory using a Canberra high-purity germanium detector. All testing in the MISS on-site field laboratory was completed in accordance with the procedures outlined in the CDQMP. MISS on-site field laboratory data have been entered onto the PDI Soil Probe Log sheets (see [Appendix 3-B](#)).

The Project Chemist evaluated 10% of the MISS on-site field laboratory radiological data packages; the evaluation is included in the PDI Quality Control Summary Report (QCSR; Stone & Webster, 2000c). The laboratory qualified the reported data when the germanium detector measurement system fell outside of one of the control limits during quality control check runs. Data qualification procedures are described in the PDI QCSR.

Ten percent of the samples analyzed by the MISS on-site field laboratory were sent to a USACE-approved off-site laboratory (ThermoRetec) for confirmatory analysis of the ROC. Following analysis, all soil samples were returned to the Maywood Site for storage and future reference. Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the off-site confirmatory radiological data. Radiological data were evaluated using the USACE's Radiological Data Quality Evaluation Guidance, as presented in the CDQMP. The data validation reports for the radiological confirmatory sample results are provided in the PDI QCSR.

2.7 Environmental Sampling

A limited number of soil samples were collected for environmental analyses in order to identify potential chemical contamination commingled with the radioactive waste. This information would aid in assessing waste classification (i.e., whether hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), is commingled with radioactive waste) as well as provide data for worker health and safety. Samples for environmental analysis were

collected using direct push Macro-Core[®] methodology. Sampling depths were based on the anticipated depth of radiological contamination. Soils exhibiting the highest PID readings or visual contamination were collected and sent for laboratory analysis by a USACE and NJDEP certified laboratory (RECRA LabNet). Samples were analyzed for RCRA disposal characteristics (ignitability, reactivity, corrosivity, and toxicity characteristic leaching procedure TCLP), the Target Compound List (TCL) and the Target Analyte List (TAL) with chromium speciation.

During performance of environmental borings, environmental boring log sheets were completed for each boring. Copies of the completed log sheets are included in [Appendix 3-C](#).

Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the environmental data. Environmental data were evaluated using the USACE's Data Quality Evaluation Guidance, as presented in the CDQMP. In addition, the USEPA Region II SOP No. HW-24, Revision I, June 1999, was also applied. The data validation reports for the environmental sample results are provided in the PDI QCSR.

2.8 Geotechnical Sampling

Radiological cleanup criteria have yet to be finalized, therefore final assessment of the extent of radiological contamination cannot be made at this time. The geotechnical investigation program was therefore suspended from the PDI. Following approximate determination of limits of excavation during the design phase, existing geotechnical information will be evaluated for remedial design purposes. If it is decided that additional information is required, then the geotechnical program will be reinstated, as necessary.

2.9 Quality Assurance/Quality Control

Field and laboratory activities were completed in accordance with the CQCP and the CDQMP. Data reflecting adherence to the Quality Assurance / Quality Control (QA/QC) program was documented and presented in the PDI QCSR.

2.10 Health and Safety

All PDI investigation activities were conducted in compliance with the SSHP and associated protocols and directives. Field crews received daily briefings at 'Plan of the Day' meetings prior to any work activities. These meetings reviewed daily health and safety issues such as potential inclement weather, as well as reviews of general site health and safety directives.

3.0 CLUSTER DESCRIPTION AND PDI RESULTS

3.1 Cluster No. 3 Description

Cluster No. 3, located at 170 Gregg Street, occupies Block 205, Lot 1.02 within the Borough of Lodi. The property, owned by Bergen Cable Technologies, covers approximately three acres and contains a 74,250 square foot block building with a brick veneer. There is a partially paved area used primarily for parking in front of the building, and gravel and grass cover the remaining area. An abandoned rail spur traverses the southeast portion of the lot on the paved area. The cluster is bounded to the south and west by commercial buildings, to the east by Gregg Street and the New York, Susquehanna and Western Railway – Lodi Branch, and to the north by a rail line and a vacant lot.

According to a 1994 report (BNI, 1994) the Bergen Cable Technologies facility operates five days a week, eight hours per day. There are approximately 35 to 40 employees at the facility who are engaged in the fabrication and sales of steel cable for industrial use. The fabrication process includes the winding of various types of steel cable varying in size and tensile strength (BNI, 1994).

A geophysical survey conducted prior to intrusive PDI field activities (see Section 2.0) detected underground features. One active 550-gallon underground storage tank (UST) was identified on the southwest side of the Bergen Cable Technologies building. A natural gas line was delineated from Gregg Street to the east corner of the building, close to several sampling locations. A storm drain and three associated vaults were identified running southeast along the fence from the east corner of the building to Gregg Street. A second storm drain was found running parallel to the southwest side of the building towards Gregg Street. A water line was traced from a hydrant by the Gregg Street entry gate to the south corner of the building, and from that point to another hydrant on the southwest side of the building (NAEVA, 2000).

Refer to [Figure 3-3](#) for more specific details of site features.

3.2 Radiological Data

3.2.1 Surface Gamma Survey

A surface gamma survey was performed at Cluster No. 3. Data, recorded using GPS, was entered into the Groundwater Modeling System (GMS) software package and contoured to a two-dimensional grid using the “Natural Neighbor” contouring protocol. “Natural Neighbor” interpolation is based on the Thiessen polygon network of the scatter point set. Data are interpolated based on distance as well as topological relationships (Boss International, Inc., 2000).

Results of the gamma scan survey for Cluster No. 3 are presented graphically on [Figure 3-4](#) and [Figure 3-A1](#) (Appendix 3-A). [Figure 3-4](#) presents surface gamma scan data in context of the Maywood Site: the upper limit of the contour range is the maximum gamma count measurement detected at the Maywood Site, and the lower contour range represents 1.5 times the background gamma count rate for Cluster No. 3 (background is approximately 2000 counts per minute for

Cluster No. 3). [Figure 3-A1](#) provides a more detailed, cluster-specific, presentation of the gamma scan data, with contoured ranges corresponding to actual minimum and maximum measured gross gamma counts recorded at Cluster No. 3.

3.2.2 Surface ISOCS Measurements

Surface ISOCS measurements were taken at 12 locations on Cluster No. 3; locations are shown on [Figure 3-3](#). The results of surface ISOCS measurements are tabulated on [Table 3-3](#).

3.2.3 Direct Push Soil Probes

Ten direct push probes were performed at Cluster No. 3 for radiological purposes. Soil probe locations are shown on [Figure 3-3](#).

3.2.3.1 Downhole Gamma Logging

Results from downhole gamma logging measurements taken at the soil probe locations are presented on the PDI Soil Probe Logs included in [Appendix 3-B](#).

3.2.3.2 Direct Push Core Screening/Sample Collection

Results of the soil core screening activities performed at the MISS radiological screening laboratory are recorded on the PDI Soil Probe Logs included in [Appendix 3-B](#).

3.2.3.3 MISS On-Site Field Laboratory Data and ThermoRetec Confirmatory Data

Thirty-four (34) soil samples were collected for laboratory analysis from the 10 soil probe locations at Cluster No. 3. Twenty-five of the 34 samples were sent for analysis (including four duplicates); 9 were archived. Laboratory data consisting of soil concentrations of the ROC are presented on the soil probe logs in [Appendix 3-B](#), and summarized on [Table 3-4](#). Archived samples are also recorded on the logs and the table.

Three of the soil samples analyzed by the MISS on-site field laboratory were sent to ThermoRetec for confirmatory analysis. Results of the confirmatory analyses performed by ThermoRetec are shown in [Table 3-4](#).

As part of the data quality objective process, a comparison study was performed between the MISS on-site field laboratory and the ThermoRetec laboratory data. The results of the comparison can be found under separate cover (Stone & Webster, 2000d).

3.3 Environmental Data

One environmental boring was drilled at Cluster No. 3, and one soil sample was collected for environmental analysis. A summary of the environmental analytical data is presented on [Table 3-5](#). [Figure 3-3](#) shows the location of the boring. In addition, the environmental boring log sheet is included in [Appendix 3-C](#).

4.0 REFERENCES

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Bechtel National, Inc. Results of Radon and Gamma Radiation Measurements at 19 Commercial and Governmental Properties of the Maywood Site, DE-AC05-91OR21949; August 1994.

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Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Quality Control Summary Report*, FUSRAP Maywood Superfund Site. Boston, MA; March 2000c.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Radiological Data Comparison Study*, FUSRAP Maywood Superfund Site. Boston, MA; December 2000d.

U.S. Department of Energy and U.S. Environmental Protection Agency. Federal Facility Agreement for the Maywood Interim Storage Site; November, 1991.

Table 3-1: Properties Comprising Each Cluster

Cluster No.	Property No.	Properties (occupant)	Township/Borough	Property Block & Lot
1	01A	72 Sidney St. (Vacant)	Lodi	Block 164, Lots 1 and 5
2	02A	100 Hancock Street (AT&T)	Lodi	Block 205.03, Lot 2.04
	02B	80 Hancock Street (Vacant)	Lodi	Block 205.03, Lot 2.03
	02C	80 Industrial Road (American Jewel Windows)	Lodi	Block 205.02, Lot 4.02
	02D	8 Mill St. (NJVIS)	Lodi	Block 205.02, Lot 1.05
3	03A	170 Gregg Street (Bergen Cable)	Lodi	Block 205, Lot 1.02
4	04A	160/174 Essex Street (Bank of New York)	Lodi	Block 186.01, Lot 1 and Block 174, Lot 1.02
	04B	I-80 Westbound Right-of-Way (NJDOT)	Lodi	Not Applicable
5	05A	99 Essex Street (Joseph Muscarelle, Inc.)	Maywood	Block 125, Lot 1
	05B	113 Essex Street (Bank of New York)	Maywood	Block 125, Lot 2
	05C	200 NJ Route 17 South (Sears Appliance Repair)	Maywood	Block 125, Lot 3
6	06A	85-101 NJ Route 17 North (Architectural Windows)	Maywood	Block 124, Lot 4
	06B	137 NJ Route 17 North (Ramsey Auto Group)	Maywood	Block 124, Lot 3
	06C	167 NJ Route 17 North (Sunoco Station - Inactive)	Maywood	Block 124, Lot 2
	06D	239 NJ Route 17 North (Gulf Station)	Maywood	Block 124, Lot 1
	06E	29 Essex Street (Federal Express Corporation)	Maywood	Block 124, Lot 5
7	07A	111 Essex Street (Scanel Company, Inc.)	Maywood	Block 131, Lots 1,2,3,4
	07B	New York, Susquehanna & Western Railway - Lodi Branch	Maywood	Block 131, Lot 8
8	08A	23 West Howcroft Road (Maywood Furniture, Inc.)	Maywood	Block 124, Lot 17
9	09A	149-151 Maywood Avenue (Sears Logistical Services)	Maywood; Rochelle Park	Block 124, Lot 30; Block 17.02, Lot 1
10	10A	100 West Hunter Avenue (Stepan Company)	Maywood; Rochelle Park	Block 124, Lot 10; Block 18.02, Lot 2
11	11A	205 Maywood Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
	11B	61 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 50
	11C	50 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
12	12A	New York, Susquehanna & Western Railway	Maywood; Rochelle Park	Block 124, Lot 55 and Block 110, Lot 1
	12B	100 West Hunter Avenue (MISS)	Maywood; Rochelle Park	Block 124, Lot 46 and Block 20.01, Lot 1
	12C	New Jersey Route 17 (NJDOT)	Rochelle Park	Not Applicable

Table 3-2: Summary of PDI Intrusive Field Activities

Cluster No.	Property No.	Property Address	Occupant	Planned			Actual			Schedule (Year 2000)
				Probe Locations	Depth (ft)	Footage (ft)	Probe Locations	Depth (ft)	Footage (ft)	
1	01A	72 Sydney Street	Vacant	13	12	156	15	12	188	Jan. 11, 12, Mar. 31
2	02A	100 Hancock Street	AT&T	17	16	272	17	6 - 12	194	Jan. 27, Feb. 1, 2, Mar. 16
	02B	80 Hancock Street	Vacant	18	16	288	Pending Right of Entry Agreement			
	02C	80 Industrial Road	American Jewel Windows	23	16	368	20	12	272	Jan. 21, 24, 28, Feb. 1
	02D	8 Mill Street	NJVIS	38	16	608	44	12 - 16	593	Jan. 13, 14, 18, 19, 20, 21
3	03A	170 Gregg Street	Bergen Cable	10	8	80	10	8	62	Jan. 12, 13
4	04A	160/174 Essex Street	Bank of New York	25	12	300	23	4 - 12	427	Feb. 2, 3, 4
	04B	I-80 Right-of-Way	NJDOT	7	12	84	7	8 - 12	69	Feb. 2, 4, Mar. 31
5	05A	99 Essex Street	Joseph Muscarelle, Inc.	38	8	304	38	8	318	Feb. 23, 24, Mar. 17
	05B	113 Essex Street	Bank of New York	18	8	144	21	4 - 16	171	Feb. 8, 10, 16
	05C	200 NJ Route 17 South	Sears Appliance Repair	23	8	184	16	8 - 10	129	Feb. 15, 16, Mar. 2
6	06A	85-101 NJ Route 17 North	Architectural Windows	17	12	204	17	8 - 18	196	Feb. 9, 10, 16, Mar. 16
	06B	137 NJ Route 17 North	Ramsey Auto Group	15	12	190	13	10 - 12	145	Feb. 9, 16, 25
	06C	167 NJ Route 17 North	Sunoco Station - Inactive	27	12	324	19	3 - 14	239	Feb. 11, Mar. 8
	06D	239 NJ Route 17 North	Gulf Station	19	12	228	2	11 - 12	23	Feb. 16
	06E	29 Essex Street	Federal Express Corporation	7	12	84	9	7 - 12	95	Feb. 16, Mar. 31
7	07A	111 Essex Street	Scanel Company, Inc.	12	16	192	12	12 - 22	161	Feb. 21, 22, 23
	07B	NYS&W - Lodi Branch	NYS&W - Lodi Branch	16	16	256	11	6 - 16	115	Feb. 21, 22
8	08A	23 West Howcroft Street	Maywood Furniture, Inc.	26	16	416	25	7 - 16	321	Feb. 17, 21
9	09A	149-151 Maywood Avenue	Sears Logistical Services	131	16	2096	72	4 - 16	574	Mar. 2, 3, 6, 7, 8, 9, 15
10	10A	100 West Hunter Avenue	Stepan Company	106	24	2544	92	4 - 24	1076	Feb. 25, 28, 29, Mar. 1, 2, 6, 7, 9, 16, 30
11	11A	205 Maywood Avenue	Myron Manufacturing	5	8	40	5	8 - 12	44	Feb. 16
	11B	61 West Hunter Avenue	Myron Manufacturing	9	8	72	10	8 - 16	87	Feb. 15, 21
	11C	50 West Hunter Avenue	Myron Manufacturing	1	8	8	1	8	8	Feb. 15
12	12A	NYS&W	NYS&W	31	24	744	27	12 - 27	335	Feb. 18, 22, 24, Mar. 16, 30
	12B	100 West Hunter Avenue	MISS	120	24	2880	100	7 - 26	1769	Feb. 4, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24, 25, 29, Mar. 1, 7, 8, 9
	12C	NJ Route 17	NJDOT	0	0	0	0	0	0	<i>No investigations planned.</i>
TOTALS:				772		13,066	626		7,611	

Table 3-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
3-SI001-SS-0-1	0.17	35.7	0.13	0.42	26.6	0.01	< 2.69	-----	2.69
3-SI002-SS-0-1	0.27	24.8	0.11	0.25	35.5	0.08	< 2.44	-----	2.44
3-SI003-SS-0-1	0.56	19.6	0.22	1.37	14.1	0.01	< 3.28	-----	3.28
3-SI004-SS-0-1	0.45	19.5	0.19	0.93	17.4	0.01	< 3.08	-----	3.08
3-SI005-SS-0-1	1.30	11.9	0.26	1.85	12.7	0.01	< 4.18	-----	4.18
3-SI006-SS-0-1	0.75	16.2	0.24	1.03	17.1	0.11	< 6.19	-----	6.19
3-SI007-SS-0-1 (1)	0.76	15.3	0.03	1.62	13.5	0.09	< 5.94	-----	5.94
3-SI007-SS-1-1 (1)	0.66	18.8	0.29	1.63	13.8	0.01	< 4.07	-----	4.07
3-SI008-SS-0-1	0.29	25.4	0.03	0.34	0.3	0.01	< 2.42	-----	2.42
3-SI009-SS-0-1	0.68	16.4	0.21	1.47	14.1	0.10	< 3.73	-----	3.73
3-SI010-SS-0-1	0.43	20.1	0.03	0.47	26.1	0.01	< 2.66	-----	2.66
3-SI011-SS-0-1	0.98	14.6	0.32	1.41	15.1	0.14	< 4.27	-----	4.27
3-SI012-SS-0-1	0.69	16.9	0.23	0.55	25.1	0.08	< 3.64	-----	3.64

* Reported data are taken from the Nuclide Identification Report

MDA : Minimum Detectable Activity

Error: 2 sigma (95% confidence interval)

< : Nuclide undetected or less than the MDA. The nuclide is assumed to be present at the MDA Value.

----- Not Applicable

(1) Sample (-0-1) and its duplicate (-1-1)

**Table 3-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
03A-001	0.50	03A03100		1.36	J	0.10	0.25	1.22	J	0.07	0.27	6.59	UJ	----	6.59
03A-001	2.00	03A03101		1.63	J	0.08	0.20	1.02	J	0.05	0.15	6.50	UJ	----	6.50
03A-001	6.50	03A03102		ARCHIVED											
03A-002	1.50	03A03103		0.84		0.08	0.21	0.87		0.06	0.22	5.53	U	----	5.53
03A-002	2.50	03A03104		1.40		0.09	0.20	0.75		0.06	0.27	5.83	U	----	5.83
03A-002	6.00	03A03105		0.46		0.06	0.15	0.50		0.04	0.17	4.39	U	----	4.39
03A-003	1.00	03A03106		0.88		0.07	0.18	0.76		0.06	0.23	5.32	U	----	5.32
		<i>ThermoRetec</i> ⁽²⁾		0.88		0.12	0.11	0.94		0.10	0.16	1.14	UJ	1.20	1.78
03A-003	1.00	03A03107	X	0.79		0.07	0.15	0.77		0.06	0.23	5.07	U	----	5.07
03A-003	2.50	03A03108		0.89		0.06	0.18	0.71		0.06	0.22	5.55	U	----	5.55
03A-003	5.00	03A03109		ARCHIVED											
03A-004	1.00	03A03110		0.96		0.08	0.20	0.68		0.06	0.24	4.98	U	----	4.98
03A-004	2.00	03A03111		1.06		0.08	0.21	0.83		0.05	0.14	5.45	U	----	5.45
03A-004	6.00	03A03112		ARCHIVED											
03A-005	1.50	03A03113		1.03		0.08	0.23	1.00		0.06	0.24	4.62		1.46	4.54
		<i>ThermoRetec</i> ⁽²⁾		0.99		0.13	0.12	0.86		0.16	0.17	1.66	J	1.46	1.78
03A-005	1.50	03A03114	X	1.01		0.07	0.21	0.93		0.05	0.13	4.93	U	----	4.93
		<i>ThermoRetec</i> ⁽²⁾		0.98		0.14	0.15	1.24		0.14	0.19	5.19		2.00	2.21
03A-005	3.00	03A03115		1.20		0.08	0.17	0.81		0.05	0.15	5.56	U	----	5.56
03A-005	5.00	03A03116		ARCHIVED											
03A-006	2.50	03A03118		0.50		0.07	0.22	0.75		0.06	0.21	5.26	U	----	5.26
03A-006	3.50	03A03119		0.91		0.07	0.20	0.83		0.05	0.14	5.37	U	----	5.37
03A-006	5.00	03A03120		ARCHIVED											
03A-007	1.00	03A03121		0.58		0.06	0.17	0.42		0.06	0.20	4.63	U	----	4.63
03A-007	1.00	03A03122	X	0.77		0.08	0.24	0.82		0.06	0.22	5.84	U	----	5.84
03A-007	3.00	03A03123		0.58		0.06	0.19	0.76		0.05	0.19	0.90		1.40	4.72
03A-007	5.50	03A03124		ARCHIVED											
03A-008	0.50	03A03125		0.92		0.07	0.20	1.22		0.06	0.13	5.86	U	----	5.86
03A-008	1.50	03A03126		0.86		0.08	0.21	1.03		0.06	0.22	5.46	U	----	5.46
03A-008	6.50	03A03127		ARCHIVED											

**Table 3-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
<i>03A-009</i>	0.50	03A03128		0.56	0.06	0.16	0.44	0.05	0.17	4.15	U	----	4.15
<i>03A-009</i>	2.00	03A03129		0.69	0.07	0.18	0.72	0.05	0.18	5.04	U	----	5.04
<i>03A-009</i>	2.00	03A03130	X	0.80	0.07	0.21	0.94	0.05	0.14	5.14	U	----	5.14
<i>03A-009</i>	6.50	03A03131		ARCHIVED									
<i>03A-010</i>	1.50	03A03132		1.90	0.11	0.28	2.15	0.09	0.22	8.73	U	----	8.73
<i>03A-010</i>	5.00	03A03133		0.50	0.05	0.17	0.57	0.04	0.11	4.63	U	----	4.63
<i>03A-010</i>	6.00	03A03134		ARCHIVED									

Error: 2 sigma (95% confidence interval)

- Not Applicable
- U Undetected or Negative Concentration Less Than the MDA
- J Estimated
- MDA Minimum Detectable Activity

- (1) The sample marked with an "X" for duplicate is a duplicate of the sample listed directly above it. Duplicate samples are prepared by homogenizing soil above and below the centerpoint and then separating for analysis. The depth listed is the center point.
- (2) Approximately 10% of all radiological soil samples collected under the PDI Program were sent to ThermoRetec, an off-site laboratory, for confirmatory radiological analyses. Results from ThermoRetec are presented in this table in italicized font immediately below the MISS On-Site field laboratory result for that same sample.

Table 3-5: Summary of Environmental Analytical Data

Parameter	Sample ID	03A-020518
	Sample Location	03A-001
	Sample Depth (feet)	0 - 4
	Sample Date	03/16/00
Units		
<i>Miscellaneous</i>		
Chromium VI	mg/kg	0.44U
Corrosivity by pH	Soil pH	7.4
Cyanide, Reactive	mg/kg	0.50U
Cyanide, Total	mg/kg	0.36U
Sulfide, Reactive	mg/kg	24.0U
<i>PCBs</i>		
4,4'-DDD	ug/kg	3.4J
4,4'-DDE	ug/kg	3.6U
4,4'-DDT	ug/kg	3.6U
Aldrin	ug/kg	1.8U
Alpha-BHC	ug/kg	1.8U
alpha-Chlordane	ug/kg	1.8U
Aroclor-1016	ug/kg	7.2U
Aroclor-1221	ug/kg	14U
Aroclor-1232	ug/kg	7.2U
Aroclor-1242	ug/kg	7.2U
Aroclor-1248	ug/kg	7.2U
Aroclor-1254	ug/kg	7.2U
Aroclor-1260	ug/kg	16
Beta-BHC	ug/kg	1.8U
Delta-BHC	ug/kg	1.8U
Dieldrin	ug/kg	3.6U
Endosulfan I	ug/kg	1.8U
Endosulfan II	ug/kg	3.6U
Endosulfan sulfate	ug/kg	3.6U
Endrin	ug/kg	3.6U
Endrin aldehyde	ug/kg	3.6U
Endrin ketone	ug/kg	3.6U
gamma-BHC (Lindane)	ug/kg	1.8U
gamma-Chlordane	ug/kg	1.8U
Heptachlor	ug/kg	1.8U
Heptachlor epoxide	ug/kg	1.8U
Methoxychlor	ug/kg	18U
Toxaphene	ug/kg	180U

Table 3-5: Summary of Environmental Analytical Data

Parameter	Sample ID	03A-020518
	Sample Location	03A-001
	Sample Depth (feet)	0 - 4
	Sample Date	03/16/00
Units		
<i>Rare Earth Metals</i>		
Cerium, Total	mg/kg	31
Dysprosium, Total	mg/kg	1.8
Lanthanum, Total	mg/kg	17.9
Neodymium, Total	mg/kg	14.8
Yttrium, Total	mg/kg	10.2
<i>Semivolatile Organics</i>		
1,2,4-Trichlorobenzene	ug/kg	3600U
1,2-Dichlorobenzene	ug/kg	3600U
1,3-Dichlorobenzene	ug/kg	3600U
1,4-Dichlorobenzene	ug/kg	3600U
2,2'-oxybis(1-Chloropropane)	ug/kg	3600U
2,4,5-Trichlorophenol	ug/kg	9100U
2,4,6-Trichlorophenol	ug/kg	3600U
2,4-Dichlorophenol	ug/kg	3600U
2,4-Dimethylphenol	ug/kg	3600U
2,4-Dinitrophenol	ug/kg	9100U
2,4-Dinitrotoluene	ug/kg	3600U
2,6-Dinitrotoluene	ug/kg	3600U
2-Chloronaphthalene	ug/kg	3600U
2-Chlorophenol	ug/kg	3600U
2-Methylnaphthalene	ug/kg	3600U
2-Methylphenol	ug/kg	3600U
2-Nitroaniline	ug/kg	9100U
2-Nitrophenol	ug/kg	3600U
3,3'-Dichlorobenzidine	ug/kg	3600U
3-Nitroaniline	ug/kg	9100U
4,6-Dinitro-2-methylphenol	ug/kg	9100U
4-Bromophenyl-phenylether	ug/kg	3600U
4-Chloro-3-methylphenol	ug/kg	3600U
4-Chloroaniline	ug/kg	3600U
4-Chlorophenyl-phenylether	ug/kg	3600U
4-Methylphenol	ug/kg	3600U
4-Nitroaniline	ug/kg	9100U
4-Nitrophenol	ug/kg	9100U
Acenaphthene	ug/kg	3600U
Acenaphthylene	ug/kg	3600U
Anthracene	ug/kg	3600U
Benzo(a)anthracene	ug/kg	3600U
Benzo(a)pyrene	ug/kg	3600U
Benzo(b)fluoranthene	ug/kg	3600U

Table 3-5: Summary of Environmental Analytical Data

Parameter	Sample ID	03A-020518
	Sample Location	03A-001
	Sample Depth (feet)	0 - 4
	Sample Date	03/16/00
Units		
<i>Semivolatile Organics (continued)</i>		
Benzo(g,h,i)perylene	ug/kg	190J
Benzo(k)fluoranthene	ug/kg	220J
bis(2-Chloroethoxy)methane	ug/kg	3600U
bis(2-Chloroethyl)ether	ug/kg	3600U
bis(2-Ethylhexyl)phthalate	ug/kg	3600U
Butylbenzylphthalate	ug/kg	3600U
Carbazole	ug/kg	3600U
Chrysene	ug/kg	260J
Di-n-Butylphthalate	ug/kg	3600U
Di-n-Octyl phthalate	ug/kg	3600U
Dibenz(a,h)anthracene	ug/kg	3600U
Dibenzofuran	ug/kg	3600U
Diethylphthalate	ug/kg	3600U
Dimethylphthalate	ug/kg	3600U
Fluoranthene	ug/kg	210J
Fluorene	ug/kg	3600U
Hexachlorobenzene	ug/kg	3600U
Hexachlorobutadiene	ug/kg	3600U
Hexachlorocyclopentadiene	ug/kg	3600U
Hexachloroethane	ug/kg	3600U
Indeno(1,2,3-cd)pyrene	ug/kg	3600U
Isophorone	ug/kg	3600U
N-Nitroso-Di-n-propylamine	ug/kg	3600U
N-Nitrosodiphenylamine (1)	ug/kg	3600U
Naphthalene	ug/kg	3600U
Nitrobenzene	ug/kg	3600U
Pentachlorophenol	ug/kg	9100U
Phenanthrene	ug/kg	3600U
Phenol	ug/kg	3600U
Pyrene	ug/kg	230J
<i>Total Metals</i>		
Aluminum, Total	mg/kg	9470
Antimony, Total	mg/kg	0.5
Arsenic, Total	mg/kg	7.4
Barium, Total	mg/kg	97.5
Beryllium, Total	mg/kg	0.33
Boron, Total	mg/kg	10.1
Cadmium, Total	mg/kg	2.3
Calcium, Total	mg/kg	4040
Chromium, Total	mg/kg	31.8

Table 3-5: Summary of Environmental Analytical Data

Parameter	Sample ID	03A-020518
	Sample Location	03A-001
	Sample Depth (feet)	0 - 4
	Sample Date	03/16/00
Units		
<i>Total Metals (continued)</i>		
Cobalt, Total	mg/kg	7.9
Copper, Total	mg/kg	80.6
Iron, Total	mg/kg	21900
Lead, Total	mg/kg	126
Lithium, Total	mg/kg	11.7
Magnesium, Total	mg/kg	4310
Manganese, Total	mg/kg	361
Mercury, Total	mg/kg	0.1
Nickel, Total	mg/kg	23
Potassium, Total	mg/kg	637
Selenium, Total	mg/kg	0.86
Silver, Total	mg/kg	10.1
Sodium, Total	mg/kg	338
Thallium, Total	mg/kg	0.54
Vanadium, Total	mg/kg	54.7
Zinc, Total	mg/kg	191
<i>Volatile Organics</i>		
1,1,1-Trichloroethane	ug/kg	520U
1,1,2,2-Tetrachloroethane	ug/kg	520U
1,1,2-Trichloroethane	ug/kg	520U
1,1-Dichloroethane	ug/kg	520U
1,1-Dichloroethene	ug/kg	520U
1,2-Dichloroethane	ug/kg	520U
1,2-Dichloroethene (total)	ug/kg	520U
1,2-Dichloropropane	ug/kg	520U
2-Butanone	ug/kg	1000U
2-Hexanone	ug/kg	1000U
4-Methyl-2-pentanone	ug/kg	1000U
Acetone	ug/kg	450BJ
Benzene	ug/kg	520U
Bromodichloromethane	ug/kg	520U
Bromoform	ug/kg	520U
Bromomethane	ug/kg	1000U
Carbon Disulfide	ug/kg	520U
Carbon Tetrachloride	ug/kg	520U
Chlorobenzene	ug/kg	520U
Chloroethane	ug/kg	1000U
Chloroform	ug/kg	520U

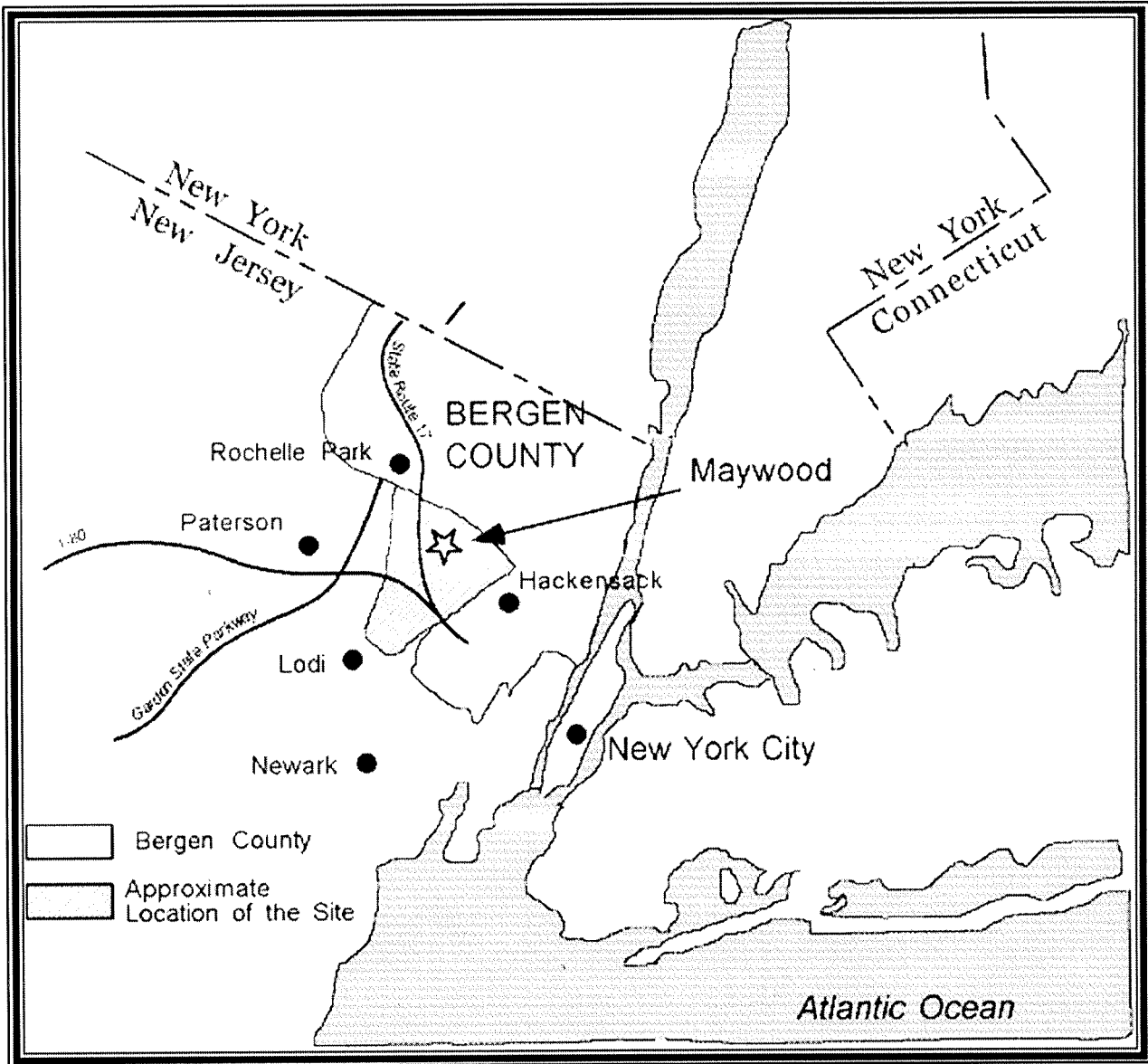
Table 3-5: Summary of Environmental Analytical Data

Parameter	Sample ID	03A-020518
	Sample Location	03A-001
	Sample Depth (feet)	0 - 4
	Sample Date	03/16/00
Units		
<i>Volatile Organics (continued)</i>		
Chloromethane	ug/kg	1000U
cis-1,3-Dichloropropene	ug/kg	520U
Dibromochloromethane	ug/kg	520U
Ethylbenzene	ug/kg	520U
Methylene Chloride	ug/kg	880B
Styrene	ug/kg	520U
Tetrachloroethene	ug/kg	520U
Toluene	ug/kg	520U
Trans-1,3-Dichloropropene	ug/kg	520U
Trichloroethene	ug/kg	520U
Vinyl Chloride	ug/kg	1000U
Xylene (total)	ug/kg	520U
<i>TCLP Metals</i>		
Arsenic	ug/L	22.9U
Barium	ug/L	735
Cadmium	ug/L	11.9U
Chromium	ug/L	3.8U
Lead	ug/L	59.7U
Mercury	ug/L	0.1U
Selenium	ug/L	49.7U
Silver	ug/L	3.7U
<i>TCLP Pesticides</i>		
Alpha-Chlordane	ug/L	0.5U
Endrin	ug/L	1U
Gamma-BHC (Lindane)	ug/L	0.5U
Gamma-Chlordane	ug/L	0.5U
Heptachlor	ug/L	0.5U
Heptachlor epoxide	ug/L	0.5U
Methoxychlor	ug/L	5U
Toxaphene	ug/L	50U
2,4,5-TP (Silvex)	ug/L	5U
2,4-D	ug/L	10U

Table 3-5: Summary of Environmental Analytical Data

Parameter	Sample ID	03A-020518
	Sample Location	03A-001
	Sample Depth (feet)	0 - 4
	Sample Date	03/16/00
Units		
<i>TCLP Volatiles</i>		
1,1-Dichloroethene	mg/L	0.025U
1,2-Dichloroethane	mg/L	0.025U
2-Butanone	mg/L	0.05U
Benzene	mg/L	0.021J
Carbon tetrachloride	mg/L	0.025U
Chlorobenzene	mg/L	0.025U
Chloroform	mg/L	0.025U
Tetrachloroethene	mg/L	0.025U
Trichloroethene	mg/L	0.025U
Vinyl Chloride	mg/L	0.05U
<i>TCLP Semi-Volatiles</i>		
1,4-Dichlorobenzene	mg/L	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U
2,4-Dinitrotoluene	mg/L	0.05U
2-Methylphenol	mg/L	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U
Hexachlorobenzene	mg/L	0.05U
Hexachlorobutadiene	mg/L	0.05U
Hexachloroethane	mg/L	0.05U
Nitrobenzene	mg/L	0.05U
Pentachlorophenol	mg/L	0.12U
Pyridine	mg/L	0.05U

B (inorganics) Value Between Method Detection Limit and Reporting Limit
 B (organics) Found in Associated Blank
 U Undetected Values
 J Estimated Value
 BJ Found in Blank; is an Estimated Value



NOT TO SCALE

<p>U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS NEW YORK DISTRICT</p> <p>US ARMY CORPS OF ENGINEERS FUSRAP FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM</p>	<p>STONE & WEBSTER, INC.</p> <p>Prepared by: MALCOLM PIRNIE</p> <p>File Name: MPI-CH3</p>
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**LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY**

PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

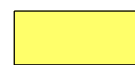
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DACW41-98-R-0034

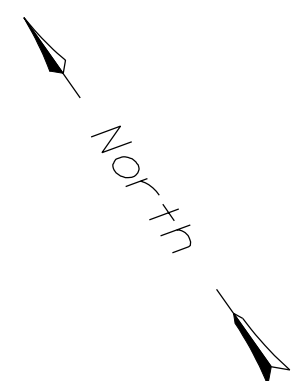
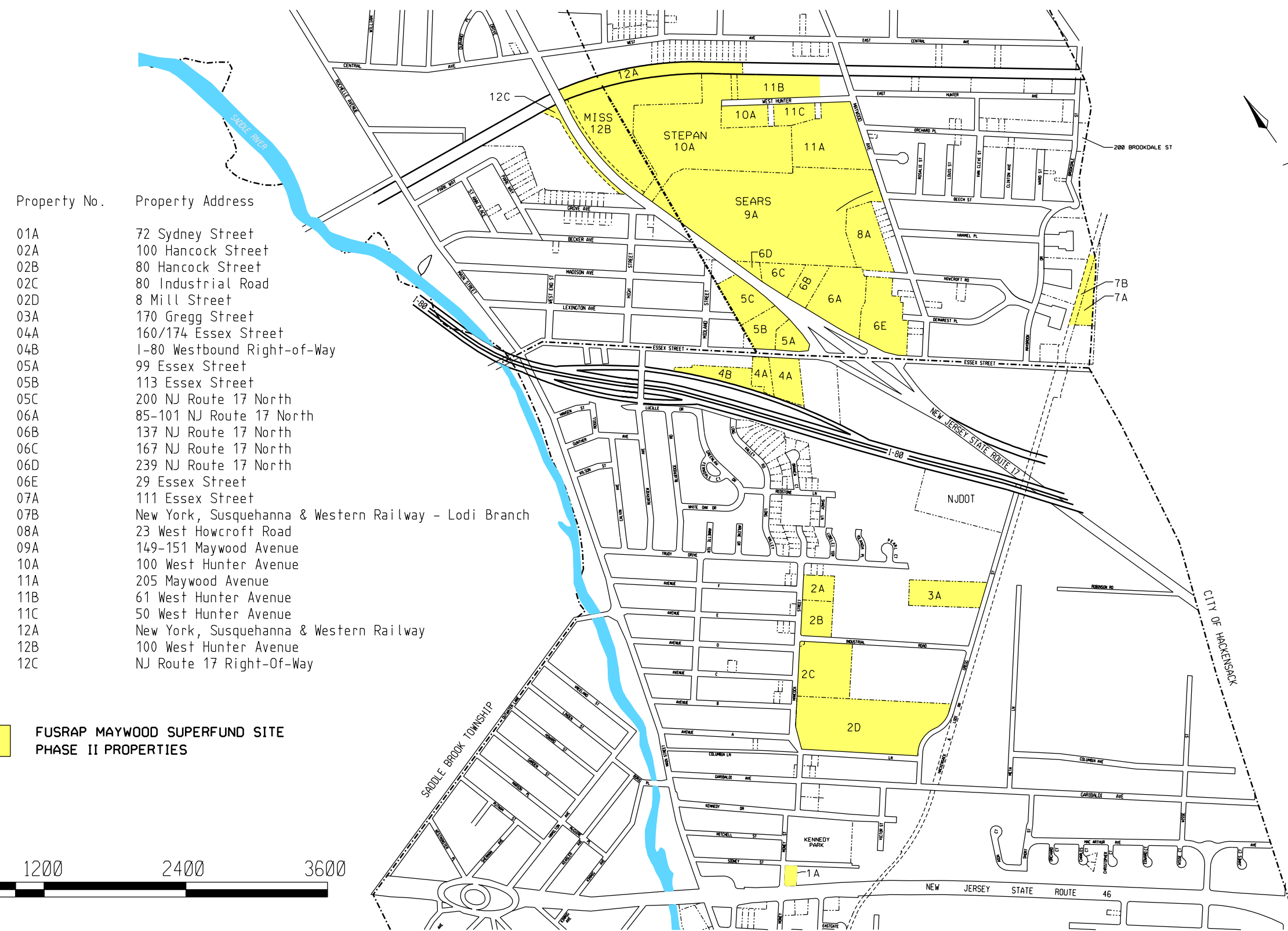
Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 3-1

Cluster No.	Property No.	Property Address
1	01A	72 Sydney Street
2	02A	100 Hancock Street
	02B	80 Hancock Street
	02C	80 Industrial Road
	02D	8 Mill Street
3	03A	170 Gregg Street
4	04A	160/174 Essex Street
5	04B	1-80 Westbound Right-of-Way
	05A	99 Essex Street
6	05B	113 Essex Street
	05C	200 NJ Route 17 North
	06A	85-101 NJ Route 17 North
	06B	137 NJ Route 17 North
	06C	167 NJ Route 17 North
7	06D	239 NJ Route 17 North
	06E	29 Essex Street
8	07A	111 Essex Street
	07B	New York, Susquehanna & Western Railway - Lodi Branch
9	08A	23 West Howcroft Road
10	09A	149-151 Maywood Avenue
11	10A	100 West Hunter Avenue
	11A	205 Maywood Avenue
	11B	61 West Hunter Avenue
12	11C	50 West Hunter Avenue
	12A	New York, Susquehanna & Western Railway
	12B	100 West Hunter Avenue
	12C	NJ Route 17 Right-Of-Way

 FUSRAP MAYWOOD SUPERFUND SITE
PHASE II PROPERTIES




U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT



US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

STONE & WEBSTER, INC.



Prepared by:
**MALCOLM
PIRNIE**

File Name:
\\MAYWOOD\TASK0318\CLUSTER REPORT\REV 1\FIGURE3-2.DGN

LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY

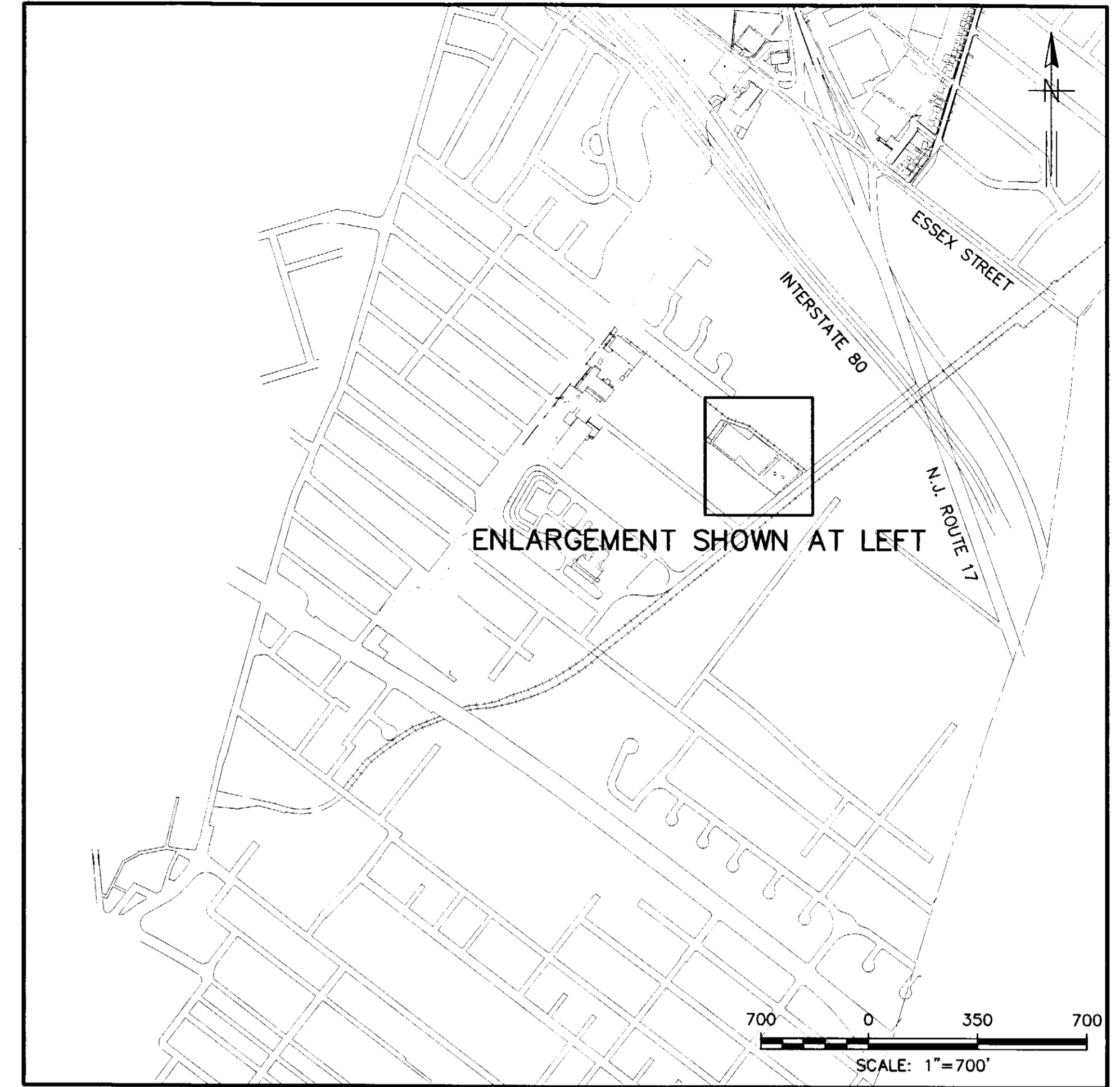
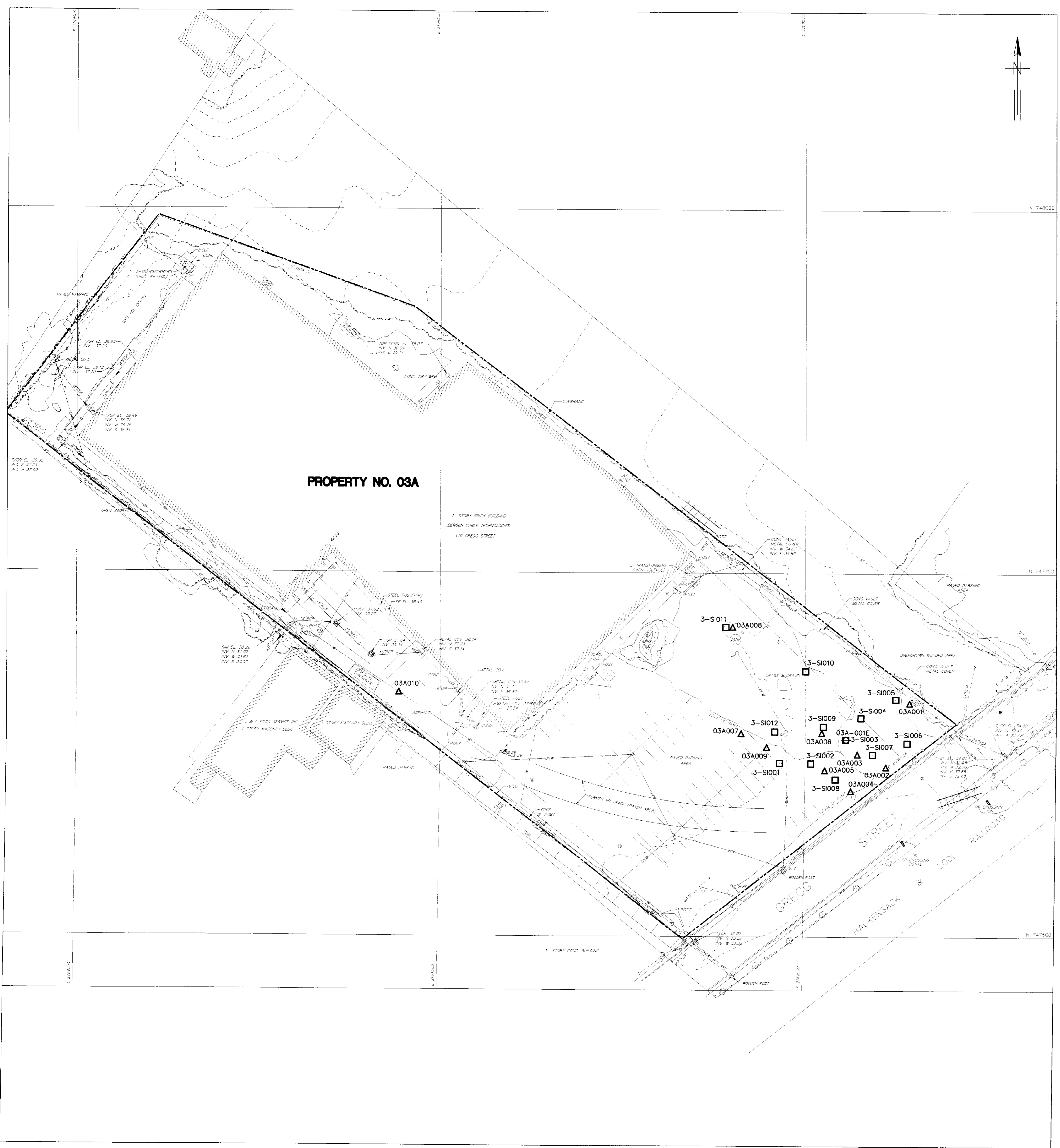
PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

Contract Number:
DACW41-99-D-9001

Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 3-2



KEY MAP

LEGEND

- PROPERTY BOUNDARY
- ▨ EXISTING BUILDING
- - - EXISTING 1' CONTOUR

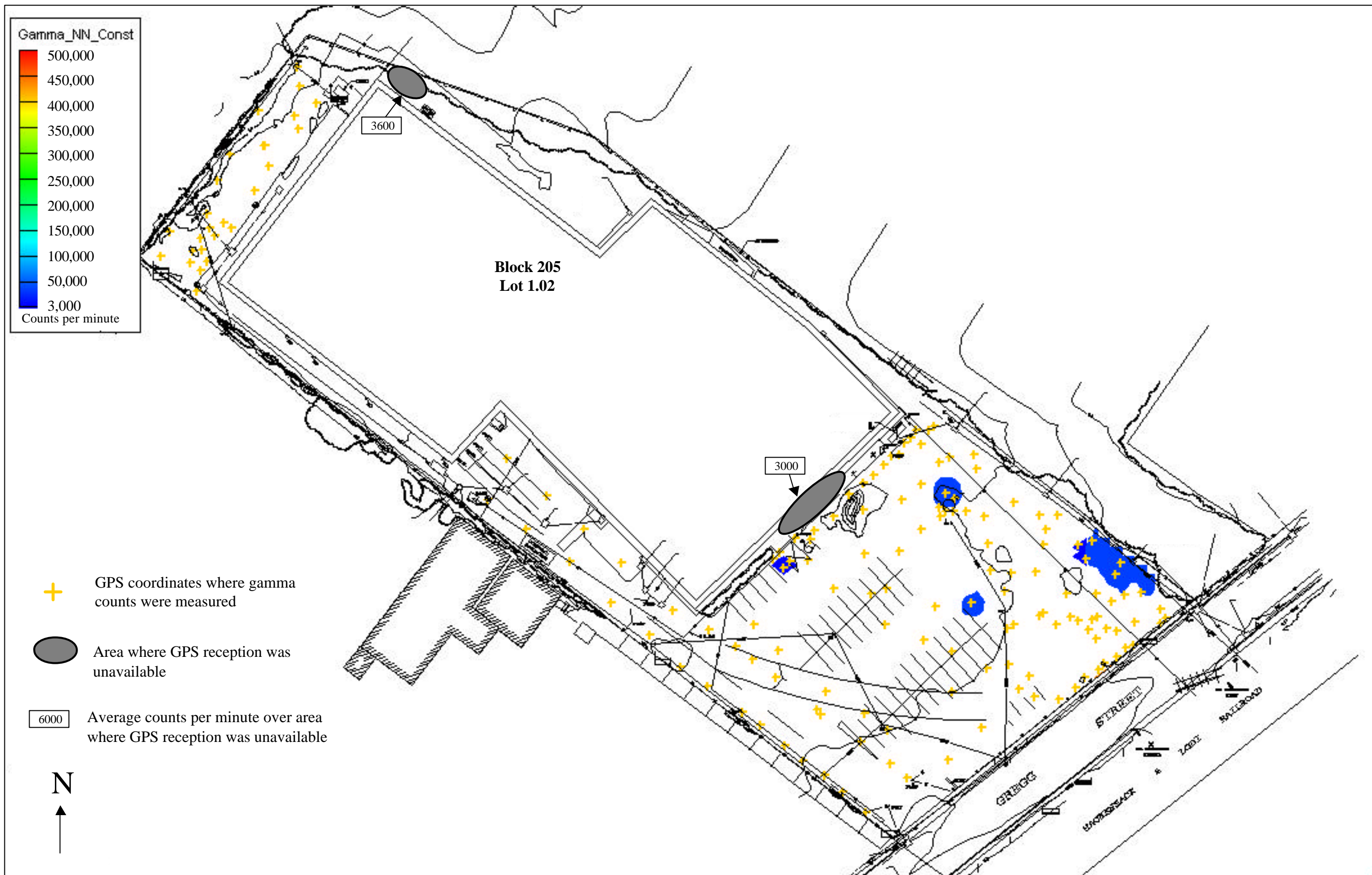
SAMPLE SYMBOL	SAMPLE TYPE	NUMBER OF SAMPLING LOCATIONS
▲	DIRECT PUSH SOIL PROBE LOCATIONS (RADIOLOGICAL)	10
□	SURFACE ISOCs LOCATIONS	12
⊕	DIRECT PUSH SOIL PROBE LOCATION (ENVIRONMENTAL)	1

- NOTES:**
- THIS SURVEY SHOWS CONDITIONS AS OF OCTOBER 1999 BASED ON AERIAL MAPPING PREPARED BY GEOD CORP. AND GROUND SURVEY BY GARDEN STATE ENGINEERING SURVEYING AND PLANNING.
 - VERTICAL DATUM IS REFERENCED TO NGVD 1929.
 - HORIZONTAL DATUM IS REFERENCED TO NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 1927.

CLUSTER NO. 3 170 GREGG STREET (03A)

30 0 30 60
SCALE: 1"=30'

<p>U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS NEW YORK DISTRICT</p> <p>FUSRAP FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM</p>	<p>STONE & WEBSTER, INC.</p> <p>Prepared by: _____ Date: _____ Checked by: _____ Date: _____</p> <p>Drawn by: _____ Date: 7/21/00 Scale: 1"=30'</p>	<p>CLUSTER NO. 3 SAMPLE LOCATION MAP</p> <p>PRE-DESIGN INVESTIGATION REPORT FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, LOCAL 140 ROCHELLE PARK, NEW JERSEY</p>	<p>Contract Number: DACW41-99-0-0001 Job Number 08575 MAP 3</p> <p>WBS# 18 Figure Number: 3-3</p>
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Lower Contour Limit = $1.5 \times \text{Background} = 1.5 \times 2000 = 3000$ counts per minute
 Upper Contour Limit = Highest measurement across entire Maywood Site: approx. 500,000 counts per minute

Property Cluster No. 3: 170 Gregg St. (Bergen Cable)
 Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 3-4

APPENDIX 3-A

Variations from the PDI Work Plan

**Letters Informing EPA and NJDEP of Use of Geoprobes⁰
In Lieu of Downhole ISOCS**



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Angela Carpenter
Remedial Project Manager
Federal Facilities Section
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Dear Ms. Carpenter:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in your December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Donna Gaffigan, NJDEP



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Donna Gaffigan
Case Manager
Bureau of Case Management
New Jersey Department of Environmental Protection
401 E State St
Trenton, NJ 08625-0600

Dear Ms. Gaffigan:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in USEPA's December 1, 1999, letter under separate cover.

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We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Angela Carpenter, EPA

Revisions to Standard Operating Procedure No. SW-MWD-509-0



**STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION**

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE: 1 of 8 plus Attachment 1
	DATE: February 2000

APPROVED:
Prepared by:
Project Chemist
Reviewed by:
PDI Task Manager
Richard Skyness 2/29/00
Project Engineer
[Signature] 2/29/00
Project Manager

1.0 PURPOSE

This Stone & Webster Standard Operating Procedure (SOP), **Soil Probe Investigation** shall be employed when collecting subsurface soil samples using the direct push soil probe method at the FUSRAP Maywood Superfund Site (hereafter referred to as the Maywood Site) properties with known or suspected soil and/or groundwater contamination.

2.0 SCOPE

This procedure details the materials, equipment, and methods common to soil probe investigation activities. Consult the site-specific project plans and work plans for proposed soil probe locations. Always consult site-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Task Manager prior to implementation and shall be documented in project field logbooks.**

3.0 REFERENCES

Stone & Webster Maywood SOP 102 - Downhole Gamma Radiation Logging
Stone & Webster Maywood SOP 307 - Surface and Shallow Subsurface Soil Sampling
Stone & Webster Maywood SOP 308 - Soil Borings and Sampling
Stone & Webster Maywood SOP 401 - Photoionization Detector (PID)
Stone & Webster Maywood SOP 504 - Labeling, Packaging, and Shipping Environmental Samples
Stone & Webster Maywood SOP 505 - Cuttings and Fluids Management
Stone & Webster Maywood SOP 506 - Decontamination
Stone & Webster Maywood SOP 507 - Field Notebook Content and Control
U.S.E.P.A., A Compendium of Superfund Field Operation Methods, Document EPA/540/P-87/001, December, 1987.

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	2 of 8

DEFINITIONS

Stone & Webster Team – personnel of the Stone & Webster Team that includes for this SOP: Stone & Webster, Malcolm Pirnie, Franklin Environmental Services, Inc., Safety & Ecology Corporation (SEC), and Garden State Surveying, Engineering and Planning, Inc. The Stone & Webster Team shall perform soil probe investigation activities, except those activities specified as performed by the Subcontractor.

Subcontractor – personnel of the direct push soil probe firm.

Direct Push Soil Probe – generic name for advancing media sampling piping/tubes with only direct mechanical force. They are typically hollow steel rods advanced using a percussive force (powered hammer) and driven directly into unconsolidated soil. There are two types of direct push soil probes. One is a single rod system (i.e., macrocore) and the other is a dual tube or cased system. The latter, which will be the method of choice for most Maywood Site investigations, utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Drive rods used with the cased system are usually made from a high-grade steel alloy and are retracted after sampling.

4.0 RESPONSIBILITIES

5.1 Project Manager - Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 Project Environmental Engineer - Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for direct push soil probe activities.

5.3 Project Superintendent - Designated by the Project Manager to supervise investigative activities by Stone & Webster Team and Subcontractor personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in monitoring soil probe investigation activities in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each workday. The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil probe investigation activities and deviations from this SOP.

5.4 Site Personnel (including the data logger) - Required to read and sign the Maywood Site Safety and Health Plan (SSHP), have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil probe investigation activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

5.5 Site Safety & Health Officer - Responsible for ensuring that all site workers (Stone & Webster and Subcontractor) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.6 Task Manager – Responsible to plan, implement, and closeout field work requiring direct push technology.

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	3 of 8

5.7 Subcontractor - Required to read and sign the SSHP, have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. Subcontractors shall report directly to the Task Manager or his designee.

6.0 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS FOR SOIL PROBE INVESTIGATION

The following is a list of equipment and material that is commonly used on all projects when the direct push probe technique is performed in the unconsolidated soils. Refer also to related SOP equipment and material requirements to ensure completeness.

Items required by Subcontractor:

- Direct push probe equipment - of appropriate size and direct push probe and sampling capabilities; vehicle mounted; direct push probe sampling tools used to advance boring (i.e., direct push small diameter rods; and augers, if required) equipment, labor, and supplies to maintain optimal efficiency
- Environmentally-safe lubricants
- Backfill material for probe holes, as required
- Soil sample collection and logging supplies – **See Stone & Webster Maywood SOP 308, Soil Borings and Sampling**
- Decontamination supplies - **See Stone & Webster Maywood SOP 506, Decontamination**

Items carried by Stone & Webster Team on-site personnel

- **SSHP To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Clipboard
- Pencils
- Six-foot-ruler
- Pocket knife
- Camera (optional), check with Project Manager if required
- Volatile organic compound vapor meter equipped with photoionization detector (PID) and other air surveillance monitoring equipment, as required by the SSHP
- Radiation meter
- Site boring logs
- Blank soil probe logs
- Weighted measuring tape
- Water level measuring device - **See Stone & Webster Maywood SOP 410, Groundwater Level Measurement**, Interface probe, if needed
- Paper towels
- Chain of Custody forms

7.0 DIRECT PUSH PROBE ACTIVITIES

7.1 General Considerations

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	4 of 8

Prior to selecting the direct push probe method for a specific property, the objectives of the field investigation must be established. These property-specific objectives shall include one or more of the following Maywood Pre-Design Investigation (PDI) program objectives:

- Soil classification/evaluation - the direct push soil probe technique will be able to accommodate the collection of soils for characterization purposes.
- Characterization of hydrogeologic conditions - the direct push soil probe technique shall allow for the characterization of each stratigraphic zone, and water level measurements.
- Evaluation of soil contamination - the direct push soil probe technique shall provide the appropriate sample collection methods, must not introduce contaminants into the probe hole or otherwise alter the existing soil or groundwater chemistry, and should not result in subsurface cross contamination during or after installation of direct push probe.

7.2 Direct Push Probe Activities

Prior to commencing direct push soil probe fieldwork, several activities should be performed. These activities, which include both pre-mobilization office tasks and pre-installation field tasks, are discussed below. Once the pre-installation activities are completed, direct push soil probe installation may commence.

7.2.1 Pre-Mobilization Tasks

1. The Stone & Webster Team and Subcontractor shall acquire as much geologic and hydrogeologic information about the site as possible. This information may include possible soil and groundwater contamination present, groundwater table depths and fluctuations, surficial and bedrock geology, approximate thickness of the unconsolidated zone, depth to top of weathered rock, depth to competent rock, and site access.
2. Soil probe locations shall be marked in the field by the Stone & Webster Team with either paint or flags/stakes during pre-mobilization tasks, and surveyed using a global positioning system (GPS). The Stone & Webster Team shall check and verify that the soil probe location corresponds to the location on the project plans. The Stone & Webster Team and Subcontractor shall check to see if visible structures will prevent the completion of proposed soil probes at specific locations.
3. The Stone & Webster Team shall communicate with the Subcontractor regarding the requirements of the direct push soil probe program and required geologic and environmental information. Inform the Subcontractor of the environmental sampling program that the project shall follow. This information includes sampling frequency, sampling depths, type of sample required (soil or groundwater), the length of casing, direct push soil probe method (i.e., macrocore, dual tube, etc.), number and type of soil samplers required, and special sampling techniques. Ensure that probe hole backfill is selected in accordance with the project specifications.
4. The Subcontractor shall ensure that all utilities in the vicinity of the proposed boring(s) have been cleared by the appropriate authorized parties (e.g., New Jersey One-Call System at 1-800-272-1000, owner, etc.) or, if utilities exist, are visibly marked on the ground surface in the area of the proposed boring. In addition, keep a safe working distance (pursuant to OSHA) from overhead utilities. **NOTE: The party responsible for having utilities cleared shall be identified. If the responsible party is not clearly identified then the Task Manager shall establish the responsible party. Ensure that utilities have been cleared prior to installation of soil probe.**

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	5 of 8

7.2.2 Pre-Installation Field Tasks

Sampling equipment shall be decontaminated prior to use, using pressure or manual washing of the rig, direct push soil probe, and tools, as required to prevent introducing off-site contamination. The direct push soil probe related equipment shall be decontaminated on site prior to direct push soil probe activities. Refer to **Stone & Webster Maywood SOP 506, Decontamination** for specific instructions.

7.3 General Direct Push Soil Probe Method Procedures

The following sections outline general direct push soil probe procedures used in unconsolidated soil materials.

1. Assuming a vertical soil probe, the Subcontractor shall set the direct push rig over the proposed soil probe location. Level the direct push rig and ensure that the direct push rods used to advance the soil probe are in a vertical position directly above the hole.
2. The inspecting Stone & Webster Team shall obtain and record measurements of tools to be used for direct push probe operations. Down-hole measurements taken by the Subcontractors shall be to the nearest 0.1 foot.
3. The Subcontractor shall begin sampling or advancement of soil probe to the desired depth utilizing the direct push method described below. Samples shall be taken using the steps described in Section 8.1.1.
4. When the direct push advancement tools are lowered into the probe hole, the Stone & Webster Team shall keep track of tool lengths to check Subcontractor's stated depth of soil probe.
5. The Stone & Webster Team shall make certain that the Subcontractor is performing depth measurements with a ruler and known tool lengths and not visually judging ("eyeballing") casing and tool projections above the ground. The Stone & Webster Team shall maintain a mental note of depth to bottom of soil probe by keeping track of the linear feet of tools in and above the ground. By mentally subtracting the "stick-up" above the ground, the Stone & Webster Team can maintain a constant approximate check on the soil probe depth and Subcontractor's indicated depths.
6. The breathing zone shall be screened by a designee of the Stone & Webster Team Site Safety and Health Officer for total volatile organic vapors using an organic vapor analyzer as outlined in the SSHP. A lower explosive limit meter (LEL) shall be employed if required in SSHP. Record the measured readings at the depth and time of reading on the boring log.
7. During direct push probe activities, both the Stone & Webster Team and Subcontractor shall record production, mechanical and/or sampling difficulties and the sequence of activities. Also record rig mobilization time, rig set-up time, and probe commencement and completion times. This information should be recorded in a field log book. The Stone & Webster Team shall also record pertinent details on the soil probe log (See Attachment A for blank soil probe log).
8. Refusal of direct push probe advancement tools (i.e., casing refusal) is defined as when the probe hole cannot be advanced using regular advancement methods. Generally, refusal can be identified by the following characteristics:
 - Advancement of probe hole is not noticeable or is very slow
 - A change in the frequency/pitch of the direct push probe equipment
 - The direct push probe downpressure may be significantly higher than under "normal" conditions. The direct push rig may be lifted off the ground surface.
9. If refusal is encountered in the soil probe, refer to **Stone & Webster Maywood SOP 308, Soil Borings and Sampling** for specific instructions. If the probe hole cannot be advanced, relocate the probe hole within approximately 5 feet distant from the original location and start with the

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	6 of 8

work in Section Paragraph 7.2.1. Measure the distance and direction from the original location, and record this information in the field logbook. The actual distance of movement necessary may be greater depending on the site conditions. If the required movement is greater than 5 feet, contact the Task Manager for direction.

10. Downhole gamma radiation logging will be performed, *where feasible* by the Stone & Webster Team as described in Section 8.1.1 below (**See Stone & Webster Maywood SOP 102, Downhole Gamma Radiation Logging**).
11. When the probe hole is completed and the area is cleaned up, all contaminated equipment, including down-hole tools, hand tools, and direct push rig shall be decontaminated by the Subcontractor (**See Stone & Webster Maywood SOP 506, Decontamination**) and as directed by the Radiation Safety Officer (RSO).
12. The Stone & Webster Team shall record the soil probe location on the project drawings.

8.0 METHOD-SPECIFIC SOIL SCREENING AND SAMPLING

In this section, the soil screening and sampling procedure for the direct push soil probe method is described.

8.1 Direct Push Probe Services

The direct push probe rig is a hydraulically powered percussion/direct push machine used for small diameter subsurface investigations. It can obtain continuous soil cores, discreet soil samples, groundwater samples and vapor samples along with installation of permanent sparge points.

8.1.1 Procedures for Screening and Sampling Direct Push Probe Soil Samples

Following is the procedure to be used at the Maywood Site for screening and sampling direct push probe soil cores.

1. Each 4-foot soil core sample will remain in the polyvinyl chloride/polyethylene terephthalate (PVC/PETG) liner and marked with the appropriate field identification number, sealed with rubber end caps for liners, and placed into a designated (2 inch ID) PVC container (including PVC end caps) supplied by the Subcontractor for storage. Pertinent sample data will also be marked on the PVC container.
2. Downhole gamma logging will be accomplished, *where feasible* by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.
3. Each soil probe hole will be backfilled for the full length, in accordance with project requirements.
4. The sealed PVC containers will be transported by the Stone & Webster Team to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. All Building 76 sample documentation, field screening, and sampling tasks shall be performed by the Stone & Webster Team. Sample documentation will include the preparation of a soil probe log containing the following pertinent field documentation: soil probe identification number and location; soil column description; soil screening data, and photo-documentation. **Stone & Webster Maywood SOP 507, Field Notebook Content and Control**, shall be followed. Sample documentation information shall be recorded electronically.
5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	7 of 8

soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integration taken at each marked location and recorded.

6. The soil cores will then be screened for total volatile organic vapors using a PID (see **Stone & Webster Maywood SOP 401, Photoionization Detector (PID)**). A series of small perforations will be made through the liner at 12-inch increments.
7. The soil cores will be described generally in accordance with the Unified Soil Classification system, based on visual observations through the liners and soil extracted from the small perforations. Prior to storage, these perforations will be sealed with tape. The soil descriptions developed will be marked with an "FC" note to define the description as a field classification.
8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.
9. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.
11. Extracted samples shall be prepared in accordance with the Safety and Ecology Corporation (SEC) on-site field laboratory soil preparation practice/SOP.
12. Analysis for ROC on extracted sections of the soil core will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector, or equivalent. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.
14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.
15. Sampling tools will be decontaminated before each boring, after collecting each soil sample, and after each boring.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term "blind duplicates"), thus eliminating potential bias in the test measurement.

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If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.

ATTACHMENT 1

PDI SOIL PROBE LOG SHEET					
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling		
Site Designator			XXX		
Activity Designator			AAA PDI		
Field Measurement/Sample Collection Designator			VV SP		
Station Number			N N N		
Media			m m SB		
Sample Type			n		
Sequential Sample Number			##### (see Below)		
Location		Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)	
		Gamma Logging		Photoionization Detector (PID) Logging	
		Down Hole	Core		
Date					Date
Time					Time
Logger					Logger
Detector Model #			SPA-3	PID Model #	Multi-RAE
Detector Serial #			CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #			2224		
Scaler Serial #			132842		
Comments:					
1. MPI No. _____ 2. Direct-push location grouted with BenSeal.					
_____ Signature (Down Hole Gamma Logging)			_____ Date		
_____ Signature (Core Gamma Logging)			_____ Date		
_____ Signature (PID Logging)			_____ Date		

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)															
					X	X	X	#	#	#	#	#	#							
0.0																				
0.5																				
1.0																				
1.5																				
2.0																				
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¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 G:\3674009\PDI Report\AppdxA\SOP509FINAL.doc

TABLE 1-A: REVISIONS TO SOP SW-MWD-509-0

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>Section 8.1.1 Procedures for Screening and Sampling Direct Push Soil Samples 2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a Bicon 3/8- inch x 3/8- inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. The detector shall be positioned below the bottom of the casing to allow gamma log readings in the uncased portion of the probe hole. The casing shall be extracted at 6-inch increments and a 30-second count reading shall be taken at each increment.</p>	<p>2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. The sodium iodide detector preamplifier is connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector™ multi-channel analyzer/amplifier/high voltage power supply. The system is controlled, and the data stored, via a notebook computer. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.</p>	<p>Cabrera Services, Inc. developed this procedure as a cost effective site characterization method. Better sensitivity of the 1-inch x 1-inch detector used by Cabrera Services, Inc. allows gross gamma measurements through the soil probe casings, thereby increasing soil probe production rates.</p>	<p>January 11, 2000, without waterproof container. Sealed solid casing installed following extraction of MacroCore or Dual Tube system. January 28, 2000, with waterproof container. Eliminated need of sealed solid casing.</p>
<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The acetate liner shall be marked off at 6-inch intervals. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Readings shall consist of 10-second integrations taken every six inches and recorded.</p>	<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the PVC/PET liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integrations taken at the marked locations and recorded.</p>	<p>Continuous scanning of the soil core provides complete coverage, longer counting time at the regions of interest, and minimizes redundancy of the downhole gamma measurements.</p>	<p>January 11, 2000</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>8. A minimum of three soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238 based on field radiological screening and gamma logging values. At a minimum, one soil sample will be taken at the highest reading location (suspected FUSRAP waste); a second soil sample shall be collected where the readings approach a constant value (suspected transition zone); and a third soil sample shall be collected within the zone of constant readings (below suspected transition zone). Additional samples may be taken based on the Task Manager's direction.</p>	<p>8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.</p>	<p>Suspected FUSRAP waste and suspected transition zones may not be present in each direct push location.</p>	<p>Selection of archived samples began February 21, 2000.</p>
<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored in Building 76 for future reference.</p>	<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.</p>	<p>Based on laboratory analysis there may be the need to collect additional samples from the stored soil cores.</p>	<p>January 11, 2000</p>
<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a USACE-certified off-site laboratory, for confirmatory ROC analysis. Soil samples shall be placed in labeled containers provided by the laboratory, then placed in coolers maintained at 4°C. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>Samples will be sealed in containers provided by the SEC on-site field laboratory.</p> <p>Preservation (i.e., 4°C) is not required for ROC analysis.</p>	<p>February 28, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>14. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.</p>	<p>14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.</p>	<p>Sample storage will be returned to the FUSRAP Maywood Superfund Site for future disposition.</p>	<p>January 11, 2000</p>
<p>9.0 QUALITY ASSURANCE/QUALITY CONTROL Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment rinsate blanks and duplicates. Equipment rinsate blanks must be collected each day that sampling occurs or each decontamination event, whichever is less, per matrix per parameter per field crew, per equipment type (assuming reusable sampling equipment is used). This QA/QC requirement may be modified based on conversations with USACE, USEPA, and NJDEP. Field duplicate samples must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement. Field duplicate samples must represent no less than 10 % of the total number of samples per matrix per parameter per area of study. Field duplicate gamma radiation readings shall also be recorded at a frequency of 10% of the total gamma radiation readings.</p> <p>Matrix spike/matrix duplicate (MS/MD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat</p>	<p>Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement.</p> <p>If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given</p>	<p>Swipe sample is a more representative QC check of loose surface alpha radioactivity than aqueous rinsate sample.</p> <p>Reduction from 10% to 5% duplicate samples based on large number of soil samples proposed for PDI. In addition, 5% is consistent with NJDEP Field Sampling Procedures Manual for field duplicates and EPA guidelines for MS/MSD analysis. Electronic mail sent to EPA and NJDEP regarding reduction in duplicate percentage on January 28, 2000.</p>	<p>Equipment blank revision implemented on January 11, 2000.</p> <p>Reduction from 10% to 5% duplicate samples implemented week of February 7, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
no less than 10% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.	method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.		

Revised PDI Work Plan Table 5-1

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

PROPERTY CLUSTER NUMBER ⁽⁸⁾	NUMBER OF SAMPLING LOCATIONS						NUMBER OF SAMPLES FOR ANALYSIS BY PARAMETER ⁽⁶⁾								
	RADIOLOGICAL SURVEY				GEOTECH	ENVIR	GEOTECHNICAL					CHEMICAL ANALYSES			
	SOIL PROBES ⁽¹⁾	SOIL PROBE DEPTHS (FT) (ESTIMATED)	SOIL PROBE RADIOLOGICAL ANALYSES ⁽²⁾	SURFACE SOIL RADIOLOGICAL ANALYSES ⁽³⁾	SOIL BORINGS ⁽⁴⁾	SOIL BORINGS ^(4,5)	SPECIFIC GRAVITY	ATTERBERG LIMITS	GRAIN SIZE	TRIAXIAL TESTS ⁽⁷⁾	CONSOLID. TESTS ⁽⁷⁾	WATER CONTENT	CHROMIUM SPECIATION	TCL/TAL	FULL RCRA CHAR.
1	13	12	39	5	3	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
2	96	16	288	50	22	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
3	10	8	30	5	2	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
4	32	12	96	15	4	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
5	79	8	237	40	8	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
6	85	16	255	40	12	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
7	28	16	84	15	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
8	26	16	78	15	6	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
9	131	16	393	65	17	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
10	106	24	318	55	16	6	TBD	TBD	TBD	TBD	TBD	TBD	6	6	6
11	16	8	48	10	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
12	151	24	453	75	17	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
TOTALS	773	N/A	2319	390	115	47	---	---	---	---	---	---	47	47	47

NOTES:

- 1 Soil probes installed using direct-push method, to the depth shown or refusal.
- 2 At a minimum, three separate soil samples (one soil sample from within the suspected FUSRAP waste, one in transition zone, and one below the transition zone) will be selected for analysis of the ROC by the on-site field laboratory. A total of 2319 subsurface soil samples (i.e., 3 X 773) will be selected for ROC analysis by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 3 Five surface soil samples will be randomly collected from up to 10% of the 773 soil probe locations for radiological analyses and comparative evaluation of surface ISOCs measurement. A total of 390 surface soil samples (i.e., 5 X 78) will be selected for ROC analyses by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 4 Depths and quantities to be determined in field based on radiological data, structure foundations depths, etc.
- 5 Advanced to depth of radiological contamination.
- 6 Sample Analyses Rationale:
 - 6a Chromium Speciation - Speciation of trivalent and hexavalent chromium for health and safety purposes.
 - 6b TCL/TAL - Detection of organic and inorganic constituents to assess the potential for the presence of commingled radiological and chemical contamination.

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

6c	RCRA Characteristics - To support transportation & disposal activities
6d	Geotechnical Parameters (Specific Gravity, Atterberg Limits, Grain Size, Water Content) - To characterize physical properties of soil for excavation and remediation.
7	Triaxial tests and consolidation tests will be performed on undisturbed tube samples to determine strength and consolidation parameters of fine-grained materials, where present. These parameters will be used to perform bearing capacity and settlement analyses where excavations are adjacent to structures.
8	Property Clusters are defined as follows: <i>PROPERTY CLUSTER NO. 1: 72 SIDNEY ST. (A.K.A 88 MONEY ST.)</i> <i>PROPERTY CLUSTER NO. 2: 100, 80 HANCOCK ST., 80 INDUSTRIAL RD., AND NJVIS</i> <i>PROPERTY CLUSTER NO. 3: 170 GREGG ST.</i> <i>PROPERTY CLUSTER NO. 4: 160/174 ESSEX ST., I-80 RIGHT-OF-WAY</i> <i>PROPERTY CLUSTER NO. 5: 99 ESSEX ST, 113 ESSEX ST., 200 ROUTE 17 SOUTH</i> <i>PROPERTY CLUSTER NO. 6: 29 ESSEX ST., 85-101 ROUTE 17 NORTH, 137 ROUTE 17 NORTH, 167 ROUTE 17 NORTH, 239 ROUTE 17 NORTH</i> <i>PROPERTY CLUSTER NO. 7: 111 ESSEX ST. - SCANEL/HACKENSACK AND LODI RAILROAD</i> <i>PROPERTY CLUSTER NO. 8: 23 WEST HOWCROFT RD.</i> <i>PROPERTY CLUSTER NO.9: 149-151 MAYWOOD AVE.</i> <i>PROPERTY CLUSTER NO.10: 100 W. HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.11: 205 MAYWOOD AVENUE AND 50 & 61 WEST HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.12: 100 W. HUNTER AVE., NY, SUSQUEHANNA AND WESTERN RAILROAD, AND NJ ROUTE 17</i>

Rationale of Intrusive Sample Location Relocations

PDI Soil Probe Variance Log

Cluster No.: 3

Property Addresses: Property No. 03A –170 Gregg St. (Bergen Cable)

Sample Location Map: Figure 3-3

Number of Revised Soil Probe Locations : 4

Rationale for Revisions

- Location 03A-008, originally proposed to delineate the contaminated area identified by Bechtel (BNI, 1986), was moved approximately 50 feet further northwest to investigate an area exhibiting elevated gamma counts.
- Location 03A-001 originally proposed inside the contaminated area identified by Bechtel (BNI, 1986) was moved approximately 25 feet further east to a small area exhibiting the highest surface gamma count rate of approximately twice the background level.
- Locations 03A-007 and 03A-009 were moved approximately 15 and 20 feet, respectively, further west due to potential soil disturbance and insufficient data available.

NOTE: From comparison of historical exposure rate data (ORNL, 1984) to PDI surface gamma survey results, it is believed that there was a surface soil disturbance in the eastern portion of the property.

Notes:

1. This list provides specific rationale for the relocation/deletion/addition of intrusive radiological sampling locations due to revised understanding of anticipated radiological contamination. This revised understanding was based on further review of previous data collected by others, and review of surface gamma survey and ISOCS data collected by the Team under this PDI program.
2. Base mapping used in the PDIWP (Stone & Webster, 1999a) has been revised by the Team. Accordingly, a number of intrusive sample locations needed to be relocated due to previously unforeseen physical restrictions (i.e., presence of underground utilities, unacceptable proximity to buildings/roadways, revisions to previously mapped property limits). This table is not intended to provide detailed rationale for points moved due to new mapping.

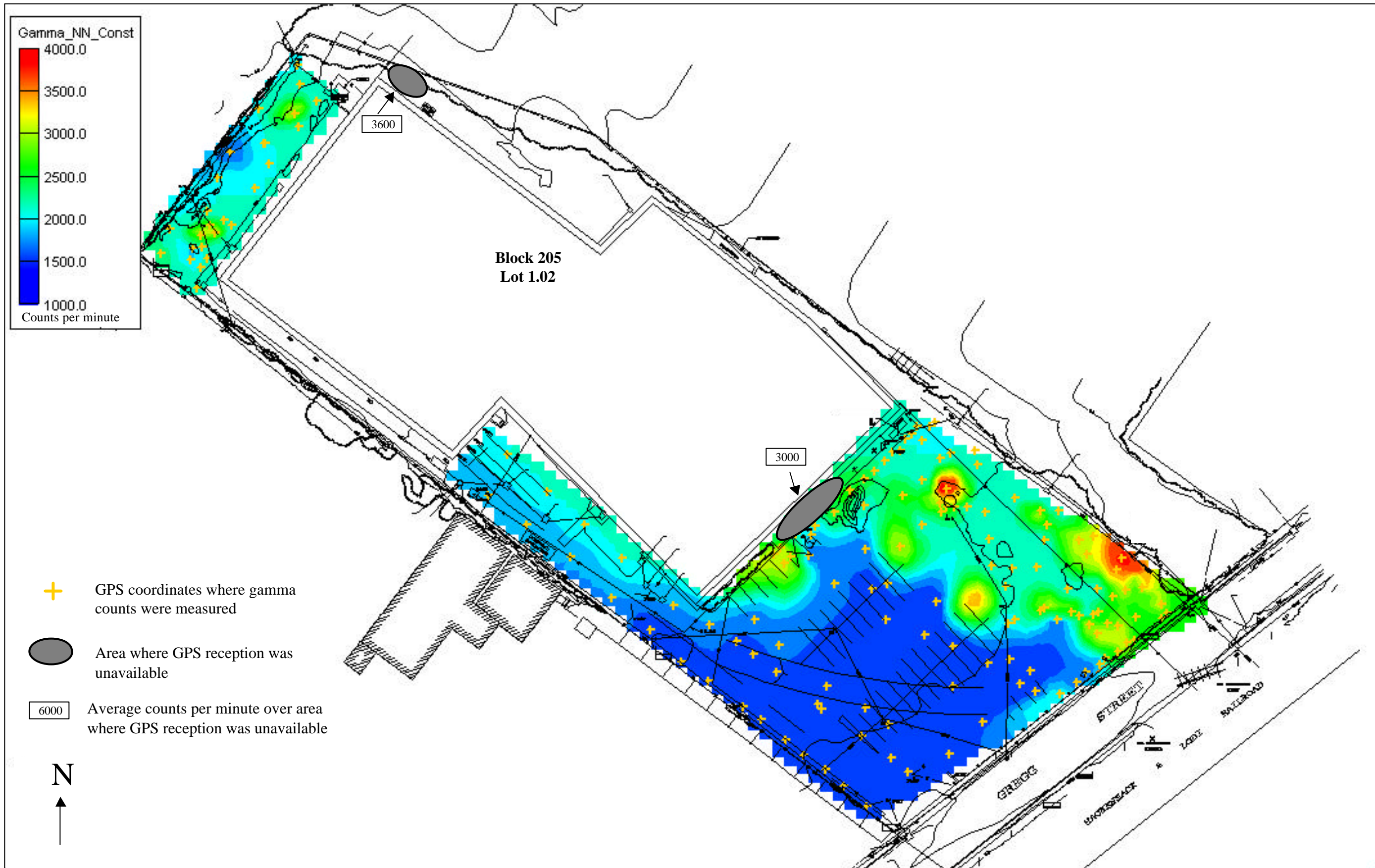
Outlier Protocol (Gamma Scan Anomalies)

Protocol for Addressing Gamma Scan Anomalies (Outliers)

Maywood FUSRAP Superfund Site

Pre-Design Investigation

1. Anomalous surface gamma scan measurements **greater than 2500 cpm for shielded areas (e.g. asphalt covered surfaces), or 3500 cpm for unshielded areas (e.g. bare soil) but, less than 6,000 cpm (1" x 1" NaI detector)** will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL. Note, these count rates are approximately one and one-half times background on shielded and unshielded surfaces.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization (i.e., eliminates the potential for elevated levels of radiological contamination at depth or provides adequate information on the existence of radiological contamination with depth) **will not be further investigated during the PDI.**
 - C. Anomalous areas that do not have previous data that are adequate for characterization **will only be investigated during the PDI if proposed soil probe locations can be moved to these locations without compromising the quality of the data from the proposed locations.** Additional soil probe locations **will not be added** to the program.
 - D. Anomalous areas where additional PDI investigations (based on 1.C) will be performed but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
2. Anomalous areas exhibiting a surface gamma count rate **greater than or equal to 6,000 cpm** (based on a 1" x 1" NaI detector) will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be as follows: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization **will not be further investigated during the PDI.**
 - C. Anomalous areas with previous data that are not adequate for characterization **will be investigated further during the PDI.** Proposed soil probe locations **will be moved** to these locations if possible, or additional soil probe locations **will be added** to the PDI program. These additional soil probes will be used to define the nature and extent of contamination within these previously unidentified areas; the quantity of additional borings is to be determined on a site-by-site basis.
 - D. Anomalous areas that require additional PDI investigations (based on 2.C) but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
3. All anomalous areas and their dispositions will be documented in the PDI.



Property Cluster No. 3: 170 Gregg St. (Bergen Cable)
 Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 3-A1

Reduction in Field Duplicate and MS/MSD Frequency

Navon, Daria

Subject: FW: Reduction in field duplicate and MS/MSD frequency request

----- Forwarded by David Doyle/Environmental/SWEC on 01/28/2000
02:54 PM -----

"Shonkwiler, Glen D NWK" <Glen.D.Shonkwiler@nwk02.usace.army.mil> on 01/28/2000
02:00:15 PM

To: "carpenter.angela@epamail.epa.gov" <carpenter.angela@epamail.epa.gov>, "dgaffica@dep.state.nj.us" <dgaffica@dep.state.nj.us>
cc: "Roos, Allen D NAN02" <Allen.D.Roos@nan02.usace.army.mil>, "Medary, Richard T NWK" <Richard.T.Medary@nwk02.usace.army.mil>, "Mellema, Doug W NWK" <Doug.W.Mellema@nwk02.usace.army.mil>, "Speckin, Paul D NWK" <Paul.D.Speckin@nwk02.usace.army.mil> (bcc: David Doyle/Environmental/SWEC)

Subject: Reduction in field duplicate and MS/MSD frequency request

Angela/Donna, with this email, USACE is notifying EPA and NJDEP of our intent to reduce the number of field duplicates and MS/MSD samples required in the Maywood Chemical Site CDQMP for the PDI sampling from 10% to 5%. The 10% frequency is a USACE-internal QC standard which USACE plans to reduce based on the large number of soil samples collected during the Pre-Design Investigation (PDI). The reduction in frequency would affect field duplicate samples collected for radionuclides of concern (ROC) and analysis by the on-site field laboratory; field duplicate gamma radiation readings (both downhole and core sample); photoionization detector (PID) or flame ionization (FID) readings; and MS/MSD samples analyzed by the off-site laboratory. It is anticipated that greater than 2000 soil samples will be analyzed by the on-site field laboratory and gamma radiation and PID readings will exceed 10,000 measurements.

Five percent is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and EPA guidelines for MS/MSD analysis. EPA Region II does not have a specific QA/QC guideline for field duplicate samples. The guideline is therefore on a case-by-case basis, in accordance with the site-specific project plans.

Please note that the 10 percent of the samples analyzed by the on-site field laboratory will still be sent to a certified off-site laboratory for confirmatory ROC analysis.

We will continue to adhere to the current 10 percent until EPA and NJ notifies USACE of its concurrence with this deviation from the CDQMP (for the PDI only). Your attention to this matter is greatly appreciated, since reduction of this QA/QC guideline will help to increase production during the Pre-Design Investigation without, in the opinion of USACE, impacting

quality and usability of the data.

Thanks,
Glen Shonkwiler
Remedial Investigations & Remedial Design Manager
Hazardous, Toxic, & Radioactive Waste Branch
U. S. Army Corps of Engineers
CENWK-EC-EA RM 610
601 E 12th St
Kansas City, MO 64106
(816) 983-3561
(816) 426-5550/5949 (fax)
glen.d.shonkwiler@usace.army.mil

APPENDIX 3-B

**PDI Soil Probe Log Sheets
(Radiological Data)**

PDI Soil Probe Log Sheet
LEGEND

List of Abbreviations:

--- = not applicable	lt = light
blk = black	MDA = minimum detectable activity
bn = brown	med = medium
cl = clay	n/r = no recovery
cnts = counts	pCi/g = picoCuries per gram
Conc. = concentration	ppm = parts per million
dk = dark	SAA = same as above
DUP = duplicate	sc = clayey sand
f = fine	sec = seconds
gm = silty gravel	sm = silty sand
gp = poorly-graded gravel	sp = poorly-graded sand
gw = well-graded gravel	sw = well-graded sand
gy = gray	tr = trace
J = estimated	U = unidentified or negative conc. less than MDA
lg = large	wht = white

List of General Comments:

- 4x4 truck-mounted model 5400 and track-mounted model 54DT Geoprobe[®] were used to collect samples. Manual direct push methodology required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- Holes were grouted with BenSeal[®]
- Gamma measurements were taken at center point
- Duplicate samples marked with an "X" for duplicate were prepared by homogenizing soil above and below the center point and then separating for analysis.
- The depth listed is the center point
- Error: 2 sigma (95% confidence interval)

Tube Types

1-inch diameter = Dual Tube (actual 1.3-inch diameter)

2-inch diameter = Macro-Core[®] (actual 1.7-inch diameter)

Sample Intervals

Dual Tube – 13 inches

Macro-Core[®] – 8 inches

Manual Direct Push – 24 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	03A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747660	2164572	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/12/2000	01/13/2000	01/13/2000	1450
Time	1125	1330	1450	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C443E	33401	CENAN21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/12/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/13/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results										
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g				
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA		
0.0																					
0.5	0	3	A	0	0	3	1	0	0	1.36	J	0.10	0.25	1.22	J	0.07	0.27	6.59	UJ	----	6.59
1.0																					
1.5																					
2.0	0	3	A	0	0	3	1	0	1	1.63	J	0.08	0.20	1.02	J	0.05	0.15	6.50	UJ	----	6.50
2.5																					
3.0																					
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4.0																					
4.5																					
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5.5																					
6.0																					
6.5	0	3	A	0	0	3	1	0	2	ARCHIVED											
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24.0																					

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	03A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747616	2164556	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/12/2000	01/13/2000	01/13/2000	1515
Time	1140	1355	J. Dekoskie	Multi Rae
Logger	J. Marsden	S. Ng	PID Model #	CENAN21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C443E	33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/12/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	03A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747599	2164531	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/12/2000	01/13/2000	01/14/2000	
Time	1320	1520	0830	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	CENAN21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132847		

Comments:

- 0 to 4 feet = 2 inch diameter
- 4 to 8 feet = 1 inch diameter

<i>Field Original Signed</i>	01/12/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	01/13/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	01/14/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	03A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747613	2164513	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/12/2000	01/14/2000	Date	01/14/2000
Time	1330	0845	Time	0910
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	CENAN21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132847		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/12/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/14/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	03A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747639	2164511	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/12/2000	01/14/2000	Date	01/14/2000
Time	1410	0905	Time	0945
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	CENAN21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132847		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/12/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/14/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	03A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747712	2164450	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/12/2000	01/14/2000		
Time	1450	1020		
Logger	J. Marsden	S. Ng		
Detector Model #	G1	SPA-3		
Detector Serial #	C443E	33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/12/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/14/2000 Date
_____ Signature (PID Logging)	_____ Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	3	A	0	0	3	1	2	5		0.92	0.07	0.20	1.22	0.06	0.13	5.86	U	----	5.86
1.0																				
1.5	0	3	A	0	0	3	1	2	6		0.86	0.08	0.21	1.03	0.06	0.22	5.46	U	----	5.46
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	03A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
	747629	2164473	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/12/2000	01/14/2000	Date	01/14/2000
Time	1540	1350	Time	1400
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	CENAN21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

Location moved 10 feet northward

<i>Field Original Signed</i> _____ Signature (Down Hole Gamma Logging)	01/12/2000 _____ Date
<i>Field Original Signed</i> _____ Signature (Core Gamma Logging)	01/14/2000 _____ Date
<i>Field Original Signed</i> _____ Signature (PID Logging)	01/14/2000 _____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	03A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	747666	2164221	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	01/13/2000	01/14/2000	Date	01/14/2000
Time	0810	1415	Time	1500
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	CENAN21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 01/13/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 01/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 01/14/2000 Date

APPENDIX 1-C

Environmental Boring Log Sheets

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Site Designator	XXX	03a
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	
Media	mm	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)
	Northing (NAD 1927)	Easting (NAD 1927) Elevation (NGVD 1929)
Location	747635.561	2164528.176
	Gamma Logging	
	Down Hole	Core
Date		3/16
Time		1320
Logger		
Detector Model #		
Detector Serial #		
Scaler Model #		
Scaler Serial #		
	Photoionization Detector (PID) Logging	
Date	3/16	
Time	1320	
Logger		
PID Model #		Multi-RAE
PID Serial #		CENAN 21811

Comments:

1. MPI No. ENV-03-3001
2. Direct-push location grouted with BenSeal.



 Signature (Core Gamma Logging)

3/16/00

 Date



 Signature (Logging)

3/16/00

 Date

START
1310
1245



STOP
1330
1300

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0				100% SP 54R42	0	3	2	0	2	0	5	1	8
0.5		↑	↑										
1.0		0.0	0.0										
1.5													
2.0													
2.5		↓	↓										
3.0		↓	↓	SMmf 54R32									
3.5													
4.0		↑	↑	80%									
4.5													
5.0				SAA trace SILT									
5.5		0.0	0.0										
6.0													
6.5		↓	↓										
7.0													
7.5		↓	↓										
8.0													
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22.0													
22.5													
23.0													
23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
020519
 Page 1 of 1

PROJECT: IUSRAP, MAYWOOD	SITE: 03a
Project No: 08575053	Client: USACE
Contractor: TERRA PROBE	SAMPLE DEPTH: 4'-8'
Start Date/Time: 3/14 - 1305	Completion Date/Time: 3/16 1400
Development Method/Equipment:	
Logged by: C. TRICONE	Water Level (ft bgs): 3.0'
Pre-development DTW (PVC) (ft): 3.0'	DTB (PVC) (ft): 8'
Protection Level: D	

Post-development DTW (PVC) (ft): **—**

Standing Well Volume (gal) = $D^2(ft)/4 \times \pi \times (DTB-DTW)(ft) \times 7.48 \text{ gal/ft}^3$, **125 GAL**

(2-inch well = $0.164 \times (DTB-DTW)(ft)$) = **NA**

(2.5-inch well = $0.255 \times (DTB-DTW)(ft)$) = **NA**

Minimum Purge Volume (gal) (3 well volumes) = **375 GAL**

Development Purge/Discharge Rate (gpm): **250 - 500 ml/min**

Minimum Drawdown During Purging (ft): **—**

Total Quantity Purged: **.5 gal**

Disposition of Purge Water: **Returned to MISS**

Hours of Development: **—**

Hours of Decon: **—**

Hours of Standby: **—**

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1335		3.0'	—	11.1°	7.17	.94	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

1335 START H₂O SAMPLING

PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 4 – Revision 1

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

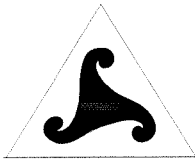
SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18

Submitted to:

Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
FUSRAP Project Office
26 Federal Plaza
New York, New York 10278

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Submitted by:



Stone & Webster, Inc.
100 West Hunter Ave.
Maywood, NJ 07607
May 2001

Reviewed/
Approved by:

Sam Rice Date: 5/31/01
Sam Rice, P.E.
Project Manager

Reviewed/
Approved by:

Kevin F. Donnelly Date: 5/31/01
Kevin F. Donnelly, P.E.
Project Environmental Engineer

Reviewed/
Approved by:

Alan F. Brown Date: 5-30-01
Alan F. Brown, P.E.
Task Manager

Reviewed/
Prepared by:

Edward A. Dudek Date: 5-31-01
Edward Dudek, P.E.
Task Leader

Reviewed/
Prepared by:

Michael Ciminera Date: 5-30-2001
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Field Operations Leader

**PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 4 – Revision 1**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18**

RECORD OF REVISIONS

Revision 0: Original Issue

Revision 1: The Final PDI Report (Revision 0) was submitted in July 2000. Revision 1 to the Final PDI Report incorporates the following significant changes: revision to text headers and footers; addition of results of confirmatory radiological analyses to [Table 4-4](#); and addition of Toxicity Characteristic Leaching Procedure (TCLP) data to [Table 4-5](#).

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ACRONYMS AND ABBREVIATIONS

AT&T	American Telephone & Telegraph
BNI	Bechtel National, Inc.
C	Degrees Centigrade
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
Conc.	Concentration
CQCP	Contractor Quality Control Plan
DOE	U.S. Department of Energy
EPP	Environmental Protection Plan
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	grams
GMS	Groundwater Modeling System
GPR	Ground Penetrating Radar
GPS	Global Positioning System
ID	Identification
ISOCS	In Situ Object Counting System
keV	kilo electron volts
kg	kilogram
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCW	Maywood Chemical Works
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
mg	milligram
MHTDP	Materials Handling, Transportation and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJVIS	New Jersey Vehicle Inspection Station
NYS&W	New York, Susquehanna & Western Railway
ORNL	Oak Ridge National Laboratories
pCi	picoCurie
PDI	Pre-Design Investigation
PDIWP	Pre-Design Investigation Work Plan
PID	Photoionization Detector
PVC/PET	Polyvinyl Chloride/Polyethylene Teraphthalate
QA	Quality Assurance
QC	Quality Control
QCSR	Quality Control Summary Report
Ra-226	Radium-226
Rn-222	Radon-222

RCRA	Resource Conservation and Recovery Act
RESRAD	Department of Energy Computer Code; RESidual RADioactivity
ROC	Radionuclides of Concern
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
St.	Street
Th-232	Thorium-232
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
ug	microgram
U-238	Uranium-238
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank

1.0 SITE BACKGROUND AND PHYSICAL SETTING

1.1 General Site Overview

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (hereafter referred to as the Maywood Site) is located in a highly developed area of Bergen County in northeastern New Jersey, in the Boroughs of Maywood and Lodi and the Township of Rochelle Park (Figure 4-1). Portions of the Maywood Site are radiologically impacted from process wastes and residues associated with the recovery and refining of thorium and thorium compounds from monazite ores by the Maywood Chemical Works (MCW) from 1916 to 1956 (Bechtel National, Inc., BNI, 1992).

Waste produced at MCW was a fine sand-like material containing residual thorium with lesser amounts of uranium and its daughter products including radium. Wastes and residues were disposed in low-lying areas west of processing facilities. In the early 1930s, a portion of these wastes and residues was separated from the main property by construction of New Jersey State Highway 17 (NJ Route 17). Additionally, the former channel of Lodi Brook runs through the majority of the properties making up the Maywood Site. Some of the contaminated materials are assumed to have eroded from the facility area and were transported downstream via Lodi Brook (Figure 4-2). In addition, from 1928 to 1944, local residents were known to use process waste in their lawns and gardens and as fill material (BNI, 1992). These are the major mechanisms for distribution of radiologically-contaminated materials on the Maywood Site.

The Maywood Site consists of 88 designated residential, commercial, municipal, and state or federal properties. All 64 Phase I properties (including all residential and municipal properties) have either been remediated by the U.S. Department of Energy (DOE) or U.S. Army Corps of Engineers (USACE) or are currently being addressed under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). The remaining 24 Phase II properties are being addressed by the Stone & Webster Team (i.e., Team).

1.2 Pre-Design Investigation Scope

On December 29, 1998, the USACE issued a Scope of Services for the design and remediation of the remaining 24 commercial and government properties. These properties potentially contain deposits of radioactive material in surface and subsurface soils resulting from operations of the former MCW. They have been designated as the Phase II properties.

A Pre-Design Investigation Work Plan (PDIWP, Stone & Webster, 1999a) was submitted in October 1999 for the Phase II properties. The purpose of the PDIWP was to address data gaps necessary to complete remedial design efforts. In determining additional data needs, it was assumed that remediation of radiologically-impacted soils would be conducted on “accessible soils” only. Accessible soils are defined as soils not under permanent structures such as buildings and roadways. Data acquisition was limited to accessible soils only.

A preliminary evaluation was performed to determine the human health risk from leaving subsurface radiologically-impacted soils proximate to these structures. The RESidual

RADioactivity (RESRAD) computer code was utilized to quantify the dose and risk under a number of assumed conditions. Based on the preliminary results, it was determined that any radioactive residues left adjacent to existing buildings, roadways, and railways would need a minimum of two feet of clean soil cover to be protective of human health. As such, it has been assumed that where radiologically-contaminated soils exist at depth adjacent to structures, at least the top two feet of radiologically-contaminated soil would be removed adjacent to the structure to a six foot horizontal setback, and then sloped at two horizontal to one vertical (2H:1V) to the required depth. However, it is recognized that site-specific calculations will need to be made during the remedial design phase in order to determine the actual depth of excavation adjacent to each structure, the horizontal setback, and the slope to final excavation depths (Stone & Webster, 1999a).

In preparing the PDIWP, the 24 Phase II properties were sub-divided into 12 clusters. The purpose of the clustering was to take a 'collective' view of a set of contiguous properties to efficiently secure needed pre-design investigation (PDI) information for those properties. [Table 4-1](#) lists the 12 clusters for the Phase II properties, from south to north. The reader is directed to the PDIWP for additional background information (Stone & Webster, 1999a).

The purpose of this PDI Report is to present data collected during the PDI for Cluster No. 4. The evaluation of PDI data, along with data collected by others during previous investigations, is documented separately.

2.0 PDI FIELD ACTIVITIES

PDI activities were performed by the following Team members:

Stone & Webster, Inc.	Team leader and engineering services
Malcolm Pirnie, Inc.	Engineering services
Science & Ecology Corporation.....	Health physics services
Cabrera Services, Inc.	Radiological survey support
Canberra Industries, Inc.	Radiological survey support
Garden State Surveying, Engineering, and Planning, Inc.	Surveying and mapping
NAEVA Geophysics, Inc.	Geophysical investigation
TerraProbe, Inc.	Direct push services
Franklin Environmental Services, Inc.	Construction services
ThermoRetec	Radiological sample analysis
RECRA LabNet.....	Environmental sample analysis
Kestrel Environmental Technologies, Inc.	Data validation

PDI activities involved non-intrusive surveys followed by intrusive investigations. The preliminary, non-intrusive PDI activities (including surface gamma scans, surface In-Situ Object Counting System (ISOCS) readings, geophysical surveys and field surveying) were initiated in August 1999. The intrusive portion of the PDI program began in January 2000 and was completed in April 2000. [Table 4-2](#) presents a summary of PDI intrusive field activities. For logistical reasons, PDI environmental borings were performed at the outset of the Groundwater Remedial Investigation program during the latter part of March and beginning of April 2000.

PDI field activities were conducted in accordance with the PDIWP, and in compliance with procedures established in the following project documents: Contractor Quality Control Plan (CQCP), Site Safety and Health Plan (SSHP), General Environmental Protection Plan (EPP), Chemical Data Quality Management Plan (CDQMP), and the Materials Handling, Transportation and Disposal Plan (MHTDP), (Stone & Webster, 1999b, c, and d, 2000a, 2000b, respectively). Variances in methodology and sample locations between the PDIWP and the actual PDI execution are discussed below.

2.1 Variances from PDIWP

This section discusses deviations in methodologies and sample locations from the approved PDIWP.

2.1.1 Methodology Variances

Methodology variances from the PDIWP were as follows:

- The PDIWP called for the use of an ISOCS utilizing germanium gamma spectroscopy to quantify radionuclide activity in soil. Following approval of the PDIWP, regulatory concerns regarding the use of ISOCS for subsurface investigation were raised. The PDIWP was subsequently modified by replacing intrusive ISOCS sampling with conventional sample

collection using direct push methods to collect soil cores for laboratory analysis. Due to this change, Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled “Soil Probe Investigation” was developed and followed. Refer to the USACE letters dated December 8, 1999 from the Project Manager, Mr. Allen Roos, informing the U.S. Environmental Protection Agency (USEPA) Project Manager, Ms. Angela Carpenter, and the New Jersey Department of Environmental Protection (NJDEP) Case Manager, Ms. Donna Gaffigan, of the modification, as presented in [Appendix 4-A](#). The USEPA approved use of SOP-SW-MWD-509-0 on December 29, 1999 and NJDEP approved it on January 20, 2000.

- A Bicron[®] Model G1 one-inch by one-inch (1” x 1”) sodium iodide (NaI) detector was substituted for the originally proposed 3/8” x 3/8” NaI detector for downhole gamma logging. This substitution was needed to provide greater detector sensitivity through the soil probe casing. Due to the addition of this detector, SOP number SW-MWD-509-0 entitled “Soil Probe Investigation” was revised. These revisions are outlined in [Table 1-A](#) in [Appendix 4-A](#). The 3/8” x 3/8” NaI detector was used only when the manual direct push method was employed. Manual direct push methodology was required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- The CDQMP originally specified a frequency of 10% for field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. This corresponds to the USACE internal quality control standard. However, due to the significant number of samples to be collected as part of the PDI program (totaling approximately 2000 soil samples and in excess of 10,000 gamma count rate and photoionization detector (PID) readings), the USACE agreed to reduce the frequency to 5%, which is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and USEPA guidelines for MS/MSD analysis. USEPA Region II does not have a specific guideline for field duplicate samples. Refer to the USACE and USEPA/NJDEP correspondence in [Appendix 4-A](#).
- The PDIWP stipulates that geotechnical borings with associated laboratory testing may be required in order to provide design parameters in locations where excavation may impact adjacent structures. Since radiological clean-up criteria have yet to be finalized, final assessment of limits of radiological contamination cannot be made at this time. The geotechnical investigation program was suspended from the PDI. During the design process, existing geotechnical information will be evaluated for design and a determination will be made if supplemental data are needed.

2.1.2 Sample Location Variances

The PDIWP was developed with the intent that proposed sample locations would be deleted, added, or moved as additional information regarding site features and contamination distribution became available during the course of the PDI implementation. In accordance with this approach, sample locations as proposed in the PDIWP were deleted, added, or moved for the following reasons:

- Base mapping developed subsequent to completion of the PDIWP provided additional information regarding underground utility locations and other site features. Proposed sample

locations proximate to these utilities and site features were moved in order to minimize impacts.

- Review of surface gamma survey data collected as part of the PDI, coupled with additional review of data from previous investigations performed by BNI and ORNL, indicated that certain proposed intrusive locations should either be moved or could be deleted. To address potential areas of surface radiological contamination not previously identified as areas of concern, a protocol was established for determining the need for additional intrusive sampling locations. Refer to “Protocol For Addressing Gamma Scan Anomalies” in [Appendix 4-A](#).

Specific rationale for the deletion, addition, or movement of locations proposed in the PDIWP are summarized in [Appendix 4-A](#).

2.2 Geophysical Surveys

Between September 20, 1999 and March 2, 2000, NAEVA Geophysics, Inc. conducted geophysical investigations on the Maywood Site. The purpose of these investigations was to delineate surface traces of detectable underground utilities in the vicinity of proposed exploratory boring sites. Equipment selected for this investigation included: a Fisher TW-6 Pipe and Cable Locator; a Radiodetection RD432PDL-2 Utility Locator; a Subsite 75 Utility Locator, a 3M Dynatel 2250 Cable Locator, and a GSSI SIR-3 ground penetrating radar (GPR) system with a 300 MHz antenna. Details of the surveys are presented in the NAEVA report (NAEVA, 2000).

2.3 Sample Locations

In October 1999, Garden State Engineering, Surveying, and Planning, Inc. performed a ground survey of the Maywood Site properties. Results of the ground survey were combined with aerial mapping prepared by GEOD Corporation to produce new base mapping for the Maywood Site. This new base mapping replaced the mapping used to generate the PDIWP drawings.

Sample points for the surface gamma survey, surface ISOCS measurements, direct push (Geoprobe[®]) sampling, and environmental sampling were located in the field using a Global Positioning System (GPS). A Trimble 4800 Site Surveyor system with a 4700 base receiver, GPS antenna, radio antenna, and ancillary equipment were used to perform GPS surveys. Base stations were set up and calibrated at specified bench-mark locations established by the surveyor. Following base receiver set up, sampling points were located. Field markings (spray paint, flags, and stakes) were used to identify intrusive sampling locations for radiological and environmental direct push mobile rigs, as well as surface ISOCS locations.

Coordinates for intrusive sample locations were determined from new PDI sample location maps which reflected updated base mapping and modified sample locations; surface ISOCS locations were identified based on original PDIWP mapping. For the surface gamma survey, GPS was used to record locations of gamma scan measurements. Where GPS instrumentation could not be utilized due to signal disruption (e.g., tree coverage, building interference, non-availability of satellites, or poor satellite reception due to weather conditions), sample locations were based on identification of site features and scaling off base mapping.

2.4 Surface Gamma Surveys

Surface gamma surveys for all of the Phase II properties were conducted from August 1999 to March 2000. Surveys were conducted to obtain distribution of surface radiological contamination for health and safety reasons, as well as to verify existing data. Measurements were collected by suspending a 1" x 1" NaI gamma scintillation detector coupled to a Ludlum Model 12 ratemeter within a few inches of the ground surface. A health physics technician walked transects (approximately four to six feet wide) covering the properties while slowly swinging the detector in a serpentine motion. Transects were spaced to assure full areal coverage with some overlap. Gamma count measurements were taken approximately every 15 to 20 feet; measurement frequency was increased in areas exhibiting elevated gamma counts. Minimum detectable concentrations (MDCs) for this detector for the radionuclides of concern (ROC) are approximately 4.7 picoCurie per gram (pCi/g) for Radium-226 (Ra-226), 3.0 pCi/g for Thorium-232 (Th-232), and 121.0 pCi/g for Uranium-238 (U-238), correcting for volume and distance from the source (Multi-Agency Radiation Survey and Site Investigation Manual, MARSSIM, 1997). Gamma count data were stored with associated locations in the GPS recorder. In some instances where locations could not be recorded with a GPS (as stipulated above), measurements were manually recorded on the PDI maps.

2.5 Surface ISOCS Measurements

Surface ISOCS measurements were collected at selected locations where environmental, geotechnical, and radiological shallow boreholes were proposed in the PDIWP. Surface ISOCS measurements were collected to identify and quantify radionuclide activity in surface soil, beneath shielded areas (e.g., areas covered with gravel, asphalt, and concrete), and in areas proposed for environmental borings.

Gamma spectroscopy measurements of surface soil were collected using the Canberra high-purity germanium ISOCS and assuming uniform radioactivity distribution in soil. The high-purity germanium detector was positioned in a "downward-looking" direction perpendicular to the ground surface at a height of three feet. The detector was collimated using a lead shield subtending a 90-degree angle, which provided a surface soil viewing area approximately six feet in diameter. The back and side of the detector were shielded with two-inch thick lead O-rings. The detector collimator and shielding were used to ensure that radioactivity detected by the probe originated only from the six-foot diameter area beneath the detector, hence minimizing one possible source of error in the measurements.

2.6 Direct Push Soil Probes

Direct push soil probes (using truck-mounted model 5400 Geoprob[®] or track-mounted model 54DT Geoprob[®]) were used to collect soil samples for radiological and environmental parameter analysis. Two types of direct push soil probes were used: a single rod system (i.e., Macro-Core[®]) and a dual tube (or cased) system. The latter system utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Samples were collected in four-foot soil cores within polyvinyl chloride/polyethylene terephthalate (PVC/PET) liners, marked with the appropriate field identification number, sealed with rubber end caps, and placed

into a two-inch inner diameter PVC container (including PVC end caps) for transport and storage.

For sample locations that were inaccessible to the mounted direct push rigs, soil cores were collected using a manual direct push method. Two-foot cores approximately one inch in diameter were collected using an electric powered hand-held vibratory hammer.

Prior to commencing intrusive sampling, underground utilities in the vicinity of the proposed boring locations were identified by reviewing PDI geophysical survey data, and by contacting the appropriate authorized parties (i.e., New Jersey One-Call System, and the property owner). In addition, a safe working distance from overhead utilities was maintained.

Sampling equipment (the rig, direct push soil probe casing and tools) was decontaminated prior to use and following each borehole installation using pressure or manual washing. Each soil probe hole was backfilled for the full length using Benseal[®] bentonite in accordance with project requirements. For areas covered by asphalt, cold patch was placed at the surface.

2.6.1 Downhole Gamma Logging

Measurements were taken with a Bicron[®] Model G1 1" x 1" NaI gamma detector sealed in a waterproof stainless steel container. The instrument MDCs are approximately 3.6 pCi/g for Ra-226, 2.3 pCi/g for Th-232, and 92.0 pCi/g for U-238, which are approximately 75% of the surface MDCs listed in Section 2.4. This estimate assumes a geometry factor of 0.50, where a four pi geometry (i.e., a sphere) when scanning downhole is approximately half of a two pi geometry (i.e., a hemisphere) when scanning the ground surface. However, this reduction in the MDCs is modified by the 0.3-inch steel casing in the hole, which results in an approximate 33% reduction in the gammas seen by the detector as calculated by the computer code Microshield[™]. The correction factor is therefore calculated by dividing the geometry factor (0.50) by the steel casing reduction factor (0.66), yielding approximately 0.75. The NaI detector was connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector[™] multi-channel analyzer/amplifier/high voltage power supply. The system was controlled, and the data stored, via notebook computer. Ten-second integrated gross gamma measurements were recorded at each 6-inch depth increment in the cased soil probe holes and data entered onto the PDI Soil Probe Log Sheets (see [Appendix 4-B](#)). In areas where samples were collected using the manual direct push method, a Bicron[®] 3/8" x 3/8" NaI gamma detector coupled to a Ludlum Model 2221 scaler/ratemeter was used to take 30 to 60-second gross gamma measurements in uncased soil probe holes. The MDCs for this instrument are estimated to be approximately 1.9 pCi/g for Ra-226 and 2.3 pCi/g for Th-232, as provided by the vendor. There is no correction factor for these MDCs.

2.6.2 Direct Push Core Screening/Sample Collection

Sealed PVC containers collected from direct push mobile and manual rigs were transported to the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation added to the PDI Soil Probe Log Sheets (see [Appendix 4-B](#)) included soil column description and soil screening data. Field screening for radiological activity was performed on soil cores contained in the PVC/PET liner. A collimated Eberline

SPA-3 2" x 2" NaI detector (or Ludlum Model 44-10) coupled to a Ludlum Model 2221 scaler/ratemeter was used to measure gamma activity. The detector was positioned approximately 0.5 inch above the soil core, on a guide, to ensure that this distance was maintained over the entire length of each soil core. Continuous scanning of the soil core was performed at an approximate rate of three inches per second. The instrument MDC, taken from MARSSIM, is estimated to be 2.8 pCi/g for Ra-226, 1.8 pCi/g for Th-232, and 80 pCi/g for U-238 (MARSSIM, 1997). Although the MARSSIM MDC values are based upon an open area, it was assumed that the slower scan time compensated for the different geometry. An indelible marker was used to mark the liner where elevated readings were identified during scanning. Total integrated gross gamma counts were accumulated over a 30-second interval and recorded.

Soil cores were also screened for total volatile organic vapors using a PID. A series of small perforations were made along the PVC/PET liner at 12-inch increments to expose soil to the PID. Perforations were sealed with tape after PID screening. Screening results were recorded on the PDI Soil Probe Logs.

Prior to obtaining samples, each core was photographed using a digital camera. A brief soil field classification description of each core was entered onto the PDI Soil Probe Log Sheet.

Soil samples were selected from each direct push location for analysis of the ROC: Th-232, Ra-226, and U-238. Samples were selected based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample was taken at the highest reading location (suspected FUSRAP waste, if present, as defined in the Federal Facilities Agreement dated November, 1991; DOE and USEPA, 1991); a second soil sample was collected where the readings approached a constant value (suspected transition zone, if present); and a third soil sample was collected within the zone of constant readings (below suspected transition zone). When soil cores exhibited uniform count rates (i.e., elevated gamma measurements were not identified), three samples per soil probe location were collected.

Selected samples were obtained from each core sufficient to fill a 300-milliliter sample container. Samples were labeled and capped at either end with plastic caps. Caps were color-coded for 'top' and 'bottom' of the original hole. Each extracted section of the soil core was replaced with a wooden spacer to indicate what portion of the soil core was sampled. The spacer was labeled with the sample identification number of the soil removed for testing. After screening and sample extraction, remaining portions of each soil core were placed back into the appropriate PVC container, with the wooden spacer in its appropriate location, and stored on-site for future reference. The section of core tube containing the sample was then transferred to the MISS on-site laboratory for sample preparation and analysis.

Evaluation of all gamma log data led to the archiving of selected samples. That is, a number of the direct push soil probes exhibited 'constant' count rates over the depth interval. In these cases, rather than having all samples analyzed at this time, the deepest prepared sample was not counted but archived. By doing this, as laboratory results confirm that radiological contamination does not exist at that soil probe location, unnecessary analytical work is

prevented. Samples that were archived are noted on the PDI Soil Logs in [Appendix 4-B](#) and on [Table 4-4](#).

As described above, a collimated Eberline SPA-3 or Ludlum Model 44-10 2" x 2" NaI detector was used to measure gamma activity for the soil cores, while a Bicron[®] Model G1 1" x 1" NaI gamma detector was used for the downhole measurements. The 2" x 2" NaI detector (Eberline SPA-3 or Ludlum Model 44-10) provided confirmation of downhole measurements and greater sensitivity for sample selection than the 1" x 1" NaI gamma detector.

2.6.3 Sample Preparation

Soil samples were screened to remove small debris and oven-dried to obtain moisture content and to facilitate grinding. Grinding assured sample homogenization. Samples were then transferred to a 300-milliliter commercially supplied metal can. Lids were secured on cans, after which they were shelved for 21 days. The 21-day period was required to allow radon and its daughter products to in-grow and establish secular equilibrium between Ra-226, Radon-222 (Rn-222), and the gamma-emitting daughters.

2.6.4 Laboratory Data

Analysis for ROC on selected samples was performed at the MISS on-site field laboratory using a Canberra high-purity germanium detector. All testing in the MISS on-site field laboratory was completed in accordance with the procedures outlined in the CDQMP. MISS on-site field laboratory data have been entered onto the PDI Soil Probe Log sheets (see [Appendix 4-B](#)).

The Project Chemist evaluated 10% of the MISS on-site field laboratory radiological data packages; the evaluation is included in the PDI Quality Control Summary Report (QCSR; Stone & Webster, 2000c). The laboratory qualified the reported data when the germanium detector measurement system fell outside of one of the control limits during quality control check runs. Data qualification procedures are described in the PDI QCSR.

Ten percent of the samples analyzed by the MISS on-site field laboratory were sent to a USACE-approved off-site laboratory (ThermoRetec) for confirmatory analysis of the ROC. Following analysis, all soil samples were returned to the Maywood Site for storage and future reference. Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the off-site confirmatory radiological data. Radiological data were evaluated using the USACE's Radiological Data Quality Evaluation Guidance, as presented in the CDQMP. The data validation reports for the radiological confirmatory sample results are provided in the PDI QCSR.

2.7 Environmental Sampling

A limited number of soil samples were collected for environmental analyses in order to identify potential chemical contamination commingled with the radioactive waste. This information would aid in assessing waste classification (i.e., whether hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), is commingled with radioactive waste) as well as provide data for worker health and safety. Samples for environmental analysis were

collected using direct push Macro-Core[®] methodology. Sampling depths were based on the anticipated depth of radiological contamination. Soils exhibiting the highest PID readings or visual contamination were collected and sent for laboratory analysis by a USACE and NJDEP certified laboratory (RECRA LabNet). Samples were analyzed for RCRA disposal characteristics (ignitability, reactivity, corrosivity, and toxicity characteristic leaching procedure TCLP), the Target Compound List (TCL) and the Target Analyte List (TAL) with chromium speciation.

During performance of environmental borings, environmental boring log sheets were completed for each boring. Copies of the completed log sheets are included in [Appendix 4-C](#).

Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the environmental data. Environmental data were evaluated using the USACE's Data Quality Evaluation Guidance, as presented in the CDQMP. In addition, the USEPA Region II SOP No. HW-24, Revision I, June 1999, was also applied. The data validation reports for the environmental sample results are provided in the PDI QCSR.

2.8 Geotechnical Sampling

Radiological cleanup criteria have yet to be finalized, therefore final assessment of the extent of radiological contamination cannot be made at this time. The geotechnical investigation program was therefore suspended from the PDI. Following approximate determination of limits of excavation during the design phase, existing geotechnical information will be evaluated for remedial design purposes. If it is decided that additional information is required, then the geotechnical program will be reinstated, as necessary.

2.9 Quality Assurance/Quality Control

Field and laboratory activities were completed in accordance with the CQCP and the CDQMP. Data reflecting adherence to the Quality Assurance / Quality Control (QA/QC) program was documented and presented in the PDI QCSR.

2.10 Health and Safety

All PDI investigation activities were conducted in compliance with the SSHP and associated protocols and directives. Field crews received daily briefings at 'Plan of the Day' meetings prior to any work activities. These meetings reviewed daily health and safety issues such as potential inclement weather, as well as reviews of general site health and safety directives.

3.0 CLUSTER DESCRIPTION AND PDI RESULTS

3.1 Cluster No. 4 Description

Cluster No. 4 consists of three properties in the Borough of Lodi:

- Property No. 04A - 160/174 Essex Street (owned by Bank of New York)
- Property No. 04B - Interstate-80 (I-80) Westbound Right-of-Way

The paragraphs below provide detailed descriptions of each property.

3.1.1 Property No. 04A - 160/174 Essex Street

Property No. 04A occupies Block 186.01, Lot 1 and Block 174, Lot 1.02 in the Borough of Lodi. These properties, situated in a heavily commercialized area along Essex St in Lodi, were purchased by the Bank of New York in 1994 (BNI, 1994). The property at 160 Essex St. is a partially paved parking lot and is adjacent to the 174 Essex St. property. The 174 Essex St. property contains a single-story stucco office building surrounded by an asphalt paved area, and a small storage building located at the rear of the lot. The facility is operational 5 days per week (BNI, 1994). A Military Reserve Facility lies to the east of the Property No. 04A, and a commercial building as well as the I-80 Westbound Right-of-Way are to the west. Property No. 04A is bounded to the north by Essex St. and to the south by I-80 Westbound Right-of-Way.

3.1.2 Property No. 04B - Interstate-80 (I-80) Westbound Right-of-Way

Property No. 04B is located on the north side of I-80 in Lodi, New Jersey. The site is partly paved. The 160/174 Essex St. property is immediately adjacent on the east. The site is bounded by several commercial properties on Essex St. to the north and by I-80 Eastbound Right of Way to the south.

Lodi Brook is open and above ground in a small area perpendicular to the right-of-way. A below grade culvert (the Lodi Brook Culvert) transects the property from Essex St. to the aboveground exposed Lodi Brook near the I-80 Westbound Right-of-Way. This location 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 8.0 to 10.0 feet deep and 15 to 18 feet wide in this area (BNI, 1992).

Refer to [Figure 4-3](#) for more specific details of site features.

3.2 Radiological Data

3.2.1 Surface Gamma Survey

A surface gamma survey was performed at Cluster No. 4. Data, recorded using GPS, was entered into the Groundwater Modeling System (GMS) software package and contoured to a two-dimensional grid using the “Natural Neighbor” contouring protocol. “Natural Neighbor” interpolation is based on the Thiessen polygon network of the scatter point set. Data are

interpolated based on distance as well as topological relationships (Boss International, Inc., 2000).

Results of the gamma scan survey for Cluster No. 4 are presented graphically on [Figure 4-4](#) and [Figure 4-A1](#) (Appendix 4-A). [Figure 4-4](#) presents surface gamma scan data in context of the Maywood Site: the upper limit of the contour range is the maximum gamma count measurement detected at the Maywood Site, and the lower contour range represents 1.5 times the background gamma count rate for Cluster No. 4 (background is approximately 1,500 counts per minute for Cluster No. 4). [Figure 4-A1](#) provides a more detailed, cluster-specific, presentation of the gamma scan data, with contoured ranges corresponding to actual minimum and maximum measured gross gamma counts recorded at Cluster No. 4.

3.2.2 Surface ISOCS Measurements

Surface ISOCS measurements were taken at 10 locations on Cluster No. 4; locations are shown on [Figure 4-3](#). Results of surface ISOCS measurements are tabulated on [Table 4-3](#).

3.2.3 Direct Push Soil Probes

Thirty direct push probes were performed at Cluster No. 4 for radiological purposes. Locations of the soil probes are shown on [Figure 4-3](#).

3.2.3.1 Downhole Gamma Logging

Results from downhole gamma logging measurements taken at the direct push soil probe locations are presented on the PDI Soil Probe Logs included in [Appendix 4-B](#).

3.2.3.2 Direct Push Core Screening/Sample Collection

Results of soil core screening activities performed at the MISS on-site field laboratory are recorded on PDI Soil Probe Logs included in [Appendix 4-B](#).

3.2.3.3 MISS On-Site Field Laboratory Data and ThermoRetec Confirmatory Data

One-hundred soil (100) samples were collected for laboratory analysis from the 30 soil probe locations at Cluster No. 4. Seventy-eight of the 100 samples were sent for analysis (including 10 duplicates); 22 were archived. Laboratory data consisting of soil concentrations of the ROC are presented on the soil probe logs in [Appendix 4-B](#), and summarized on [Table 4-4](#). Archived samples are also recorded on the logs and the table.

Thirteen of the soil samples analyzed by the MISS on-site field laboratory were sent to ThermoRetec for confirmatory analysis. Results of the confirmatory analyses performed by ThermoRetec are shown in [Table 4-4](#).

As part of the data quality objective process, a comparison study was performed between the MISS on-site field laboratory and the ThermoRetec laboratory data. The results of the comparison can be found under separate cover (Stone & Webster, 2000d).

3.3 Environmental Data

Three environmental borings were drilled at Cluster No. 4, and three soil samples were collected for environmental analysis. A summary of the environmental analytical data is presented on [Table 4-5](#). [Figure 4-3](#) shows the location of the borings. In addition, the environmental boring log sheets are included in [Appendix 4-C](#).

4.0 REFERENCES

Bechtel National, Inc. Radiological Characterization Report for the Commercial Property at 160 and 174 Essex Street (National Community Bank), DE-AC05-81OR20722; September 1989.

Bechtel National, Inc. Remedial Investigation Report for the Maywood Site, December 1992

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Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Work Plan*, FUSRAP Maywood Superfund Site. Boston, MA; October 1999a.

Stone & Webster Environmental Technology & Services. *Final Contractor Quality Control Plan*, FUSRAP Maywood Superfund Site. Boston, MA; October 1999b.

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Stone & Webster Environmental Technology & Services. *Final General Environmental Protection Plan*, FUSRAP Maywood Superfund Site. Boston, MA; November 1999d.

Stone & Webster Environmental Technology & Services. *Chemical Data Quality Management Plan, Revision 1*, FUSRAP Maywood Superfund Site. Boston, MA; February 2000a.

Stone & Webster Environmental Technology & Services. *Materials Handling/Transportation and Disposal Plan*, FUSRAP Maywood Superfund Site. Boston, MA; January 2000b.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Quality Control Summary Report*, FUSRAP Maywood Superfund Site. Boston, MA; March 2000c.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Radiological Data Comparison Study*, FUSRAP Maywood Superfund Site. Boston, MA; December 2000d.

U.S. Department of Energy and U.S. Environmental Protection Agency. Federal Facility Agreement for the Maywood Interim Storage Site; November, 1991.

Table 4-1: Properties Comprising Each Cluster

Cluster No.	Property No.	Properties (occupant)	Township/Borough	Property Block & Lot
1	01A	72 Sidney St. (Vacant)	Lodi	Block 164, Lots 1 and 5
2	02A	100 Hancock Street (AT&T)	Lodi	Block 205.03, Lot 2.04
	02B	80 Hancock Street (Vacant)	Lodi	Block 205.03, Lot 2.03
	02C	80 Industrial Road (American Jewel Windows)	Lodi	Block 205.02, Lot 4.02
	02D	8 Mill St. (NJVIS)	Lodi	Block 205.02, Lot 1.05
3	03A	170 Gregg Street (Bergen Cable)	Lodi	Block 205, Lot 1.02
4	04A	160/174 Essex Street (Bank of New York)	Lodi	Block 186.01, Lot 1 and Block 174, Lot 1.02
	04B	I-80 Westbound Right-of-Way (NJDOT)	Lodi	Not Applicable
5	05A	99 Essex Street (Joseph Muscarelle, Inc.)	Maywood	Block 125, Lot 1
	05B	113 Essex Street (Bank of New York)	Maywood	Block 125, Lot 2
	05C	200 NJ Route 17 South (Sears Appliance Repair)	Maywood	Block 125, Lot 3
6	06A	85-101 NJ Route 17 North (Architectural Windows)	Maywood	Block 124, Lot 4
	06B	137 NJ Route 17 North (Ramsey Auto Group)	Maywood	Block 124, Lot 3
	06C	167 NJ Route 17 North (Sunoco Station - Inactive)	Maywood	Block 124, Lot 2
	06D	239 NJ Route 17 North (Gulf Station)	Maywood	Block 124, Lot 1
	06E	29 Essex Street (Federal Express Corporation)	Maywood	Block 124, Lot 5
7	07A	111 Essex Street (Scanel Company, Inc.)	Maywood	Block 131, Lots 1,2,3,4
	07B	New York, Susquehanna & Western Railway - Lodi Branch	Maywood	Block 131, Lot 8
8	08A	23 West Howcroft Road (Maywood Furniture, Inc.)	Maywood	Block 124, Lot 17
9	09A	149-151 Maywood Avenue (Sears Logistical Services)	Maywood; Rochelle Park	Block 124, Lot 30; Block 17.02, Lot 1
10	10A	100 West Hunter Avenue (Stepan Company)	Maywood; Rochelle Park	Block 124, Lot 10; Block 18.02, Lot 2
11	11A	205 Maywood Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
	11B	61 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 50
	11C	50 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
12	12A	New York, Susquehanna & Western Railway	Maywood; Rochelle Park	Block 124, Lot 55 and Block 110, Lot 1
	12B	100 West Hunter Avenue (MISS)	Maywood; Rochelle Park	Block 124, Lot 46 and Block 20.01, Lot 1
	12C	New Jersey Route 17 (NJDOT)	Rochelle Park	Not Applicable

Table 4-2: Summary of PDI Intrusive Field Activities

Cluster No.	Property No.	Property Address	Occupant	Planned			Actual			Schedule (Year 2000)
				Probe Locations	Depth (ft)	Footage (ft)	Probe Locations	Depth (ft)	Footage (ft)	
1	01A	72 Sydney Street	Vacant	13	12	156	15	12	188	Jan. 11, 12, Mar. 31
2	02A	100 Hancock Street	AT&T	17	16	272	17	6 - 12	194	Jan. 27, Feb. 1, 2, Mar. 16
	02B	80 Hancock Street	Vacant	18	16	288	Pending Right of Entry Agreement			
	02C	80 Industrial Road	American Jewel Windows	23	16	368	20	12	272	Jan. 21, 24, 28, Feb. 1
	02D	8 Mill Street	NJVIS	38	16	608	44	12 - 16	593	Jan. 13, 14, 18, 19, 20, 21
3	03A	170 Gregg Street	Bergen Cable	10	8	80	10	8	62	Jan. 12, 13
4	04A	160/174 Essex Street	Bank of New York	25	12	300	23	4 - 12	427	Feb. 2, 3, 4
	04B	I-80 Right-of-Way	NJDOT	7	12	84	7	8 - 12	69	Feb. 2, 4, Mar. 31
5	05A	99 Essex Street	Joseph Muscarelle, Inc.	38	8	304	38	8	318	Feb. 23, 24, Mar. 17
	05B	113 Essex Street	Bank of New York	18	8	144	21	4 - 16	171	Feb. 8, 10, 16
	05C	200 NJ Route 17 South	Sears Appliance Repair	23	8	184	16	8 - 10	129	Feb. 15, 16, Mar. 2
6	06A	85-101 NJ Route 17 North	Architectural Windows	17	12	204	17	8 - 18	196	Feb. 9, 10, 16, Mar. 16
	06B	137 NJ Route 17 North	Ramsey Auto Group	15	12	190	13	10 - 12	145	Feb. 9, 16, 25
	06C	167 NJ Route 17 North	Sunoco Station - Inactive	27	12	324	19	3 - 14	239	Feb. 11, Mar. 8
	06D	239 NJ Route 17 North	Gulf Station	19	12	228	2	11 - 12	23	Feb. 16
	06E	29 Essex Street	Federal Express Corporation	7	12	84	9	7 - 12	95	Feb. 16, Mar. 31
7	07A	111 Essex Street	Scanel Company, Inc.	12	16	192	12	12 - 22	161	Feb. 21, 22, 23
	07B	NYS&W - Lodi Branch	NYS&W - Lodi Branch	16	16	256	11	6 - 16	115	Feb. 21, 22
8	08A	23 West Howcroft Street	Maywood Furniture, Inc.	26	16	416	25	7 - 16	321	Feb. 17, 21
9	09A	149-151 Maywood Avenue	Sears Logistical Services	131	16	2096	72	4 - 16	574	Mar. 2, 3, 6, 7, 8, 9, 15
10	10A	100 West Hunter Avenue	Stepan Company	106	24	2544	92	4 - 24	1076	Feb. 25, 28, 29, Mar. 1, 2, 6, 7, 9, 16, 30
11	11A	205 Maywood Avenue	Myron Manufacturing	5	8	40	5	8 - 12	44	Feb. 16
	11B	61 West Hunter Avenue	Myron Manufacturing	9	8	72	10	8 - 16	87	Feb. 15, 21
	11C	50 West Hunter Avenue	Myron Manufacturing	1	8	8	1	8	8	Feb. 15
12	12A	NYS&W	NYS&W	31	24	744	27	12 - 27	335	Feb. 18, 22, 24, Mar. 16, 30
	12B	100 West Hunter Avenue	MISS	120	24	2880	100	7 - 26	1769	Feb. 4, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24, 25, 29, Mar. 1, 7, 8, 9
	12C	NJ Route 17	NJDOT	0	0	0	0	0	0	<i>No investigations planned.</i>
TOTALS:				772		13,066	626		7,611	

Table 4-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
4A-SI001-SS-0-1	0.31	27.76	0.22	0.50	26.00	0.12	< 5.47	-----	5.47
4A-SI002-SS-0-1	0.35	26.90	0.16	0.42	30.10	0.09	< 5.18	-----	5.18
4A-SI002-SS-1-1	0.37	25.10	0.22	0.28	41.70	0.06	< 5.34	-----	5.34
4A-SI003-SS-0-1	0.38	23.90	0.03	0.24	42.50	0.08	< 4.52	-----	4.52
4A-SI004-SS-0-1	0.36	25.00	0.21	0.44	28.36	0.01	< 5.09	-----	5.09
4A-SI005-SS-0-1	0.55	20.38	0.15	0.49	27.70	0.06	< 5.01	-----	5.01
4B-SI001-SS-0-1	0.36	24.00	0.18	0.30	25.80	0.06	< 4.19	-----	4.19
4B-SI002-SS-0-1 (1)	0.45	24.50	0.24	1.61	14.00	0.01	< 6.17	-----	6.17
4B-SI002-SS-1-1 (1)	0.48	23.00	0.22	1.65	14.00	0.07	< 5.87	-----	5.87
4B-SI003-SS-0-1	0.46	22.00	0.28	0.96	18.50	0.01	< 5.63	-----	5.63
4B-SI004-SS-0-1	0.48	24.60	0.31	2.80	11.00	0.12	< 6.32	-----	6.32
4B-SI005-SS-0-1	0.66	20.60	0.36	4.48	9.79	0.16	< 7.79	-----	7.79

* Reported data are taken from the Nuclide Identification Report

MDA : Minimum Detectable Activity

Error: 2 sigma (95% confidence interval)

< : Nuclide undetected or less than the MDA. The nuclide is assumed to be present at the MDA Value.

----- Not Applicable

(1) Sample (-0-1) and its duplicate (-1-1)

**Table 4-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
04A-001	1.50	04A03200		0.76	0.07	0.20	1.06	0.06	0.20	6.97	U	---	6.97		
04A-001	4.50	04A03201		0.83	J	0.07	0.19	0.92	J	0.06	0.23	7.59	UJ	---	7.59
04A-001	6.50	04A03202		ARCHIVED											
04A-002	1.00	04A03203		0.51	J	0.06	0.27	2.33	J	0.08	0.23	8.07	UJ	---	8.07
04A-002	1.50	04A03204		0.37	J	0.06	0.18	0.46	J	0.05	0.20	6.27	UJ	---	6.27
04A-002	4.50	04A03205		0.77		0.08	0.23	1.03		0.07	0.24	5.73	U	---	5.73
04A-003	2.50	04A03206		0.58		0.06	0.14	0.99		0.06	0.21	4.86	U	---	4.86
04A-003	3.50	04A03207		1.26		0.08	0.21	1.84		0.08	0.28	7.01	U	---	7.01
<i>ThermoRetec</i> ⁽²⁾		04A03207		1.12		0.14	0.15	2.07		0.16	0.23	3.42		2.24	2.43
04A-003	3.50	04A03208	X	1.64	J	0.08	0.25	3.46	J	0.10	0.20	11.30	UJ	---	11.30
<i>ThermoRetec</i> ⁽²⁾		04A03208		1.26		0.18	0.19	2.72		0.21	0.28	1.68	UJ	2.6	3.07
04A-003	4.50	04A03209		0.65		0.07	0.21	1.18		0.07	0.23	5.79	U	---	5.79
04A-004	3.50	04A03210		0.52		0.06	0.15	0.69		0.06	0.20	5.13	U	---	5.13
04A-004	5.00	04A03211		0.66		0.05	0.21	1.05		0.06	0.21	7.03	U	---	7.03
04A-004	6.00	04A03212		1.19		0.09	0.27	3.64		0.11	0.19	7.82	U	---	7.82
<i>ThermoRetec</i> ⁽²⁾		04A03212		0.78		0.14	0.13	1.07		0.11	0.19	1.21	UJ	1.41	1.92
04A-005	2.50	04A03213		0.80	J	0.07	0.27	2.72	J	0.09	0.30	10.20	UJ	---	10.20
04A-005	4.50	04A03214		0.89	J	0.07	0.24	1.74	J	0.07	0.17	8.67	UJ	---	8.67
04A-005	5.50	04A03215		ARCHIVED											
04A-006	5.00	04A03216		7.58		0.24	0.90	61.09		0.79	0.64	25.20	U	---	25.20
<i>ThermoRetec</i> ⁽²⁾		04A03216		6.71		0.53	0.48	58.08		2.28	0.72	9.88		5.54	7.86
04A-006	6.00	04A03217		0.64	J	0.05	0.18	0.95	J	0.05	0.19	6.84	UJ	---	6.84
04A-006	7.50	04A03218		ARCHIVED											
04A-007	1.00	04A03219		0.78		0.10	0.26	3.01		0.11	0.28	7.37	U	---	7.37
04A-007	2.00	04A03220		1.88		0.11	0.30	2.60		0.10	0.24	12.50	U	---	12.50
<i>ThermoRetec</i> ⁽²⁾		04A03220		1.57		0.20	0.19	2.41		0.22	0.30	5.96		2.87	3.19
04A-007	2.00	04A03221	X	1.58		0.09	0.32	2.22		0.09	0.21	11.90	U	---	11.90
<i>ThermoRetec</i> ⁽²⁾		04A03221		1.45		0.20	0.21	1.95		0.19	0.32	2.17	J	1.94	3.42
04A-007	4.50	04A03222		0.68		0.06	0.19	1.09		0.05	0.13	5.54	U	---	5.54
04A-008	3.00	04A03223		0.56	J	0.05	0.19	2.06	J	0.07	0.24	8.17	UJ	---	8.17
04A-008	4.50	04A03224		1.39	J	0.08	0.31	5.31	J	0.14	0.23	9.15	U	---	9.15
04A-008	5.50	04A03225		0.98		0.08	0.21	1.03		0.05	0.15	5.87	U	---	5.87

**Table 4-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
04A-009	3.50	04A03226		1.07	0.08	0.24	2.92	0.10	0.28	7.12	U	---	7.12		
04A-009	4.50	04A03227		0.96	0.08	0.22	1.17	0.07	0.25	-4.01	U	2.19	7.71		
04A-009	5.00	04A03228		0.59	J	0.07	0.19	0.59	J	0.05	0.19	4.82	U	---	4.82
04A-009	5.00	04A03229	X	ARCHIVED											
04A-010	1.00	04A03230		0.54	J	0.06	0.16	1.31	J	0.07	0.22	7.67	UJ	---	7.67
04A-010	1.50	04A03231		ARCHIVED											
04A-010	2.50	04A03232		0.81		0.07	0.21	1.02		0.06	0.15	5.61	U	---	5.61
04A-011	6.50	04A03233		2.82		0.12	0.47	15.87		0.27	0.35	-5.93	U	5.95	20.20
04A-011	8.50	04A03234		0.67		0.07	0.21	0.76		0.06	0.22	7.43	U	---	7.43
04A-011	10.00	04A03235		ARCHIVED											
04A-012	2.00	04A03236		1.40	J	0.08	0.31	5.33	J	0.13	0.22	8.54	U	---	8.54
		<i>ThermoRetec⁽²⁾</i>		<i>1.51</i>		<i>0.23</i>	<i>0.18</i>	<i>5.62</i>		<i>0.31</i>	<i>0.25</i>	<i>0.94</i>		<i>1.60</i>	<i>2.74</i>
04A-012	4.50	04A03237		0.72		0.07	0.17	1.43		0.07	0.23	5.56	U	---	5.56
04A-012	5.50	04A03238		0.56		0.06	0.19	0.68		0.06	0.20	4.82	U	---	4.82
04A-013	1.50	04A03239		1.15	J	0.08	0.28	3.39	J	0.10	0.22	11.80	UJ	---	11.80
04A-013	2.00	04A03240		1.50	J	0.09	0.22	1.96	J	0.08	0.20	10.20	UJ	---	10.20
04A-013	4.50	04A03241		0.45		0.06	0.15	0.74		0.05	0.19	4.77	U	---	4.77
04A-014	1.00	04A03242		0.41		0.06	0.18	0.65		0.05	0.19	4.48	U	---	4.48
04A-014	2.00	04A03243		0.49		0.07	0.22	0.80		0.05	0.21	7.45	U	---	7.45
04A-014	2.00	04A03244	X	0.45	J	0.07	0.21	0.66	J	0.05	0.19	4.69	U	---	4.69
04A-014	5.00	04A03245		ARCHIVED											
04A-015	1.50	04A03246		0.74		0.07	0.17	0.72		0.05	0.20	5.01	U	---	5.01
04A-015	2.50	04A03247		0.43		0.05	0.16	0.47		0.04	0.15	4.05	U	---	4.05
04A-015	5.50	04A03248		ARCHIVED											
04A-016	0.50	04A03249		0.33	J	0.05	0.14	0.31	J	0.05	0.17	5.23	UJ	---	5.23
04A-016	1.00	04A03250		0.49		0.06	0.17	0.68		0.05	0.19	4.61	U	---	4.61
04A-016	1.50	04A03251		ARCHIVED											
04A-017	2.50	04A03252		1.07	J	0.08	0.19	1.09	J	0.07	0.26	9.18	UJ	---	9.18
04A-017	2.50	04A03253	X	1.27	J	0.09	0.25	1.33	J	0.07	0.19	9.73	UJ	---	9.73
04A-017	5.00	04A03254		1.10		0.08	0.24	1.26		0.07	0.28	8.86	U	---	8.86
04A-017	6.00	04A03255		ARCHIVED											

**Table 4-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
04A-018	2.00	04A03256		4.90	J	0.18	0.72	43.92	J	0.59	0.54	21.30	U	---	21.30
<i>ThermoRetec</i> ⁽²⁾		04A03256		4.17		0.43	0.42	45.00		1.81	0.61	2.98	UJ	4.71	6.70
04A-018	5.00	04A03257		0.64	J	0.06	0.18	0.63	J	0.05	0.21	6.28	UJ	---	6.28
04A-018	6.00	04A03258		ARCHIVED											
04A-019	1.00	04A03259		1.03		0.08	0.31	1.29		0.06	0.18	9.02	U	---	9.02
04A-019	3.00	04A03260		1.00		0.08	0.22	1.20		0.07	0.25	8.00	U	---	8.00
04A-019	3.00	04A03261	X	1.26		0.08	0.18	1.19		0.06	0.16	8.61	U	---	8.61
04A-019	5.00	04A03262		ARCHIVED											
04A-020	1.50	04A03263		0.77		0.07	0.17	0.95		0.06	0.22	7.48	U	---	7.48
04A-020	3.00	04A03264		0.69	J	0.08	0.21	0.89	J	0.06	0.20	5.05	U	---	5.05
04A-020	6.00	04A03265		ARCHIVED											
04A-021	1.00	04A03266		1.27	J	0.07	0.24	4.23	J	0.11	0.22	11.10	UJ	---	11.10
04A-021	3.00	04A03267		0.73	J	0.06	0.19	0.76	J	0.06	0.22	6.90	UJ	---	6.90
04A-021	4.50	04A03268		ARCHIVED											
04A-022	2.00	04A03269		0.84		0.08	0.27	2.44		0.09	0.27	7.11	U	---	7.11
04A-022	4.50	04A03270		0.97	J	0.08	0.20	1.15	J	0.06	0.23	7.80	UJ	---	7.80
04A-022	4.50	04A03271	X	0.82		0.06	0.15	1.00		0.06	0.21	5.18	U	---	5.18
04A-022	5.50	04A03272		ARCHIVED											
04A-023	1.50	04A03273		0.68		0.06	0.18	1.23		0.06	0.14	5.31	U	---	5.31
04A-023	6.00	04A03274		0.86	J	0.07	0.22	2.04	J	0.08	0.24	6.52	U	---	6.52
04A-023	6.50	04A03275		ARCHIVED											
04B-001	1.50	04B03400		0.92		0.07	0.21	1.01		0.05	0.13	5.23	U	---	5.23
<i>ThermoRetec</i> ⁽²⁾		04B03400		0.81		0.12	0.12	1.07		0.10	0.17	0.86		1.07	1.79
04B-001	1.50	04B03401	X	0.80	J	0.06	0.21	1.13	J	0.05	0.16	7.60	UJ	---	7.60
<i>ThermoRetec</i> ⁽²⁾		04B03401		0.69		0.12	0.13	0.94		0.16	0.21	0.26	UJ	1.45	1.91
04B-001	2.50	04B03402		0.62		0.07	0.20	0.67		0.06	0.22	7.75	U	---	7.75
04B-001	4.50	04B03403		ARCHIVED											
04B-002	1.00	04B03404		0.83		0.08	0.22	1.12		0.07	0.21	5.71	U	---	5.71
04B-002	7.50	04B03405		0.81	J	0.07	0.20	1.13	J	0.06	0.16	8.02	UJ	---	8.02
04B-002	9.00	04B03406		0.74		0.07	0.21	1.21		0.06	0.22	5.40	U	---	5.40
04B-003	2.00	04B03407		0.61	J	0.07	0.21	0.90	J	0.06	0.24	6.95	UJ	---	6.95
04B-003	3.00	04B03408		0.70		0.07	0.24	0.87		0.06	0.19	5.61	U	---	5.61
04B-003	6.50	04B03409		ARCHIVED											

**Table 4-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
04B-004	2.50	04B03410		1.61	J	0.09	0.26	3.17	J	0.10	0.33	11.30	UJ	---	11.30
04B-004	4.50	04B03411		1.23		0.09	0.33	3.60		0.11	0.30	0.74	J	2.48	8.37
<i>ThermoRetec⁽²⁾</i>		<i>04B03411</i>		<i>1.17</i>		<i>0.19</i>	<i>0.20</i>	<i>3.63</i>		<i>0.38</i>	<i>0.31</i>	<i>4.46</i>		<i>2.45</i>	<i>3.20</i>
04B-004	5.50	04B03412		ARCHIVED											
04B-005	2.00	04B03413		2.20	J	0.11	0.39	7.99	J	0.17	0.29	15.50	UJ	---	15.50
<i>ThermoRetec⁽²⁾</i>		<i>04B03413</i>		<i>1.81</i>		<i>0.23</i>	<i>0.25</i>	<i>7.20</i>		<i>0.40</i>	<i>0.38</i>	<i>2.76</i>	<i>J</i>	<i>2.30</i>	<i>3.51</i>
04B-005	5.00	04B03414		2.32		0.12	0.29	2.38		0.09	0.23	8.53		2.71	8.53
04B-005	6.00	04B03415		1.26		0.09	0.24	1.00		0.06	0.17	6.54	U	---	6.54
04B-006	1.00	04B03416		0.90	J	0.08	0.25	1.22	J	0.06	0.17	8.38	UJ	---	8.38
04B-006	2.50	04B03417		0.78		0.07	0.16	1.08		0.06	0.21	5.31	U	---	5.31
<i>ThermoRetec⁽²⁾</i>		<i>04B03417</i>		<i>0.86</i>		<i>0.13</i>	<i>0.15</i>	<i>1.01</i>		<i>0.17</i>	<i>0.21</i>	<i>1.53</i>	<i>J</i>	<i>1.08</i>	<i>1.95</i>
04B-006	2.50	04B03418	X	0.85	J	0.06	0.21	1.10	J	0.07	0.27	7.89	UJ	---	7.89
04B-006	4.50	04B03419		ARCHIVED											
04B-007	1.50	04B03420		0.92		0.09	0.27	1.02		0.06	0.16	6.26	U	---	6.26
04B-007	1.50	04B03421	X	0.98		0.07	0.24	1.02		0.06	0.19	9.26	U	---	9.26
04B-007	3.00	04B03422		0.88		0.08	0.17	0.89		0.06	0.21	5.54	U	---	5.54
04B-007	4.5	04B03423		0.82		0.08	0.26	1.02		0.06	0.21	9.21	U	---	9.21

Error: 2 sigma (95% confidence interval)

- Not Applicable
- U Undetected or Negative Concentration Less Than the MDA
- J Estimated
- MDA Minimum Detectable Activity

- (1) The sample marked with an "X" for duplicate is a duplicate of the sample listed directly above it. Duplicate samples are prepared by homogenizing soil above and below the centerpoint and then separating for analysis. The depth listed is the center point.
- (2) Approximately 10% of all radiological soil samples collected under the PDI Program were sent to ThermoRetec, an off-site laboratory, for confirmatory radiological analyses. Results from ThermoRetec are presented in this table in italicized font immediately below the MISS On-Site field laboratory result for that same sample.

Table 4-5: Summary of Environmental Analytical Data

Parameter	Sample ID	04A-020522	04A-020520	04A-020524
	Sample Location	04A-001	04A-002	04A-003
	Sample Depth (feet)	0 - 3.5	4 - 8	4 - 8
	Sample Date	03/17/00	03/22/00	03/22/00
	Units			
Miscellaneous				
Chromium VI	mg/kg	0.43U	0.62U	0.50U
Corrosivity by pH	Soil pH	8.4	8.1	8.4
Cyanide, Reactive	mg/kg	0.50U	0.50U	0.50U
Cyanide, Total	mg/kg	0.36U	0.48U	0.38U
Sulfide, Reactive	mg/kg	24.0U	24.0U	24.0U
PCBs				
4,4'-DDD	ug/kg	3.6U	10U	3.1J
4,4'-DDE	ug/kg	3.6U	10U	5.9
4,4'-DDT	ug/kg	3.6U	10U	3.9J
Aldrin	ug/kg	1.8U	5.1U	2.1U
Alpha-BHC	ug/kg	1.8U	5.1U	2.1U
alpha-Chlordane	ug/kg	1.8U	5.1U	2.1U
Aroclor-1016	ug/kg	7.2U	10U	8.3U
Aroclor-1221	ug/kg	14U	21U	17U
Aroclor-1232	ug/kg	7.2U	10U	8.3U
Aroclor-1242	ug/kg	7.2U	10U	8.3U
Aroclor-1248	ug/kg	7.2U	10U	8.3U
Aroclor-1254	ug/kg	7.2U	10U	8.3U
Aroclor-1260	ug/kg	7.2U	18	9
Beta-BHC	ug/kg	1.8U	5.1U	2.1U
Delta-BHC	ug/kg	1.8U	5.1U	2.1U
Dieldrin	ug/kg	3.6U	10U	4.1U
Endosulfan I	ug/kg	1.8U	5.1U	2.1U
Endosulfan II	ug/kg	3.6U	10U	4.1U
Endosulfan sulfate	ug/kg	3.6U	10U	4.1U
Endrin	ug/kg	3.6U	10U	4.1U
Endrin aldehyde	ug/kg	3.6U	10U	4.1U
Endrin ketone	ug/kg	3.6U	10U	4.1U
gamma-BHC (Lindane)	ug/kg	1.8U	5.1U	2.1U
gamma-Chlordane	ug/kg	1.8U	5.1U	2.1U
Heptachlor	ug/kg	1.8U	5.1U	2.1U
Heptachlor epoxide	ug/kg	1.8U	5.1U	2.1U
Methoxychlor	ug/kg	18U	51U	21U
Toxaphene	ug/kg	180U	510U	210U

Table 4-5: Summary of Environmental Analytical Data

Parameter	Sample ID	04A-020522	04A-020520	04A-020524
	Sample Location	04A-001	04A-002	04A-003
	Sample Depth (feet)	0 - 3.5	4 - 8	4 - 8
	Sample Date	03/17/00	03/22/00	03/22/00
Units				
<i>Rare Earth Metals</i>				
Cerium, Total	mg/kg	20.5	308	34.6
Dysprosium, Total	mg/kg	1.2	5.6	1.9
Lanthanum, Total	mg/kg	8.3	173	17.4
Neodymium, Total	mg/kg	10.2	107	17.2
Yttrium, Total	mg/kg	5.7	24.1	9.4
<i>Semivolatile Organics</i>				
1,2,4-Trichlorobenzene	ug/kg	1800U	2600U	830U
1,2-Dichlorobenzene	ug/kg	1800U	2600U	830U
1,3-Dichlorobenzene	ug/kg	1800U	2600U	830U
1,4-Dichlorobenzene	ug/kg	1800U	2600U	830U
2,2'-oxybis(1-Chloropropane)	ug/kg	1800U	2600U	830U
2,4,5-Trichlorophenol	ug/kg	4500U	6400U	2100U
2,4,6-Trichlorophenol	ug/kg	1800U	2600U	830U
2,4-Dichlorophenol	ug/kg	1800U	2600U	830U
2,4-Dimethylphenol	ug/kg	1800U	2600U	830U
2,4-Dinitrophenol	ug/kg	4500U	6400U	2100U
2,4-Dinitrotoluene	ug/kg	1800U	2600U	830U
2,6-Dinitrotoluene	ug/kg	1800U	2600U	830U
2-Chloronaphthalene	ug/kg	1800U	2600U	830U
2-Chlorophenol	ug/kg	1800U	2600U	830U
2-Methylnaphthalene	ug/kg	1800U	2600U	830U
2-Methylphenol	ug/kg	1800U	2600U	830U
2-Nitroaniline	ug/kg	4500U	6400U	2100U
2-Nitrophenol	ug/kg	1800U	2600U	830U
3,3'-Dichlorobenzidine	ug/kg	1800U	2600U	830U
3-Nitroaniline	ug/kg	4500U	6400U	2100U
4,6-Dinitro-2-methylphenol	ug/kg	4500U	6400U	2100U
4-Bromophenyl-phenylether	ug/kg	1800U	2600U	830U
4-Chloro-3-methylphenol	ug/kg	1800U	2600U	830U
4-Chloroaniline	ug/kg	1800U	2600U	830U
4-Chlorophenyl-phenylether	ug/kg	1800U	2600U	830U
4-Methylphenol	ug/kg	1800U	2600U	830U
4-Nitroaniline	ug/kg	4500U	6400U	2100U
4-Nitrophenol	ug/kg	4500U	6400U	2100U
Acenaphthene	ug/kg	200J	2600U	45J
Acenaphthylene	ug/kg	1800U	270J	91J
Anthracene	ug/kg	300J	240J	250J
Benzo(a)anthracene	ug/kg	380J	610J	850
Benzo(a)pyrene	ug/kg	340J	700J	770J
Benzo(b)fluoranthene	ug/kg	340J	580J	650J

Table 4-5: Summary of Environmental Analytical Data

Parameter	Sample ID	04A-020522	04A-020520	04A-020524
		Sample Location	04A-001	04A-002
	Sample Depth (feet)	0 - 3.5	4 - 8	4 - 8
	Sample Date	03/17/00	03/22/00	03/22/00
Units				
<i>Semivolatile Organics (continued)</i>				
Benzo(g,h,i)perylene	ug/kg	370J	590J	470J
Benzo(k)fluoranthene	ug/kg	400J	580J	740J
bis(2-Chloroethoxy)methane	ug/kg	1800U	2600U	830U
bis(2-Chloroethyl)ether	ug/kg	1800U	2600U	830U
bis(2-Ethylhexyl)phthalate	ug/kg	1800U	2600U	830U
Butylbenzylphthalate	ug/kg	1800U	2600U	830U
Carbazole	ug/kg	210J	2600U	61J
Chrysene	ug/kg	550J	660J	870
Di-n-Butylphthalate	ug/kg	1800U	2600U	830U
Di-n-Octyl phthalate	ug/kg	1800U	2600U	830U
Dibenz(a,h)anthracene	ug/kg	1800U	2600U	69J
Dibenzofuran	ug/kg	250J	2600U	830U
Diethylphthalate	ug/kg	1800U	2600U	830U
Dimethylphthalate	ug/kg	1800U	2600U	830U
Fluoranthene	ug/kg	1900	1100J	1900
Fluorene	ug/kg	140J	2600U	66J
Hexachlorobenzene	ug/kg	1800U	2600U	830U
Hexachlorobutadiene	ug/kg	1800U	2600U	830U
Hexachlorocyclopentadiene	ug/kg	1800U	2600U	830U
Hexachloroethane	ug/kg	1800U	2600U	830U
Indeno(1,2,3-cd)pyrene	ug/kg	330J	540J	440J
Isophorone	ug/kg	1800U	2600U	830U
N-Nitroso-Di-n-propylamine	ug/kg	1800U	2600U	830U
N-Nitrosodiphenylamine (1)	ug/kg	1800U	2600U	830U
Naphthalene	ug/kg	1800U	2600U	830U
Nitrobenzene	ug/kg	1800U	2600U	830U
Pentachlorophenol	ug/kg	4500U	6400U	2100U
phenanthrene	ug/kg	2200	620J	650J
phenol	ug/kg	1800U	2600U	830U
Pyrene	ug/kg	1400J	870J	1500
<i>Total Metals</i>				
Aluminum, Total	mg/kg	6090	8650	8290
Antimony, Total	mg/kg	0.17	0.6	0.27
Arsenic, Total	mg/kg	3.5	24.9	7.2
Barium, Total	mg/kg	34.2	379	150
Beryllium, Total	mg/kg	0.23	0.7	0.41
Boron, Total	mg/kg	3.2	7.7	4.4
Cadmium, Total	mg/kg	0.09	0.67	10.1
Calcium, Total	mg/kg	2090	3030	2150
Chromium, Total	mg/kg	12.3	251	16.7

Table 4-5: Summary of Environmental Analytical Data

Parameter	Sample ID	04A-020522	04A-020520	04A-020524
	Sample Location	04A-001	04A-002	04A-003
	Sample Depth (feet)	0 - 3.5	4 - 8	4 - 8
	Sample Date	03/17/00	03/22/00	03/22/00
Units				
Total Metals (continued)				
Cobalt, Total	mg/kg	5.3	5.4	3.8
Copper, Total	mg/kg	21.7	180	19.1
Iron, Total	mg/kg	11600	11300	10700
Lead, Total	mg/kg	15.3	227	96.5
Lithium, Total	mg/kg	8.4	36.9	10.1
Magnesium, Total	mg/kg	2770	1710	1370
Manganese, Total	mg/kg	197	206	197
Mercury, Total	mg/kg	0.01U	5.3	0.21
Nickel, Total	mg/kg	11.4	15.9	8.9
Potassium, Total	mg/kg	672	570	520
Selenium, Total	mg/kg	0.40U	2	1.1
Silver, Total	mg/kg	0.08U	0.13U	1.3
Sodium, Total	mg/kg	278	321	160
Thallium, Total	mg/kg	0.34U	0.52U	0.42U
Vanadium, Total	mg/kg	22.1	26.5	23.6
Zinc, Total	mg/kg	27.6	263	61.6
Volatile Organics				
1,1,1-Trichloroethane	ug/kg	650U	770U	610U
1,1,2,2-Tetrachloroethane	ug/kg	650U	770U	610U
1,1,2-Trichloroethane	ug/kg	650U	770U	610U
1,1-Dichloroethane	ug/kg	650U	770U	610U
1,1-Dichloroethene	ug/kg	650U	770U	610U
1,2-Dichloroethane	ug/kg	650U	770U	610U
1,2-Dichloroethene (total)	ug/kg	650U	770U	610U
1,2-Dichloropropane	ug/kg	650U	770U	610U
2-Butanone	ug/kg	1300U	1500U	1200U
2-Hexanone	ug/kg	1300U	1500U	1200U
4-Methyl-2-pentanone	ug/kg	1300U	1500U	1200U
Acetone	ug/kg	510BJ	990BJ	680BJ
Benzene	ug/kg	650U	770U	610U
Bromodichloromethane	ug/kg	650U	770U	610U
Bromoform	ug/kg	650U	770U	610U
Bromomethane	ug/kg	1300U	1500U	1200U
Carbon Disulfide	ug/kg	650U	770U	610U
Carbon Tetrachloride	ug/kg	650U	770U	610U
Chlorobenzene	ug/kg	650U	770U	610U
Chloroethane	ug/kg	1300U	1500U	1200U
Chloroform	ug/kg	650U	770U	610U

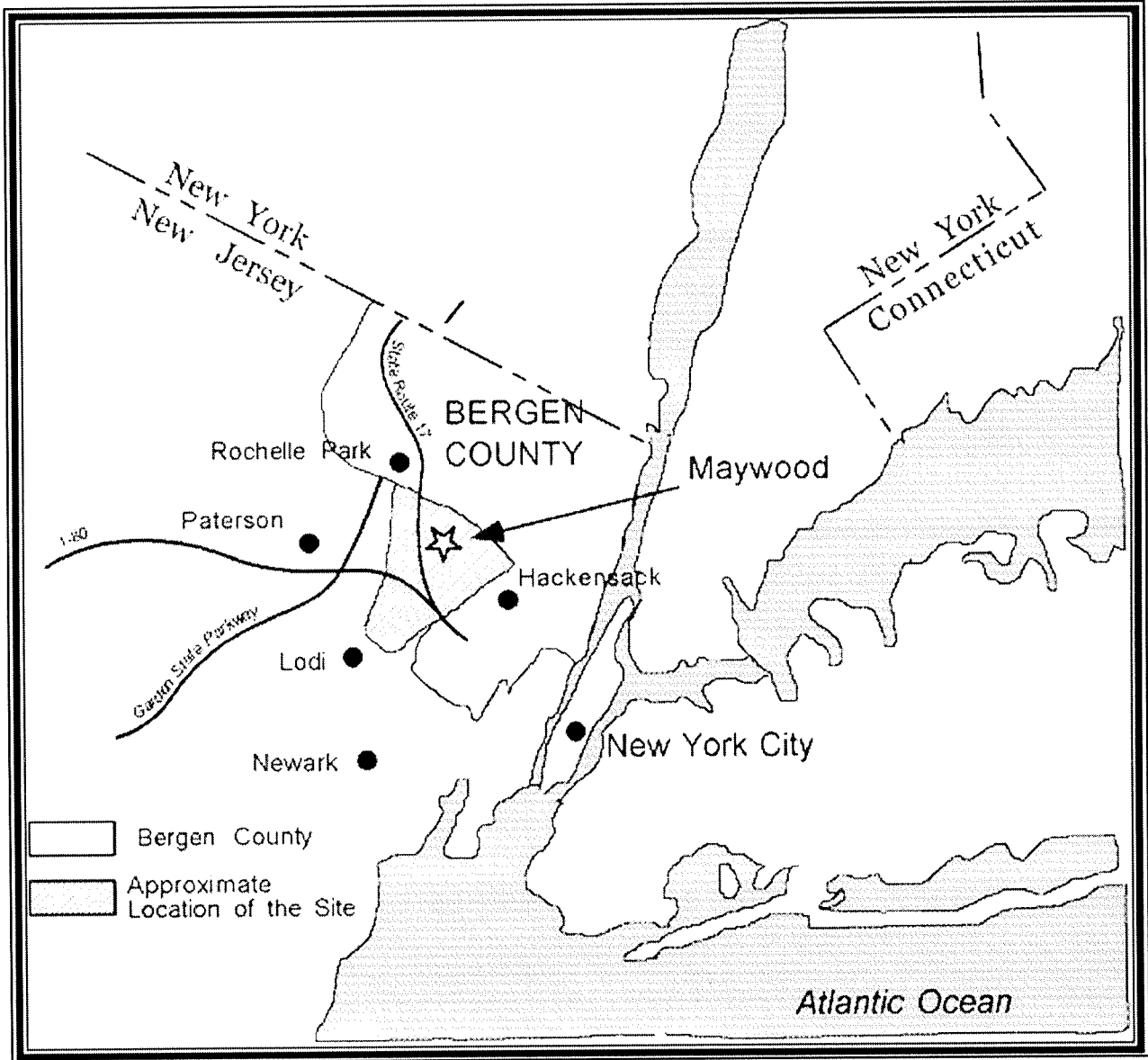
Table 4-5: Summary of Environmental Analytical Data

Parameter	Sample ID	04A-020522	04A-020520	04A-020524
	Sample Location	04A-001	04A-002	04A-003
	Sample Depth (feet)	0 - 3.5	4 - 8	4 - 8
	Sample Date	03/17/00	03/22/00	03/22/00
Units				
<i>Volatile Organics (continued)</i>				
Chloromethane	ug/kg	1300U	1500U	1200U
cis-1,3-Dichloropropene	ug/kg	650U	770U	610U
Dibromochloromethane	ug/kg	650U	770U	610U
Ethylbenzene	ug/kg	650U	770U	610U
Methylene Chloride	ug/kg	940B	2200B	1800B
Styrene	ug/kg	650U	770U	610U
Tetrachloroethene	ug/kg	650U	770U	610U
Toluene	ug/kg	650U	770U	610U
Trans-1,3-Dichloropropene	ug/kg	650U	770U	610U
Trichloroethene	ug/kg	650U	770U	610U
Vinyl Chloride	ug/kg	1300U	1500U	1200U
Xylene (total)	ug/kg	650U	770U	610U
<i>TCLP Metals</i>				
Arsenic	ug/L	22.9U	142U	38.9U
Barium	ug/L	229	886	949
Cadmium	ug/L	4.1U	4.1U	61.2
Chromium	ug/L	3.4U	21.8U	8.1U
Lead	ug/L	26.6U	109U	71.6U
Mercury	ug/L	0.1U	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U	49.7U
Silver	ug/L	3.7U	3.7U	3.7U
<i>TCLP Pesticides</i>				
Alpha-Chlordane	ug/L	0.5U	0.5U	0.5U
Endrin	ug/L	1U	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5U	0.5U	0.5U
Heptachlor	ug/L	0.5U	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5U	0.5U	0.5U
Methoxychlor	ug/L	5U	5U	5U
Toxaphene	ug/L	50U	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U	5U
2,4-D	ug/L	10U	10U	10U

Table 4-5: Summary of Environmental Analytical Data

Parameter	Sample ID	04A-020522	04A-020520	04A-020524
	Sample Location	04A-001	04A-002	04A-003
	Sample Depth (feet)	0 - 3.5	4 - 8	4 - 8
	Sample Date	03/17/00	03/22/00	03/22/00
Units				
<i>TCLP Volatiles</i>				
1,1-Dichloroethene	mg/L	0.025U	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.011J	0.05U
Benzene	mg/L	0.025U	0.025	0.025U
Carbon tetrachloride	mg/L	0.025U	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>				
1,4-Dichlorobenzene	mg/L	0.05U	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U	0.05U

B (inorganics) Value Between Method Detection Limit and Reporting Limit
 B (organics) Found in Associated Blank
 U Undetected Values
 J Estimated Value
 BJ Found in Blank; is an Estimated Value and Reporting Limit



NOT TO SCALE

U.S. ARMY ENGINEER DIVISION
 CORPS OF ENGINEERS
 NEW YORK DISTRICT
 US ARMY CORPS OF ENGINEERS
FUSRAP
 FORMERLY UTILIZED SITES
 REMEDIAL ACTION PROGRAM



STONE & WEBSTER, INC.

Prepared by:

**MALCOLM
 FIRNIE**

File Name:

MPI-CH4

**LOCATION OF MAYWOOD SITE
 BERGEN COUNTY, NEW JERSEY**

PDI REPORT
 FUSRAP MAYWOOD SUPERFUND SITE
 MAYWOOD, LODI, AND
 ROCHELLE PARK, NEW JERSEY

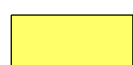
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 Job Number 08575
 WAD# 3

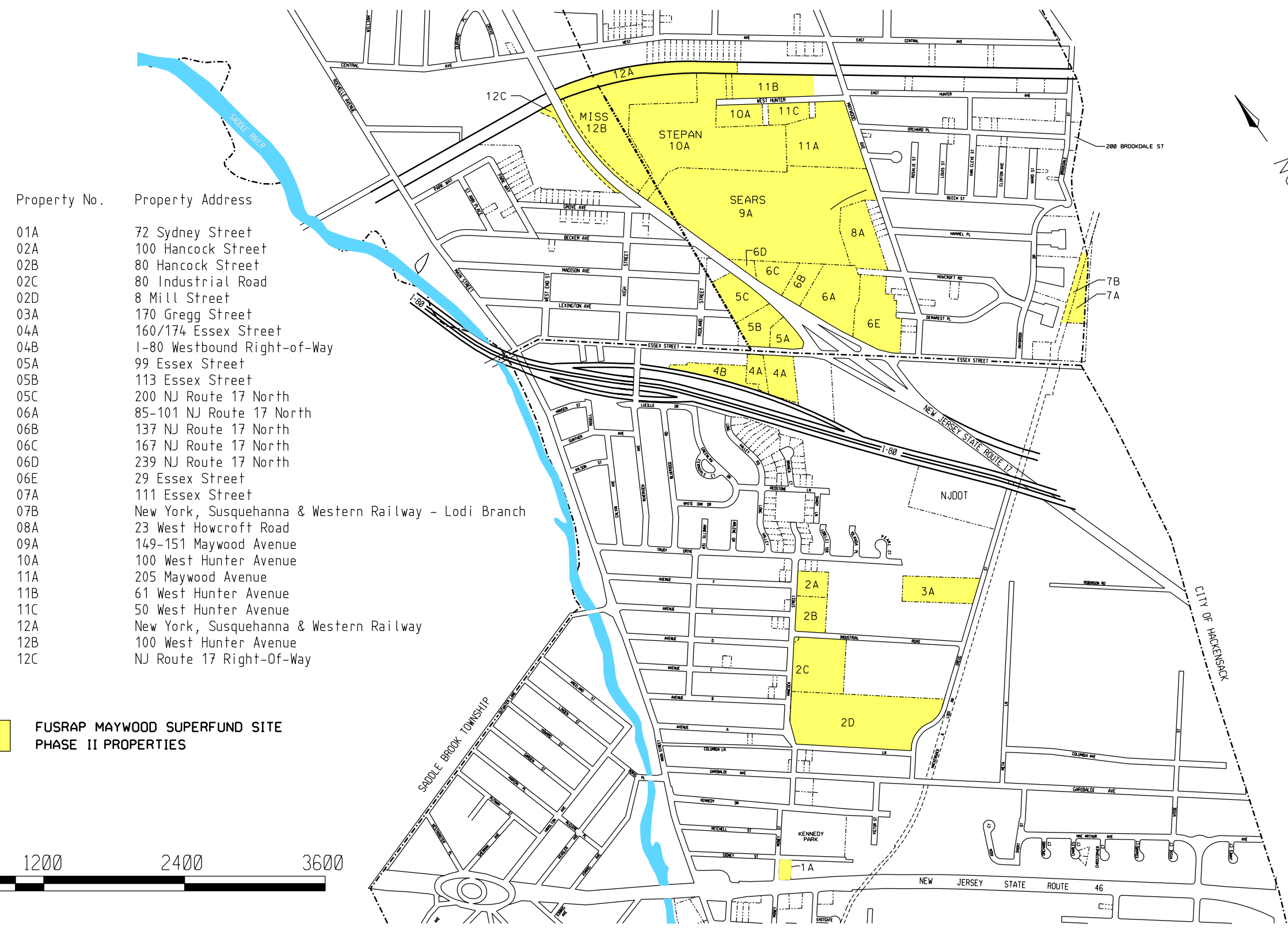
WBS# 18

Figure Number:

FIGURE 4-1

Cluster No.	Property No.	Property Address
1	01A	72 Sydney Street
2	02A	100 Hancock Street
	02B	80 Hancock Street
	02C	80 Industrial Road
	02D	8 Mill Street
3	03A	170 Gregg Street
	04A	160/174 Essex Street
4	04B	1-80 Westbound Right-of-Way
	05A	99 Essex Street
5	05B	113 Essex Street
	05C	200 NJ Route 17 North
	06A	85-101 NJ Route 17 North
	06B	137 NJ Route 17 North
6	06C	167 NJ Route 17 North
	06D	239 NJ Route 17 North
	06E	29 Essex Street
	07A	111 Essex Street
7	07B	New York, Susquehanna & Western Railway - Lodi Branch
	08A	23 West Howcroft Road
9	09A	149-151 Maywood Avenue
	10A	100 West Hunter Avenue
11	11A	205 Maywood Avenue
	11B	61 West Hunter Avenue
	11C	50 West Hunter Avenue
12	12A	New York, Susquehanna & Western Railway
	12B	100 West Hunter Avenue
	12C	NJ Route 17 Right-Of-Way

 FUSRAP MAYWOOD SUPERFUND SITE
PHASE II PROPERTIES




U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT



US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

STONE & WEBSTER, INC.



Prepared by:
**MALCOLM
PIRNIE**

File Name:
\\MAYWOOD\TASK0318\CLUSTER REPORT\REV 1\FIGURE4-2.DGN

LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY

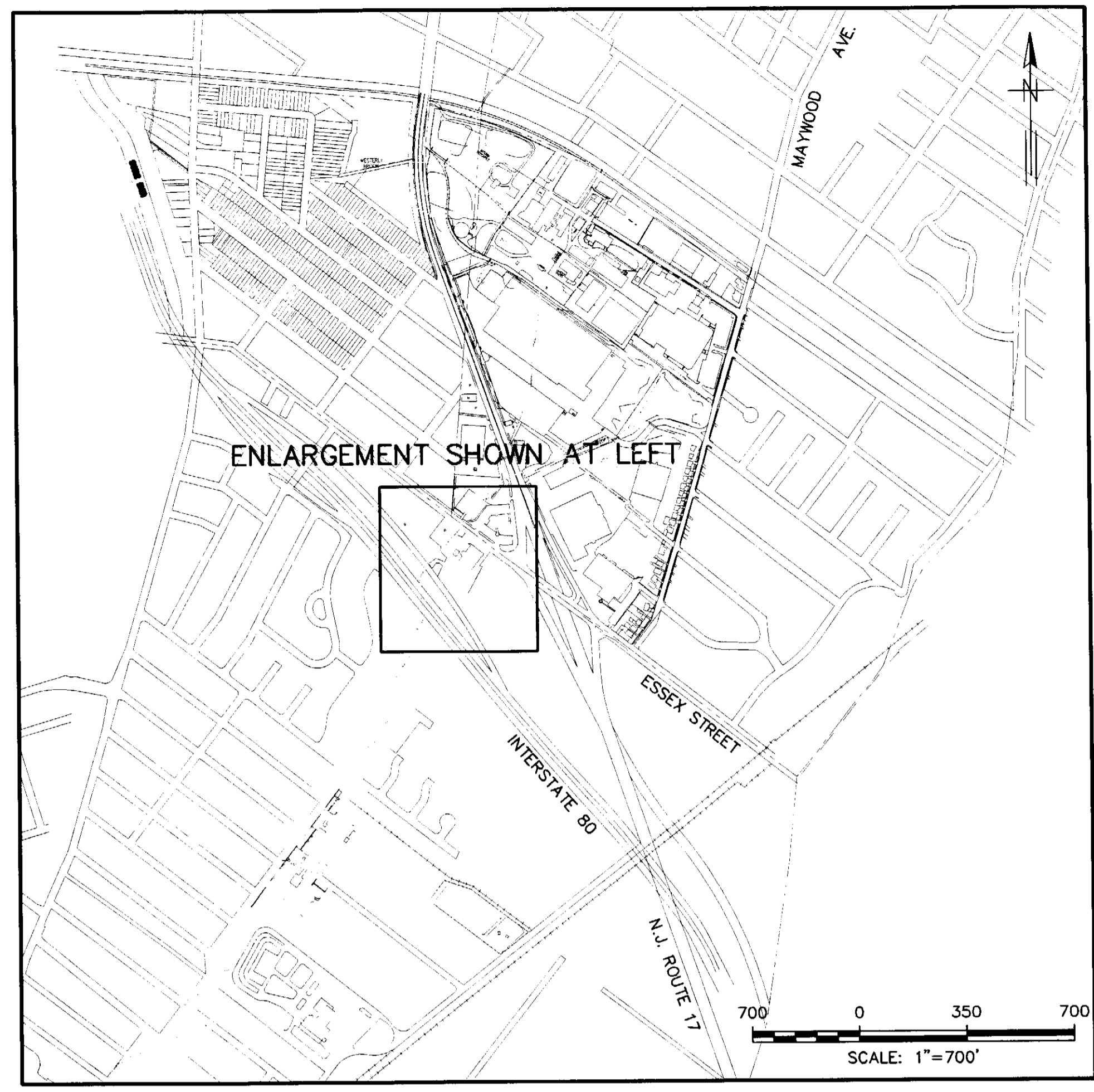
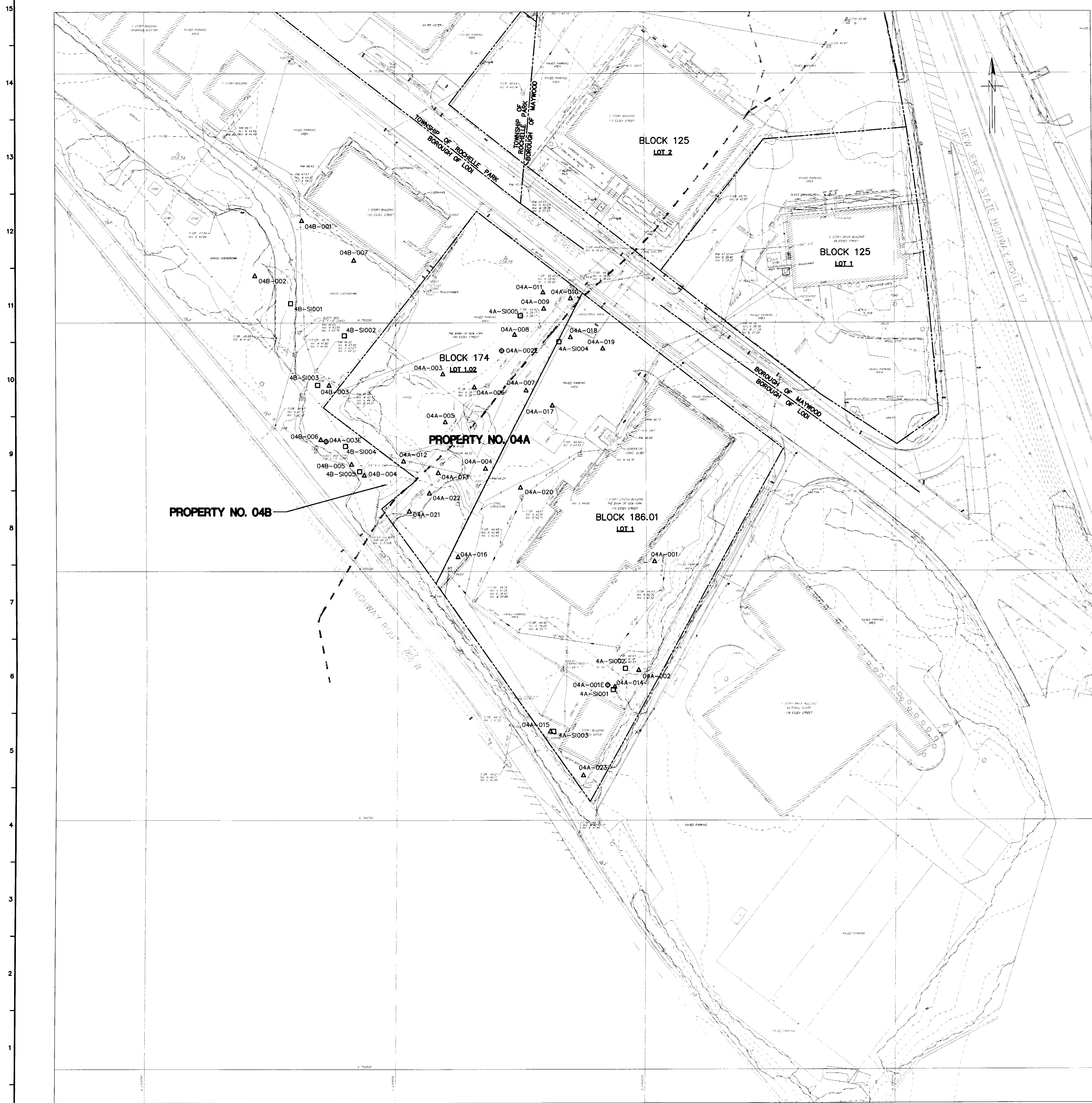
PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

Contract Number:
DACW41-99-D-9001

Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 4-2



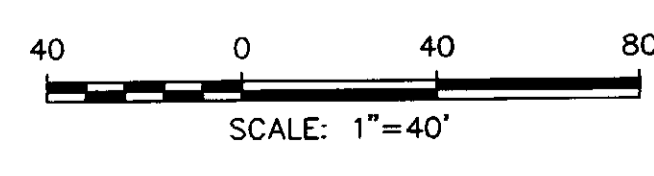
KEY MAP

- LEGEND**
- PROPERTY BOUNDARY
 - ▨ EXISTING BUILDING
 - - - EXISTING 1' CONTOUR
 - - - - - APPROXIMATE LOCATION OF HISTORIC LODI BROOK CHANNEL

SAMPLE SYMBOL	SAMPLE TYPE	NUMBER OF SAMPLING LOCATIONS
▲	DIRECT PUSH SOIL PROBE LOCATIONS (RADIOLOGICAL)	30
□	SURFACE ISOCs LOCATIONS	10
⊕	DIRECT PUSH SOIL PROBE LOCATION (ENVIRONMENTAL)	3

- NOTES:**
- THIS SURVEY SHOWS CONDITIONS AS OF OCTOBER 1999 BASED ON AERIAL MAPPING PREPARED BY GEOD CORP. AND GROUND SURVEY BY GARDEN STATE ENGINEERING SURVEYING AND PLANNING.
 - VERTICAL DATUM IS REFERENCED TO NGVD 1929.
 - HORIZONTAL DATUM IS REFERENCED TO NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 1927.
 - THE LOCATION OF THE HISTORIC LODI BROOK SHOWN ON THIS SHEET WAS APPROXIMATED BASED UPON REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS FROM APRIL 6, 1940.

**CLUSTER NO. 4 160/174 ESSEX STREET (04A)
I-80 WEST RIGHT-OF-WAY (04B)**



U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT
US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

STONE & WEBSTER, INC.
Prepared by: [Signature]
Reviewed by: [Signature]
Date: 7-21-00
File Name: SMP1-C4

CLUSTER NO. 4
SAMPLE LOCATION MAP
PRE-DESIGN INVESTIGATION REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LOOK, AND
ROCHELLE PARK, NEW JERSEY
Control Number: DACW41-99-D-0001
Job Number: 00015
WSP# 3
WSP# 18
Sheet Number:
4-3

Plot: C:\404_2\0015_2\0015_2.dwg Plot: W:\0015\0015_2.dwg Date: 07/21/00 11:45:35
 Sheet: 11 Date: 07/21/2000 Time: 11:45:35



Lower Contour Limit = $1.5 \times \text{Background} = 1.5 \times 1,500 = 2,250$ counts per minute

Upper Contour Limit = Highest measurement across entire Maywood Site: approx. 500,000 counts per minute

Property Cluster No. 4: 160/174 Essex St. (Bank of NY) and I-80 Westbound Right-of-Way

Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 4-4

APPENDIX 4-A

Variations from the PDI Work Plan

**Letters Informing EPA and NJDEP of Use of Geoprobes⁰
In Lieu of Downhole ISOCS**



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Angela Carpenter
Remedial Project Manager
Federal Facilities Section
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Dear Ms. Carpenter:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in your December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Donna Gaffigan, NJDEP



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

December 8, 1999

REPLY TO
ATTENTION OF

Programs and Project Management Division

Ms. Donna Gaffigan
Case Manager
Bureau of Case Management
New Jersey Department of Environmental Protection
401 E State St
Trenton, NJ 08625-0600

Dear Ms. Gaffigan:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in USEPA's December 1, 1999, letter under separate cover.

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If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Angela Carpenter, EPA

Revisions to Standard Operating Procedure No. SW-MWD-509-0



**STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION**

TITLE:

Soil Probe Investigation

NO.:

SW-MWD-509-0

PAGE

1 of 8 plus Attachment 1

DATE:

February 2000

APPROVED:

Prepared by:

Project Chemist

Reviewed by:

PDI Task Manager

Richard Skyness 2/29/00
Project Engineer

[Signature] 2/29/00
Project Manager

1.0 PURPOSE

This Stone & Webster Standard Operating Procedure (SOP), **Soil Probe Investigation** shall be employed when collecting subsurface soil samples using the direct push soil probe method at the FUSRAP Maywood Superfund Site (hereafter referred to as the Maywood Site) properties with known or suspected soil and/or groundwater contamination.

2.0 SCOPE

This procedure details the materials, equipment, and methods common to soil probe investigation activities. Consult the site-specific project plans and work plans for proposed soil probe locations. Always consult site-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Task Manager prior to implementation and shall be documented in project field logbooks.**

3.0 REFERENCES

Stone & Webster Maywood SOP 102 - Downhole Gamma Radiation Logging

Stone & Webster Maywood SOP 307 - Surface and Shallow Subsurface Soil Sampling

Stone & Webster Maywood SOP 308 - Soil Borings and Sampling

Stone & Webster Maywood SOP 401 - Photoionization Detector (PID)

Stone & Webster Maywood SOP 504 - Labeling, Packaging, and Shipping Environmental Samples

Stone & Webster Maywood SOP 505 - Cuttings and Fluids Management

Stone & Webster Maywood SOP 506 - Decontamination

Stone & Webster Maywood SOP 507 - Field Notebook Content and Control

U.S.E.P.A., A Compendium of Superfund Field Operation Methods, Document EPA/540/P-87/001, December, 1987.

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	2 of 8

DEFINITIONS

Stone & Webster Team – personnel of the Stone & Webster Team that includes for this SOP: Stone & Webster, Malcolm Pirnie, Franklin Environmental Services, Inc., Safety & Ecology Corporation (SEC), and Garden State Surveying, Engineering and Planning, Inc. The Stone & Webster Team shall perform soil probe investigation activities, except those activities specified as performed by the Subcontractor.

Subcontractor – personnel of the direct push soil probe firm.

Direct Push Soil Probe – generic name for advancing media sampling piping/tubes with only direct mechanical force. They are typically hollow steel rods advanced using a percussive force (powered hammer) and driven directly into unconsolidated soil. There are two types of direct push soil probes. One is a single rod system (i.e., macrocore) and the other is a dual tube or cased system. The latter, which will be the method of choice for most Maywood Site investigations, utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Drive rods used with the cased system are usually made from a high-grade steel alloy and are retracted after sampling.

4.0 RESPONSIBILITIES

5.1 Project Manager - Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 Project Environmental Engineer - Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for direct push soil probe activities.

5.3 Project Superintendent - Designated by the Project Manager to supervise investigative activities by Stone & Webster Team and Subcontractor personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in monitoring soil probe investigation activities in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each workday. The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil probe investigation activities and deviations from this SOP.

5.4 Site Personnel (including the data logger) - Required to read and sign the Maywood Site Safety and Health Plan (SSHP), have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil probe investigation activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

5.5 Site Safety & Health Officer - Responsible for ensuring that all site workers (Stone & Webster and Subcontractor) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.6 Task Manager – Responsible to plan, implement, and closeout field work requiring direct push technology.

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE 3 of 8

5.7 Subcontractor - Required to read and sign the SSHP, have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. Subcontractors shall report directly to the Task Manager or his designee.

6.0 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS FOR SOIL PROBE INVESTIGATION

The following is a list of equipment and material that is commonly used on all projects when the direct push probe technique is performed in the unconsolidated soils. Refer also to related SOP equipment and material requirements to ensure completeness.

Items required by Subcontractor:

- Direct push probe equipment - of appropriate size and direct push probe and sampling capabilities; vehicle mounted; direct push probe sampling tools used to advance boring (i.e., direct push small diameter rods; and augers, if required) equipment, labor, and supplies to maintain optimal efficiency
- Environmentally-safe lubricants
- Backfill material for probe holes, as required
- Soil sample collection and logging supplies – **See Stone & Webster Maywood SOP 308, Soil Borings and Sampling**
- Decontamination supplies - **See Stone & Webster Maywood SOP 506, Decontamination**

Items carried by Stone & Webster Team on-site personnel

- **SSHP To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Clipboard
- Pencils
- Six-foot-ruler
- Pocket knife
- Camera (optional), check with Project Manager if required
- Volatile organic compound vapor meter equipped with photoionization detector (PID) and other air surveillance monitoring equipment, as required by the SSHP
- Radiation meter
- Site boring logs
- Blank soil probe logs
- Weighted measuring tape
- Water level measuring device - **See Stone & Webster Maywood SOP 410, Groundwater Level Measurement**, Interface probe, if needed
- Paper towels
- Chain of Custody forms

7.0 DIRECT PUSH PROBE ACTIVITIES

7.1 General Considerations

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE 4 of 8

Prior to selecting the direct push probe method for a specific property, the objectives of the field investigation must be established. These property-specific objectives shall include one or more of the following Maywood Pre-Design Investigation (PDI) program objectives:

- Soil classification/evaluation - the direct push soil probe technique will be able to accommodate the collection of soils for characterization purposes.
- Characterization of hydrogeologic conditions - the direct push soil probe technique shall allow for the characterization of each stratigraphic zone, and water level measurements.
- Evaluation of soil contamination - the direct push soil probe technique shall provide the appropriate sample collection methods, must not introduce contaminants into the probe hole or otherwise alter the existing soil or groundwater chemistry, and should not result in subsurface cross contamination during or after installation of direct push probe.

7.2 Direct Push Probe Activities

Prior to commencing direct push soil probe fieldwork, several activities should be performed. These activities, which include both pre-mobilization office tasks and pre-installation field tasks, are discussed below. Once the pre-installation activities are completed, direct push soil probe installation may commence.

7.2.1 Pre-Mobilization Tasks

1. The Stone & Webster Team and Subcontractor shall acquire as much geologic and hydrogeologic information about the site as possible. This information may include possible soil and groundwater contamination present, groundwater table depths and fluctuations, surficial and bedrock geology, approximate thickness of the unconsolidated zone, depth to top of weathered rock, depth to competent rock, and site access.
2. Soil probe locations shall be marked in the field by the Stone & Webster Team with either paint or flags/stakes during pre-mobilization tasks, and surveyed using a global positioning system (GPS). The Stone & Webster Team shall check and verify that the soil probe location corresponds to the location on the project plans. The Stone & Webster Team and Subcontractor shall check to see if visible structures will prevent the completion of proposed soil probes at specific locations.
3. The Stone & Webster Team shall communicate with the Subcontractor regarding the requirements of the direct push soil probe program and required geologic and environmental information. Inform the Subcontractor of the environmental sampling program that the project shall follow. This information includes sampling frequency, sampling depths, type of sample required (soil or groundwater), the length of casing, direct push soil probe method (i.e., macrocore, dual tube, etc.), number and type of soil samplers required, and special sampling techniques. Ensure that probe hole backfill is selected in accordance with the project specifications.
4. The Subcontractor shall ensure that all utilities in the vicinity of the proposed boring(s) have been cleared by the appropriate authorized parties (e.g., New Jersey One-Call System at 1-800-272-1000, owner, etc.) or, if utilities exist, are visibly marked on the ground surface in the area of the proposed boring. In addition, keep a safe working distance (pursuant to OSHA) from overhead utilities. **NOTE: The party responsible for having utilities cleared shall be identified. If the responsible party is not clearly identified then the Task Manager shall establish the responsible party. Ensure that utilities have been cleared prior to installation of soil probe.**

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7.2.2 Pre-Installation Field Tasks

Sampling equipment shall be decontaminated prior to use, using pressure or manual washing of the rig, direct push soil probe, and tools, as required to prevent introducing off-site contamination. The direct push soil probe related equipment shall be decontaminated on site prior to direct push soil probe activities. Refer to **Stone & Webster Maywood SOP 506, Decontamination** for specific instructions.

7.3 General Direct Push Soil Probe Method Procedures

The following sections outline general direct push soil probe procedures used in unconsolidated soil materials.

1. Assuming a vertical soil probe, the Subcontractor shall set the direct push rig over the proposed soil probe location. Level the direct push rig and ensure that the direct push rods used to advance the soil probe are in a vertical position directly above the hole.
2. The inspecting Stone & Webster Team shall obtain and record measurements of tools to be used for direct push probe operations. Down-hole measurements taken by the Subcontractors shall be to the nearest 0.1 foot.
3. The Subcontractor shall begin sampling or advancement of soil probe to the desired depth utilizing the direct push method described below. Samples shall be taken using the steps described in Section 8.1.1.
4. When the direct push advancement tools are lowered into the probe hole, the Stone & Webster Team shall keep track of tool lengths to check Subcontractor's stated depth of soil probe.
5. The Stone & Webster Team shall make certain that the Subcontractor is performing depth measurements with a ruler and known tool lengths and not visually judging ("eyeballing") casing and tool projections above the ground. The Stone & Webster Team shall maintain a mental note of depth to bottom of soil probe by keeping track of the linear feet of tools in and above the ground. By mentally subtracting the "stick-up" above the ground, the Stone & Webster Team can maintain a constant approximate check on the soil probe depth and Subcontractor's indicated depths.
6. The breathing zone shall be screened by a designee of the Stone & Webster Team Site Safety and Health Officer for total volatile organic vapors using an organic vapor analyzer as outlined in the SSHP. A lower explosive limit meter (LEL) shall be employed if required in SSHP. Record the measured readings at the depth and time of reading on the boring log.
7. During direct push probe activities, both the Stone & Webster Team and Subcontractor shall record production, mechanical and/or sampling difficulties and the sequence of activities. Also record rig mobilization time, rig set-up time, and probe commencement and completion times. This information should be recorded in a field log book. The Stone & Webster Team shall also record pertinent details on the soil probe log (See Attachment A for blank soil probe log).
8. Refusal of direct push probe advancement tools (i.e., casing refusal) is defined as when the probe hole cannot be advanced using regular advancement methods. Generally, refusal can be identified by the following characteristics:
 - Advancement of probe hole is not noticeable or is very slow
 - A change in the frequency/pitch of the direct push probe equipment
 - The direct push probe downpressure may be significantly higher than under "normal" conditions. The direct push rig may be lifted off the ground surface.
9. If refusal is encountered in the soil probe, refer to **Stone & Webster Maywood SOP 308, Soil Borings and Sampling** for specific instructions. If the probe hole cannot be advanced, relocate the probe hole within approximately 5 feet distant from the original location and start with the

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work in Section Paragraph 7.2.1. Measure the distance and direction from the original location, and record this information in the field logbook. The actual distance of movement necessary may be greater depending on the site conditions. If the required movement is greater than 5 feet, contact the Task Manager for direction.

10. Downhole gamma radiation logging will be performed, *where feasible* by the Stone & Webster Team as described in Section 8.1.1 below (**See Stone & Webster Maywood SOP 102, Downhole Gamma Radiation Logging**).
11. When the probe hole is completed and the area is cleaned up, all contaminated equipment, including down-hole tools, hand tools, and direct push rig shall be decontaminated by the Subcontractor (**See Stone & Webster Maywood SOP 506, Decontamination**) and as directed by the Radiation Safety Officer (RSO).
12. The Stone & Webster Team shall record the soil probe location on the project drawings.

8.0 METHOD-SPECIFIC SOIL SCREENING AND SAMPLING

In this section, the soil screening and sampling procedure for the direct push soil probe method is described.

8.1 Direct Push Probe Services

The direct push probe rig is a hydraulically powered percussion/direct push machine used for small diameter subsurface investigations. It can obtain continuous soil cores, discreet soil samples, groundwater samples and vapor samples along with installation of permanent sparge points.

8.1.1 Procedures for Screening and Sampling Direct Push Probe Soil Samples

Following is the procedure to be used at the Maywood Site for screening and sampling direct push probe soil cores.

1. Each 4-foot soil core sample will remain in the polyvinyl chloride/polyethylene terephthalate (PVC/PETG) liner and marked with the appropriate field identification number, sealed with rubber end caps for liners, and placed into a designated (2 inch ID) PVC container (including PVC end caps) supplied by the Subcontractor for storage. Pertinent sample data will also be marked on the PVC container.
2. Downhole gamma logging will be accomplished, *where feasible* by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.
3. Each soil probe hole will be backfilled for the full length, in accordance with project requirements.
4. The sealed PVC containers will be transported by the Stone & Webster Team to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. All Building 76 sample documentation, field screening, and sampling tasks shall be performed by the Stone & Webster Team. Sample documentation will include the preparation of a soil probe log containing the following pertinent field documentation: soil probe identification number and location; soil column description; soil screening data, and photo-documentation. **Stone & Webster Maywood SOP 507, Field Notebook Content and Control**, shall be followed. Sample documentation information shall be recorded electronically.
5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each

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soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integration taken at each marked location and recorded.

6. The soil cores will then be screened for total volatile organic vapors using a PID (see **Stone & Webster Maywood SOP 401, Photoionization Detector (PID)**). A series of small perforations will be made through the liner at 12-inch increments.
7. The soil cores will be described generally in accordance with the Unified Soil Classification system, based on visual observations through the liners and soil extracted from the small perforations. Prior to storage, these perforations will be sealed with tape. The soil descriptions developed will be marked with an "FC" note to define the description as a field classification.
8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.
9. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.
11. Extracted samples shall be prepared in accordance with the Safety and Ecology Corporation (SEC) on-site field laboratory soil preparation practice/SOP.
12. Analysis for ROC on extracted sections of the soil core will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector, or equivalent. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.
14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.
15. Sampling tools will be decontaminated before each boring, after collecting each soil sample, and after each boring.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term "blind duplicates"), thus eliminating potential bias in the test measurement.

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If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.

ATTACHMENT 1

PDI SOIL PROBE LOG SHEET				
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling		
Site Designator		XXX		
Activity Designator		AAA		PDI
Field Measurement/Sample Collection Designator		VV		SP
Station Number		N N N		
Media		m m		SB
Sample Type		n		
Sequential Sample Number		# # # # #		(see Below)
		Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location				
		Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core		
Date			Date	
Time			Time	
Logger			Logger	
Detector Model #		SPA-3	PID Model #	Multi-RAE
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		
Comments: 1. MPI No. _____. 2. Direct-push location grouted with BenSeal.				
_____ Signature (Down Hole Gamma Logging)		_____ Date		
_____ Signature (Core Gamma Logging)		_____ Date		
_____ Signature (PID Logging)			_____ Date	

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)									
					X	X	X	#	#	#	#	#	#	
0.0														
0.5														
1.0														
1.5														
2.0														
2.5														
3.0														
3.5														
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24.0														

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 G:\3674009\PDI Report\AppdxA\SOP509FINAL.doc

TABLE 1-A: REVISIONS TO SOP SW-MWD-509-0

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>Section 8.1.1 Procedures for Screening and Sampling Direct Push Soil Samples 2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a Bicon 3/8- inch x 3/8- inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. The detector shall be positioned below the bottom of the casing to allow gamma log readings in the uncased portion of the probe hole. The casing shall be extracted at 6-inch increments and a 30-second count reading shall be taken at each increment.</p>	<p>2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. The sodium iodide detector preamplifier is connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector™ multi-channel analyzer/amplifier/high voltage power supply. The system is controlled, and the data stored, via a notebook computer. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.</p>	<p>Cabrera Services, Inc. developed this procedure as a cost effective site characterization method. Better sensitivity of the 1-inch x 1-inch detector used by Cabrera Services, Inc. allows gross gamma measurements through the soil probe casings, thereby increasing soil probe production rates.</p>	<p>January 11, 2000, without waterproof container. Sealed solid casing installed following extraction of MacroCore or Dual Tube system. January 28, 2000, with waterproof container. Eliminated need of sealed solid casing.</p>
<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The acetate liner shall be marked off at 6-inch intervals. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Readings shall consist of 10-second integrations taken every six inches and recorded.</p>	<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the PVC/PET liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integrations taken at the marked locations and recorded.</p>	<p>Continuous scanning of the soil core provides complete coverage, longer counting time at the regions of interest, and minimizes redundancy of the downhole gamma measurements.</p>	<p>January 11, 2000</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>8. A minimum of three soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238 based on field radiological screening and gamma logging values. At a minimum, one soil sample will be taken at the highest reading location (suspected FUSRAP waste); a second soil sample shall be collected where the readings approach a constant value (suspected transition zone); and a third soil sample shall be collected within the zone of constant readings (below suspected transition zone). Additional samples may be taken based on the Task Manager's direction.</p>	<p>8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.</p>	<p>Suspected FUSRAP waste and suspected transition zones may not be present in each direct push location.</p>	<p>Selection of archived samples began February 21, 2000.</p>
<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored in Building 76 for future reference.</p>	<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.</p>	<p>Based on laboratory analysis there may be the need to collect additional samples from the stored soil cores.</p>	<p>January 11, 2000</p>
<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a USACE-certified off-site laboratory, for confirmatory ROC analysis. Soil samples shall be placed in labeled containers provided by the laboratory, then placed in coolers maintained at 4°C. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>Samples will be sealed in containers provided by the SEC on-site field laboratory.</p> <p>Preservation (i.e., 4°C) is not required for ROC analysis.</p>	<p>February 28, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>14. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.</p>	<p>14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.</p>	<p>Sample storage will be returned to the FUSRAP Maywood Superfund Site for future disposition.</p>	<p>January 11, 2000</p>
<p>9.0 QUALITY ASSURANCE/QUALITY CONTROL Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment rinsate blanks and duplicates. Equipment rinsate blanks must be collected each day that sampling occurs or each decontamination event, whichever is less, per matrix per parameter per field crew, per equipment type (assuming reusable sampling equipment is used). This QA/QC requirement may be modified based on conversations with USACE, USEPA, and NJDEP. Field duplicate samples must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement. Field duplicate samples must represent no less than 10 % of the total number of samples per matrix per parameter per area of study. Field duplicate gamma radiation readings shall also be recorded at a frequency of 10% of the total gamma radiation readings.</p> <p>Matrix spike/matrix duplicate (MS/MD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat</p>	<p>Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement.</p> <p>If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given</p>	<p>Swipe sample is a more representative QC check of loose surface alpha radioactivity than aqueous rinsate sample.</p> <p>Reduction from 10% to 5% duplicate samples based on large number of soil samples proposed for PDI. In addition, 5% is consistent with NJDEP Field Sampling Procedures Manual for field duplicates and EPA guidelines for MS/MSD analysis. Electronic mail sent to EPA and NJDEP regarding reduction in duplicate percentage on January 28, 2000.</p>	<p>Equipment blank revision implemented on January 11, 2000.</p> <p>Reduction from 10% to 5% duplicate samples implemented week of February 7, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
no less than 10% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.	method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.		

Revised PDI Work Plan Table 5-1

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

PROPERTY CLUSTER NUMBER ⁽⁸⁾	NUMBER OF SAMPLING LOCATIONS						NUMBER OF SAMPLES FOR ANALYSIS BY PARAMETER ⁽⁶⁾								
	RADIOLOGICAL SURVEY				GEOTECH	ENVIR	GEOTECHNICAL					CHEMICAL ANALYSES			
	SOIL PROBES ⁽¹⁾	SOIL PROBE DEPTHS (FT) (ESTIMATED)	SOIL PROBE RADIOLOGICAL ANALYSES ⁽²⁾	SURFACE SOIL RADIOLOGICAL ANALYSES ⁽³⁾	SOIL BORINGS ⁽⁴⁾	SOIL BORINGS ^(4,5)	SPECIFIC GRAVITY	ATTERBERG LIMITS	GRAIN SIZE	TRIAXIAL TESTS ⁽⁷⁾	CONSOLID. TESTS ⁽⁷⁾	WATER CONTENT	CHROMIUM SPECIATION	TCL/TAL	FULL RCRA CHAR.
1	13	12	39	5	3	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
2	96	16	288	50	22	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
3	10	8	30	5	2	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
4	32	12	96	15	4	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
5	79	8	237	40	8	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
6	85	16	255	40	12	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
7	28	16	84	15	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
8	26	16	78	15	6	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
9	131	16	393	65	17	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
10	106	24	318	55	16	6	TBD	TBD	TBD	TBD	TBD	TBD	6	6	6
11	16	8	48	10	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
12	151	24	453	75	17	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
TOTALS	773	N/A	2319	390	115	47	---	---	---	---	---	---	47	47	47

NOTES:

- 1 Soil probes installed using direct-push method, to the depth shown or refusal.
- 2 At a minimum, three separate soil samples (one soil sample from within the suspected FUSRAP waste, one in transition zone, and one below the transition zone) will be selected for analysis of the ROC by the on-site field laboratory. A total of 2319 subsurface soil samples (i.e., 3 X 773) will be selected for ROC analysis by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 3 Five surface soil samples will be randomly collected from up to 10% of the 773 soil probe locations for radiological analyses and comparative evaluation of surface ISOCs measurement. A total of 390 surface soil samples (i.e., 5 X 78) will be selected for ROC analyses by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 4 Depths and quantities to be determined in field based on radiological data, structure foundations depths, etc.
- 5 Advanced to depth of radiological contamination.
- 6 Sample Analyses Rationale:
 - 6a Chromium Speciation - Speciation of trivalent and hexavalent chromium for health and safety purposes.
 - 6b TCL/TAL - Detection of organic and inorganic constituents to assess the potential for the presence of commingled radiological and chemical contamination.

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

6c	RCRA Characteristics - To support transportation & disposal activities
6d	Geotechnical Parameters (Specific Gravity, Atterberg Limits, Grain Size, Water Content) - To characterize physical properties of soil for excavation and remediation.
7	Triaxial tests and consolidation tests will be performed on undisturbed tube samples to determine strength and consolidation parameters of fine-grained materials, where present. These parameters will be used to perform bearing capacity and settlement analyses where excavations are adjacent to structures.
8	Property Clusters are defined as follows: <i>PROPERTY CLUSTER NO. 1: 72 SIDNEY ST. (A.K.A 88 MONEY ST.)</i> <i>PROPERTY CLUSTER NO. 2: 100, 80 HANCOCK ST., 80 INDUSTRIAL RD., AND NJVIS</i> <i>PROPERTY CLUSTER NO. 3: 170 GREGG ST.</i> <i>PROPERTY CLUSTER NO. 4: 160/174 ESSEX ST., I-80 RIGHT-OF-WAY</i> <i>PROPERTY CLUSTER NO. 5: 99 ESSEX ST, 113 ESSEX ST., 200 ROUTE 17 SOUTH</i> <i>PROPERTY CLUSTER NO. 6: 29 ESSEX ST., 85-101 ROUTE 17 NORTH, 137 ROUTE 17 NORTH, 167 ROUTE 17 NORTH, 239 ROUTE 17 NORTH</i> <i>PROPERTY CLUSTER NO. 7: 111 ESSEX ST. - SCANEL/HACKENSACK AND LODI RAILROAD</i> <i>PROPERTY CLUSTER NO. 8: 23 WEST HOWCROFT RD.</i> <i>PROPERTY CLUSTER NO.9: 149-151 MAYWOOD AVE.</i> <i>PROPERTY CLUSTER NO.10: 100 W. HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.11: 205 MAYWOOD AVENUE AND 50 & 61 WEST HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.12: 100 W. HUNTER AVE., NY, SUSQUEHANNA AND WESTERN RAILROAD, AND NJ ROUTE 17</i>

Rationale of Intrusive Sample Location Relocations

PDI Soil Probe Variance Log

Cluster No.: 4

Property Address(es): Property No. 04A – 160/174 Essex St. (Bank of New York)
Property No. 04B – I-80 Westbound Right-of-Way (NJDOT)

Sample Location Map: Figure 4-3

Number of Revised Soil Probe Locations: 14

Rationale for Revisions

- Two site wide locations, one originally proposed near the northeastern corner, and the other originally proposed along the southern boundary, were deleted because of their proximity to previous Bechtel locations. They were originally proposed to optimize the use of ISOCS. They were deleted because of the use of technology similar to the technology of previous investigations.
- Location 04A-001, originally proposed as a site wide location, was moved further northwest to investigate an area exhibiting elevated gamma counts
- Locations 04A-005 and 04A-006, originally proposed as site wide locations, were moved from the northwest central portion of 160 Essex towards the area identified as contaminated by Bechtel (BNI, 1989) for more accurate contamination delineation.
- Location 04A-013, originally proposed as a site wide location near the southwestern corner of 160 Essex, was moved further southeast to an area identified as contaminated by Bechtel (BNI, 1989) for more accurate contamination delineation.
- Locations 04A-014, 04A-015, and 04A-023 were moved due to inaccessibility. The new locations are still within the vicinity of the contaminated area identified by Bechtel (BNI, 1989) near the southeastern corner of the property along the former Lodi Brook channel.
- Location 04A-018, originally proposed as a site wide location near the northwestern portion of 174 Essex, was moved to the northwestern corner of the property after further review of ORNL's site investigation (ORNL, 1989a). Bechtel's investigation (BNI, 1989) did not identify contamination in the vicinity of the aforementioned area identified by ORNL.
- Location 04A-019, originally proposed to investigate the path of the Lodi Brook near the northwestern corner of 174 Essex, was moved further north to investigate an area exhibiting elevated gamma counts. The new location is still within the vicinity of the former Lodi Brook channel.
- Locations 04A-021 and 04A-022 near the southeastern corner of 160 Essex were moved slightly further west closer to the boundary of the area identified as contaminated by Bechtel (BNI, 1989).

- Location 04B-001 originally proposed as a site wide location, was moved further northwest into a small area with slight contamination (slightly above 5 pCi/g) after obtaining an approval from USACE to investigate that area.
- Location 04B-005 near the southeastern portion of I-80 was moved slightly further east to accommodate for the movement of location 04B-006.
- Location 04B-006 near the southeastern portion of I-80 was moved slightly further east towards the boundary of a contaminated area identified by ORNL (ORNL, 1989b).

Notes:

1. This list provides specific rationale for the relocation/deletion/addition of intrusive radiological sampling locations due to revised understanding of anticipated radiological contamination. This revised understanding was based on further review of previous data collected by others, and review of surface gamma survey and ISOCS data collected by the Team under this PDI program.
2. Base mapping used in the PDIWP (Stone & Webster, 1999a) has been revised by the Team. Accordingly, a number of intrusive sample locations needed to be relocated due to previously unforeseen physical restrictions (i.e., presence of underground utilities, unacceptable proximity to buildings/roadways, revisions to previously mapped property limits). This table is not intended to provide detailed rationale for points moved due to new mapping.

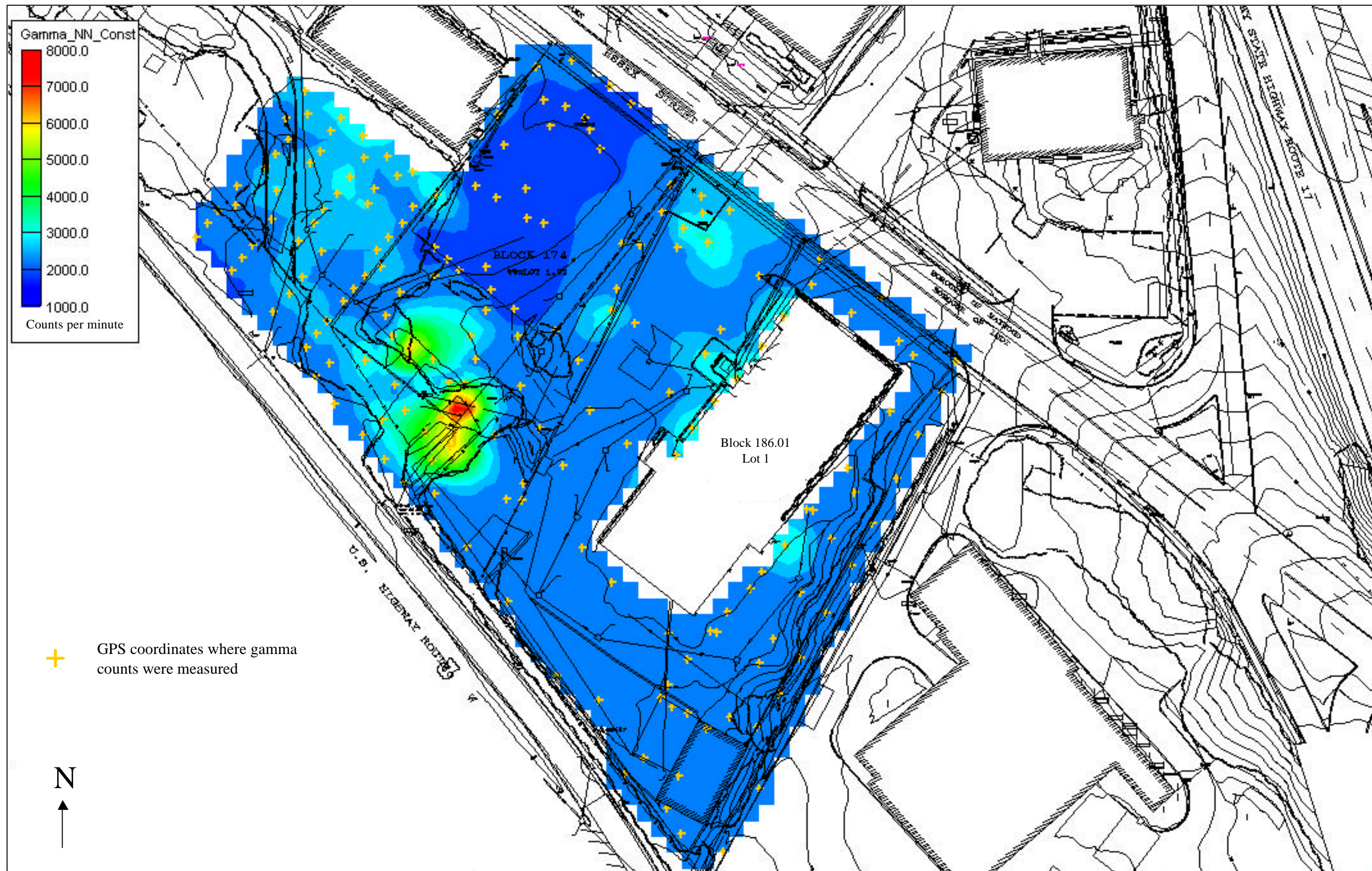
Outlier Protocol (Gamma Scan Anomalies)

Protocol for Addressing Gamma Scan Anomalies (Outliers)

Maywood FUSRAP Superfund Site

Pre-Design Investigation

1. Anomalous surface gamma scan measurements **greater than 2500 cpm for shielded areas (e.g. asphalt covered surfaces), or 3500 cpm for unshielded areas (e.g. bare soil) but, less than 6,000 cpm (1" x 1" NaI detector)** will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL. Note, these count rates are approximately one and one-half times background on shielded and unshielded surfaces.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization (i.e., eliminates the potential for elevated levels of radiological contamination at depth or provides adequate information on the existence of radiological contamination with depth) **will not be further investigated during the PDI.**
 - C. Anomalous areas that do not have previous data that are adequate for characterization **will only be investigated during the PDI if proposed soil probe locations can be moved to these locations without compromising the quality of the data from the proposed locations.** Additional soil probe locations **will not be added** to the program.
 - D. Anomalous areas where additional PDI investigations (based on 1.C) will be performed but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
2. Anomalous areas exhibiting a surface gamma count rate **greater than or equal to 6,000 cpm** (based on a 1" x 1" NaI detector) will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be as follows: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization **will not be further investigated during the PDI.**
 - C. Anomalous areas with previous data that are not adequate for characterization **will be investigated further during the PDI.** Proposed soil probe locations **will be moved** to these locations if possible, or additional soil probe locations **will be added** to the PDI program. These additional soil probes will be used to define the nature and extent of contamination within these previously unidentified areas; the quantity of additional borings is to be determined on a site-by-site basis.
 - D. Anomalous areas that require additional PDI investigations (based on 2.C) but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
3. All anomalous areas and their dispositions will be documented in the PDI.



Property Cluster No. 4: 160/174 Essex St. (Bank of NY) and I-80 Westbound Right-of-Way

Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure A4-1

Reduction in Field Duplicate and MS/MSD Frequency

Navon, Daria

Subject: FW: Reduction in field duplicate and MS/MSD frequency request

----- Forwarded by David Doyle/Environmental/SWEC on 01/28/2000
02:54 PM -----

"Shonkwiler, Glen D NWK" <Glen.D.Shonkwiler@nwk02.usace.army.mil> on 01/28/2000
02:00:15 PM

To: "carpenter.angela@epamail.epa.gov" <carpenter.angela@epamail.epa.gov>,
"dgaffica@dep.state.nj.us" <dgaffica@dep.state.nj.us>
cc: "Roos, Allen D NAN02" <Allen.D.Roos@nan02.usace.army.mil>, "Medary,
Richard T NWK" <Richard.T.Medary@nwk02.usace.army.mil>, "Mellema, Doug W
NWK" <Doug.W.Mellema@nwk02.usace.army.mil>, "Speckin, Paul D NWK"
<Paul.D.Speckin@nwk02.usace.army.mil> (bcc: David
Doyle/Environmental/SWEC)

Subject: Reduction in field duplicate and MS/MSD frequency request

Angela/Donna, with this email, USACE is notifying EPA and NJDEP of our intent to reduce the number of field duplicates and MS/MSD samples required in the Maywood Chemical Site CDQMP for the PDI sampling from 10% to 5%. The 10% frequency is a USACE-internal QC standard which USACE plans to reduce based on the large number of soil samples collected during the Pre-Design Investigation (PDI). The reduction in frequency would affect field duplicate samples collected for radionuclides of concern (ROC) and analysis by the on-site field laboratory; field duplicate gamma radiation readings (both downhole and core sample); photoionization detector (PID) or flame ionization (FID) readings; and MS/MSD samples analyzed by the off-site laboratory. It is anticipated that greater than 2000 soil samples will be analyzed by the on-site field laboratory and gamma radiation and PID readings will exceed 10,000 measurements.

Five percent is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and EPA guidelines for MS/MSD analysis. EPA Region II does not have a specific QA/QC guideline for field duplicate samples. The guideline is therefore on a case-by-case basis, in accordance with the site-specific project plans.

Please note that the 10 percent of the samples analyzed by the on-site field laboratory will still be sent to a certified off-site laboratory for confirmatory ROC analysis.

We will continue to adhere to the current 10 percent until EPA and NJ notifies USACE of its concurrence with this deviation from the CDQMP (for the PDI only). Your attention to this matter is greatly appreciated, since reduction of this QA/QC guideline will help to increase production during the Pre-Design Investigation without, in the opinion of USACE, impacting

quality and usability of the data.

Thanks,
Glen Shonkwiler
Remedial Investigations & Remedial Design Manager
Hazardous, Toxic, & Radioactive Waste Branch
U. S. Army Corps of Engineers
CENWK-EC-EA RM 610
601 E 12th St
Kansas City, MO 64106
(816) 983-3561
(816) 426-5550/5949 (fax)
glen.d.shonkwiler@usace.army.mil

APPENDIX 4-B

**PDI Soil Probe Log Sheets
(Radiological Data)**

PDI Soil Probe Log Sheet
LEGEND

List of Abbreviations:

--- = not applicable	lt = light
blk = black	MDA = minimum detectable activity
bn = brown	med = medium
cl = clay	n/r = no recovery
cnts = counts	pCi/g = picoCuries per gram
Conc. = concentration	ppm = parts per million
dk = dark	SAA = same as above
DUP = duplicate	sc = clayey sand
f = fine	sec = seconds
gm = silty gravel	sm = silty sand
gp = poorly-graded gravel	sp = poorly-graded sand
gw = well-graded gravel	sw = well-graded sand
gy = gray	tr = trace
J = estimated	U = unidentified or negative conc. less than MDA
lg = large	wht = white

List of General Comments:

- 4x4 truck-mounted model 5400 and track-mounted model 54DT Geoprobe[®] were used to collect samples. Manual direct push methodology required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- Holes were grouted with BenSeal[®]
- Gamma measurements were taken at center point
- Duplicate samples marked with an "X" for duplicate were prepared by homogenizing soil above and below the center point and then separating for analysis.
- The depth listed is the center point
- Error: 2 sigma (95% confidence interval)

Tube Types

1-inch diameter = Dual Tube (actual 1.3-inch diameter)

2-inch diameter = Macro-Core[®] (actual 1.7-inch diameter)

Sample Intervals

Dual Tube – 13 inches

Macro-Core[®] – 8 inches

Manual Direct Push – 24 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750009	2164258	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/02/2000	02/03/2000	02/03/2000	11:05
Time	10:15	10:05	J. Dekoskie	
Logger	Eric Barbour	S. Ng	Multi Rae	
Detector Model #	G1	SPA-3	PID Model #	CENAN21811
Detector Serial #	C442E	33401	PID Serial #	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ Date 02/02/2000
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ Date 02/03/2000
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ Date 02/03/2000

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749900	2164241	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/02/2000	02/03/2000	02/03/2000	
Time	16:50	10:30	11:25	
Logger	Eric Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	33401	CENAN21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> 02/02/2000 Date
<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> <i>Field Original Signed</i> Signature (Core Gamma Logging)	<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> 02/03/2000 Date
<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> <i>Field Original Signed</i> Signature (PID Logging)	<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> 02/03/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750198	2164046	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/02/2000	02/03/2000	02/03/2000	11:50
Time	11:20	11:20	11:50	11:50
Logger	E. Barbour	S. Ng	J. Dekoskie	J. Dekoskie
Detector Model #	G1	SPA-3	Multi Rae	Multi Rae
Detector Serial #	C442E	CENAN 33401	CENAN 21811	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/03/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750103	2164089	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/02/2000	02/03/2000	02/03/2000	
Time	16:00	11:35	13:30	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/03/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750150	2164049	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/02/2000	02/03/2000	02/03/2000	13:55
Time	15:20	11:55	13:55	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/03/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750185	2164078	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/03/2000	02/04/2000	02/04/2000	8:00
Time	8:15	7:40	8:00	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	04A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	007	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750182	2164130	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	02/03/2000	02/04/2000	Date 02/04/2000
Time	9:20	8:00	Time 8:20
Logger	E. Barbour	S. Ng	Logger J. Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: <div style="padding-left: 40px;">0 to 4 feet = 2 inch diameter 4 to 8 feet = 1 inch diameter 8 to 12 feet = 1 inch diameter</div>			
<hr/> <i>Field Original Signed</i>		02/03/2000	
Signature (Down Hole Gamma Logging)		Date	
<hr/> <i>Field Original Signed</i>		02/04/2000	
Signature (Core Gamma Logging)		Date	
<hr/> <i>Field Original Signed</i>		02/04/2000	
Signature (PID Logging)		Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750238	2164119	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/03/2000	02/04/2000	02/04/2000	9:25
Time	10:15	8:20	J. Dekoskie	Multi Rae
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750264	2164149	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/03/2000	02/04/2000	02/04/2000	9:50
Time	10:45	8:35	02/04/2000	9:50
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750274	2164175	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		02/04/2000	02/04/2000	
Time		9:25	10:20	
Logger		S. Ng	J. Dekoskie	
Detector Model #		SPA-3	PID Model #	Multi Rae
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 4 feet = 2 inch diameter

_____ Signature (Down Hole Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/04/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results											
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5																						
1.0	0	4	A	0	0	3	2	3	0		0.54	J	0.06	0.16	1.31	J	0.07	0.22	7.67	UJ	---	7.67
1.5	0	4	A	0	0	3	2	3	1		ARCHIVED											
2.0																						
2.5	0	4	A	0	0	3	2	3	2		0.81		0.07	0.21	1.02		0.06	0.15	5.61	U	---	5.61
3.0																						
3.5																						
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750280	2164147	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/03/2000	02/04/2000	02/04/2000	11:00
Time	11:30	9:55	11:00	11:00
Logger	E. Barbour	S. Ng	J. Dekoskie	J. Dekoskie
Detector Model #	G1	SPA-3	Multi Rae	Multi Rae
Detector Serial #	C442E	CENAN 33401	CENAN 21811	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750111	2164007	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/03/2000	02/04/2000	02/04/2000	11:30
Time	12:10	10:25	11:30	J. Dekoskie
Logger	E. Barbour	S. Ng	J. Dekoskie	Multi Rae
Detector Model #	G1	SPA-3	PID Model #	CENAN 21811
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750099	2164041	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/03/2000	02/04/2000	02/04/2000	11:50
Time	13:10	10:40	11:50	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	014
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749884	2164217	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/03/2000	02/04/2000	02/04/2000	14:00
Time	13:55	11:05	14:00	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	015
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749839	2164153	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/03/2000	02/04/2000	02/04/2000	14:35
Time	14:15	11:40	14:35	14:35
Logger	E. Barbour	S. Ng	J. Dekoskie	J. Dekoskie
Detector Model #	G1	SPA-3	Multi Rae	Multi Rae
Detector Serial #	C442E	CENAN 33401	CENAN 21811	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	016
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750014	2164061	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		02/04/2000	02/07/2000	
Time		12:00	8:20	
Logger		S. Ng	J. Dekoskie	
Detector Model #		SPA-3	PID Model #	Multi Rae
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 4 feet = 2 inch diameter

_____ Signature (Down Hole Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/07/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	--					0-0.5: dk bn/blk gp sm														
0.5			385	397	0.1	0.5-1.5: dk bn sm and gp	0	4	A	0	0	3	2	4	9					
1.0			463		0.0		0	4	A	0	0	3	2	5	0					
1.5			434		0.0	1.5-2.0: red/ bn sm and gp	0	4	A	0	0	3	2	5	1					
2.0						2-4: no recovery														
2.5																				
3.0																				
3.5																				
4.0																				
4.5																				
5.0																				
5.5																				
6.0																				
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23.5																				
24.0																				

Recovery

0-4 feet: 24 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	017
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750167	2164156	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/03/2000	02/04/2000	02/07/2000	8:40
Time	14:40	14:00	J. Dekoskie	Multi Rae
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	018
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750235	2164175	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/03/2000	02/04/2000	02/07/2000	
Time	15:10	14:35	9:10	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	019
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750224	2164207	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/04/2000	02/07/2000	Date	02/07/2000
Time	10:50	8:00	Time	9:40
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	020
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750084	2164124	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/04/2000	02/07/2000	02/07/2000	11:10
Time	10:30	8:20	02/07/2000	11:10
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	021
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750060	2164012	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/04/2000	02/07/2000	02/07/2000	11:40
Time	12:00	8:45	02/07/2000	11:40
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	022
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750078	2164032	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/04/2000	02/07/2000	02/07/2000	12:00
Time	12:40	9:35	12:00	12:00
Logger	E. Barbour	S. Ng	J. Dekoskie	J. Dekoskie
Detector Model #	G1	SPA-3	Multi Rae	Multi Rae
Detector Serial #	C442E	CENAN 33401	CENAN 21811	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	023
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749795	2164187	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/04/2000	02/07/2000	02/07/2000	13:20
Time	13:05	11:00	13:20	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750352	2163907	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		02/03/2000	02/03/2000	
Time		13:45	14:15	
Logger		S. Ng	J. Dekoskie	
Detector Model #		SPA-3	PID Model #	Multi Rae
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 4 feet = 2 inch diameter
4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/03/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	04B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750297	2163860	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/02/2000	02/03/2000	02/03/2000	14:35
Time	14:00	14:00	14:35	14:35
Logger	E. Barbour	S. Ng	J. Dekoskie	J. Dekoskie
Detector Model #	G1	SPA-3	Multi Rae	Multi Rae
Detector Serial #	C442E	CENAN 33401	CENAN 21811	CENAN 21811
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 4 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/03/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	04B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750187	2163934	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/02/2000	02/03/2000	02/03/2000	
Time	14:45	14:25	15:15	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/03/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	04B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750096	2163968	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/04/2000	02/07/2000	02/07/2000	13:45
Time	8:40	11:35	13:45	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	04B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750107	2163956	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/04/2000	02/07/2000	02/07/2000	14:25
Time	9:20	13:15	02/07/2000	14:25
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2 inch diameter
4 to 8 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	04B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750132	2163925	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/04/2000	02/07/2000	02/07/2000	15:15
Time	10:00	13:40		
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	04B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750312	2163959	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/31/2000	04/03/2000	04/04/2000	
Time	10:03	14:40	10:45	
Logger	C.S. Hales	S. Ng	J. Lincoln	
Detector Model #	C443E	44-10	PID Model #	Multi Rae
Detector Serial #	G1	21779	PID Serial #	CENAN 21811
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter
 8 to 11 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/31/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 04/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 04/04/2000 Date

APPENDIX 4-C

Environmental Boring Log Sheets

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

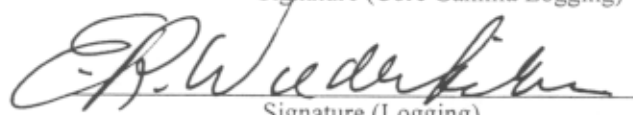
Site Designator	XXX	04a
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	m m	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)
Location	Northing (NAD 1927) 749885.648	Easting (NAD 1927) 2164210.298
	Elevation (NGVD 1929)	
	Gamma Logging	Photoionization Detector (PID) Logging
	Down Hole	Core
Date	3/17	Date
Time	1020	Time
Logger	ED WIEDERKEHR	Logger
Detector Model #		PID Model #
Detector Serial #		Multi-RAE
Scaler Model #		PID Serial #
Scaler Serial #		CENAN 21811

Comments:

- MPI No. EN04001
- Direct-push location grouted with BenSeal.


 Signature (Core Gamma Logging)

3/17/00
 Date


 Signature (Logging)

3/17/00
 Date

RAD
B.G.M 5 CPM - FOR LOCATION

START
10:00A

H₂O
6.15' ↓

STC
10:20A

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	50% RECV.	0	4	2	0	2	0	5	2	2
0.5		RANGE	↑	54R 4\2 SITY f-m									
1.0		4.8 TO	0.0	SAND ALGMS BLK CINDER									
1.5		6.05		grouting to SYRAVA									
2.0				f SANDY SILT OCCASIONAL									
2.5		↓	↓	GRAVEL fragments									
3.0													
3.5		↓	↓										
4.0		↑	↑	40% RECV.									
4.5		RANGE	↑	54R 4\4 f SANDY									
5.0		5.0 TO	0.0	SILT OCCASIONAL GRAVEL									
5.5		6.3		fragment									
6.0													
6.5		↓	↓										
7.0													
7.5		↓	↓										
8.0													
8.5				PUSHED FOR GW SAMPLING									
9.0													
9.5													
10.0				REFUSAL @ 10'									
10.5													
11.0													
11.5													
12.0													
12.5													
13.0													
13.5													
14.0													
14.5													
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23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 04a 020523

PROJECT: FUSRAP MAYWOOD SITE: 04a Page 1 of 1

Project No: 08575053 Client: USACE

Contractor: TERRA PROBE SAMPLE DEPTH: 8'-10'

Start Date/Time: 3/17/00 1020 Completion Date/Time: 3/17/00 1245 Well Diameter:

Development Method/Equipment: PURGE PERISTALTIC PUMP

Logged by: Water Level (ft bgs): 6.05' Protection Level: D

Pre-development DTW (PVC) (ft): 6.05' DTB (PVC) (ft): 10.0'

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$, 025 GAL

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) = 1.1 A

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) = 1.1 A

Minimum Purge Volume (gal) (3 well volumes) = 0.1 GAL

Development Purge/Discharge Rate (gpm):

Minimum Drawdown During Purging (ft):

Total Quantity Purged: 2 RT.

Disposition of Purge Water:

Hours of Development: 20 MIN.

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
10:48		6.15'	-	7.7°	7.82	1.72	499+	DO → 9.20
10:53		6.15'	-	7.4°	7.7	1.7	499+	DO → 9.40

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

START PURGE @ 10:20
 END PURGE @ 10:40
 1 do = 9.20
 2 do = 9.40

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	04a
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	0072 062
Media	mm	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)

	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	750221.824	2164106.223	

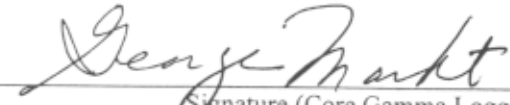

Gamma Logging		Photoionization Detector (PID) Logging	
Date	Down Hole	Date	Core
		3/22	
		0945	
		G. MARKT	
Detector Model #		PID Model #	Multi-RAE
Detector Serial #		PID Serial #	CENAN 21811
Scaler Model #			
Scaler Serial #			

Comments:


1. MPI No. ENV-04-4008
2. Direct-push location grouted with BenSeal.

DRILLER

0800 - 0815 SITE SAFETY
 0815 - 0930 STEAM CLEAN
 0930 - 0945 SOIL SAMPLING - 8'
 0945 - 1045 H₂O SAMPLE
 1045 - 1145 STEAM CLEAN

 _____ Signature (Core Gamma Logging)	3/22/00 _____ Date
 _____ Signature (Logging)	3/22/00 _____ Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)									
					X	X	X	#	#	#	#	#		
0.0				90% RECV.										
0.5		↑	↑	m-f SAND trace SILT	0	4	a	0	2	0	5	2	0	
1.0														
1.5		0.0												
2.0		↓	0.0											
2.5		↑												
3.0														
3.5		5.0	↓											
4.0		↓	↑	100% RECV.										
4.5		↑		SAME AS ABOVE										
5.0				WOOD CHIPS BLK.										
5.5														
6.0		0.0	0.0	m-f SAND, trace SILT										
6.5														
7.0		↓	↓											
7.5		↓	↓											
8.0		↓	↓											
8.5				END OF SAMPLING										
9.0				@ 8'										
9.5														
10.0				OVERDRILLED TO										
10.5				14' FOR GW SAMPLE										
11.0														
11.5														
12.0														
12.5														
13.0														
13.5														
14.0														
14.5														
15.0														
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24.0														

H₂O


¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID:
04a020521
 Page 1 of 1

PROJECT: <i>FUSRAP MAYWOOD</i>	SITE: <i>04a</i>
Project No: <i>08575053</i>	Client: <i>USACE</i>
Contractor: <i>TERRA PROBE</i>	SAMPLE DEPTH:
Start Date/Time: <i>3/22/00 0945</i>	Completion Date/Time: <i>1045</i>
Development Method/Equipment:	

Logged by:	Water Level (ft bgs): <i>8.75</i>	Protection Level: <i>D</i>
Pre-development DTW (PVC) (ft): <u>8.75</u> DTB (PVC) (ft): <u>14'</u>		
Post-development DTW (PVC) (ft):		
Standing Well Volume (gal) = $D^2(ft)/4 \times \pi \times (DTB-DTW)(ft) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.13 \text{ gal}$		
(2-inch well = $0.164 \times (DTB-DTW)(ft)$) = <u> </u>		
(2.5-inch well = $0.255 \times (DTB-DTW)(ft)$) = <u> </u>		
Minimum Purge Volume (gal) (3 well volumes) = <i>0.40 gal</i>		
Development Purge/Discharge Rate (gpm): <u> </u>		
Minimum Drawdown During Purging (ft): <u> </u>		
Total Quantity Purged: $\Rightarrow 1.5 \text{ gal}$		
Disposition of Purge Water: = <i>stored @ MISS</i>		
Hours of Development: <u> </u>		
Hours of Decon: <u> </u>		
Hours of Standby: <u> </u>		

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
<i>1010</i>		<i>8.75</i>	<i>—</i>	<i>10.6</i>	<i>8.15</i>	<i>1.35</i>	<i>33</i>	<i>DO = 5.26</i>

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

SCREEN @ 10'-14'

020524

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Site Designator	XXX	040
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	003
Media	m m	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)

	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	750130.735	21163930.465	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		3/22	Date	3/22
Time		1200	Time	1200
Logger			Logger	
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

- MPI No. ENV-04-4005
- Direct-push location grouted with BenSeal.

DRILLER

1145 - 1200 SOIL SAMPLING - 8'
 1200 - 1300 H₂O SAMPLE
 1300 - 1345 STEAM CLEAN

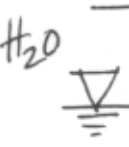
Guy Mukt
 Signature (Core Gamma Logging)

3/22/02
 Date

Guy Mukt
 Signature (Logging)

3/22/02
 Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)														
					X	X	X	#	#	#	#	#							
0.0																			
0.5		↑	↑	90% RECV.	0	4	0	2	0	5	7	4							
1.0		0.0	0.0	m-f SAND processed															
1.5				STONE, GLASS & BRICK															
2.0		↓	↓																
2.5																			
3.0		2.0	↓																
3.5																			
4.0		↑	↑	100% RECV.															
4.5				SILTY CLAY, GRAY															
5.0				m-f poorly sorted															
5.5		0.0	0.0	SAND															
6.0																			
6.5		↓	↓																
7.0																			
7.5		↓	↓																
8.0																			
8.5				END OF SAMPLING															
9.0				@ 8'															
9.5																			
10.0				OVERDRILLED TO															
10.5				12' for GW SAMPLE															
11.0																			
11.5																			
12.0																			
12.5																			
13.0																			
13.5																			
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22.5																			
23.0																			
23.5																			
24.0																			



¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
04a 020525
 Page 1 of 1

PROJECT: <i>FUSRAP MAYWOOD</i>	SITE: <i>04a</i>
Project No: <i>08575053</i>	Client: <i>USACE</i>
Contractor: <i>TERRA PROBE INC.</i>	SAMPLE DEPTH:
Start Date/Time: <i>3/22/00 1200</i>	Completion Date/Time: <i>1300</i>
Well Diameter:	

Development Method/Equipment:

Logged by: _____ Water Level (ft bgs): *5.5'* Protection Level: *D*

Pre-development DTW (PVC) (ft): *5.5'* DTB (PVC) (ft): *12'*

Post-development DTW (PVC) (ft): _____

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow .1625 \text{ gal}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ _____)

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ _____)

Minimum Purge Volume (gal) (3 well volumes) = *.4875 gal*

Development Purge/Discharge Rate (gpm): _____

Maximum Drawdown During Purging (ft): _____

Total Quantity Purged: \Rightarrow *2 gal*

Disposition of Purge Water: \Rightarrow *Storage @ MISS*

Hours of Development: _____

Hours of Decon: _____

Hours of Standby: _____

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
<i>1207</i>		<i>5.5'</i>	<i>-</i>	<i>10.3</i>	<i>7.53</i>	<i>.999</i>	<i>204</i>	<i>DO = 2.17</i>

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

SCREEN @ 8'-12'

PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 5 – Revision 1

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

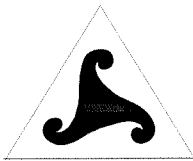
SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18

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**PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 5 – Revision 1**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18**

RECORD OF REVISIONS

Revision 0: Original Issue

Revision 1: The Final PDI Report (Revision 0) was submitted in July 2000. Revision 1 to the Final PDI Report incorporates the following significant changes: revision to text headers and footers; addition of results of confirmatory radiological analyses to [Table 5-4](#); and addition of Toxicity Characteristic Leaching Procedure (TCLP) data to [Table 5-5](#).

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ACRONYMS AND ABBREVIATIONS

AT&T	American Telephone & Telegraph
BNI	Bechtel National, Inc.
C	Degrees Centigrade
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
Conc.	Concentration
CQCP	Contractor Quality Control Plan
DOE	U.S. Department of Energy
EPP	Environmental Protection Plan
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	grams
GMS	Groundwater Modeling System
GPR	Ground Penetrating Radar
GPS	Global Positioning System
ID	Identification
ISOCS	In Situ Object Counting System
keV	kilo electron volts
kg	kilogram
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCW	Maywood Chemical Works
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
mg	milligram
MHTDP	Materials Handling, Transportation and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJVIS	New Jersey Vehicle Inspection Station
NYS&W	New York, Susquehanna & Western Railway
ORNL	Oak Ridge National Laboratories
pCi	picoCurie
PDI	Pre-Design Investigation
PDIWP	Pre-Design Investigation Work Plan
PID	Photoionization Detector
PVC/PET	Polyvinyl Chloride/Polyethylene Teraphthalate
QA	Quality Assurance
QC	Quality Control
QCSR	Quality Control Summary Report
Ra-226	Radium-226
Rn-222	Radon-222

RCRA	Resource Conservation and Recovery Act
RESRAD	Department of Energy Computer Code; RESidual RADioactivity
ROC	Radionuclides of Concern
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
St.	Street
Th-232	Thorium-232
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
ug	microgram
U-238	Uranium-238
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank

1.0 SITE BACKGROUND AND PHYSICAL SETTING

1.1 General Site Overview

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (hereafter referred to as the Maywood Site) is located in a highly developed area of Bergen County in northeastern New Jersey, in the Boroughs of Maywood and Lodi and the Township of Rochelle Park (Figure 5-1). Portions of the Maywood Site are radiologically impacted from process wastes and residues associated with the recovery and refining of thorium and thorium compounds from monazite ores by the Maywood Chemical Works (MCW) from 1916 to 1956 (Bechtel National, Inc., BNI, 1992).

Waste produced at MCW was a fine sand-like material containing residual thorium with lesser amounts of uranium and its daughter products including radium. Wastes and residues were disposed in low-lying areas west of processing facilities. In the early 1930s, a portion of these wastes and residues was separated from the main property by construction of New Jersey State Highway 17 (NJ Route 17). Additionally, the former channel of Lodi Brook runs through the majority of the properties making up the Maywood Site. Some of the contaminated materials are assumed to have eroded from the facility area and were transported downstream via Lodi Brook (Figure 5-2). In addition, from 1928 to 1944, local residents were known to use process waste in their lawns and gardens and as fill material (BNI, 1992). These are the major mechanisms for distribution of radiologically-contaminated materials on the Maywood Site.

The Maywood Site consists of 88 designated residential, commercial, municipal, and state or federal properties. All 64 Phase I properties (including all residential and municipal properties) have either been remediated by the U.S. Department of Energy (DOE) or U.S. Army Corps of Engineers (USACE) or are currently being addressed under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). The remaining 24 Phase II properties are being addressed by the Stone & Webster Team (i.e., Team).

1.2 Pre-Design Investigation Scope

On December 29, 1998, the USACE issued a Scope of Services for the design and remediation of the remaining 24 commercial and government properties. These properties potentially contain deposits of radioactive material in surface and subsurface soils resulting from operations of the former MCW. They have been designated as the Phase II properties.

A Pre-Design Investigation Work Plan (PDIWP, Stone & Webster, 1999a) was submitted in October 1999 for the Phase II properties. The purpose of the PDIWP was to address data gaps necessary to complete remedial design efforts. In determining additional data needs, it was assumed that remediation of radiologically-impacted soils would be conducted on “accessible soils” only. Accessible soils are defined as soils not under permanent structures such as buildings and roadways. Data acquisition was limited to accessible soils only.

A preliminary evaluation was performed to determine the human health risk from leaving subsurface radiologically-impacted soils proximate to these structures. The RESidual RADioactivity (RESRAD) computer code was utilized to quantify the dose and risk under a

number of assumed conditions. Based on the preliminary results, it was determined that any radioactive residues left adjacent to existing buildings, roadways, and railways would need a minimum of two feet of clean soil cover to be protective of human health. As such, it has been assumed that where radiologically-contaminated soils exist at depth adjacent to structures, at least the top two feet of radiologically-contaminated soil would be removed adjacent to the structure to a six foot horizontal setback, and then sloped at two horizontal to one vertical (2H:1V) to the required depth. However, it is recognized that site-specific calculations will need to be made during the remedial design phase in order to determine the actual depth of excavation adjacent to each structure, the horizontal setback, and the slope to final excavation depths (Stone & Webster, 1999a).

In preparing the PDIWP, the 24 Phase II properties were sub-divided into 12 clusters. The purpose of the clustering was to take a 'collective' view of a set of contiguous properties to efficiently secure needed pre-design investigation (PDI) information for those properties. [Table 5-1](#) lists the 12 clusters for the Phase II properties, from south to north. The reader is directed to the PDIWP for additional background information (Stone & Webster, 1999a).

The purpose of this PDI Report is to present data collected during the PDI for Cluster No. 5. The evaluation of PDI data, along with data collected by others during previous investigations, is documented separately.

2.0 PDI FIELD ACTIVITIES

PDI activities were performed by the following Team members:

Stone & Webster, Inc.	Team leader and engineering services
Malcolm Pirnie, Inc.	Engineering services
Science & Ecology Corporation.....	Health physics services
Cabrera Services, Inc.	Radiological survey support
Canberra Industries, Inc.	Radiological survey support
Garden State Surveying, Engineering, and Planning, Inc.	Surveying and mapping
NAEVA Geophysics, Inc.	Geophysical investigation
TerraProbe, Inc.	Direct push services
Franklin Environmental Services, Inc.	Construction services
ThermoRetec	Radiological sample analysis
RECRA LabNet.....	Environmental sample analysis
Kestrel Environmental Technologies, Inc.	Data validation

PDI activities involved non-intrusive surveys followed by intrusive investigations. The preliminary, non-intrusive PDI activities (including surface gamma scans, surface In-Situ Object Counting System (ISOCS) readings, geophysical surveys and field surveying) were initiated in August 1999. The intrusive portion of the PDI program began in January 2000 and was completed in April 2000. [Table 5-2](#) presents a summary of PDI intrusive field activities. For logistical reasons, PDI environmental borings were performed at the outset of the Groundwater Remedial Investigation program during the latter part of March and beginning of April 2000.

PDI field activities were conducted in accordance with the PDIWP, and in compliance with procedures established in the following project documents: Contractor Quality Control Plan (CQCP), Site Safety and Health Plan (SSHP), General Environmental Protection Plan (EPP), Chemical Data Quality Management Plan (CDQMP), and the Materials Handling, Transportation and Disposal Plan (MHTDP), (Stone & Webster, 1999b, c, and d, 2000a, 2000b, respectively). Variances in methodology and sample locations between the PDIWP and the actual PDI execution are discussed below.

2.1 Variances from PDIWP

This section discusses deviations in methodologies and sample locations from the approved PDIWP.

2.1.1 Methodology Variances

Methodology variances from the PDIWP were as follows:

- The PDIWP called for the use of an ISOCS utilizing germanium gamma spectroscopy to quantify radionuclide activity in soil. Following approval of the PDIWP, regulatory concerns regarding the use of ISOCS for subsurface investigation were raised. The PDIWP was subsequently modified by replacing intrusive ISOCS sampling with conventional sample

collection using direct push methods to collect soil cores for laboratory analysis. Due to this change, Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled “Soil Probe Investigation” was developed and followed. Refer to the USACE letters dated December 8, 1999 from the Project Manager, Mr. Allen Roos, informing the U.S. Environmental Protection Agency (USEPA) Project Manager, Ms. Angela Carpenter, and the New Jersey Department of Environmental Protection (NJDEP) Case Manager, Ms. Donna Gaffigan, of the modification, as presented in [Appendix 5-A](#). The USEPA approved use of SOP-SW-MWD-509-0 on December 29, 1999 and NJDEP approved it on January 20, 2000.

- A Bicron[®] Model G1 one-inch by one-inch (1” x 1”) sodium iodide (NaI) detector was substituted for the originally proposed 3/8” x 3/8” NaI detector for downhole gamma logging. This substitution was needed to provide greater detector sensitivity through the soil probe casing. Due to the addition of this detector, SOP number SW-MWD-509-0 entitled “Soil Probe Investigation” was revised. These revisions are outlined in [Table 1-A](#) in [Appendix 5-A](#). The 3/8” x 3/8” NaI detector was used only when the manual direct push method was employed. Manual direct push methodology was required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- The CDQMP originally specified a frequency of 10% for field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. This corresponds to the USACE internal quality control standard. However, due to the significant number of samples to be collected as part of the PDI program (totaling approximately 2000 soil samples and in excess of 10,000 gamma count rate and photoionization detector (PID) readings), the USACE agreed to reduce the frequency to 5%, which is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and USEPA guidelines for MS/MSD analysis. USEPA Region II does not have a specific guideline for field duplicate samples. Refer to the USACE and USEPA/NJDEP correspondence in [Appendix 5-A](#).
- The PDIWP stipulates that geotechnical borings with associated laboratory testing may be required in order to provide design parameters in locations where excavation may impact adjacent structures. Since radiological clean-up criteria have yet to be finalized, final assessment of limits of radiological contamination cannot be made at this time. The geotechnical investigation program was suspended from the PDI. During the design process, existing geotechnical information will be evaluated for design and a determination will be made if supplemental data are needed.

2.1.2 Sample Location Variances

The PDIWP was developed with the intent that proposed sample locations would be deleted, added, or moved as additional information regarding site features and contamination distribution became available during the course of the PDI implementation. In accordance with this approach, sample locations as proposed in the PDIWP were deleted, added, or moved for the following reasons:

- Base mapping developed subsequent to completion of the PDIWP provided additional information regarding underground utility locations and other site features. Proposed sample

locations proximate to these utilities and site features were moved in order to minimize impacts.

- Review of surface gamma survey data collected as part of the PDI, coupled with additional review of data from previous investigations performed by BNI and ORNL, indicated that certain proposed intrusive locations should either be moved or could be deleted. To address potential areas of surface radiological contamination not previously identified as areas of concern, a protocol was established for determining the need for additional intrusive sampling locations. Refer to “Protocol For Addressing Gamma Scan Anomalies” in [Appendix 5-A](#).

Specific rationale for the deletion, addition, or movement of locations proposed in the PDIWP are summarized in [Appendix 5-A](#).

2.2 Geophysical Surveys

Between September 20, 1999 and March 2, 2000, NAEVA Geophysics, Inc. conducted geophysical investigations on the Maywood Site. The purpose of these investigations was to delineate surface traces of detectable underground utilities in the vicinity of proposed exploratory boring sites. Equipment selected for this investigation included: a Fisher TW-6 Pipe and Cable Locator; a Radiodetection RD432PDL-2 Utility Locator; a Subsite 75 Utility Locator, a 3M Dynatel 2250 Cable Locator, and a GSSI SIR-3 ground penetrating radar (GPR) system with a 300 MHz antenna. Details of the surveys are presented in the NAEVA report (NAEVA, 2000).

2.3 Sample Locations

In October 1999, Garden State Engineering, Surveying, and Planning, Inc. performed a ground survey of the Maywood Site properties. Results of the ground survey were combined with aerial mapping prepared by GEOD Corporation to produce new base mapping for the Maywood Site. This new base mapping replaced the mapping used to generate the PDIWP drawings.

Sample points for the surface gamma survey, surface ISOCS measurements, direct push (Geoprobe[®]) sampling, and environmental sampling were located in the field using a Global Positioning System (GPS). A Trimble 4800 Site Surveyor system with a 4700 base receiver, GPS antenna, radio antenna, and ancillary equipment were used to perform GPS surveys. Base stations were set up and calibrated at specified bench-mark locations established by the surveyor. Following base receiver set up, sampling points were located. Field markings (spray paint, flags, and stakes) were used to identify intrusive sampling locations for radiological and environmental direct push mobile rigs, as well as surface ISOCS locations.

Coordinates for intrusive sample locations were determined from new PDI sample location maps which reflected updated base mapping and modified sample locations; surface ISOCS locations were identified based on original PDIWP mapping. For the surface gamma survey, GPS was used to record locations of gamma scan measurements. Where GPS instrumentation could not be utilized due to signal disruption (e.g., tree coverage, building interference, non-availability of satellites, or poor satellite reception due to weather conditions), sample locations were based on identification of site features and scaling off base mapping.

2.4 Surface Gamma Surveys

Surface gamma surveys for all of the Phase II properties were conducted from August 1999 to March 2000. Surveys were conducted to obtain distribution of surface radiological contamination for health and safety reasons, as well as to verify existing data. Measurements were collected by suspending a 1" x 1" NaI gamma scintillation detector coupled to a Ludlum Model 12 ratemeter within a few inches of the ground surface. A health physics technician walked transects (approximately four to six feet wide) covering the properties while slowly swinging the detector in a serpentine motion. Transects were spaced to assure full areal coverage with some overlap. Gamma count measurements were taken approximately every 15 to 20 feet; measurement frequency was increased in areas exhibiting elevated gamma counts. Minimum detectable concentrations (MDCs) for this detector for the radionuclides of concern (ROC) are approximately 4.7 picoCurie per gram (pCi/g) for Radium-226 (Ra-226), 3.0 pCi/g for Thorium-232 (Th-232), and 121.0 pCi/g for Uranium-238 (U-238), correcting for volume and distance from the source (Multi-Agency Radiation Survey and Site Investigation Manual, MARSSIM, 1997). Gamma count data were stored with associated locations in the GPS recorder. In some instances where locations could not be recorded with a GPS (as stipulated above), measurements were manually recorded on the PDI maps.

2.5 Surface ISOCS Measurements

Surface ISOCS measurements were collected at selected locations where environmental, geotechnical, and radiological shallow boreholes were proposed in the PDIWP. Surface ISOCS measurements were collected to identify and quantify radionuclide activity in surface soil, beneath shielded areas (e.g., areas covered with gravel, asphalt, and concrete), and in areas proposed for environmental borings.

Gamma spectroscopy measurements of surface soil were collected using the Canberra high-purity germanium ISOCS and assuming uniform radioactivity distribution in soil. The high-purity germanium detector was positioned in a "downward-looking" direction perpendicular to the ground surface at a height of three feet. The detector was collimated using a lead shield subtending a 90-degree angle, which provided a surface soil viewing area approximately six feet in diameter. The back and side of the detector were shielded with two-inch thick lead O-rings. The detector collimator and shielding were used to ensure that radioactivity detected by the probe originated only from the six-foot diameter area beneath the detector, hence minimizing one possible source of error in the measurements.

2.6 Direct Push Soil Probes

Direct push soil probes (using truck-mounted model 5400 Geoprob[®] or track-mounted model 54DT Geoprob[®]) were used to collect soil samples for radiological and environmental parameter analysis. Two types of direct push soil probes were used: a single rod system (i.e., Macro-Core[®]) and a dual tube (or cased) system. The latter system utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Samples were collected in four-foot soil cores within polyvinyl chloride/polyethylene terephthalate (PVC/PET) liners, marked with the appropriate field identification number, sealed with rubber end caps, and placed

into a two-inch inner diameter PVC container (including PVC end caps) for transport and storage.

For sample locations that were inaccessible to the mounted direct push rigs, soil cores were collected using a manual direct push method. Two-foot cores approximately one inch in diameter were collected using an electric powered hand-held vibratory hammer.

Prior to commencing intrusive sampling, underground utilities in the vicinity of the proposed boring locations were identified by reviewing PDI geophysical survey data, and by contacting the appropriate authorized parties (i.e., New Jersey One-Call System, and the property owner). In addition, a safe working distance from overhead utilities was maintained.

Sampling equipment (the rig, direct push soil probe casing and tools) was decontaminated prior to use and following each borehole installation using pressure or manual washing. Each soil probe hole was backfilled for the full length using Benseal[®] bentonite in accordance with project requirements. For areas covered by asphalt, cold patch was placed at the surface.

2.6.1 Downhole Gamma Logging

Measurements were taken with a Bicron[®] Model G1 1" x 1" NaI gamma detector sealed in a waterproof stainless steel container. The instrument MDCs are approximately 3.6 pCi/g for Ra-226, 2.3 pCi/g for Th-232, and 92.0 pCi/g for U-238, which are approximately 75% of the surface MDCs listed in Section 2.4. This estimate assumes a geometry factor of 0.50, where a four pi geometry (i.e., a sphere) when scanning downhole is approximately half of a two pi geometry (i.e., a hemisphere) when scanning the ground surface. However, this reduction in the MDCs is modified by the 0.3-inch steel casing in the hole, which results in an approximate 33% reduction in the gammas seen by the detector as calculated by the computer code Microshield[™]. The correction factor is therefore calculated by dividing the geometry factor (0.50) by the steel casing reduction factor (0.66), yielding approximately 0.75. The NaI detector was connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector[™] multi-channel analyzer/amplifier/high voltage power supply. The system was controlled, and the data stored, via notebook computer. Ten-second integrated gross gamma measurements were recorded at each 6-inch depth increment in the cased soil probe holes and data entered onto the PDI Soil Probe Log Sheets (see [Appendix 5-B](#)). In areas where samples were collected using the manual direct push method, a Bicron[®] 3/8" x 3/8" NaI gamma detector coupled to a Ludlum Model 2221 scaler/ratemeter was used to take 30 to 60-second gross gamma measurements in uncased soil probe holes. The MDCs for this instrument are estimated to be approximately 1.9 pCi/g for Ra-226 and 2.3 pCi/g for Th-232, as provided by the vendor. There is no correction factor for these MDCs.

2.6.2 Direct Push Core Screening/Sample Collection

Sealed PVC containers collected from direct push mobile and manual rigs were transported to the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation added to the PDI Soil Probe Log Sheets (see [Appendix 5-B](#)) included soil column description and soil screening data. Field screening for radiological activity was performed on soil cores contained in the PVC/PET liner. A collimated Eberline

SPA-3 2" x 2" NaI detector (or Ludlum Model 44-10) coupled to a Ludlum Model 2221 scaler/ratemeter was used to measure gamma activity. The detector was positioned approximately 0.5 inch above the soil core, on a guide, to ensure that this distance was maintained over the entire length of each soil core. Continuous scanning of the soil core was performed at an approximate rate of three inches per second. The instrument MDC, taken from MARSSIM, is estimated to be 2.8 pCi/g for Ra-226, 1.8 pCi/g for Th-232, and 80 pCi/g for U-238 (MARSSIM, 1997). Although the MARSSIM MDC values are based upon an open area, it was assumed that the slower scan time compensated for the different geometry. An indelible marker was used to mark the liner where elevated readings were identified during scanning. Total integrated gross gamma counts were accumulated over a 30-second interval and recorded.

Soil cores were also screened for total volatile organic vapors using a PID. A series of small perforations were made along the PVC/PET liner at 12-inch increments to expose soil to the PID. Perforations were sealed with tape after PID screening. Screening results were recorded on the PDI Soil Probe Logs.

Prior to obtaining samples, each core was photographed using a digital camera. A brief soil field classification description of each core was entered onto the PDI Soil Probe Log Sheet.

Soil samples were selected from each direct push location for analysis of the ROC: Th-232, Ra-226, and U-238. Samples were selected based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample was taken at the highest reading location (suspected FUSRAP waste, if present, as defined in the Federal Facilities Agreement dated November, 1991; DOE and USEPA, 1991); a second soil sample was collected where the readings approached a constant value (suspected transition zone, if present); and a third soil sample was collected within the zone of constant readings (below suspected transition zone). When soil cores exhibited uniform count rates (i.e., elevated gamma measurements were not identified), three samples per soil probe location were collected.

Selected samples were obtained from each core sufficient to fill a 300-milliliter sample container. Samples were labeled and capped at either end with plastic caps. Caps were color-coded for 'top' and 'bottom' of the original hole. Each extracted section of the soil core was replaced with a wooden spacer to indicate what portion of the soil core was sampled. The spacer was labeled with the sample identification number of the soil removed for testing. After screening and sample extraction, remaining portions of each soil core were placed back into the appropriate PVC container, with the wooden spacer in its appropriate location, and stored on-site for future reference. The section of core tube containing the sample was then transferred to the MISS on-site laboratory for sample preparation and analysis.

Evaluation of all gamma log data led to the archiving of selected samples. That is, a number of the direct push soil probes exhibited 'constant' count rates over the depth interval. In these cases, rather than having all samples analyzed at this time, the deepest prepared sample was not counted but archived. By doing this, as laboratory results confirm that radiological contamination does not exist at that soil probe location, unnecessary analytical work is

prevented. Samples that were archived are noted on the PDI Soil Logs in [Appendix 5-B](#) and on [Table 5-4](#).

As described above, a collimated Eberline SPA-3 or Ludlum Model 44-10 2" x 2" NaI detector was used to measure gamma activity for the soil cores, while a Bicron[®] Model G1 1" x 1" NaI gamma detector was used for the downhole measurements. The 2" x 2" NaI detector (Eberline SPA-3 or Ludlum Model 44-10) provided confirmation of downhole measurements and greater sensitivity for sample selection than the 1" x 1" NaI gamma detector.

2.6.3 Sample Preparation

Soil samples were screened to remove small debris and oven-dried to obtain moisture content and to facilitate grinding. Grinding assured sample homogenization. Samples were then transferred to a 300-milliliter commercially supplied metal can. Lids were secured on cans, after which they were shelved for 21 days. The 21-day period was required to allow radon and its daughter products to in-grow and establish secular equilibrium between Ra-226, Radon-222 (Rn-222), and the gamma-emitting daughters.

2.6.4 Laboratory Data

Analysis for ROC on selected samples was performed at the MISS on-site field laboratory using a Canberra high-purity germanium detector. All testing in the MISS on-site field laboratory was completed in accordance with the procedures outlined in the CDQMP. MISS on-site field laboratory data have been entered onto the PDI Soil Probe Log sheets (see [Appendix 5-B](#)).

The Project Chemist evaluated 10% of the MISS on-site field laboratory radiological data packages; the evaluation is included in the PDI Quality Control Summary Report (QCSR; Stone & Webster, 2000c). The laboratory qualified the reported data when the germanium detector measurement system fell outside of one of the control limits during quality control check runs. Data qualification procedures are described in the PDI QCSR.

Ten percent of the samples analyzed by the MISS on-site field laboratory were sent to a USACE-approved off-site laboratory (ThermoRetec) for confirmatory analysis of the ROC. Following analysis, all soil samples were returned to the Maywood Site for storage and future reference. Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the off-site confirmatory radiological data. Radiological data were evaluated using the USACE's Radiological Data Quality Evaluation Guidance, as presented in the CDQMP. The data validation reports for the radiological confirmatory sample results are provided in the PDI QCSR.

2.7 Environmental Sampling

A limited number of soil samples were collected for environmental analyses in order to identify potential chemical contamination commingled with the radioactive waste. This information would aid in assessing waste classification (i.e., whether hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), is commingled with radioactive waste) as well as provide data for worker health and safety. Samples for environmental analysis were

collected using direct push Macro-Core[®] methodology. Sampling depths were based on the anticipated depth of radiological contamination. Soils exhibiting the highest PID readings or visual contamination were collected and sent for laboratory analysis by a USACE and NJDEP certified laboratory (RECRA LabNet). Samples were analyzed for RCRA disposal characteristics (ignitability, reactivity, corrosivity, and toxicity characteristic leaching procedure TCLP), the Target Compound List (TCL) and the Target Analyte List (TAL) with chromium speciation.

During performance of environmental borings, environmental boring log sheets were completed for each boring. Copies of the completed log sheets are included in [Appendix 5-C](#).

Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the environmental data. Environmental data were evaluated using the USACE's Data Quality Evaluation Guidance, as presented in the CDQMP. In addition, the USEPA Region II SOP No. HW-24, Revision I, June 1999, was also applied. The data validation reports for the environmental sample results are provided in the PDI QCSR.

2.8 Geotechnical Sampling

Radiological cleanup criteria have yet to be finalized, therefore final assessment of the extent of radiological contamination cannot be made at this time. The geotechnical investigation program was therefore suspended from the PDI. Following approximate determination of limits of excavation during the design phase, existing geotechnical information will be evaluated for remedial design purposes. If it is decided that additional information is required, then the geotechnical program will be reinstated, as necessary.

2.9 Quality Assurance/Quality Control

Field and laboratory activities were completed in accordance with the CQCP and the CDQMP. Data reflecting adherence to the Quality Assurance / Quality Control (QA/QC) program was documented and presented in the PDI QCSR.

2.10 Health and Safety

All PDI investigation activities were conducted in compliance with the SSHP and associated protocols and directives. Field crews received daily briefings at 'Plan of the Day' meetings prior to any work activities. These meetings reviewed daily health and safety issues such as potential inclement weather, as well as reviews of general site health and safety directives.

3.0 CLUSTER DESCRIPTION AND PDI RESULTS

3.1 Cluster No. 5 Description

Cluster No. 5 consists of three properties in the Borough of Maywood:

- Property No. 05A - 99 Essex Street (owned by Joseph Muscarelle Associates)
- Property No. 05B – 113 Essex Street (owned by Bank of New York)
- Property No. 05C – 200 NJ Route 17 South (owned by 200 Route 17 Associates L.L.C.; tenant is Sears Appliance Service Center)

The paragraphs below provide detailed descriptions of each property.

3.1.1 Property No. 05A – 99 Essex Street

Property No. 05A (99 Essex St.; Block 125, Lot 1) is located at the corner of Essex Street and NJ Route 17 South (adjacent to the NJ Route 17 South exit ramp for Essex Street). The property contains a 2-story building and is surrounded by asphalt pavement with small landscaped areas adjacent to the building on three sides. The building contains offices, open clerical areas, and conference rooms. A basement area contains offices, storage areas, and a boiler room. There are both front and rear entrances to the building. Employees are normally present 5 days per week for 8 hours per day (BNI, 1994). Building tenants include Joseph Muscarelle Associates, D.M.R. Associates, and Key Skills Learning, Inc.

The north side of the property is bordered by 113 Essex Street (Property No. 05B). The NJ Route 17 exit ramp lies to the east of the property and Essex Street borders the property to the south. A former 2,000 gallon gasoline Underground Storage Tank (UST) located near Essex Street was removed from service in 1993. Soil samples were collected and no chemical contamination was detected above the NJDEP cleanup criteria. The property has two NJDEP enforcement cases (#92-03-12-1004, #93-03- #93-03-0900) both related to the 2,000 gallon UST. A letter of No Further Action was issued by the NJDEP on October 14, 1993 (Environmental Resolutions Inc., 1999).

3.1.2 Property No. 05B – 113 Essex St.

Property No. 05B (113 Essex St.; Block 125, Lot 2) was formerly owned by National Community Bank, and is currently under ownership of the Bank of New York. The property contains a 2-story building constructed in the mid-1960s. The former stream channel of the Lodi Brook once flowed across this property (BNI, 1994). Later, before the 2-story building was constructed, the Lodi Brook crossed the property in four underground 24-inch concrete pipes. At present, it crosses the bank property in a new concrete box culvert a few feet south of the original easement at the rear of the building. From the original point of entry to the property at NJ Route 17, the new easement parallels the southeast wall of the building until it reaches the front lawn, where it angles back to the original easement and goes under Essex Street. Movement of soil

during installation of the original four pipes, and again during relocation of the stream to the new culvert, could have spread contamination over a large portion of the property (ORNL, 1989).

Property No. 05B was purchased by the Bank of New York in 1994. Currently, there are about 150 full-time employees in the bank's service center, which is not open to the public. Most of the property is covered with asphalt pavement and there is a small landscaped lawn area in front of the building. The brick veneer building is two stories tall with a full basement, which contains a cafeteria, several large work areas, and a boiler room. The property is bounded by Property No. 05C to the north and Property No. 05A to the south. Commercial properties lie to the west and NJ Route 17 lies to the east.

3.1.3 Property No. 05C – 200 Route 17 South

The 200 Route 17 South property (Sears Appliance Service Center; Block 125, Lot 3) is accessed from NJ Route 17 South, which lies just east of the property. This access area was previously found to be contaminated with subsurface radioactive contamination. The property contains a 1-story building that includes a retail sales area, telemarketing area, television repair, small engine repair, office for clerical personnel, parts warehouse, employee lunchroom, and a loading dock. The facility is operated six days per week (64 hours) and has approximately 40 employees (BNI, 1994). Most of the property is covered by asphalt pavement. An open, unconfined portion of Lodi Brook flows parallel with NJ Route 17 South along the southeastern property boundary (BNI, 1994). At the point the brook exits the property, it enters a concrete conduit and flows to a box culvert on the adjacent property. At the southern end of the building, in the parking area, there is a buried petroleum tank (size and exact location unknown) used to fuel delivery/service vehicles operated by the Sears facility (BNI, 1994).

Refer to [Figure 5-3](#) for more specific details of site features.

3.2 Radiological Data

3.2.1 Surface Gamma Survey

A surface gamma survey was performed at Cluster No. 5. Data, recorded using GPS, was entered into the Groundwater Modeling System (GMS) software package and contoured to a two-dimensional grid using the "Natural Neighbor" contouring protocol. "Natural Neighbor" interpolation is based on the Thiessen polygon network of the scatter point set. Data are interpolated based on distance as well as topological relationships (Boss International, Inc., 2000).

Results of the gamma scan survey for Cluster No. 5 are presented graphically on [Figure 5-4](#) and [Figure 5-A1](#) (Appendix 5-A). [Figure 5-4](#) presents surface gamma scan data in context of the Maywood Site: the upper limit of the contour range is the maximum gamma count measurement detected at the Maywood Site, and the lower contour range represents 1.5 times the background gamma count rate for Cluster No. 5 (background is approximately 1,800 counts per minute for Cluster No. 5). [Figure 5-A1](#) provides a more detailed, cluster-specific, presentation of the gamma scan data, with contoured ranges corresponding to actual minimum and maximum measured gross gamma counts recorded at Cluster No. 5.

3.2.2 *Surface ISOCS Measurements*

Surface ISOCS measurements were taken at 40 locations on Cluster No. 5; locations are shown on [Figure 5-3](#). Results of surface ISOCS measurements are tabulated on [Table 5-3](#).

3.2.3 *Direct Push Soil Probes*

Seventy-five (75) direct push soil probes were performed at Cluster No. 5 for radiological purposes. Locations of the probes are shown on [Figure 5-3](#).

3.2.3.1 Downhole Gamma Logging

Results from downhole gamma logging measurements taken at the direct push soil probe locations are presented on the PDI Soil Probe Logs included in [Appendix 5-B](#).

3.2.3.2 Direct Push Core Screening/Sample Collection

Results of soil core screening activities performed at the MISS on-site field laboratory are recorded on PDI Soil Probe Logs included in [Appendix 5-B](#).

3.2.3.3 MISS On-Site Field Laboratory Data and ThermoRetec Confirmatory Data

Two-hundred and thirty-five (235) soil samples were collected for laboratory analysis from the 75 soil probe locations at Cluster No. 5. One-hundred and eighty-two (182) of 235 samples were sent for analysis (including 19 duplicates); 53 were archived. Laboratory data consisting of soil concentrations of the ROC are presented on the soil probe logs in [Appendix 5-B](#), and summarized on [Table 5-4](#). Archived samples are also recorded on the logs and the table.

Twelve of the soil samples analyzed by the MISS on-site field laboratory were sent to ThermoRetec for confirmatory analysis. Results of the confirmatory analyses performed by ThermoRetec are shown in [Table 5-4](#).

As part of the data quality objective process, a comparison study was performed between the MISS on-site field laboratory and the ThermoRetec laboratory data. The results of the comparison can be found under separate cover (Stone & Webster, 2000d).

3.3 Environmental Data

Three environmental borings were drilled at Cluster No. 5, and three soil samples were collected for environmental analysis. A summary of the environmental analytical data is presented on [Table 5-5](#). [Figure 5-3](#) shows the location of the borings. In addition, the environmental boring log sheets are included in [Appendix 5-C](#).

4.0 REFERENCES

Bechtel National, Inc. Remedial Investigation Report for the Maywood Site, December 1992

Bechtel National, Inc. Results of Radon and Gamma Radiation Measurements at 19 Commercial and Governmental Properties of the Maywood Site, DE-AC05-91OR21949; August 1994.

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NAEVA Geophysics, Inc. Results of Subsurface Investigation for the FUSRAP Maywood Superfund Site; 2000.

Oak Ridge National Laboratory (ORNL). Results of the Radiological Survey at 200 State Route 17 (MJ035), ORNL/RASA-88/23. Oak Ridge, Tennessee; February 1989.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Work Plan*, FUSRAP Maywood Superfund Site. Boston, MA; October 1999a.

Stone & Webster Environmental Technology & Services. *Final Contractor Quality Control Plan*, FUSRAP Maywood Superfund Site. Boston, MA; October 1999b.

Stone & Webster Environmental Technology & Services. *Final Site Safety and Health Plan*, FUSRAP Maywood Superfund Site. Boston, MA, August 1999c.

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Stone & Webster Environmental Technology & Services. *Chemical Data Quality Management Plan, Revision 1*, FUSRAP Maywood Superfund Site. Boston, MA; February 2000a.

Stone & Webster Environmental Technology & Services. *Materials Handling/Transportation and Disposal Plan*, FUSRAP Maywood Superfund Site. Boston, MA; January 2000b.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Quality Control Summary Report*, FUSRAP Maywood Superfund Site. Boston, MA; March 2000c.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Radiological Data Comparison Study*, FUSRAP Maywood Superfund Site. Boston, MA; December 2000d.

U.S. Department of Energy and U.S. Environmental Protection Agency. Federal Facility Agreement for the Maywood Interim Storage Site; November, 1991.

Table 5-1: Properties Comprising Each Cluster

Cluster No.	Property No.	Properties (occupant)	Township/Borough	Property Block & Lot
1	01A	72 Sidney St. (Vacant)	Lodi	Block 164, Lots 1 and 5
2	02A	100 Hancock Street (AT&T)	Lodi	Block 205.03, Lot 2.04
	02B	80 Hancock Street (Vacant)	Lodi	Block 205.03, Lot 2.03
	02C	80 Industrial Road (American Jewel Windows)	Lodi	Block 205.02, Lot 4.02
	02D	8 Mill St. (NJVIS)	Lodi	Block 205.02, Lot 1.05
3	03A	170 Gregg Street (Bergen Cable)	Lodi	Block 205, Lot 1.02
4	04A	160/174 Essex Street (Bank of New York)	Lodi	Block 186.01, Lot 1 and Block 174, Lot 1.02
	04B	I-80 Westbound Right-of-Way (NJDOT)	Lodi	Not Applicable
5	05A	99 Essex Street (Joseph Muscarelle, Inc.)	Maywood	Block 125, Lot 1
	05B	113 Essex Street (Bank of New York)	Maywood	Block 125, Lot 2
	05C	200 NJ Route 17 South (Sears Appliance Repair)	Maywood	Block 125, Lot 3
6	06A	85-101 NJ Route 17 North (Architectural Windows)	Maywood	Block 124, Lot 4
	06B	137 NJ Route 17 North (Ramsey Auto Group)	Maywood	Block 124, Lot 3
	06C	167 NJ Route 17 North (Sunoco Station - Inactive)	Maywood	Block 124, Lot 2
	06D	239 NJ Route 17 North (Gulf Station)	Maywood	Block 124, Lot 1
	06E	29 Essex Street (Federal Express Corporation)	Maywood	Block 124, Lot 5
7	07A	111 Essex Street (Scanel Company, Inc.)	Maywood	Block 131, Lots 1,2,3,4
	07B	New York, Susquehanna & Western Railway - Lodi Branch	Maywood	Block 131, Lot 8
8	08A	23 West Howcroft Road (Maywood Furniture, Inc.)	Maywood	Block 124, Lot 17
9	09A	149-151 Maywood Avenue (Sears Logistical Services)	Maywood; Rochelle Park	Block 124, Lot 30; Block 17.02, Lot 1
10	10A	100 West Hunter Avenue (Stepan Company)	Maywood; Rochelle Park	Block 124, Lot 10; Block 18.02, Lot 2
11	11A	205 Maywood Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
	11B	61 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 50
	11C	50 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
12	12A	New York, Susquehanna & Western Railway	Maywood; Rochelle Park	Block 124, Lot 55 and Block 110, Lot 1
	12B	100 West Hunter Avenue (MISS)	Maywood; Rochelle Park	Block 124, Lot 46 and Block 20.01, Lot 1
	12C	New Jersey Route 17 (NJDOT)	Rochelle Park	Not Applicable

Table 5-2: Summary of PDI Intrusive Field Activities

Cluster No.	Property No.	Property Address	Occupant	Planned			Actual			Schedule (Year 2000)
				Probe Locations	Depth (ft)	Footage (ft)	Probe Locations	Depth (ft)	Footage (ft)	
1	01A	72 Sydney Street	Vacant	13	12	156	15	12	188	Jan. 11, 12, Mar. 31
2	02A	100 Hancock Street	AT&T	17	16	272	17	6 - 12	194	Jan. 27, Feb. 1, 2, Mar. 16
	02B	80 Hancock Street	Vacant	18	16	288	Pending Right of Entry Agreement			
	02C	80 Industrial Road	American Jewel Windows	23	16	368	20	12	272	Jan. 21, 24, 28, Feb. 1
	02D	8 Mill Street	NJVIS	38	16	608	44	12 - 16	593	Jan. 13, 14, 18, 19, 20, 21
3	03A	170 Gregg Street	Bergen Cable	10	8	80	10	8	62	Jan. 12, 13
4	04A	160/174 Essex Street	Bank of New York	25	12	300	23	4 - 12	427	Feb. 2, 3, 4
	04B	I-80 Right-of-Way	NJDOT	7	12	84	7	8 - 12	69	Feb. 2, 4, Mar. 31
5	05A	99 Essex Street	Joseph Muscarelle, Inc.	38	8	304	38	8	318	Feb. 23, 24, Mar. 17
	05B	113 Essex Street	Bank of New York	18	8	144	21	4 - 16	171	Feb. 8, 10, 16
	05C	200 NJ Route 17 South	Sears Appliance Repair	23	8	184	16	8 - 10	129	Feb. 15, 16, Mar. 2
6	06A	85-101 NJ Route 17 North	Architectural Windows	17	12	204	17	8 - 18	196	Feb. 9, 10, 16, Mar. 16
	06B	137 NJ Route 17 North	Ramsey Auto Group	15	12	190	13	10 - 12	145	Feb. 9, 16, 25
	06C	167 NJ Route 17 North	Sunoco Station - Inactive	27	12	324	19	3 - 14	239	Feb. 11, Mar. 8
	06D	239 NJ Route 17 North	Gulf Station	19	12	228	2	11 - 12	23	Feb. 16
	06E	29 Essex Street	Federal Express Corporation	7	12	84	9	7 - 12	95	Feb. 16, Mar. 31
7	07A	111 Essex Street	Scanel Company, Inc.	12	16	192	12	12 - 22	161	Feb. 21, 22, 23
	07B	NYS&W - Lodi Branch	NYS&W - Lodi Branch	16	16	256	11	6 - 16	115	Feb. 21, 22
8	08A	23 West Howcroft Street	Maywood Furniture, Inc.	26	16	416	25	7 - 16	321	Feb. 17, 21
9	09A	149-151 Maywood Avenue	Sears Logistical Services	131	16	2096	72	4 - 16	574	Mar. 2, 3, 6, 7, 8, 9, 15
10	10A	100 West Hunter Avenue	Stepan Company	106	24	2544	92	4 - 24	1076	Feb. 25, 28, 29, Mar. 1, 2, 6, 7, 9, 16, 30
11	11A	205 Maywood Avenue	Myron Manufacturing	5	8	40	5	8 - 12	44	Feb. 16
	11B	61 West Hunter Avenue	Myron Manufacturing	9	8	72	10	8 - 16	87	Feb. 15, 21
	11C	50 West Hunter Avenue	Myron Manufacturing	1	8	8	1	8	8	Feb. 15
12	12A	NYS&W	NYS&W	31	24	744	27	12 - 27	335	Feb. 18, 22, 24, Mar. 16, 30
	12B	100 West Hunter Avenue	MISS	120	24	2880	100	7 - 26	1769	Feb. 4, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24, 25, 29, Mar. 1, 7, 8, 9
	12C	NJ Route 17	NJDOT	0	0	0	0	0	0	<i>No investigations planned.</i>
TOTALS:				772		13,066	626		7,611	

Table 5-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
5A-SI001-SS-0-1	0.45	20.7	0.32	1.57	13.5	0.01	< 4.48	----	4.48
5A-SI002-SS-0-1	0.45	21.7	0.25	1.35	14.9	0.01	< 4.07	----	4.07
5A-SI003-SS-0-1	0.66	17.6	0.31	2.90	10.7	0.01	< 5.62	----	5.62
5A-SI004-SS-0-1	0.44	21.9	0.23	1.67	13.0	0.01	< 5.45	----	5.45
5A-SI005-SS-0-1	0.56	19.6	0.34	3.18	10.0	0.10	< 5.18	----	5.18
5A-SI006-SS-0-1	0.46	23.0	0.25	2.98	10.5	0.16	< 5.24	----	5.24
5A-SI007-SS-0-1	0.61	18.6	0.40	3.35	10.0	0.20	< 5.50	----	5.50
5A-SI008-SS-0-1	0.62	19.8	0.38	4.47	8.9	0.01	< 6.47	----	6.47
5A-SI009-SS-0-1 (1)	0.77	16.8	0.32	3.92	9.5	0.01	< 5.56	----	5.56
5A-SI009-SS-1-1 (1)	0.59	20.8	0.33	4.08	9.3	0.09	< 5.57	----	5.57
5A-SI010-SS-0-1	0.45	21.0	0.29	2.28	11.5	0.01	< 4.43	----	4.43
5A-SI011-SS-0-1	0.33	24.0	0.15	0.35	33.0	0.09	< 3.89	----	3.89
5A-SI012-SS-0-1	0.50	20.6	0.27	2.26	11.6	0.09	< 4.43	----	4.43
5A-SI013-SS-0-1	0.30	27.0	0.22	0.42	28.0	0.01	< 5.54	----	5.54
5A-SI014-SS-0-1	0.30	24.9	0.18	0.35	33.0	0.01	< 3.09	----	3.09
5A-SI015-SS-0-1	0.65	28.0	0.36	0.62	33.7	0.13	< 10.20	----	10.20
5A-SI016-SS-0-1	0.30	25.7	0.16	0.79	18.9	0.01	< 3.34	----	3.34
5A-SI017-SS-0-1	0.36	23.7	0.03	0.38	30.0	0.11	< 5.70	----	5.70
5A-SI018-SS-0-1	0.35	28.5	0.32	4.07	9.0	0.14	< 5.57	----	5.57
5A-SI019-SS-0-1 (1)	0.37	26.9	0.22	1.06	17.0	0.08	< 5.37	----	5.37
5A-SI019-SS-1-1 (1)	0.39	23.0	0.15	0.96	18.5	0.01	< 6.17	----	6.17
5A-SI020-SS-0-1 (1)	0.64	19.0	0.35	6.14	8.0	0.17	< 6.87	----	6.87
5A-SI020-SS-1-1 (1)	0.69	18.0	0.33	6.27	8.0	0.01	< 6.56	----	6.56
5A-SI021-SS-0-1	0.27	28.6	0.19	0.60	23.0	0.01	< 5.63	----	5.63
5A-SI022-SS-0-1	0.89	15.5	0.38	6.84	7.7	0.17	< 6.47	----	6.47
5A-SI023-SS-0-1	0.64	22.0	0.46	5.05	9.0	0.09	< 7.96	----	7.96
5A-SI024-SS-0-1	0.16	79.0	0.33	0.56	35.5	0.02	< 9.61	----	9.61

Table 5-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
5A-SI025-SS-0-1 (1)	0.51	23.7	0.35	4.19	10.0	0.01	< 7.38	----	7.38
5A-SI025-SS-1-1 (1)	0.54	24.6	0.36	3.87	10.0	0.11	< 7.13	----	7.13
5A-SI026-SS-0-1	0.35	25.5	0.26	1.26	23.0	0.01	< 4.12	----	4.12
5A-SI027-SS-0-1	0.53	22.0	0.32	2.79	11.0	0.01	< 6.80	----	6.80
5A-SI028-SS-0-1	0.46	21.2	0.21	1.65	13.6	0.01	< 4.02	----	4.02
5A-SI029-SS-0-1	0.51	25.0	0.33	4.58	9.7	0.13	< 6.67	----	6.67
5A-SI030-SS-0-1	0.52	19.6	0.21	1.97	12.5	0.09	< 4.42	----	4.42
5A-SI031-SS-0-1	0.33	28.8	0.21	1.36	15.6	0.01	< 5.54	----	5.54
5A-SI032-SS-0-1	0.35	25.7	0.27	1.85	12.6	0.01	< 4.68	----	4.69
5A-SI033-SS-0-1	0.44	25.6	0.27	1.89	13.7	0.07	< 6.02	----	6.02
5B-SI001-SS-0-1	0.66	18.0	0.26	0.35	31.0	0.10	< 5.25	----	5.25
5B-SI002-SS-0-1 (1)	0.63	18.5	0.25	0.39	31.0	0.15	< 5.37	----	5.37
5B-SI002-SS-1-1 (1)	0.57	18.8	0.14	0.47	26.0	0.16	< 4.52	----	4.52
5B-SI003-SS-0-1	0.60	20.8	0.27	2.75	11.7	0.09	< 6.94	----	6.94
5B-SI004-SS-0-1	0.50	23.0	0.39	2.92	11.0	0.01	< 6.94	----	6.94
5C-SI-001-SS-0-1	5.17	15.0	1.92	19.35	8.7	0.46	< 36.10	----	36.10
5C-SI-002-SS-0-1	0.35	22.0	0.03	0.37	33.0	0.08	< 4.78	----	4.78
5C-SI-003-SS-0-1 (1)	0.59	28.0	0.24	0.85	28.7	0.02	< 8.16	----	8.16
5C-SI-003-SS-1-1 (1)	0.83	20.8	0.24	1.19	21.9	0.02	< 9.45	----	9.45

* Reported data are taken from the Nuclide Identification Report.

MDA : Minimum Detectable Activity

Error: 2 sigma (95% confidence interval)

< : Nuclide undetected or less than the MDA. The nuclide is assumed to be present at the MDA Value.

---- Not Applicable

(1) Sample (-0-1) and its duplicate (-1-1)

**Table 5-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226			Thorium-232			Uranium-238					
				pCi/g			pCi/g			pCi/g					
Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA							
05A-001	4.50	05A03500		1.29	0.10	0.25	1.98	0.10	0.34	4.38	J	---	8.15		
05A-001	5.50	05A03501		1.36	J	0.09	0.28	1.22	J	0.06	0.19	9.92	UJ	---	9.92
05A-001	5.50	05A03502	X	1.17	0.08	0.15	1.02	0.05	0.15	6.08	U	---	6.08		
05A-001	7.00	05A03503		ARCHIVED											
05A-002	1.50	05A03504		2.67	J	0.12	0.31	1.69	J	0.07	0.21	11.00	UJ	---	11.00
05A-002	5.00	05A03505		1.25	0.08	0.19	1.03	0.06	0.16	6.18	U	---	6.18		
05A-002	6.00	05A03506		ARCHIVED											
05A-003	2.00	05A03507		2.45	J	0.10	0.28	1.63	J	0.07	0.19	10.20	UJ	---	10.20
05A-003	5.00	05A03508		0.67	0.06	0.12	0.59	0.05	0.18	4.36	U	---	4.36		
05A-003	6.00	05A03509		ARCHIVED											
05A-004	1.50	05A03510		0.48	J	0.06	0.18	0.80	J	0.06	0.22	6.94	UJ	---	6.94
05A-004	2.50	05A03511		0.56	0.06	0.10	0.57	0.05	0.16	4.09	U	---	4.09		
05A-004	2.50	05A03512	X	0.38	0.06	0.21	0.66	0.05	0.19	4.56	U	---	4.56		
05A-004	4.50	05A03513		ARCHIVED											
05A-005	4.50	05A03514		0.40	J	0.07	0.22	0.65	J	0.05	0.20	6.64	UJ	---	6.64
05A-005	5.50	05A03515		0.54	J	0.06	0.17	0.62	J	0.05	0.21	6.45	UJ	---	6.45
05A-005	7.00	05A03516		ARCHIVED											
05A-006	1.50	05A03517		0.99	0.09	0.30	2.59	0.10	0.32	7.93	U	---	7.93		
05A-006	2.50	05A03518		0.47	J	0.07	0.22	1.40	J	0.07	0.21	7.94	UJ	---	7.94
05A-006	5.50	05A03519		ARCHIVED											
05A-007	0.50	05A03520		0.86	0.08	0.18	1.07	0.07	0.24	5.92	U	---	5.92		
05A-007	4.50	05A03521		0.80	J	0.07	0.21	1.11	J	0.06	0.24	7.71	UJ	---	7.71
05A-007	4.50	05A03522	X	0.82	0.06	0.20	1.00	0.06	0.21	5.38	U	---	5.38		
05A-007	6.50	05A03523		ARCHIVED											
05A-008	1.50	05A03524		1.16	J	0.09	0.26	1.47	J	0.08	0.28	10.10	UJ	---	10.10
05A-008	2.50	05A03525	X	1.31	0.10	0.26	1.02	0.07	0.29	4.35	J	2.07	6.71		
05A-008	5.50	05A03526		ARCHIVED											
05A-009	1.00	05A03527		2.18	J	0.11	0.44	9.31	J	0.20	0.33	17.10	UJ	---	17.10
05A-009	2.00	05A03528		0.67	0.07	0.20	0.56	0.05	0.20	5.00	U	---	5.00		
05A-009	7.50	05A03529		ARCHIVED											
05A-010	0.50	05A03530		1.81	J	0.11	0.37	6.78	J	0.17	0.46	15.60	UJ	---	15.60
05A-010	1.00	05A03531		0.91	0.08	0.23	1.15	0.07	0.23	6.11	U	---	6.11		
05A-010	4.50	05A03532		ARCHIVED											

**Table 5-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226			Thorium-232			Uranium-238					
				pCi/g			pCi/g			pCi/g					
Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA							
05A-011	2.00	05A03533		0.65	J	0.07	0.23	0.79	J	0.05	0.15	6.94	UJ	---	6.94
05A-011	2.00	05A03534	X	0.86	J	0.07	0.20	0.83	J	0.06	0.21	7.33	UJ	---	7.33
05A-011	5.00	05A03535		0.59		0.07	0.21	0.75		0.05	0.18	4.82	U	---	4.82
05A-011	6.00	05A03536		ARCHIVED											
05A-012	5.50	05A03537		0.76		0.08	0.21	0.92		0.06	0.21	5.04	U	---	5.04
05A-012	6.50	05A03538		0.91	J	0.08	0.23	1.06	J	0.07	0.27	9.02	UJ	---	9.02
05A-013	2.00	05A03539		0.67		0.06	0.23	0.99		0.06	0.20	5.29	U	---	5.29
05A-013	4.50	05A03540		0.64	J	0.06	0.20	0.95	J	0.06	0.23	7.84	UJ	---	7.84
05A-013	7.50	05A03541		ARCHIVED											
05A-014	5.00	05A03542		0.70		0.07	0.17	0.81		0.06	0.20	4.80	U	---	4.80
05A-014	5.00	05A03543	X	0.67	J	0.06	0.20	0.85	J	0.05	0.23	7.11	UJ	---	7.11
05A-014	6.50	05A03544		0.54		0.07	0.16	0.49		0.05	0.20	4.84	U	---	4.84
05A-014	7.00	05A03545		ARCHIVED											
05A-015	1.50	05A03546		0.63	J	0.07	0.19	0.76	J	0.06	0.24	7.43	UJ	---	7.43
05A-015	2.50	05A03547		0.54		0.06	0.18	0.65		0.05	0.18	-0.51	U	1.22	4.29
05A-015	6.50	05A03548		ARCHIVED											
05A-016	1.00	05A03549		1.92	J	0.12	0.41	8.81	J	0.20	0.49	17.40	UJ	---	17.40
<i>ThermoRetec⁽²⁾</i>		05A03549		1.72		0.25	0.29	7.83		0.47	0.39	4.12	J	3.21	4.78
05A-016	1.50	05A03550		0.44		0.06	0.19	0.78		0.05	0.18	4.89	U	---	4.89
05A-016	5.50	05A03551		0.72	J	0.07	0.23	0.87	J	0.05	0.17	8.20	UJ	---	8.20
05A-017	0.50	05A03552		0.44		0.06	0.15	0.35		0.05	0.16	4.65	U	---	4.65
05A-017	2.00	05A03553		0.43		0.07	0.21	0.76		0.06	0.20	6.41	U	---	6.41
05A-017	7.50	05A03554		0.75		0.07	0.24	0.84		0.05	0.16	5.65	U	---	5.65
05A-018	1.50	05A03555		1.24		0.08	0.25	3.53		0.11	0.31	11.00	U	---	11.00
05A-018	3.00	05A03556		0.79		0.07	0.23	1.01		0.05	0.13	5.36	U	---	5.36
05A-018	4.50	05A03557		ARCHIVED											
05A-019	3.00	05A03558		0.55		0.05	0.15	0.74		0.04	0.14	6.84	U	---	6.84
05A-019	4.50	05A03559		0.48		0.06	0.17	0.72		0.04	0.12	4.53	U	---	4.53
05A-019	5.50	05A03560		ARCHIVED											
05A-020	1.00	05A03561		1.95		0.10	0.37	9.64		0.19	0.29	16.20	U	---	16.20
05A-020	1.50	05A03562		0.42		0.05	0.18	0.78		0.05	0.17	4.61	U	---	4.61
05A-020	3.00	05A03563		0.61		0.07	0.18	0.74		0.06	0.23	7.41	U	---	7.41

**Table 5-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results										
				Radium-226			Thorium-232			Uranium-238				
				pCi/g			pCi/g			pCi/g				
Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA						
05A-021	1.00	05A03564		1.22	0.08	0.29	4.27	0.12	0.20	3.03	J	2.44	8.06	
05A-021	1.50	05A03565		0.51	0.07	0.22	0.85	0.06	0.23	7.58	U	---	7.58	
05A-021	4.50	05A03566		0.41	0.06	0.18	0.94	0.06	0.19	4.77	U	---	4.77	
05A-021	4.50	05A03567	X	ARCHIVED										
05A-022	1.00	05A03568		1.58	0.09	0.38	8.32	0.18	0.27	14.70	U	---	14.70	
05A-022	1.50	05A03569		0.41	0.07	0.21	0.59	0.05	0.17	4.39	U	---	4.39	
05A-022	2.50	05A03570		ARCHIVED										
05A-023	1.50	05A03571		1.40	0.09	0.34	4.52	0.13	0.26	13.80	U	---	13.80	
05A-023	2.00	05A03572		0.39	0.06	0.18	0.65	0.05	0.17	4.77	U	---	4.77	
05A-023	4.50	05A03573		ARCHIVED										
05A-024	1.50	05A03574		0.66	0.08	0.21	1.38	0.08	0.27	9.33	U	---	9.33	
05A-024	3.00	05A03575		0.52	0.06	0.19	0.55	0.05	0.18	4.69	U	---	4.69	
05A-024	7.00	05A03576		0.76	0.09	0.29	0.85	0.07	0.29	9.29	U	---	9.29	
05A-025	2.50	05A03577		0.87	0.09	0.23	0.92	0.07	0.25	2.24	J	1.61	5.32	
05A-025	4.50	05A03578		0.77	0.06	0.18	0.94	0.05	0.13	5.56	U	---	5.56	
05A-025	7.00	05A03579		1.02	0.08	0.21	1.21	0.08	0.27	8.95	U	---	8.95	
05A-026	1.00	05A03580		0.83	0.06	0.22	2.29	0.08	0.20	9.51	U	---	9.51	
05A-026	1.50	05A03581		0.78	0.09	0.24	0.95	0.07	0.25	6.42	U	---	6.42	
05A-026	7.00	05A03582		ARCHIVED										
05A-027	0.50	05A03583		2.09	0.11	0.41	7.35	0.17	0.29	16.00	U	---	16.00	
05A-027	1.50	05A03584		0.71	0.08	0.21	0.83	0.06	0.21	5.73	U	---	5.73	
05A-027	4.50	05A03585		ARCHIVED										
05A-028	0.50	05A03586		1.84	0.09	0.27	4.62	0.12	0.24	12.70	U	---	12.70	
05A-028	1.50	05A03587		1.13	0.08	0.19	1.08	0.06	0.15	6.51	U	---	6.51	
05A-028	1.50	05A03588	X	1.01	J	0.09	0.28	1.14	J	0.08	0.30	5.76	J	2.69
05A-028	4.50	05A03589		ARCHIVED										
05A-029	0.50	05A03590		1.70	0.11	0.40	5.58	0.16	0.28	10.80	U	---	10.80	
05A-029	1.00	05A03591		0.75	J	0.08	0.24	0.95	J	0.06	0.24	8.12	UJ	---
05A-029	4.50	05A03592		ARCHIVED										
05A-030	0.50	05A03593		1.52	0.09	0.30	4.21	0.12	0.22	8.50	U	---	8.50	
05A-030	1.00	05A03594		0.96	0.08	0.24	1.35	0.07	0.28	9.60	U	---	9.60	
05A-030	3.00	05A03595		ARCHIVED										

**Table 5-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226			Thorium-232			Uranium-238			
				pCi/g			pCi/g			pCi/g			
Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA					
05A-031	0.50	05A03596		1.03	0.09	0.27	1.97	0.09	0.29	7.60	U	---	7.60
05A-031	1.00	05A03597		0.87	J 0.12	0.36	1.10	J 0.09	0.35	11.20	UJ	---	11.20
05A-031	4.50	05A03598		ARCHIVED									
05A-032	4.50	05A03599		0.49	0.06	0.16	0.52	0.05	0.18	4.57	U	---	4.57
05A-032	5.00	05A03600		1.26	0.08	0.27	2.82	0.09	0.19	9.95	U	---	9.95
05A-032	6.00	05A03601		0.68	0.07	0.18	0.93	0.06	0.21	5.40	U	---	5.40
05A-033	0.50	05A03602		0.93	0.09	0.32	3.96	0.14	0.37	9.31	U	---	9.31
05A-033	1.00	05A03603		0.41	0.06	0.16	0.65	0.05	0.19	6.83	U	---	6.83
05A-033	2.50	05A03604		ARCHIVED									
05A-034	0.50	05A03605		1.96	0.11	0.43	8.91	0.19	0.28	11.30	U	---	11.30
		<i>ThermoRetec</i> ⁽²⁾		1.65	0.20	0.21	8.43	0.44	0.34	7.38		3.08	3.55
05A-034	1.00	05A03606		0.41	0.05	0.19	0.68	0.05	0.19	6.21	U	---	6.21
05A-034	4.50	05A03607		ARCHIVED									
05A-035	2.50	05A03608		1.24	0.09	0.33	4.88	0.14	0.24	8.73	U	---	8.73
		<i>ThermoRetec</i> ⁽²⁾		1.21	0.17	0.21	5.26	0.31	0.29	8.49		3.49	3.21
05A-036	1.50	05A03609		0.75	0.09	0.28	1.10	0.08	0.29	9.31	U	---	9.31
05A-036	2.50	05A03610		0.66	0.07	0.17	0.63	0.05	0.19	4.85	U	---	4.85
05A-037	1.00	05A03611		0.94	0.10	0.30	2.12	0.11	0.39	13.30	U	---	13.30
05A-037	3.00	05A03612		0.55	0.08	0.25	0.79	0.06	0.24	5.82	U	---	5.82
05A-037	5.00	05A03613		0.74	0.08	0.21	0.88	0.06	0.22	7.67	U	---	7.67
05A-038	1.00	05A03614		1.00	0.12	0.30	1.39	0.10	0.35	9.50	U	---	9.50
05A-038	2.50	05A03615		0.72	0.07	0.21	1.67	0.07	0.18	8.37	U	---	8.37
05A-038	5.00	05A03616		0.59	0.06	0.19	0.95	0.06	0.23	7.76	U	---	7.76
05B-001	1.00	05B03800		1.58	J 0.08	0.28	2.85	J 0.09	0.23	10.80	UJ	---	10.80
05B-001	1.00	05B03801	X	1.28	0.09	0.23	2.23	0.09	0.28	7.44	U	---	7.44
05B-001	4.50	05B03802		2.55	J 0.14	0.36	2.55	J 0.11	0.29	14.80	UJ	---	14.80
		<i>ThermoRetec</i> ⁽²⁾		1.88	0.23	0.20	2.37	0.22	0.34	2.91	UJ	2.97	3.27
05B-001	5.50	05B03803		ARCHIVED									
05B-002	1.00	05B03804		1.71	0.09	0.26	2.83	0.10	0.29	7.14	U	---	7.14
05B-002	2.00	05B03805		0.97	J 0.07	0.21	1.31	J 0.06	0.16	7.88	UJ	---	7.88
05B-002	4.50	05B03806		ARCHIVED									

**Table 5-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226			Thorium-232			Uranium-238			
				pCi/g			pCi/g			pCi/g			
Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA					
05B-003	3.00	05B03807		2.52	0.11	0.31	4.14	0.12	0.21	8.82	U	---	8.82
05B-003	5.00	05B03808		3.52	J 0.13	0.35	4.79	J 0.14	0.30	15.30	UJ	---	15.30
		<i>ThermoRetec</i> ⁽²⁾		3.06	0.29	0.21	4.17	0.28	0.31	4.14		2.79	3.41
05B-003	6.00	05B03809		0.75	0.06	0.16	0.75	0.04	0.12	5.16	U	---	5.16
05B-004	1.00	05B03810		1.13	0.07	0.25	2.93	0.09	0.18	7.03	U	---	7.03
		<i>ThermoRetec</i> ⁽²⁾		1.11	0.15	0.18	2.92	0.21	0.27	1.88	J	1.56	2.71
05B-004	1.00	05B03811	X	1.49	J 0.08	0.27	3.52	J 0.10	0.20	10.80	U	---	10.80
		<i>ThermoRetec</i> ⁽²⁾		1.22	0.20	0.18	3.02	0.23	0.26	0.75	UJ	2.50	2.93
05B-004	5.00	05B03812		2.68	0.12	0.39	6.34	0.15	0.24	10.60	U	---	10.60
05B-004	6.00	05B03813		1.84	0.11	0.34	2.24	0.09	0.24	11.70	U	---	11.70
05B-005	2.00	05B03814		1.52	0.08	0.27	2.68	0.09	0.19	7.62	U	---	7.62
05B-006	0.50	05B03815		2.02	0.10	0.34	6.06	0.15	0.29	14.70	U	---	14.70
05B-006	2.00	05B03816		1.10	0.07	0.29	1.86	0.07	0.16	6.32	U	---	6.32
05B-006	2.50	05B03817		1.02	0.07	0.24	1.64	0.07	0.26	8.65	U	---	8.65
05B-007	2.00	05B03818		2.02	0.10	0.38	6.09	0.15	0.25	9.98	U	---	9.98
05B-008	1.50	05B03819		1.52	0.08	0.29	2.91	0.09	0.21	10.40	U	---	10.40
		<i>ThermoRetec</i> ⁽²⁾		1.13	0.16	0.13	2.68	0.19	0.22	0.67	UJ	1.75	2.28
05B-008	1.50	05B03820	X	1.49	0.08	0.26	2.48	0.09	0.19	7.29	U	---	7.29
05B-008	2.50	05B03821		1.07	0.07	0.23	0.95	0.05	0.15	7.42	U	---	7.42
05B-008	4.50	05B03822		ARCHIVED									
05B-009	0.50	05B03823		2.17	0.12	0.42	7.84	0.19	0.31	2.60	J	3.97	13.30
05B-009	3.00	05B03824		1.35	0.08	0.12	1.34	0.06	0.16	6.39	U	---	6.39
05B-009	5.00	05B03825		ARCHIVED									
05B-010	2.00	05B03826		0.86	0.06	0.21	1.53	0.07	0.14	5.44	U	---	5.44
05B-010	2.50	05B03827		0.82	0.06	0.23	1.21	0.06	0.15	7.70	U	---	7.70
05B-010	4.50	05B03828		ARCHIVED									
05B-011	3.00	05B03829		0.93	0.06	0.25	1.64	0.07	0.16	8.62	U	---	8.62
05B-011	5.00	05B03830		0.58	0.07	0.22	0.68	0.05	0.18	4.92	U	---	4.92
05B-011	7.00	05B03831		ARCHIVED									
05B-012	1.00	05B03832		1.07	0.08	0.24	2.81	0.10	0.28	7.29	U	---	7.29
05B-012	2.00	05B03833		1.01	0.07	0.20	0.67	0.06	0.27	8.65	U	---	8.65
05B-012	2.00	05B03834	X	0.47	0.06	0.18	0.55	0.05	0.20	1.32	J	1.70	5.71
05B-012	4.50	05B03835		ARCHIVED									

**Table 5-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226			Thorium-232			Uranium-238					
				pCi/g			pCi/g			pCi/g					
Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA							
05B-013	2.00	05B03836		0.54	0.06	0.14	0.69	0.05	0.18	4.21	U	---	4.21		
05B-013	3.00	05B03837		1.02	0.07	0.17	1.02	0.05	0.15	8.18	U	---	8.18		
05B-013	4.50	05B03838		ARCHIVED											
05B-014	2.50	05B03839		1.14	0.09	0.25	2.02	0.08	0.27	3.85	J	1.96	6.38		
		<i>ThermoRetec</i> ⁽²⁾		1.29	0.15	0.15	1.94	0.16	0.21	2.43		2.13	2.30		
05B-014	2.50	05B03840	X	1.45	J	0.08	0.23	2.31	J	0.08	0.18	10.10	UJ	---	10.10
		<i>ThermoRetec</i> ⁽²⁾		1.25	0.16	0.18	2.20	0.27	0.25	2.56	J	1.47	2.60		
05B-014	3.50	05B03841		0.51	0.07	0.21	0.51	0.05	0.18	4.66	U	---	4.66		
05B-014	4.50	05B03842		1.16	J	0.07	0.24	1.82	J	0.07	0.18	8.75	UJ	---	8.75
05B-015	1.00	05B03843		0.87	0.07	0.18	1.23	0.06	0.22	5.48	U	---	5.48		
05B-015	1.50	05B03844		0.24	J	0.05	0.18	0.28	J	0.05	0.20	6.16	UJ	---	6.16
05B-015	4.50	05B03845		ARCHIVED											
05B-016	3.00	05B03846		1.38	0.09	0.30	4.68	0.13	0.22	8.67	U	---	8.67		
05B-016	5.00	05B03847		0.81	J	0.07	0.19	0.91	J	0.05	0.15	7.49	UJ	---	7.49
05B-016	6.00	05B03848		ARCHIVED											
05B-017	1.50	05B03849		1.46	0.08	0.26	2.77	0.09	0.18	7.17	U	---	7.17		
05B-017	5.50	05B03850		0.57	J	0.05	0.19	0.79	J	0.06	0.22	6.86	UJ	---	6.86
05B-017	6.50	05B03851		ARCHIVED											
05B-018	5.00	05B03852		1.02	0.07	0.26	2.94	0.10	0.17	2.54	J	2.02	6.70		
05B-018	6.00	05B03853		0.59	J	0.05	0.17	0.82	J	0.05	0.22	6.74	UJ	---	6.74
05B-018	7.00	05B03854		0.44	J	0.05	0.16	0.48	J	0.04	0.15	5.85	UJ	---	5.85
05B-019	2.50	05B03855		1.52	J	0.09	0.33	5.51	J	0.14	0.36	13.00	UJ	---	13.00
05B-019	4.50	05B03856		1.07	J	0.08	0.28	2.49	J	0.08	0.19	9.65	UJ	---	9.65
05B-019	6.50	05B03857		1.37	J	0.08	0.32	5.87	J	0.13	0.23	12.40	UJ	---	12.40
05B-020	2.50	05B03858		1.05	0.07	0.22	1.42	0.07	0.26	5.97	U	---	5.97		
05B-020	2.50	05B03859	X	0.79	0.08	0.22	1.41	0.07	0.24	6.09	U	---	6.09		
05B-020	4.50	05B03860		1.01	0.08	0.16	1.41	0.07	0.25	6.24	U	---	6.24		
05B-020	6.00	05B03861		ARCHIVED											
05B-021	1.50	05B03862		1.14	0.09	0.24	1.85	0.08	0.18	6.59	U	---	6.59		
05B-021	1.50	05B03863	X	1.19	0.08	0.27	2.16	0.08	0.19	9.70	U	---	9.70		
05B-021	4.50	05B03864		0.74	0.09	0.27	1.34	0.07	0.25	6.20	U	---	6.20		
05B-021	7.00	05B03865		0.57	0.07	0.21	0.86	0.06	0.20	4.80	U	---	4.80		

**Table 5-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226			Thorium-232			Uranium-238			
				pCi/g			pCi/g			pCi/g			
Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA					
05C-001	2.00	05C04000		0.60	0.06	0.20	0.76	0.05	0.20	4.71	U	---	4.71
05C-001	2.00	05C04001	X	0.98	0.07	0.22	1.35	0.07	0.24	6.36	U	---	6.36
05C-001	3.00	05C04002		0.61	0.07	0.19	0.72	0.06	0.22	5.48	U	---	5.48
05C-001	5.00	05C04003		ARCHIVED									
05C-002	1.00	05C04004		1.22	0.12	0.32	2.46	0.11	0.40	14.20	U	---	14.20
05C-002	1.50	05C04005		0.76	0.07	0.22	1.14	0.06	0.18	8.21	U	---	8.21
05C-002	2.50	05C04006		ARCHIVED									
05C-003	0.50	05C04007		0.47	0.07	0.21	0.50	0.05	0.20	4.66	U	---	4.66
05C-003	1.00	05C04008		1.09	0.08	0.26	1.86	0.09	0.32	10.10	U	---	10.10
05C-003	2.00	05C04009		ARCHIVED									
05C-004	1.50	05C04010		1.28	0.08	0.21	1.18	0.06	0.16	6.13	U	---	6.13
05C-004	2.00	05C04011		ARCHIVED									
05C-004	6.00	05C04012		1.01	0.07	0.24	0.98	0.05	0.16	8.06	U	---	8.06
05C-004	6.00	05C04013	X	0.70	0.07	0.19	0.82	0.06	0.21	0.65	J	1.45	4.94
05C-005	1.50	05C04014		9.08	0.24	0.66	22.06	0.37	0.49	11.09	J	7.12	23.40
05C-005	2.00	05C04015		0.93	0.07	0.22	0.90	0.06	0.17	9.04	U	---	9.04
05C-005	5.50	05C04016		ARCHIVED									
05C-006	1.00	05C04017		0.67	0.07	0.19	1.00	0.06	0.19	5.05	U	---	5.05
05C-006	2.00	05C04018		0.52	0.06	0.18	0.60	0.05	0.20	6.56	U	---	6.56
05C-006	6.50	05C04019		ARCHIVED									
05C-007	1.50	05C04020		2.32	0.10	0.29	4.64	0.12	0.24	12.60	U	---	12.60
<i>ThermoRetec</i> ⁽²⁾		05C04020		1.99	0.22	0.21	3.49	0.34	0.32	4.93		2.53	3.29
05C-007	2.00	05C04021		ARCHIVED									
05C-007	4.50	05C04022		0.53	0.05	0.18	0.67	0.04	0.11	4.06	U	---	4.06
05C-007	4.50	05C04023	X	0.51	0.06	0.20	0.75	0.05	0.21	6.79	U	---	6.79
05C-008	1.50	05C04024		2.07	0.11	0.43	10.94	0.21	0.30	11.60	U	---	11.60
05C-008	2.00	05C04025		0.49	0.06	0.20	0.42	0.05	0.19	6.54	U	---	6.54
05C-008	4.50	05C04026		ARCHIVED									
05C-009	1.00	05C04027		0.49	0.07	0.19	0.98	0.06	0.22	5.23	U	---	5.23
05C-009	1.50	05C04028		0.82	0.07	0.22	0.92	0.05	0.16	7.76	U	---	7.76
05C-009	4.50	05C04029		ARCHIVED									

**Table 5-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226			Thorium-232			Uranium-238			
				pCi/g			pCi/g			pCi/g			
Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA					
05C-010	2.00	05C04030		0.62	0.08	0.21	0.79	0.06	0.22	5.51	U	---	5.51
05C-010	2.50	05C04031		0.74	0.06	0.17	1.02	0.05	0.15	7.58	U	---	7.58
05C-010	4.50	05C04032		ARCHIVED									
05C-011	1.50	05C04033		0.71	0.07	0.24	0.98	0.05	0.16	-3.94	U	2.97	3.85
05C-011	2.50	05C04034		0.77	0.07	0.20	1.01	0.06	0.23	5.78	U	---	5.78
05C-011	2.50	05C04035	X	0.72	0.07	0.22	0.96	0.05	0.16	7.58	U	---	7.58
05C-011	4.50	05C04036		ARCHIVED									
05C-012	4.50	05C04037		4.57	0.19	0.76	43.95	0.62	0.59	22.60	U	---	22.60
<i>ThermoRetec⁽²⁾</i>		<i>05C04037</i>		<i>3.13</i>	<i>0.46</i>	<i>0.50</i>	<i>42.06</i>	<i>1.78</i>	<i>0.75</i>	<i>2.55</i>	<i>UJ</i>	<i>5.68</i>	<i>8.08</i>
05C-012	5.50	05C04038		0.74	0.08	0.25	1.72	0.08	0.26	8.74	U	---	8.74
05C-013	2.50	05C04039		0.65	0.06	0.24	1.63	0.07	0.23	6.06	U	---	6.06
05C-013	4.50	05C04040		0.62	0.06	0.21	0.83	0.06	0.21	7.51	U	---	7.51
05C-013	5.50	05C04041		ARCHIVED									
05C-014	2.00	05C04042		0.55	0.06	0.14	0.64	0.05	0.18	4.71	U	---	4.71
05C-014	3.00	05C04043		0.45	0.06	0.20	0.60	0.05	0.19	6.79	U	---	6.79
05C-014	4.50	05C04044		ARCHIVED									
05C-015	1.00	05C04045		1.19	0.09	0.25	1.23	0.07	0.18	6.49	U	---	6.49
05C-015	2.00	05C04046		1.61	0.13	0.31	1.24	0.09	0.38	8.79	J	3.42	10.90
05C-015	4.50	05C04047		ARCHIVED									
05C-016	1.50	05C04049		0.90	0.07	0.17	1.12	0.06	0.15	5.75	U	---	5.75
05C-016	2.00	05C04050		0.97	0.08	0.24	1.21	0.06	0.17	8.42	U	---	8.42
05C-016	5.00	05C04051		ARCHIVED									

Error: 2 sigma (95% confidence interval)

--- Not Applicable

U Undetected or Negative Concentration Less Than the MDA

J Estimated

MDA Minimum Detectable Activity

(1) The sample marked with an "X" for duplicate is a duplicate of the sample listed directly above it. Duplicate samples are prepared by homogenizing soil above and below the centerpoint and then separating for analysis. The depth listed is the center point.

(2) Approximately 10% of all radiological soil samples collected under the PDI Program were sent to ThermoRetec, an off-site laboratory, for confirmatory radiological analyses. Results from ThermoRetec are presented in this table in italicized font immediately below the MISS On-Site field laboratory result for that same sample.

Table 5-5: Summary of Environmental Analytical Data

Parameter	Sample ID Sample Location Sample Depth (feet) Sample Date	05A-020526 05A-001 4 - 8 03/22/00	05B-020528 05B-001 8 - 12 03/23/00	05C-020530 05C-001 4 - 8 03/23/00
Units				
<i>Miscellaneous</i>				
Chromium VI	mg/kg	0.44U	0.46U	0.46U
Corrosivity by pH	SOIL pH	8.5	8.5	8.8
Cyanide, Reactive	mg/kg	0.50U	0.50U	0.50U
Cyanide, Total	mg/kg	0.35U	0.36U	0.36U
Sulfide, Reactive	mg/kg	24.0U	24.0U	24.0U
<i>PCBs and Pesticides</i>				
4,4'-DDD	ug/kg	0.73U	11	3.7U
4,4'-DDE	ug/kg	0.73U	3.8U	3.7U
4,4'-DDT	ug/kg	0.73U	3.8U	3.7U
Aldrin	ug/kg	0.36U	1.9U	1.8U
Alpha-BHC	ug/kg	0.36U	1.9U	1.8U
alpha-Chlordane	ug/kg	0.36U	1.9U	1.8U
Aroclor-1016	ug/kg	7.2U	38U	37U
Aroclor-1221	ug/kg	14U	76U	73U
Aroclor-1232	ug/kg	7.2U	38U	37U
Aroclor-1242	ug/kg	7.2U	38U	37U
Aroclor-1248	ug/kg	7.2U	38U	37U
Aroclor-1254	ug/kg	7.2U	38U	37U
Aroclor-1260	ug/kg	7.2U	38U	37U
Beta-BHC	ug/kg	0.36U	1.9U	1.8U
Delta-BHC	ug/kg	0.36U	1.9U	1.8U
Dieldrin	ug/kg	0.73U	3.8U	3.7U
Endosulfan I	ug/kg	0.36U	1.9U	1.8U
Endosulfan II	ug/kg	0.73U	3.8U	3.7U
Endosulfan sulfate	ug/kg	0.73U	3.8U	3.7U
Endrin	ug/kg	0.73U	3.8U	3.7U
Endrin aldehyde	ug/kg	0.73U	3.8U	3.7U
Endrin ketone	ug/kg	0.73U	3.8U	3.7U
gamma-BHC (Lindane)	ug/kg	0.36U	1.9U	1.8U
gamma-Chlordane	ug/kg	0.36U	1.9U	1.8U
Heptachlor	ug/kg	0.36U	1.9U	1.8U
Heptachlor epoxide	ug/kg	0.36U	1.9U	1.8U
Methoxychlor	ug/kg	3.6U	19U	18U
Toxaphene	ug/kg	36U	190U	180U

Table 5-5: Summary of Environmental Analytical Data

Parameter	Sample ID	05A-020526	05B-020528	05C-020530
	Sample Location	05A-001	05B-001	05C-001
	Sample Depth (feet)	4 - 8	8 - 12	4 - 8
	Sample Date	03/22/00	03/23/00	03/23/00
Units				
<i>Rare Earth Metals</i>				
Cerium, Total	mg/kg	22.4	62	27.5
Dysprosium, Total	mg/kg	1	2.4	1.7
Lanthanum, Total	mg/kg	8.5	36.2	11.1
Neodymium, Total	mg/kg	10.9	34.7	13.9
Yttrium, Total	mg/kg	4.9	9.3	7.1
<i>Semivolatile Organics</i>				
1,2,4-Trichlorobenzene	ug/kg	360U	380U	370U
1,2-Dichlorobenzene	ug/kg	360U	380U	370U
1,3-Dichlorobenzene	ug/kg	360U	380U	370U
1,4-Dichlorobenzene	ug/kg	360U	380U	370U
2,2'-oxybis(1-Chloropropane)	ug/kg	360U	380U	370U
2,4,5-Trichlorophenol	ug/kg	910U	940U	920U
2,4,6-Trichlorophenol	ug/kg	360U	380U	370U
2,4-Dichlorophenol	ug/kg	360U	380U	370U
2,4-Dimethylphenol	ug/kg	360U	380U	370U
2,4-Dinitrophenol	ug/kg	910U	940U	920U
2,4-Dinitrotoluene	ug/kg	360U	380U	370U
2,6-Dinitrotoluene	ug/kg	360U	380U	370U
2-Chloronaphthalene	ug/kg	360U	380U	370U
2-Chlorophenol	ug/kg	360U	380U	370U
2-Methylnaphthalene	ug/kg	360U	380U	370U
2-Methylphenol	ug/kg	360U	380U	370U
2-Nitroaniline	ug/kg	910U	940U	920U
2-Nitrophenol	ug/kg	360U	380U	370U
3,3'-Dichlorobenzidine	ug/kg	360U	380U	370U
3-Nitroaniline	ug/kg	910U	940U	920U
4,6-Dinitro-2-methylphenol	ug/kg	910U	940U	920U
4-Bromophenyl-phenylether	ug/kg	360U	380U	370U
4-Chloro-3-methylphenol	ug/kg	360U	380U	370U
4-Chloroaniline	ug/kg	360U	380U	370U
4-Chlorophenyl-phenylether	ug/kg	360U	380U	370U
4-Methylphenol	ug/kg	360U	380U	370U
4-Nitroaniline	ug/kg	910U	940U	920U
4-Nitrophenol	ug/kg	910U	940U	920U
Acenaphthene	ug/kg	360U	380U	370U
Acenaphthylene	ug/kg	360U	380U	370U
Anthracene	ug/kg	360U	26J	370U
Benzo(a)anthracene	ug/kg	360U	100J	370U
Benzo(a)pyrene	ug/kg	360U	100J	370U
Benzo(b)fluoranthene	ug/kg	360U	92J	370U

Table 5-5: Summary of Environmental Analytical Data

Parameter	Sample ID	05A-020526	05B-020528	05C-020530
	Sample Location	05A-001	05B-001	05C-001
	Sample Depth (feet)	4 - 8	8 - 12	4 - 8
	Sample Date	03/22/00	03/23/00	03/23/00
Units				
<i>Semivolatile Organics (continued)</i>				
Benzo(g,h,i)perylene	ug/kg	360U	66J	370U
Benzo(k)fluoranthene	ug/kg	360U	100J	370U
bis(2-Chloroethoxy)methane	ug/kg	360U	380U	370U
bis(2-Chloroethyl)ether	ug/kg	360U	380U	370U
bis(2-Ethylhexyl)phthalate	ug/kg	22J	50J	65BJ
Butylbenzylphthalate	ug/kg	360U	380U	370U
Carbazole	ug/kg	360U	380U	370U
Chrysene	ug/kg	360U	130J	370U
Di-n-Butylphthalate	ug/kg	23BJ	23BJ	370U
Di-n-Octyl phthalate	ug/kg	360U	380U	370U
Dibenz(a,h)anthracene	ug/kg	360U	380U	370U
Dibenzofuran	ug/kg	360U	380U	370U
Diethylphthalate	ug/kg	360U	380U	370U
Dimethylphthalate	ug/kg	360U	380U	370U
Fluoranthene	ug/kg	360U	210J	370U
Fluorene	ug/kg	360U	380U	370U
Hexachlorobenzene	ug/kg	360U	380U	370U
Hexachlorobutadiene	ug/kg	360U	380U	370U
Hexachlorocyclopentadiene	ug/kg	360U	380U	370U
Hexachloroethane	ug/kg	360U	380U	370U
Indeno(1,2,3-cd)pyrene	ug/kg	360U	63J	370U
Isophorone	ug/kg	360U	380U	370U
N-Nitroso-Di-n-propylamine	ug/kg	360U	380U	370U
N-Nitrosodiphenylamine (1)	ug/kg	360U	380U	370U
Naphthalene	ug/kg	360U	380U	370U
Nitrobenzene	ug/kg	360U	380U	370U
Pentachlorophenol	ug/kg	910U	940U	920U
phenanthrene	ug/kg	360U	110J	370U
phenol	ug/kg	360U	380U	370U
Pyrene	ug/kg	360U	190J	370U
<i>Total Metals</i>				
Aluminum, Total	mg/kg	6690	10200	4070
Antimony, Total	mg/kg	0.19U	0.20U	0.16U
Arsenic, Total	mg/kg	2.1	5.3	3
Barium, Total	mg/kg	32.4	106	94.6
Beryllium, Total	mg/kg	0.27	0.66	0.34
Boron, Total	mg/kg	5.7	8.3	2.7
Cadmium, Total	mg/kg	0.03U	0.03U	0.03U
Calcium, Total	mg/kg	1440	4760	2650
Chromium, Total	mg/kg	11.5	28.4	10.6

Table 5-5: Summary of Environmental Analytical Data

Parameter	Sample ID Sample Location Sample Depth (feet) Sample Date	05A-020526 05A-001 4 - 8 03/22/00	05B-020528 05B-001 8 - 12 03/23/00	05C-020530 05C-001 4 - 8 03/23/00
Units				
Total Metals (continued)				
Cobalt, Total	mg/kg	4.3	7.8	3.9
Copper, Total	mg/kg	9.8	12.6	6.8
Iron, Total	mg/kg	11000	17500	10700
Lead, Total	mg/kg	8.5	34.1	4.9
Lithium, Total	mg/kg	4.3	21.8	5.6
Magnesium, Total	mg/kg	1500	4050	1580
Manganese, Total	mg/kg	275	279	81.9
Mercury, Total	mg/kg	0.05	0.07	0.02U
Nickel, Total	mg/kg	12.5	17.4	8.3
Potassium, Total	mg/kg	724	1540	550
Selenium, Total	mg/kg	0.46U	0.51	0.38U
Silver, Total	mg/kg	0.09U	0.10U	0.08U
Sodium, Total	mg/kg	189	124	86.1
Thallium, Total	mg/kg	0.38U	0.69	0.32U
Vanadium, Total	mg/kg	13.1	21.5	17.3
Zinc, Total	mg/kg	16.6	56.3	20.9
Volatile Organics				
1,1,1-Trichloroethane	ug/kg	630U	530U	550U
1,1,2,2-Tetrachloroethane	ug/kg	630U	530U	550U
1,1,2-Trichloroethane	ug/kg	630U	530U	550U
1,1-Dichloroethane	ug/kg	630U	530U	550U
1,1-Dichloroethene	ug/kg	630U	530U	550U
1,2-Dichloroethane	ug/kg	630U	530U	550U
1,2-Dichloroethene (total)	ug/kg	630U	530U	550U
1,2-Dichloropropane	ug/kg	630U	530U	550U
2-Butanone	ug/kg	1300U	1100U	1100U
2-Hexanone	ug/kg	1300U	1100U	1100U
4-Methyl-2-pentanone	ug/kg	1300U	1100U	1100U
Acetone	ug/kg	970BJ	700BJ	380BJ
Benzene	ug/kg	630U	530U	550U
Bromodichloromethane	ug/kg	630U	530U	550U
Bromoform	ug/kg	630U	530U	550U
Bromomethane	ug/kg	1300U	1100U	1100U
Carbon Disulfide	ug/kg	630U	530U	550U
Carbon Tetrachloride	ug/kg	630U	530U	550U
Chlorobenzene	ug/kg	630U	530U	550U
Chloroethane	ug/kg	1300U	1100U	1100U
Chloroform	ug/kg	630U	530U	550U

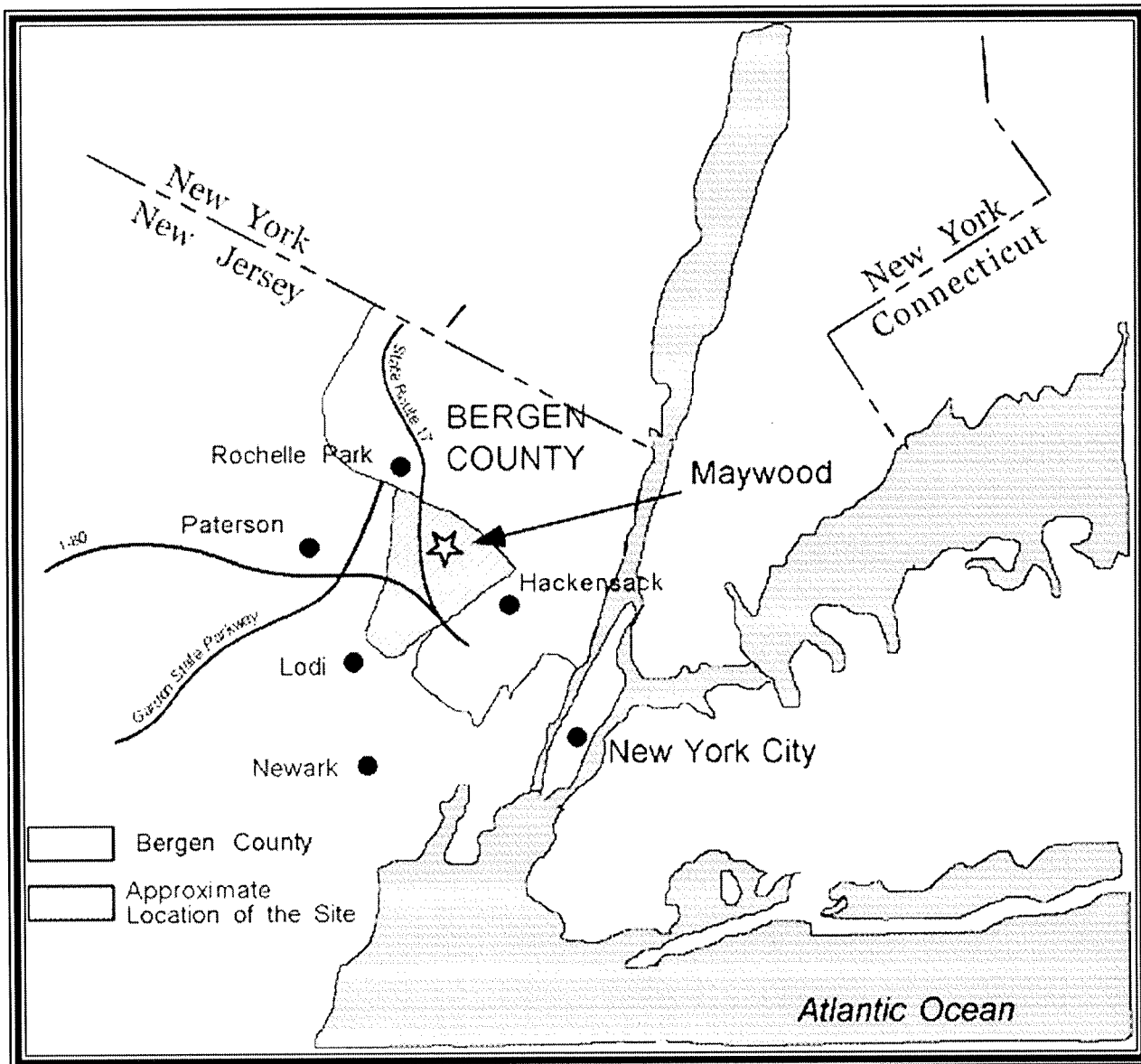
Table 5-5: Summary of Environmental Analytical Data

Parameter	Sample ID	05A-020526	05B-020528	05C-020530
	Sample Location	05A-001	05B-001	05C-001
	Sample Depth (feet)	4 - 8	8 - 12	4 - 8
	Sample Date	03/22/00	03/23/00	03/23/00
	Units			
<i>Volatile Organics (continued)</i>				
Chloromethane	ug/kg	1300U	1100U	110J
cis-1,3-Dichloropropene	ug/kg	630U	530U	550U
Dibromochloromethane	ug/kg	630U	530U	550U
Ethylbenzene	ug/kg	630U	530U	550U
Methylene Chloride	ug/kg	1700B	680B	550U
Styrene	ug/kg	630U	530U	550U
Tetrachloroethene	ug/kg	630U	530U	550U
Toluene	ug/kg	630U	530U	550U
Trans-1,3-Dichloropropene	ug/kg	630U	530U	550U
Trichloroethene	ug/kg	630U	530U	550U
Vinyl Chloride	ug/kg	1300U	1100U	1100U
Xylene (total)	ug/kg	630U	530U	550U
<i>TCLP Metals</i>				
Arsenic	ug/L	22.9U	29.2U	44.4U
Barium	ug/L	381	582	874
Cadmium	ug/L	4.1U	4.1U	4.1U
Chromium	ug/L	5.7	10.7U	3.4U
Lead	ug/L	26.6U	50.2U	26.6U
Mercury	ug/L	0.1U	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U	49.7U
Silver	ug/L	3.7U	3.7U	3.7U
<i>TCLP Pesticides</i>				
Alpha-Chlordane	ug/L	0.5U	0.5U	0.5U
Endrin	ug/L	1U	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5U	0.5U	0.5U
Heptachlor	ug/L	0.5U	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5U	0.5U	0.5U
Methoxychlor	ug/L	5U	5U	5U
Toxaphene	ug/L	50U	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U	5U
2,4-D	ug/L	10U	10U	10U

Table 5-5: Summary of Environmental Analytical Data

Parameter	Sample ID	05A-020526	05B-020528	05C-020530
	Sample Location	05A-001	05B-001	05C-001
	Sample Depth (feet)	4 - 8	8 - 12	4 - 8
	Sample Date	03/22/00	03/23/00	03/23/00
Units				
<i>TCLP Volatiles</i>				
1,1-Dichloroethene	mg/L	0.025U	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U	0.05U
Benzene	mg/L	0.025U	0.034	0.012J
Carbon tetrachloride	mg/L	0.025U	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.007J	0.025U
Chloroform	mg/L	0.025U	0.008J	0.025U
Tetrachloroethene	mg/L	0.025U	0.006J	0.025U
Trichloroethene	mg/L	0.025U	0.006J	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>				
1,4-Dichlorobenzene	mg/L	0.05U	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U	0.05U


B (inorganics) Value Between Method Detection Limit and Reporting Limit
 B (organics) Found in Associated Blank
 U Undetected Values
 J Estimated Value
 BJ Found in Blank; is an Estimated Value



NOT TO SCALE

U.S. ARMY ENGINEER DIVISION
 CORPS OF ENGINEERS
 NEW YORK DISTRICT

US ARMY CORPS OF ENGINEERS
FUSRAP
 FORMERLY UTILIZED SITES
 REMEDIAL ACTION PROGRAM

 **STONE & WEBSTER, INC.**

Prepared by:
**MALCOLM
 PIRNIE**

File Name:
 MPI-CH5

**LOCATION OF MAYWOOD SITE
 BERGEN COUNTY, NEW JERSEY**

PDI REPORT
 FUSRAP MAYWOOD SUPERFUND SITE
 MAYWOOD, LODI, AND
 ROCHELLE PARK, NEW JERSEY

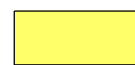
Contract Number:
 DACW41-98-R-0034

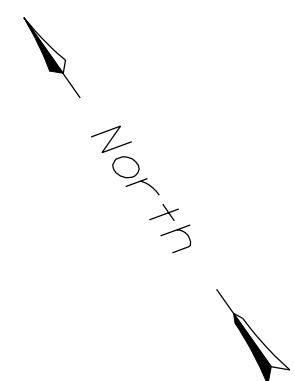
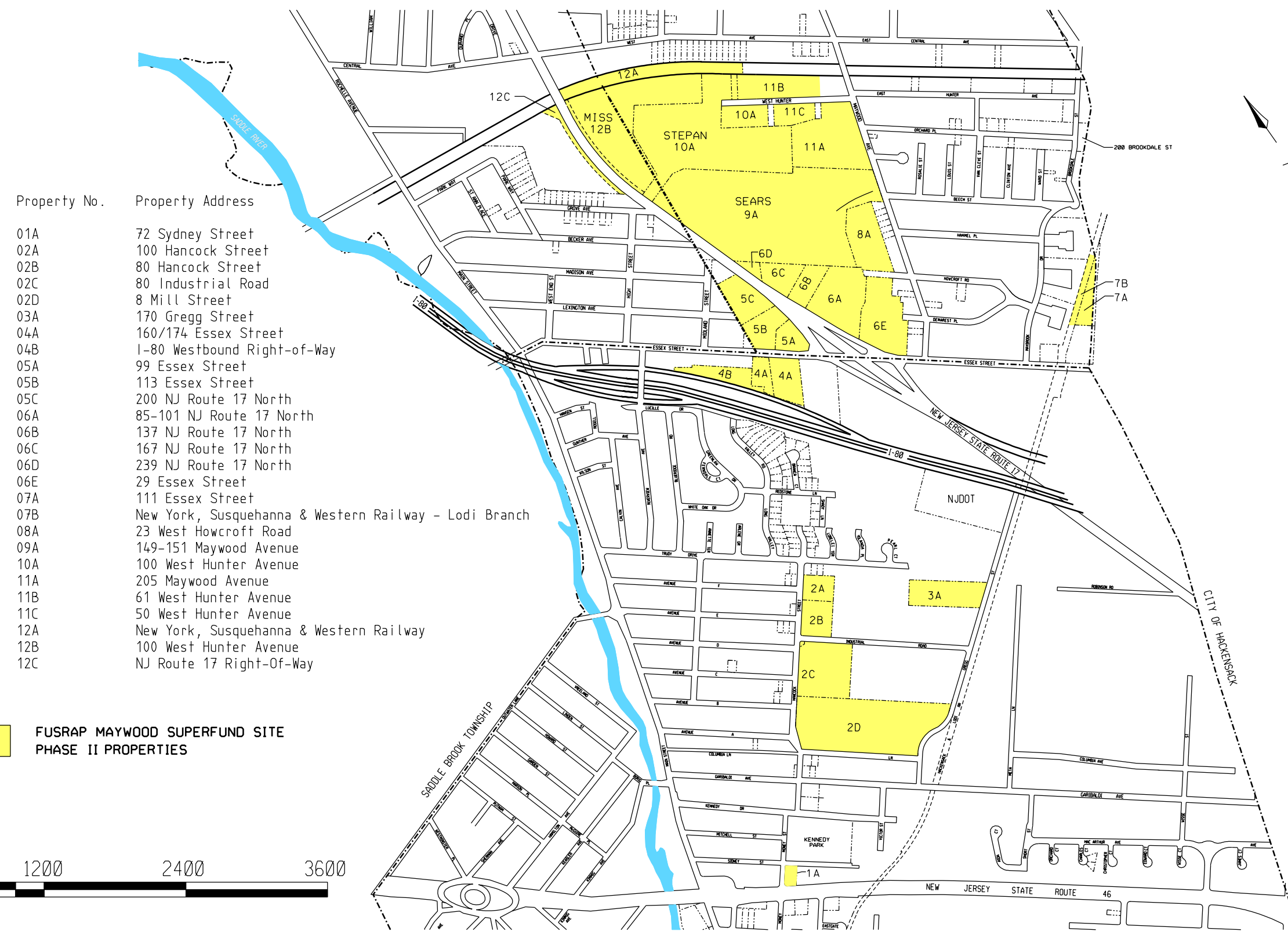
Job Number 08575
 WAD# 3

WBS# 10

Figure Number:
FIGURE 5-1

Cluster No.	Property No.	Property Address
1	01A	72 Sydney Street
2	02A	100 Hancock Street
	02B	80 Hancock Street
	02C	80 Industrial Road
	02D	8 Mill Street
3	03A	170 Gregg Street
	04A	160/174 Essex Street
4	04B	1-80 Westbound Right-of-Way
	05A	99 Essex Street
5	05B	113 Essex Street
	05C	200 NJ Route 17 North
	06A	85-101 NJ Route 17 North
	06B	137 NJ Route 17 North
6	06C	167 NJ Route 17 North
	06D	239 NJ Route 17 North
	06E	29 Essex Street
	07A	111 Essex Street
7	07B	New York, Susquehanna & Western Railway - Lodi Branch
	08A	23 West Howcroft Road
9	09A	149-151 Maywood Avenue
	10A	100 West Hunter Avenue
11	11A	205 Maywood Avenue
	11B	61 West Hunter Avenue
	11C	50 West Hunter Avenue
12	12A	New York, Susquehanna & Western Railway
	12B	100 West Hunter Avenue
	12C	NJ Route 17 Right-Of-Way

 FUSRAP MAYWOOD SUPERFUND SITE
PHASE II PROPERTIES



U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT



US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

STONE & WEBSTER, INC.

Prepared by:
**MALCOLM
PIRNIE**

File Name:
\\MAYWOOD\TASK0318\CLUSTER REPORT\REV 1\FIGURE5-2.DGN

LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY

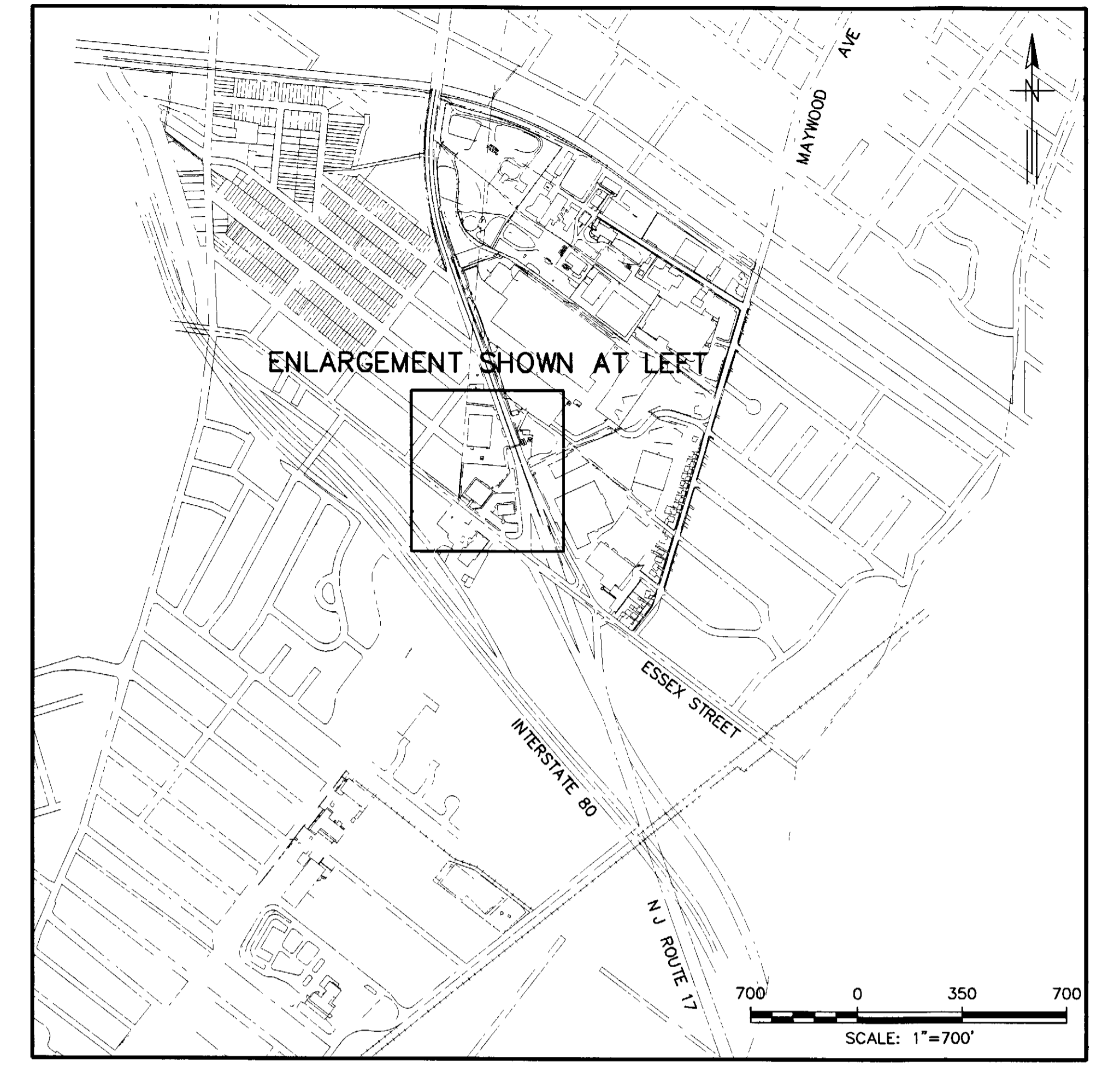
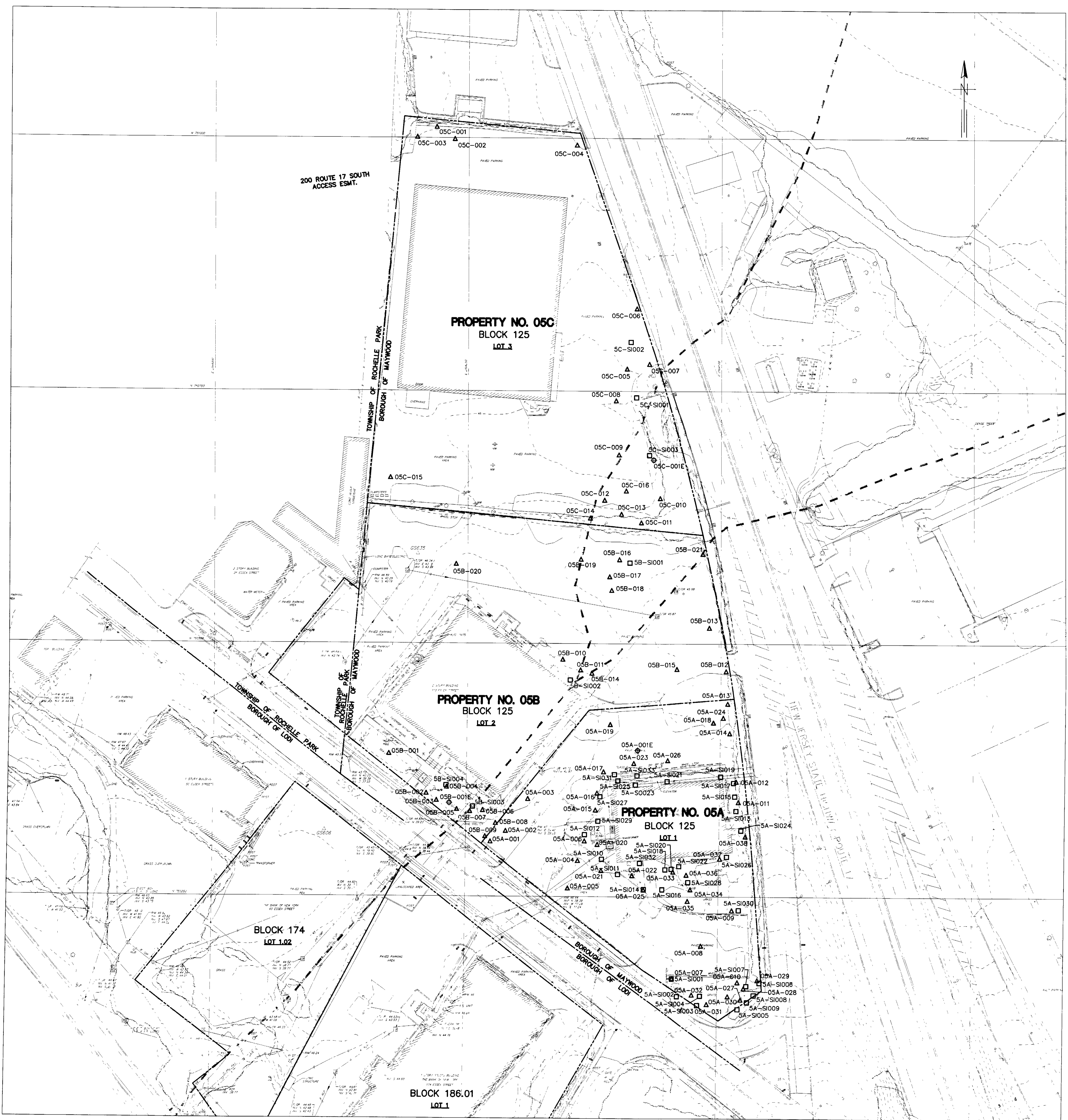
PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

Contract Number:
DACW41-99-D-9001

Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 5-2



KEY MAP

LEGEND

- PROPERTY BOUNDARY
- ▨ EXISTING BUILDING
- - - EXISTING 1' CONTOUR
- - - - APPROXIMATE LOCATION OF HISTORIC LODI BROOK CHANNEL

SAMPLE SYMBOL	SAMPLE TYPE	NUMBER OF SAMPLING LOCATIONS
▲	DIRECT PUSH SOIL PROBE LOCATIONS (RADIOLOGICAL)	75
□	SURFACE ISOCS LOCATIONS	40
⊕	DIRECT PUSH SOIL PROBE LOCATION (ENVIRONMENTAL)	3

- NOTES:**
- THIS SURVEY SHOWS CONDITIONS AS OF OCTOBER 1999 BASED ON AERIAL MAPPING PREPARED BY GEOD CORP. AND GROUND SURVEY BY GARDEN STATE ENGINEERING SURVEYING AND PLANNING
 - VERTICAL DATUM IS REFERENCED TO NGVD 1929
 - HORIZONTAL DATUM IS REFERENCED TO NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 1927.
 - THE LOCATION OF THE HISTORIC LODI BROOK SHOWN ON THIS SHEET WAS APPROXIMATED BASED UPON REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS FROM APRIL 6, 1940.
 - LOCATIONS OF SURFACE ISOCS POINTS 5A-SI004, 5A-SI012, 5A-SI024, 5A-SI026, 5A-SI028, 5A-SI030, AND 5A-SI032 ARE APPROXIMATE

CLUSTER NO. 5		99 ESSEX STREET (05A)		40 0 40 80	
		113 ESSEX STREET (05B)		SCALE: 1"=40'	
		200 ROUTE 17S (05C)			
<p>U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS NEW YORK DISTRICT FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM</p>	<p>STONE & WEBSTER, INC. Reviewed by: _____ Date: _____</p>	<p>CLUSTER NO. 5 SAMPLE LOCATION MAP</p>		<p>Sheet Number: 0675 Job Number: 0675 Block: 3 MSS# 18 Figure Number 5-3</p>	
		<p>U.S. ARMY CORPS OF ENGINEERS DATE: 7/21/00 FILE NAME: MFI-C5</p>			<p>PRE-DESIGN INVESTIGATION REPORT FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, LODI, AND ROCHELLE PARK, NEW JERSEY</p>



Lower Contour Limit = 1.5 X Background = 1.5 X 1800 = 2700 counts per minute
 Upper Contour Limit = Highest measurement across entire Maywood Site: approx. 500,000 counts per minute

Property Cluster No. 5: 99 Essex St. (Muscarelle)
 113 Essex St. (Bank of NY)
 200 Route 17 South (Sears Appliance Repair)
 Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 5-4

APPENDIX 5-A

Variations from the PDI Work Plan

**Letters Informing EPA and NJDEP of Use of Geoprobes⁰
In Lieu of Downhole ISOCS**



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Angela Carpenter
Remedial Project Manager
Federal Facilities Section
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Dear Ms. Carpenter:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in your December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Donna Gaffigan, NJDEP



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

December 8, 1999

REPLY TO
ATTENTION OF

Programs and Project Management Division

Ms. Donna Gaffigan
Case Manager
Bureau of Case Management
New Jersey Department of Environmental Protection
401 E State St
Trenton, NJ 08625-0600

Dear Ms. Gaffigan:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in USEPA's December 1, 1999, letter under separate cover.

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If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Angela Carpenter, EPA

Revisions to Standard Operating Procedure No. SW-MWD-509-0



**STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION**

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE: 1 of 8 plus Attachment 1
	DATE: February 2000

APPROVED:

Prepared by:
Project Chemist

Reviewed by:
PDI Task Manager
Richard Skyness 2/29/00
Project Engineer
[Signature] 2/29/00
Project Manager

1.0 PURPOSE

This Stone & Webster Standard Operating Procedure (SOP), **Soil Probe Investigation** shall be employed when collecting subsurface soil samples using the direct push soil probe method at the FUSRAP Maywood Superfund Site (hereafter referred to as the Maywood Site) properties with known or suspected soil and/or groundwater contamination.

2.0 SCOPE

This procedure details the materials, equipment, and methods common to soil probe investigation activities. Consult the site-specific project plans and work plans for proposed soil probe locations. Always consult site-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Task Manager prior to implementation and shall be documented in project field logbooks.**

3.0 REFERENCES

- Stone & Webster Maywood SOP 102 - Downhole Gamma Radiation Logging
- Stone & Webster Maywood SOP 307 - Surface and Shallow Subsurface Soil Sampling
- Stone & Webster Maywood SOP 308 - Soil Borings and Sampling
- Stone & Webster Maywood SOP 401 - Photoionization Detector (PID)
- Stone & Webster Maywood SOP 504 - Labeling, Packaging, and Shipping Environmental Samples
- Stone & Webster Maywood SOP 505 - Cuttings and Fluids Management
- Stone & Webster Maywood SOP 506 - Decontamination
- Stone & Webster Maywood SOP 507 - Field Notebook Content and Control
- U.S.E.P.A., A Compendium of Superfund Field Operation Methods, Document EPA/540/P-87/001, December, 1987.

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	2 of 8

DEFINITIONS

Stone & Webster Team – personnel of the Stone & Webster Team that includes for this SOP: Stone & Webster, Malcolm Pirnie, Franklin Environmental Services, Inc., Safety & Ecology Corporation (SEC), and Garden State Surveying, Engineering and Planning, Inc. The Stone & Webster Team shall perform soil probe investigation activities, except those activities specified as performed by the Subcontractor.

Subcontractor – personnel of the direct push soil probe firm.

Direct Push Soil Probe – generic name for advancing media sampling piping/tubes with only direct mechanical force. They are typically hollow steel rods advanced using a percussive force (powered hammer) and driven directly into unconsolidated soil. There are two types of direct push soil probes. One is a single rod system (i.e., macrocore) and the other is a dual tube or cased system. The latter, which will be the method of choice for most Maywood Site investigations, utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Drive rods used with the cased system are usually made from a high-grade steel alloy and are retracted after sampling.

4.0 RESPONSIBILITIES

5.1 Project Manager - Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 Project Environmental Engineer - Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for direct push soil probe activities.

5.3 Project Superintendent - Designated by the Project Manager to supervise investigative activities by Stone & Webster Team and Subcontractor personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in monitoring soil probe investigation activities in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each workday. The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil probe investigation activities and deviations from this SOP.

5.4 Site Personnel (including the data logger) - Required to read and sign the Maywood Site Safety and Health Plan (SSHP), have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil probe investigation activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

5.5 Site Safety & Health Officer - Responsible for ensuring that all site workers (Stone & Webster and Subcontractor) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.6 Task Manager – Responsible to plan, implement, and closeout field work requiring direct push technology.

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE 3 of 8

5.7 Subcontractor - Required to read and sign the SSHP, have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. Subcontractors shall report directly to the Task Manager or his designee.

6.0 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS FOR SOIL PROBE INVESTIGATION

The following is a list of equipment and material that is commonly used on all projects when the direct push probe technique is performed in the unconsolidated soils. Refer also to related SOP equipment and material requirements to ensure completeness.

Items required by Subcontractor:

- Direct push probe equipment - of appropriate size and direct push probe and sampling capabilities; vehicle mounted; direct push probe sampling tools used to advance boring (i.e., direct push small diameter rods; and augers, if required) equipment, labor, and supplies to maintain optimal efficiency
- Environmentally-safe lubricants
- Backfill material for probe holes, as required
- Soil sample collection and logging supplies – **See Stone & Webster Maywood SOP 308, Soil Borings and Sampling**
- Decontamination supplies - **See Stone & Webster Maywood SOP 506, Decontamination**

Items carried by Stone & Webster Team on-site personnel

- **SSHP To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Clipboard
- Pencils
- Six-foot-ruler
- Pocket knife
- Camera (optional), check with Project Manager if required
- Volatile organic compound vapor meter equipped with photoionization detector (PID) and other air surveillance monitoring equipment, as required by the SSHP
- Radiation meter
- Site boring logs
- Blank soil probe logs
- Weighted measuring tape
- Water level measuring device - **See Stone & Webster Maywood SOP 410, Groundwater Level Measurement**, Interface probe, if needed
- Paper towels
- Chain of Custody forms

7.0 DIRECT PUSH PROBE ACTIVITIES

7.1 General Considerations

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Prior to selecting the direct push probe method for a specific property, the objectives of the field investigation must be established. These property-specific objectives shall include one or more of the following Maywood Pre-Design Investigation (PDI) program objectives:

- Soil classification/evaluation - the direct push soil probe technique will be able to accommodate the collection of soils for characterization purposes.
- Characterization of hydrogeologic conditions - the direct push soil probe technique shall allow for the characterization of each stratigraphic zone, and water level measurements.
- Evaluation of soil contamination - the direct push soil probe technique shall provide the appropriate sample collection methods, must not introduce contaminants into the probe hole or otherwise alter the existing soil or groundwater chemistry, and should not result in subsurface cross contamination during or after installation of direct push probe.

7.2 Direct Push Probe Activities

Prior to commencing direct push soil probe fieldwork, several activities should be performed. These activities, which include both pre-mobilization office tasks and pre-installation field tasks, are discussed below. Once the pre-installation activities are completed, direct push soil probe installation may commence.

7.2.1 Pre-Mobilization Tasks

1. The Stone & Webster Team and Subcontractor shall acquire as much geologic and hydrogeologic information about the site as possible. This information may include possible soil and groundwater contamination present, groundwater table depths and fluctuations, surficial and bedrock geology, approximate thickness of the unconsolidated zone, depth to top of weathered rock, depth to competent rock, and site access.
2. Soil probe locations shall be marked in the field by the Stone & Webster Team with either paint or flags/stakes during pre-mobilization tasks, and surveyed using a global positioning system (GPS). The Stone & Webster Team shall check and verify that the soil probe location corresponds to the location on the project plans. The Stone & Webster Team and Subcontractor shall check to see if visible structures will prevent the completion of proposed soil probes at specific locations.
3. The Stone & Webster Team shall communicate with the Subcontractor regarding the requirements of the direct push soil probe program and required geologic and environmental information. Inform the Subcontractor of the environmental sampling program that the project shall follow. This information includes sampling frequency, sampling depths, type of sample required (soil or groundwater), the length of casing, direct push soil probe method (i.e., macrocore, dual tube, etc.), number and type of soil samplers required, and special sampling techniques. Ensure that probe hole backfill is selected in accordance with the project specifications.
4. The Subcontractor shall ensure that all utilities in the vicinity of the proposed boring(s) have been cleared by the appropriate authorized parties (e.g., New Jersey One-Call System at 1-800-272-1000, owner, etc.) or, if utilities exist, are visibly marked on the ground surface in the area of the proposed boring. In addition, keep a safe working distance (pursuant to OSHA) from overhead utilities. **NOTE: The party responsible for having utilities cleared shall be identified. If the responsible party is not clearly identified then the Task Manager shall establish the responsible party. Ensure that utilities have been cleared prior to installation of soil probe.**

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7.2.2 Pre-Installation Field Tasks

Sampling equipment shall be decontaminated prior to use, using pressure or manual washing of the rig, direct push soil probe, and tools, as required to prevent introducing off-site contamination. The direct push soil probe related equipment shall be decontaminated on site prior to direct push soil probe activities. Refer to **Stone & Webster Maywood SOP 506, Decontamination** for specific instructions.

7.3 General Direct Push Soil Probe Method Procedures

The following sections outline general direct push soil probe procedures used in unconsolidated soil materials.

1. Assuming a vertical soil probe, the Subcontractor shall set the direct push rig over the proposed soil probe location. Level the direct push rig and ensure that the direct push rods used to advance the soil probe are in a vertical position directly above the hole.
2. The inspecting Stone & Webster Team shall obtain and record measurements of tools to be used for direct push probe operations. Down-hole measurements taken by the Subcontractors shall be to the nearest 0.1 foot.
3. The Subcontractor shall begin sampling or advancement of soil probe to the desired depth utilizing the direct push method described below. Samples shall be taken using the steps described in Section 8.1.1.
4. When the direct push advancement tools are lowered into the probe hole, the Stone & Webster Team shall keep track of tool lengths to check Subcontractor's stated depth of soil probe.
5. The Stone & Webster Team shall make certain that the Subcontractor is performing depth measurements with a ruler and known tool lengths and not visually judging ("eyeballing") casing and tool projections above the ground. The Stone & Webster Team shall maintain a mental note of depth to bottom of soil probe by keeping track of the linear feet of tools in and above the ground. By mentally subtracting the "stick-up" above the ground, the Stone & Webster Team can maintain a constant approximate check on the soil probe depth and Subcontractor's indicated depths.
6. The breathing zone shall be screened by a designee of the Stone & Webster Team Site Safety and Health Officer for total volatile organic vapors using an organic vapor analyzer as outlined in the SSHP. A lower explosive limit meter (LEL) shall be employed if required in SSHP. Record the measured readings at the depth and time of reading on the boring log.
7. During direct push probe activities, both the Stone & Webster Team and Subcontractor shall record production, mechanical and/or sampling difficulties and the sequence of activities. Also record rig mobilization time, rig set-up time, and probe commencement and completion times. This information should be recorded in a field log book. The Stone & Webster Team shall also record pertinent details on the soil probe log (See Attachment A for blank soil probe log).
8. Refusal of direct push probe advancement tools (i.e., casing refusal) is defined as when the probe hole cannot be advanced using regular advancement methods. Generally, refusal can be identified by the following characteristics:
 - Advancement of probe hole is not noticeable or is very slow
 - A change in the frequency/pitch of the direct push probe equipment
 - The direct push probe downpressure may be significantly higher than under "normal" conditions. The direct push rig may be lifted off the ground surface.
9. If refusal is encountered in the soil probe, refer to **Stone & Webster Maywood SOP 308, Soil Borings and Sampling** for specific instructions. If the probe hole cannot be advanced, relocate the probe hole within approximately 5 feet distant from the original location and start with the

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work in Section Paragraph 7.2.1. Measure the distance and direction from the original location, and record this information in the field logbook. The actual distance of movement necessary may be greater depending on the site conditions. If the required movement is greater than 5 feet, contact the Task Manager for direction.

10. Downhole gamma radiation logging will be performed, *where feasible* by the Stone & Webster Team as described in Section 8.1.1 below (**See Stone & Webster Maywood SOP 102, Downhole Gamma Radiation Logging**).
11. When the probe hole is completed and the area is cleaned up, all contaminated equipment, including down-hole tools, hand tools, and direct push rig shall be decontaminated by the Subcontractor (**See Stone & Webster Maywood SOP 506, Decontamination**) and as directed by the Radiation Safety Officer (RSO).
12. The Stone & Webster Team shall record the soil probe location on the project drawings.

8.0 METHOD-SPECIFIC SOIL SCREENING AND SAMPLING

In this section, the soil screening and sampling procedure for the direct push soil probe method is described.

8.1 Direct Push Probe Services

The direct push probe rig is a hydraulically powered percussion/direct push machine used for small diameter subsurface investigations. It can obtain continuous soil cores, discreet soil samples, groundwater samples and vapor samples along with installation of permanent sparge points.

8.1.1 Procedures for Screening and Sampling Direct Push Probe Soil Samples

Following is the procedure to be used at the Maywood Site for screening and sampling direct push probe soil cores.

1. Each 4-foot soil core sample will remain in the polyvinyl chloride/polyethylene terephthalate (PVC/PETG) liner and marked with the appropriate field identification number, sealed with rubber end caps for liners, and placed into a designated (2 inch ID) PVC container (including PVC end caps) supplied by the Subcontractor for storage. Pertinent sample data will also be marked on the PVC container.
2. Downhole gamma logging will be accomplished, *where feasible* by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.
3. Each soil probe hole will be backfilled for the full length, in accordance with project requirements.
4. The sealed PVC containers will be transported by the Stone & Webster Team to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. All Building 76 sample documentation, field screening, and sampling tasks shall be performed by the Stone & Webster Team. Sample documentation will include the preparation of a soil probe log containing the following pertinent field documentation: soil probe identification number and location; soil column description; soil screening data, and photo-documentation. **Stone & Webster Maywood SOP 507, Field Notebook Content and Control**, shall be followed. Sample documentation information shall be recorded electronically.
5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each

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soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integration taken at each marked location and recorded.

6. The soil cores will then be screened for total volatile organic vapors using a PID (see **Stone & Webster Maywood SOP 401, Photoionization Detector (PID)**). A series of small perforations will be made through the liner at 12-inch increments.
7. The soil cores will be described generally in accordance with the Unified Soil Classification system, based on visual observations through the liners and soil extracted from the small perforations. Prior to storage, these perforations will be sealed with tape. The soil descriptions developed will be marked with an "FC" note to define the description as a field classification.
8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.
9. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.
11. Extracted samples shall be prepared in accordance with the Safety and Ecology Corporation (SEC) on-site field laboratory soil preparation practice/SOP.
12. Analysis for ROC on extracted sections of the soil core will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector, or equivalent. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.
14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.
15. Sampling tools will be decontaminated before each boring, after collecting each soil sample, and after each boring.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term "blind duplicates"), thus eliminating potential bias in the test measurement.

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If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.

ATTACHMENT 1

PDI SOIL PROBE LOG SHEET				
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator		XXX		
Activity Designator		AAA		PDI
Field Measurement/Sample Collection Designator		VV		SP
Station Number		N N N		
Media		m m		SB
Sample Type		n		
Sequential Sample Number		#####		(see Below)
Location		Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
		Gamma Logging		Photoionization Detector (PID) Logging
		Down Hole	Core	
Date			Date	
Time			Time	
Logger			Logger	
Detector Model #		SPA-3	PID Model #	Multi-RAE
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		
Comments:				
1. MPI No. _____.				
2. Direct-push location grouted with BenSeal.				
_____ Signature (Down Hole Gamma Logging)			_____ Date	
_____ Signature (Core Gamma Logging)			_____ Date	
_____ Signature (PID Logging)			_____ Date	

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)									
					X	X	X	#	#	#	#	#	#	
0.0														
0.5														
1.0														
1.5														
2.0														
2.5														
3.0														
3.5														
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24.0														

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 G:\3674009\PDI Report\AppdxA\SOP509FINAL.doc

TABLE 1-A: REVISIONS TO SOP SW-MWD-509-0

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>Section 8.1.1 Procedures for Screening and Sampling Direct Push Soil Samples 2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a Bicon 3/8- inch x 3/8- inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. The detector shall be positioned below the bottom of the casing to allow gamma log readings in the uncased portion of the probe hole. The casing shall be extracted at 6-inch increments and a 30-second count reading shall be taken at each increment.</p>	<p>2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. The sodium iodide detector preamplifier is connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector™ multi-channel analyzer/amplifier/high voltage power supply. The system is controlled, and the data stored, via a notebook computer. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.</p>	<p>Cabrera Services, Inc. developed this procedure as a cost effective site characterization method. Better sensitivity of the 1-inch x 1-inch detector used by Cabrera Services, Inc. allows gross gamma measurements through the soil probe casings, thereby increasing soil probe production rates.</p>	<p>January 11, 2000, without waterproof container. Sealed solid casing installed following extraction of MacroCore or Dual Tube system. January 28, 2000, with waterproof container. Eliminated need of sealed solid casing.</p>
<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The acetate liner shall be marked off at 6-inch intervals. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Readings shall consist of 10-second integrations taken every six inches and recorded.</p>	<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the PVC/PET liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integrations taken at the marked locations and recorded.</p>	<p>Continuous scanning of the soil core provides complete coverage, longer counting time at the regions of interest, and minimizes redundancy of the downhole gamma measurements.</p>	<p>January 11, 2000</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>8. A minimum of three soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238 based on field radiological screening and gamma logging values. At a minimum, one soil sample will be taken at the highest reading location (suspected FUSRAP waste); a second soil sample shall be collected where the readings approach a constant value (suspected transition zone); and a third soil sample shall be collected within the zone of constant readings (below suspected transition zone). Additional samples may be taken based on the Task Manager's direction.</p>	<p>8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.</p>	<p>Suspected FUSRAP waste and suspected transition zones may not be present in each direct push location.</p>	<p>Selection of archived samples began February 21, 2000.</p>
<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored in Building 76 for future reference.</p>	<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.</p>	<p>Based on laboratory analysis there may be the need to collect additional samples from the stored soil cores.</p>	<p>January 11, 2000</p>
<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a USACE-certified off-site laboratory, for confirmatory ROC analysis. Soil samples shall be placed in labeled containers provided by the laboratory, then placed in coolers maintained at 4°C. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>Samples will be sealed in containers provided by the SEC on-site field laboratory.</p> <p>Preservation (i.e., 4°C) is not required for ROC analysis.</p>	<p>February 28, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>14. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.</p>	<p>14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.</p>	<p>Sample storage will be returned to the FUSRAP Maywood Superfund Site for future disposition.</p>	<p>January 11, 2000</p>
<p>9.0 QUALITY ASSURANCE/QUALITY CONTROL Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment rinsate blanks and duplicates. Equipment rinsate blanks must be collected each day that sampling occurs or each decontamination event, whichever is less, per matrix per parameter per field crew, per equipment type (assuming reusable sampling equipment is used). This QA/QC requirement may be modified based on conversations with USACE, USEPA, and NJDEP. Field duplicate samples must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement. Field duplicate samples must represent no less than 10 % of the total number of samples per matrix per parameter per area of study. Field duplicate gamma radiation readings shall also be recorded at a frequency of 10% of the total gamma radiation readings.</p> <p>Matrix spike/matrix duplicate (MS/MD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat</p>	<p>Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement.</p> <p>If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given</p>	<p>Swipe sample is a more representative QC check of loose surface alpha radioactivity than aqueous rinsate sample.</p> <p>Reduction from 10% to 5% duplicate samples based on large number of soil samples proposed for PDI. In addition, 5% is consistent with NJDEP Field Sampling Procedures Manual for field duplicates and EPA guidelines for MS/MSD analysis. Electronic mail sent to EPA and NJDEP regarding reduction in duplicate percentage on January 28, 2000.</p>	<p>Equipment blank revision implemented on January 11, 2000.</p> <p>Reduction from 10% to 5% duplicate samples implemented week of February 7, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
no less than 10% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.	method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.		

Revised PDI Work Plan Table 5-1

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

PROPERTY CLUSTER NUMBER ⁽⁸⁾	NUMBER OF SAMPLING LOCATIONS						NUMBER OF SAMPLES FOR ANALYSIS BY PARAMETER ⁽⁶⁾								
	RADIOLOGICAL SURVEY				GEOTECH	ENVIR	GEOTECHNICAL					CHEMICAL ANALYSES			
	SOIL PROBES ⁽¹⁾	SOIL PROBE DEPTHS (FT) (ESTIMATED)	SOIL PROBE RADIOLOGICAL ANALYSES ⁽²⁾	SURFACE SOIL RADIOLOGICAL ANALYSES ⁽³⁾	SOIL BORINGS ⁽⁴⁾	SOIL BORINGS ^(4,5)	SPECIFIC GRAVITY	ATTERBERG LIMITS	GRAIN SIZE	TRIAXIAL TESTS ⁽⁷⁾	CONSOLID. TESTS ⁽⁷⁾	WATER CONTENT	CHROMIUM SPECIATION	TCL/TAL	FULL RCRA CHAR.
1	13	12	39	5	3	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
2	96	16	288	50	22	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
3	10	8	30	5	2	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
4	32	12	96	15	4	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
5	79	8	237	40	8	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
6	85	16	255	40	12	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
7	28	16	84	15	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
8	26	16	78	15	6	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
9	131	16	393	65	17	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
10	106	24	318	55	16	6	TBD	TBD	TBD	TBD	TBD	TBD	6	6	6
11	16	8	48	10	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
12	151	24	453	75	17	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
TOTALS	773	N/A	2319	390	115	47	---	---	---	---	---	---	47	47	47

NOTES:

- 1 Soil probes installed using direct-push method, to the depth shown or refusal.
- 2 At a minimum, three separate soil samples (one soil sample from within the suspected FUSRAP waste, one in transition zone, and one below the transition zone) will be selected for analysis of the ROC by the on-site field laboratory. A total of 2319 subsurface soil samples (i.e., 3 X 773) will be selected for ROC analysis by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 3 Five surface soil samples will be randomly collected from up to 10% of the 773 soil probe locations for radiological analyses and comparative evaluation of surface ISOCs measurement. A total of 390 surface soil samples (i.e., 5 X 78) will be selected for ROC analyses by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 4 Depths and quantities to be determined in field based on radiological data, structure foundations depths, etc.
- 5 Advanced to depth of radiological contamination.
- 6 Sample Analyses Rationale:
 - 6a Chromium Speciation - Speciation of trivalent and hexavalent chromium for health and safety purposes.
 - 6b TCL/TAL - Detection of organic and inorganic constituents to assess the potential for the presence of commingled radiological and chemical contamination.

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

6c	RCRA Characteristics - To support transportation & disposal activities
6d	Geotechnical Parameters (Specific Gravity, Atterberg Limits, Grain Size, Water Content) - To characterize physical properties of soil for excavation and remediation.
7	Triaxial tests and consolidation tests will be performed on undisturbed tube samples to determine strength and consolidation parameters of fine-grained materials, where present. These parameters will be used to perform bearing capacity and settlement analyses where excavations are adjacent to structures.
8	Property Clusters are defined as follows: <i>PROPERTY CLUSTER NO. 1: 72 SIDNEY ST. (A.K.A 88 MONEY ST.)</i> <i>PROPERTY CLUSTER NO. 2: 100, 80 HANCOCK ST., 80 INDUSTRIAL RD., AND NJVIS</i> <i>PROPERTY CLUSTER NO. 3: 170 GREGG ST.</i> <i>PROPERTY CLUSTER NO. 4: 160/174 ESSEX ST., I-80 RIGHT-OF-WAY</i> <i>PROPERTY CLUSTER NO. 5: 99 ESSEX ST, 113 ESSEX ST., 200 ROUTE 17 SOUTH</i> <i>PROPERTY CLUSTER NO. 6: 29 ESSEX ST., 85-101 ROUTE 17 NORTH, 137 ROUTE 17 NORTH, 167 ROUTE 17 NORTH, 239 ROUTE 17 NORTH</i> <i>PROPERTY CLUSTER NO. 7: 111 ESSEX ST. - SCANEL/HACKENSACK AND LODI RAILROAD</i> <i>PROPERTY CLUSTER NO. 8: 23 WEST HOWCROFT RD.</i> <i>PROPERTY CLUSTER NO.9: 149-151 MAYWOOD AVE.</i> <i>PROPERTY CLUSTER NO.10: 100 W. HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.11: 205 MAYWOOD AVENUE AND 50 & 61 WEST HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.12: 100 W. HUNTER AVE., NY, SUSQUEHANNA AND WESTERN RAILROAD, AND NJ ROUTE 17</i>

Rationale of Intrusive Sample Location Relocations

PDI Soil Probe Variance Log

Cluster No.: 5

Property Addresses: Property No. 05A - 99 Essex Street (owned by Joseph Muscarelle Associates)
Property No. 05B - 113 Essex Street (owned by Bank of New York)
Property No. 05C - 200 NJ Route 17 South (owned by 200 Route 17 Associates L.L.C.; tenant is Sears Appliance Service Center)

PDIWP Map: Figure 5-3

Number of Revised Soil Probe Locations: 11

Rationale for Revisions

- Locations 5027, 5090, 5029, 5022, 5023, 5034 and 5038 as originally proposed in the PDIWP were deleted. The locations form a line from north to south along the eastern boundary of the property, adjacent to the NJ Route 17 ramp. These points are in an area which is heavily wooded with a steep slope (swale) that is very difficult to access. Additional review of historic data indicated a sufficient number of borings in this vicinity (BNI, 1992; ORNL, 1989b).
- Sample location 05C-013 was moved approximately 5 feet to the north to better bracket an anomalous area noted by Bechtel (BNI, 1994).
- Sample locations 05A-013, 05A-014, and 05A-018 were moved to a triangular area in the northwest corner of 99 Essex St. to investigate an area exhibiting elevated gamma counts. Locations 05A-013 and 05A-014 were originally located in the southern portion of the swale area. Location 05A-018 was originally located in the northwest area in the proximity of the building.

Notes:

1. This list provides specific rationale for the relocation/deletion/addition of intrusive radiological sampling locations due to revised understanding of anticipated radiological contamination. This revised understanding was based on further review of previous data collected by others, and review of surface gamma survey and ISOCS data collected by the Team under this PDI program.
2. Base mapping used in the PDIWP (Stone & Webster, 1999a) has been revised by the Team. Accordingly, a number of intrusive sample locations needed to be relocated due to previously unforeseen physical restrictions (i.e., presence of underground utilities, unacceptable proximity to buildings/roadways, revisions to previously mapped property limits). This table is not intended to provide detailed rationale for points moved due to new mapping.

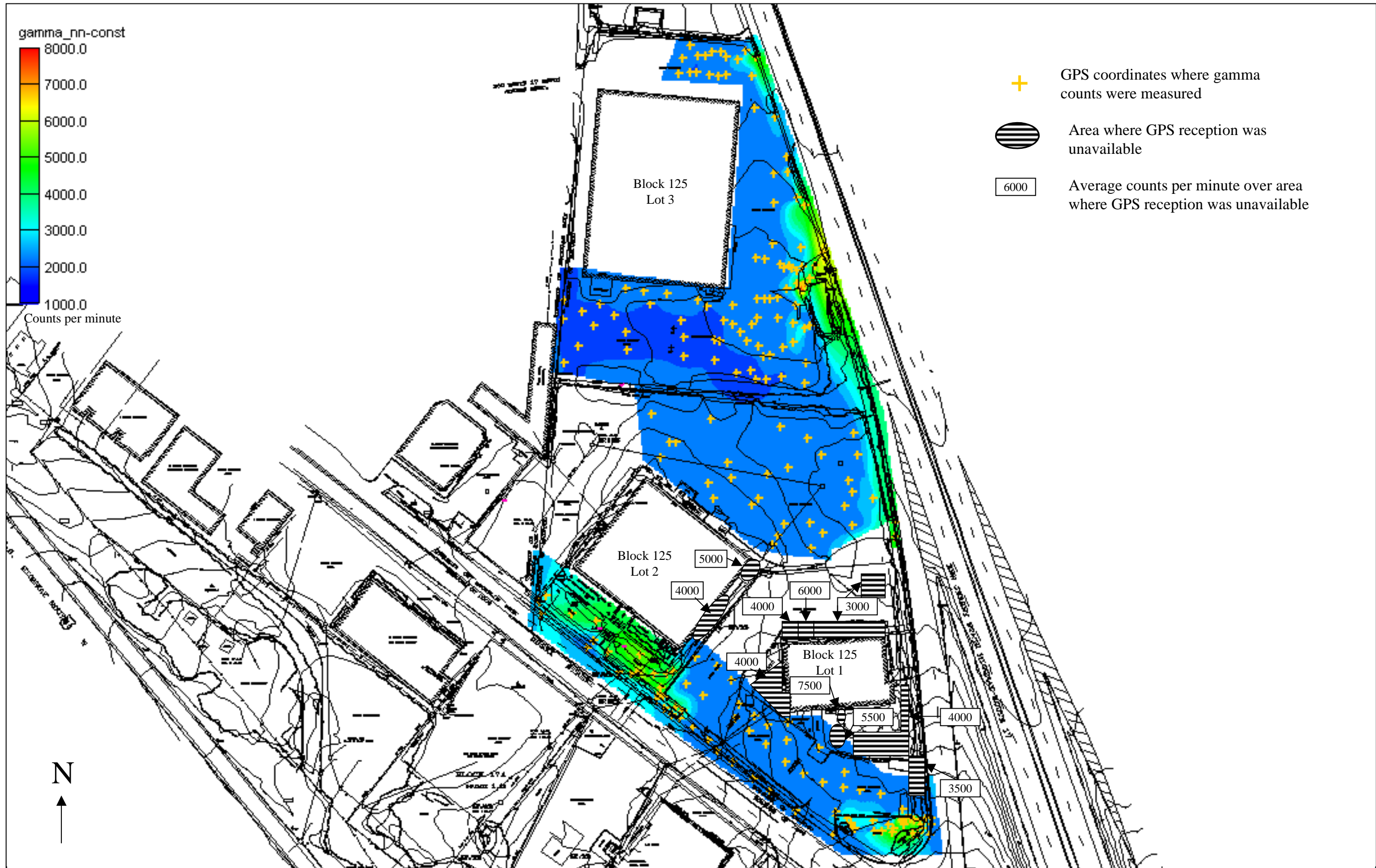
Outlier Protocol (Gamma Scan Anomalies)

Protocol for Addressing Gamma Scan Anomalies (Outliers)

Maywood FUSRAP Superfund Site

Pre-Design Investigation

1. Anomalous surface gamma scan measurements **greater than 2500 cpm for shielded areas (e.g. asphalt covered surfaces), or 3500 cpm for unshielded areas (e.g. bare soil) but, less than 6,000 cpm (1" x 1" NaI detector)** will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL. Note, these count rates are approximately one and one-half times background on shielded and unshielded surfaces.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization (i.e., eliminates the potential for elevated levels of radiological contamination at depth or provides adequate information on the existence of radiological contamination with depth) **will not be further investigated during the PDI.**
 - C. Anomalous areas that do not have previous data that are adequate for characterization **will only be investigated during the PDI if proposed soil probe locations can be moved to these locations without compromising the quality of the data from the proposed locations.** Additional soil probe locations **will not be added** to the program.
 - D. Anomalous areas where additional PDI investigations (based on 1.C) will be performed but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
2. Anomalous areas exhibiting a surface gamma count rate **greater than or equal to 6,000 cpm** (based on a 1" x 1" NaI detector) will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be as follows: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization **will not be further investigated during the PDI.**
 - C. Anomalous areas with previous data that are not adequate for characterization **will be investigated further during the PDI.** Proposed soil probe locations **will be moved** to these locations if possible, or additional soil probe locations **will be added** to the PDI program. These additional soil probes will be used to define the nature and extent of contamination within these previously unidentified areas; the quantity of additional borings is to be determined on a site-by-site basis.
 - D. Anomalous areas that require additional PDI investigations (based on 2.C) but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
3. All anomalous areas and their dispositions will be documented in the PDI.



Property Cluster No. 5: 99 Essex St. (Muscarelle)
 113 Essex St. (Bank of NY)
 200 Route 17 South (Sears Appliance Repair)
 Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 5-A1

Reduction in Field Duplicate and MS/MSD Frequency

Navon, Daria

Subject: FW: Reduction in field duplicate and MS/MSD frequency request

----- Forwarded by David Doyle/Environmental/SWEC on 01/28/2000
02:54 PM -----

"Shonkwiler, Glen D NWK" <Glen.D.Shonkwiler@nwk02.usace.army.mil> on 01/28/2000
02:00:15 PM

To: "carpenter.angela@epamail.epa.gov" <carpenter.angela@epamail.epa.gov>, "dgaffica@dep.state.nj.us" <dgaffica@dep.state.nj.us>
cc: "Roos, Allen D NAN02" <Allen.D.Roos@nan02.usace.army.mil>, "Medary, Richard T NWK" <Richard.T.Medary@nwk02.usace.army.mil>, "Mellema, Doug W NWK" <Doug.W.Mellema@nwk02.usace.army.mil>, "Speckin, Paul D NWK" <Paul.D.Speckin@nwk02.usace.army.mil> (bcc: David Doyle/Environmental/SWEC)

Subject: Reduction in field duplicate and MS/MSD frequency request

Angela/Donna, with this email, USACE is notifying EPA and NJDEP of our intent to reduce the number of field duplicates and MS/MSD samples required in the Maywood Chemical Site CDQMP for the PDI sampling from 10% to 5%. The 10% frequency is a USACE-internal QC standard which USACE plans to reduce based on the large number of soil samples collected during the Pre-Design Investigation (PDI). The reduction in frequency would affect field duplicate samples collected for radionuclides of concern (ROC) and analysis by the on-site field laboratory; field duplicate gamma radiation readings (both downhole and core sample); photoionization detector (PID) or flame ionization (FID) readings; and MS/MSD samples analyzed by the off-site laboratory. It is anticipated that greater than 2000 soil samples will be analyzed by the on-site field laboratory and gamma radiation and PID readings will exceed 10,000 measurements.

Five percent is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and EPA guidelines for MS/MSD analysis. EPA Region II does not have a specific QA/QC guideline for field duplicate samples. The guideline is therefore on a case-by-case basis, in accordance with the site-specific project plans.

Please note that the 10 percent of the samples analyzed by the on-site field laboratory will still be sent to a certified off-site laboratory for confirmatory ROC analysis.

We will continue to adhere to the current 10 percent until EPA and NJ notifies USACE of its concurrence with this deviation from the CDQMP (for the PDI only). Your attention to this matter is greatly appreciated, since reduction of this QA/QC guideline will help to increase production during the Pre-Design Investigation without, in the opinion of USACE, impacting

quality and usability of the data.

Thanks,
Glen Shonkwiler
Remedial Investigations & Remedial Design Manager
Hazardous, Toxic, & Radioactive Waste Branch
U. S. Army Corps of Engineers
CENWK-EC-EA RM 610
601 E 12th St
Kansas City, MO 64106
(816) 983-3561
(816) 426-5550/5949 (fax)
glen.d.shonkwiler@usace.army.mil

APPENDIX 5-B

**PDI Soil Probe Log Sheets
(Radiological Data)**

PDI Soil Probe Log Sheet
LEGEND

List of Abbreviations:

--- = not applicable	lt = light
blk = black	MDA = minimum detectable activity
bn = brown	med = medium
cl = clay	n/r = no recovery
cnts = counts	pCi/g = picoCuries per gram
Conc. = concentration	ppm = parts per million
dk = dark	SAA = same as above
DUP = duplicate	sc = clayey sand
f = fine	sec = seconds
gm = silty gravel	sm = silty sand
gp = poorly-graded gravel	sp = poorly-graded sand
gw = well-graded gravel	sw = well-graded sand
gy = gray	tr = trace
J = estimated	U = unidentified or negative conc. less than MDA
lg = large	wht = white

List of General Comments:

- 4x4 truck-mounted model 5400 and track-mounted model 54DT Geoprobe[®] were used to collect samples. Manual direct push methodology required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- Holes were grouted with BenSeal[®]
- Gamma measurements were taken at center point
- Duplicate samples marked with an "X" for duplicate were prepared by homogenizing soil above and below the center point and then separating for analysis.
- The depth listed is the center point
- Error: 2 sigma (95% confidence interval)

Tube Types

1-inch diameter = Dual Tube (actual 1.3-inch diameter)

2-inch diameter = Macro-Core[®] (actual 1.7-inch diameter)

Sample Intervals

Dual Tube – 13 inches

Macro-Core[®] – 8 inches

Manual Direct Push – 24 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling		
Site Designator		X X X	05A	
Activity Designator		A A A	PDI	
Field Measurement / Sample Collection Designator		V V	SP	
Station Number		N N N	001	
Media		m m	SB	
Sample Type		n	0	
Sequential Sample Number		# # # # #	(See Below)	
Location		Northing (NAD 1927)	Easting (NAD 1927)	
		750304	2164275	
		Gamma Logging		
		Down Hole	Core	
		Photoionization Detector (PID) Logging		
Date	02/23/2000	03/01/2000	Date	03/02/2000
Time	10:00	9:45	Time	8:00
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		
Comments: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> 0 to 4 feet = 2 inch diameter 4 to 8 feet = 2 inch diameter </div> <div style="width: 45%;"> native @ 4.9' </div> </div>				
<i>Field Original Signed</i> <hr style="border: 0.5px solid black;"/> Signature (Down Hole Gamma Logging)			<hr style="border: 0.5px solid black;"/> 02/23/2000 Date	
<i>Field Original Signed</i> <hr style="border: 0.5px solid black;"/> Signature (Core Gamma Logging)			<hr style="border: 0.5px solid black;"/> 03/01/2000 Date	
<i>Field Original Signed</i> <hr style="border: 0.5px solid black;"/> Signature (PID Logging)			<hr style="border: 0.5px solid black;"/> 03/02/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling		
Site Designator	X X X	05A		
Activity Designator	A A A	PDI		
Field Measurement / Sample Collection Designator	V V	SP		
Station Number	N N N	002		
Media	m m	SB		
Sample Type	n	0		
Sequential Sample Number	# # # # #	(See Below)		
Location	Northing (NAD 1927)	Easting (NAD 1927)		
	750314	2164290		
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Date
Date	02/23/2000	03/01/2000	03/02/2000	
Time	10:20	10:05	8:30	
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		
Comments: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> 0 to 4 feet = 2 inch diameter 4 to 8 feet = 2 inch diameter </div> <div style="width: 45%; text-align: right;"> native @ 4.5' </div> </div>				
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)			<hr style="width: 80%; margin: 0 auto;"/> 02/23/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)			<hr style="width: 80%; margin: 0 auto;"/> 03/01/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)			<hr style="width: 80%; margin: 0 auto;"/> 03/03/2000 Date	

PDI SOIL PROBE LOG SHEET			
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	05A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	003	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927) 750346	Easting (NAD 1927) 2164311	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	02/23/2000	03/01/2000	Date 03/02/2000
Time	10:30	10:20	Time 9:00
Logger	E. Barbour	S. Ng	Logger J. Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2 inch diameter native @ 4.0' 4 to 8 feet = 2 inch diameter			
<i>Field Original Signed</i> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> Signature (Down Hole Gamma Logging)		<hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> 02/23/2000 Date	
<i>Field Original Signed</i> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> Signature (Core Gamma Logging)		<hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> 03/01/2000 Date	
<i>Field Original Signed</i> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> Signature (PID Logging)		<hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> 03/02/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling		
Site Designator		X X X	05A	
Activity Designator		A A A	PDI	
Field Measurement / Sample Collection Designator		V V	SP	
Station Number		N N N	004	
Media		m m	SB	
Sample Type		n	0	
Sequential Sample Number		# # # # #	(See Below)	
Location		Northing (NAD 1927)	Easting (NAD 1927)	
		750285	2164361	
		Gamma Logging		
		Down Hole	Core	
		Photoionization Detector (PID) Logging		
Date	02/23/2000	03/01/2000	Date	03/02/2000
Time	10:45	10:40	Time	9:25
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		
Comments: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> 0 to 4 feet = 2 inch diameter 4 to 8 feet = 2 inch diameter </div> <div style="width: 45%;"> native @ 4.0' </div> </div>				
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)			<hr style="width: 80%; margin: 0 auto;"/> 02/23/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)			<hr style="width: 80%; margin: 0 auto;"/> 03/01/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)			<hr style="width: 80%; margin: 0 auto;"/> 03/02/2000 Date	

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				1.9	0.0-2.0: gy sm w/gp														
0.5	100																			
1.0	160				1.5															
1.5	197		490	458			0	5	A	0	0	3	5	1	0					
2.0	156				0.9	2.0-3.3: red/bn sm tr gp														
2.5	173		482				0	5	A	0	0	3	5	1	1					
3.0	183		470		0.5	3.3-4.0: no recovery	0	5	A	0	0	3	5	1	2	X				
3.5	157																			
4.0	140	168			0.0	4.0-5.5: gy/bn sm tr sc														
4.5	156		466				0	5	A	0	0	3	5	1	3					
5.0	138				0.0	5.5-7.2: gy/bn sm tr sc														
5.5	152																			
6.0	168				0.2															
6.5	191																			
7.0	246		394		0.6	7.2-8.0: no recovery														
7.5	243																			
8.0																				
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
11.5																				
12.0																				
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
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17.5																				
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18.5																				
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 39 inches
4-8 feet: 38 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	05A		
Activity Designator	A A A	PDI		
Field Measurement / Sample Collection Designator	V V	SP		
Station Number	N N N	005		
Media	m m	SB		
Sample Type	n	0		
Sequential Sample Number	#####	(See Below)		
Location	Northing (NAD 1927)	Easting (NAD 1927)		
	750258	2164351		
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	02/23/2000	03/01/2000	Date	03/02/2000
Time		11:35	Time	9:45
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

native @ 2.0'

<u>Field Original Signed</u> _____ Signature (Down Hole Gamma Logging)	<u>02/23/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (Core Gamma Logging)	<u>03/01/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (PID Logging)	<u>03/02/2000</u> _____ Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.0	0.0-1.0: bn sm tr gp														
0.5	314		392	354																
1.0	343		454		0.0	1.0-1.6: red/bn sm tr gp														
1.5	320		478	442		1.6-4.0: no recovery	0	5	A	0	0	3	5	1	7					
2.0	200	195	463		n/r															
2.5	188		439				0	5	A	0	0	3	5	1	8					
3.0	189		461		n/r															
3.5	175																			
4.0					1.7	4.0-5.1: red/bn sm tr gp														
4.5			410																	
5.0			443		1.6	5.1-6.5: bn/gy sm tr sc														
5.5			466				0	5	A	0	0	3	5	1	9					
6.0			477		3.6															
6.5			395			6.5-7.5: bn/gy sm														
7.0					1.2															
7.5						7.5-8.0: no recovery														
8.0																				
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
11.5																				
12.0																				
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
15.0																				
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18.0																				
18.5																				
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 19 inches
4-8 feet: 42 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750169	2164455	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/23/2000	03/01/2000	Date	03/02/2000
Time	12:20	13:40	Time	12:05
Logger	E. Barbour	S. Ng	Logger	J.Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native @ 3.0'
4 to 8 feet = 2 inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/02/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results											
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	0	5	A	0	0	3	5	2	0		0.86	0.08	0.18	1.07	0.07	0.24	5.92	U	---	5.92		
1.0																						
1.5																						
2.0																						
2.5																						
3.0																						
3.5																						
4.0																						
4.5	0	5	A	0	0	3	5	2	1		0.80	J	0.07	0.21	1.11	J	0.06	0.24	7.71	UJ	---	7.71
5.0	0	5	A	0	0	3	5	2	2	X	0.82		0.06	0.2	1.00		0.06	0.21	5.38	U	---	5.38
5.5																						
6.0																						
6.5	0	5	A	0	0	3	5	2	3		ARCHIVED											
7.0																						
7.5																						
8.0																						
8.5																						
9.0																						
9.5																						
10.0																						
10.5																						
11.0																						
11.5																						
12.0																						
12.5																						
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19.5																						
20.0																						
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21.0																						
21.5																						
22.0																						
22.5																						
23.0																						
23.5																						
24.0																						

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750201	2164483	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/23/2000	03/01/2000	03/02/2000	
Time	13:30	14:00	12:30	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native @ 1.5'
4 to 8 feet = 2 inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750236	2164514	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Date
Date	02/23/2000	03/01/2000	Date	03/02/2000
Time	13:45	14:30	Time	12:50
Logger	E. Barbour	S. Ng	Logger	J.Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter 4 to 8 feet = 2 inch diameter	native @ 0.5'
--	---------------

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	02/23/2000 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	03/01/2000 Date
<i>Field Original Signed</i> Signature (PID Logging)	03/02/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750165	2164520	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/23/2000	03/01/2000	Date	03/02/2000
Time	14:05	15:40	Time	13:00
Logger	E. Barbour	S. Ng	Logger	J.Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

native @ 1.0'

<i>Field Original Signed</i>	02/23/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/01/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/02/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling		
Site Designator	X X X	05A		
Activity Designator	A A A	PDI		
Field Measurement / Sample Collection Designator	V V	SP		
Station Number	N N N	011		
Media	m m	SB		
Sample Type	n	0		
Sequential Sample Number	# # # # #	(See Below)		
Location	Northing (NAD 1927)	Easting (NAD 1927)		
	750343	2164519		
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Date
Date	02/23/2000	03/01/2000	03/02/2000	
Time	13:48	16:25	14:14	
Logger	E. Barbour	S. Ng	Logger	J.Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		
Comments: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> 0 to 4 feet = 2 inch diameter 4 to 8 feet = 2 inch diameter </div> <div style="width: 45%;"> native @ 2.0' </div> </div>				
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)			<hr style="width: 80%; margin: 0 auto;"/> 02/23/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)			<hr style="width: 80%; margin: 0 auto;"/> 03/01/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)			<hr style="width: 80%; margin: 0 auto;"/> 03/02/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750363	2164516	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/23/2000	03/01/2000	03/02/2000	
Time	14:00	16:40	14:35	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

native @ 1.5'

<u>Field Original Signed</u> _____ Signature (Down Hole Gamma Logging)	<u>02/23/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (Core Gamma Logging)	<u>03/01/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (PID Logging)	<u>03/02/2000</u> _____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750440	2164507

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Date
Date	02/23/2000	03/02/2000		03/02/2000
Time	14:21	8:15		14:55
Logger	C. Hales	S. Ng		J.Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments: 0 to 4 feet = 2 inch diameter native @ 1.0'
4 to 8 feet = 2 inch diameter

<u>Field Original Signed</u> _____ Signature (Down Hole Gamma Logging)	<u>02/23/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (Core Gamma Logging)	<u>03/02/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (PID Logging)	<u>03/02/2000</u> _____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	014
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750411	2164509	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/23/2000	03/02/2000	Date	03/02/2000
Time	14:35	8:50	Time	15:10
Logger	C. Hales	S. Ng	Logger	J.Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native @ 2.5'

4 to 8 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ Date 02/23/2000
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ Date 03/02/2000
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ Date 03/02/2000

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	#	DUP			
0.0	---				3.4	0.0-1.0: gy sm w/gp														
0.5	108		432	468																
1.0	116				3.1	1.0-3.1: bn sm tr gp														
1.5	169		464																	
2.0	141		453		0.0															
2.5	199		466																	
3.0	182				0.0	3.1-4.0: no recovery														
3.5	173																			
4.0	194	200			0.0	4.0-5.6: bn gy sm tr sc														
4.5	215		439																	
5.0	267		484	493	0.0		0	5	A	0	0	3	5	4	2					
5.5	235		465	502		5.6-7.2: bn sm tr sc	0	5	A	0	0	3	5	4	3	X				
6.0	225		492	451	0.0															
6.5	198		436				0	5	A	0	0	3	5	4	4					
7.0	202		485		0.0	7.2-8.0: no recovery	0	5	A	0	0	3	5	4	5					
7.5	238																			
8.0																				
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
11.5																				
12.0																				
12.5																				
13.0																				
13.5																				
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17.0																				
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18.0																				
18.5																				
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 37 inches
4-8 feet: 39 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	015
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750335	2164377

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/23/2000	03/02/2000	03/02/2000	15:28
Time		9:25	15:28	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native @ 2.0'
4 to 8 feet = 2 inch diameter	

<i>Field Original Signed</i>	02/23/2000
Signature (Down Hole Gamma Logging)	Date

<i>Field Original Signed</i>	03/02/2000
Signature (Core Gamma Logging)	Date

<i>Field Original Signed</i>	03/02/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	016
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750352	2164379	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/23/2000	03/02/2000	Date	03/02/2000
Time	14:50	9:50	Time	15:45
Logger	E. Barbour	S. Ng	Logger	J.Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

native @ 1.0'

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	02/23/2000 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	03/02/2000 Date
<i>Field Original Signed</i> Signature (PID Logging)	03/02/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	#	DUP			
0.0	---				14.2	0.0-1.5: dk bn sm tr sc tr wood mat														
0.5	402		659	608																
1.0	484		721		5.9		0	5	A	0	0	3	5	4	9					
1.5	225		451			1.5-2.1: bn red sm tr gp	0	5	A	0	0	3	5	5	0					
2.0	205				0.6	2.1-3.5: SAA														
2.5	180	186																		
3.0	186				0.0															
3.5	195					3.5-4.0: no recovery														
4.0	140				0.0	4.0-6.8: bn sw tr sm														
4.5	138		431																	
5.0	138				15.2															
5.5	185		489				0	5	A	0	0	3	5	5	1					
6.0	166				14.3															
6.5	193					6.8-7.5: bn sm tr sc														
7.0	124				0.6															
7.5	166					7.5-8.0: no recovery														
8.0																				
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
11.5																				
12.0																				
12.5																				
13.0																				
13.5																				
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17.0																				
17.5																				
18.0																				
18.5																				
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0						Recovery														
23.5						0-4 feet: 42 inches														
24.0						4-8 feet: 41 inches														

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	017
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750373	2164385	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/23/2000	03/02/2000	03/03/2000	
Time	15:05	10:55	7:30	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

native @ 5.5'

<u>Field Original Signed</u> _____ Signature (Down Hole Gamma Logging)	<u>02/23/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (Core Gamma Logging)	<u>03/02/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (PID Logging)	<u>03/03/2000</u> _____ Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	#	DUP			
0.0	---				2.0	0.0-0.8: dk gy sm w/gp														
0.5	118		477			0.8-3.3: red bn sm w/gp	0	5	A	0	0	3	5	5	2					
1.0	176				1.5															
1.5	183		425																	
2.0	169		386		2.0		0	5	A	0	0	3	5	5	3					
2.5	178																			
3.0	165		474		0.9	3.3-4.0: no recovery														
3.5	193																			
4.0	198	195			4.5	4.0-5.0: red bn sm tr sc gp														
4.5	176																			
5.0	186				3.7	5.0-7.0: bn gy sm tr sc														
5.5	212		434																	
6.0	171				4.0															
6.5	177																			
7.0	199		462		1.2	7.0-7.7: SAA														
7.5	233		543	539			0	5	A	0	0	3	5	5	4					
8.0																				
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
11.5																				
12.0																				
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
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19.0																				
19.5																				
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20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 39 inches
4-8 feet: 46 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling		
Site Designator		X X X	05A	
Activity Designator		A A A	PDI	
Field Measurement / Sample Collection Designator		V V	SP	
Station Number		N N N	018	
Media		m m	SB	
Sample Type		n	0	
Sequential Sample Number		# # # # #	(See Below)	
Location		Northing (NAD 1927)	Easting (NAD 1927)	
		750421	2164493	
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/23/2000	03/02/2000	Date	03/03/2000
Time	15:00	11:20	Time	9:30
Logger	C. Hales	S. Ng	Logger	J.Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		
Comments: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> 0 to 4 feet = 2 inch diameter native @ 2.0' </div> <div style="margin-top: 5px;"> 4 to 8 feet = 2 inch diameter </div>				
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)			<hr style="width: 80%; margin: 0 auto;"/> 02/23/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)			<hr style="width: 80%; margin: 0 auto;"/> 03/02/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)			<hr style="width: 80%; margin: 0 auto;"/> 03/03/2000 Date	

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	#	DUP			
0.0	---				1.0	0.0-1.0: gy sm w/gp														
0.5	283		534	567																
1.0	454				0.3	1.0-2.5: dk gy sm w/sc														
1.5	476		574	717			0	5	A	0	0	3	5	5	5					
2.0	421	416			0.3															
2.5	366					2.5-3.3: dk gy sm														
3.0	287		454		1.0	3.3-4.0: no recovery	0	5	A	0	0	3	5	5	6					
3.5	196																			
4.0	190				2.0	4.0-5.0: gy/bn sm														
4.5			484				0	5	A	0	0	3	5	5	7					
5.0			468		0.3	5.0-7.7: bn sw tr sm														
5.5			431																	
6.0			446		0.0															
6.5			468																	
7.0			457		0.0															
7.5			445	434		7.7-8.0: no recovery														
8.0					n/r															
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
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22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 39 inches
4-8 feet: 46 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	019
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750419	2164391	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/24/2000	03/02/2000	03/03/2000	
Time	9:30	14:10	10:55	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native @ 1.6'
 4 to 8 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/03/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	05A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	021	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750275	2164384	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	02/24/2000	03/02/2000	Date 03/03/2000
Time	8:13	14:45	Time 11:40
Logger	C. Hales	S. Ng	Logger J.Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

native @ 1.5'

<u>Field Original Signed</u> _____ Signature (Down Hole Gamma Logging)	<u>02/24/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (Core Gamma Logging)	<u>03/02/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (PID Logging)	<u>03/03/2000</u> _____ Date

PDI SOIL PROBE LOG SHEET								
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling					
Site Designator	X X X		05A					
Activity Designator	A A A		PDI					
Field Measurement / Sample Collection Designator	V V		SP					
Station Number	N N N		022					
Media	m m		SB					
Sample Type	n		0					
Sequential Sample Number	#####		(See Below)					
Location	Northing (NAD 1927)	Easting (NAD 1927)						
	750270	2164414						
	Gamma Logging		Photoionization Detector (PID) Logging					
	Down Hole	Core	Date	03/03/2000				
Date	02/24/2000	03/02/2000	Date					
Time	8:30	14:55	Time	12:00				
Logger	C. Hales	S. Ng	Logger	J.Dekoskie				
Detector Model #	G1	SPA-3	PID Model #	Multi Rae				
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811				
Scaler Model #	N/A	2224						
Scaler Serial #	N/A	132842						
Comments: <table style="margin-left: 40px; width: 80%;"> <tr> <td>0 to 4 feet = 2 inch diameter</td> <td style="padding-left: 200px;">native @ 1.3'</td> </tr> <tr> <td>4 to 8 feet = 2 inch diameter</td> <td></td> </tr> </table>					0 to 4 feet = 2 inch diameter	native @ 1.3'	4 to 8 feet = 2 inch diameter	
0 to 4 feet = 2 inch diameter	native @ 1.3'							
4 to 8 feet = 2 inch diameter								
<i>Field Original Signed</i> <hr style="width: 100%;"/> Signature (Down Hole Gamma Logging)			02/24/2000 <hr style="width: 100%;"/> Date					
<i>Field Original Signed</i> <hr style="width: 100%;"/> Signature (Core Gamma Logging)			03/02/2000 <hr style="width: 100%;"/> Date					
<i>Field Original Signed</i> <hr style="width: 100%;"/> Signature (PID Logging)			03/03/2000 <hr style="width: 100%;"/> Date					

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results								
												Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0	0	5	A	0	0	3	5	6	8		1.58	0.09	0.38	8.32	0.18	0.27	14.70	U	---	14.70
1.5	0	5	A	0	0	3	5	6	9		0.41	0.07	0.21	0.59	0.05	0.17	4.39	U	---	4.39
2.0																				
2.5	0	5	A	0	0	3	5	7	0		ARCHIVED									
3.0																				
3.5																				
4.0																				
4.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	024
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750426	2164503	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/24/2000	03/02/2000		
Time	10:34	15:20		
Logger	C. Hales	S. Ng		
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

native @ 2.0'

Field Original Signed

Signature (Down Hole Gamma Logging)

02/24/2000

Date

Field Original Signed

Signature (Core Gamma Logging)

03/02/2000

Date

Signature (PID Logging)

Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	#	DUP			
0.0	---				1.0	0.0-0.9: bn/gy sm w/gp														
0.5	118					0.9-1.3: red gp														
1.0	195				0.2	1.3-2.0: red sm														
1.5	205		465				0	5	A	0	0	3	5	7	4					
2.0	225		463		0.5	2.0-3.5: bn sm tr sc														
2.5	167		470																	
3.0	230		453		0.0		0	5	A	0	0	3	5	7	5					
3.5	186	168				3.5-4.0: no recovery														
4.0	177				2.4	4.0-6.5: bn sm														
4.5	147																			
5.0	166				0.0															
5.5	179																			
6.0	205				0.2															
6.5	250		515			6.5-7.8: red/bn sm tr sc														
7.0	236		526	523	0.0		0	5	A	0	0	3	5	7	6					
7.5			486	510		7.8-8.0: no recovery														
8.0																				
8.5																				
9.0																				
9.5																				
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24.0																				

Recovery

0-4 feet: 42 inches
4-8 feet: 46 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	026
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750384	2164448

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	02/24/2000	03/02/2000	Date	03/03/2000
Time	10:49	16:15	Time	14:30
Logger	C. Hales	S. Ng	Logger	J.Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

native @ 2.0'

_____	02/24/2000
Field Original Signed	Date
Signature (Down Hole Gamma Logging)	

_____	03/02/2000
Field Original Signed	Date
Signature (Core Gamma Logging)	

_____	03/03/2000
Field Original Signed	Date
Signature (PID Logging)	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	027
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750148	2164523	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/24/2000	03/03/2000	03/03/2000	
Time	11:39	7:30	14:40	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/03/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results								
												Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	5	A	0	0	3	5	8	3		2.09	0.11	0.41	7.35	0.17	0.29	16.00	U	---	16.00
1.0																				
1.5	0	5	A	0	0	3	5	8	4		0.71	0.08	0.21	0.83	0.06	0.21	5.73	U	---	5.73
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5	0	5	A	0	0	3	5	8	5		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Tel: (201) 226-6600 FAX: (201) 226-6660				
Site Designator		X X X	05A	
Activity Designator		A A A	PDI	
Field Measurement / Sample Collection Designator		V V	SP	
Station Number		N N N	028	
Media		m m	SB	
Sample Type		n	0	
Sequential Sample Number		# # # # #	(See Below)	
Location		Northing (NAD 1927)	Easting (NAD 1927)	
		750159	2164526	
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	03/03/2000
Date	02/24/2000	03/03/2000	Date	03/03/2000
Time	11:57	7:50	Time	14:52
Logger	C. Hales	S. Ng	Logger	J.Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		
Comments:				
	0 to 4 feet = 2 inch diameter		native @ 1.2'	
	4 to 8 feet = 2 inch diameter			
<i>Field Original Signed</i> _____ Signature (Down Hole Gamma Logging)			02/24/2000 _____ Date	
<i>Field Original Signed</i> _____ Signature (Core Gamma Logging)			03/03/2000 _____ Date	
<i>Field Original Signed</i> _____ Signature (PID Logging)			03/03/2000 _____ Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	05A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	029	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750167	2164540	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	02/24/2000	03/03/2000	Date
Time	12:15	8:15	Time
Logger	C. Hales	S. Ng	Logger
Detector Model #	G1	SPA-3	PID Model #
Detector Serial #	C436E	CENAN 33401	PID Serial #
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

native @ 1.0'

Field Original Signed

 Signature (Down Hole Gamma Logging)

02/24/2000

Date

Field Original Signed

 Signature (Core Gamma Logging)

03/03/2000

Date

Field Original Signed

 Signature (PID Logging)

03/03/2000

Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				3.1	0.0-1.3: dk bn sm tr gp														
0.5	632		634	630			0	5	A	0	0	3	5	9	0					
1.0	780		462		1.0	1.3-2.6: bn/red sm tr sc	0	5	A	0	0	3	5	9	1					
1.5	434																			
2.0	251				0.2															
2.5	202					2.6-4.0: no recovery														
3.0	189				n/r															
3.5	189																			
4.0	177	194			0.5	4.0-7.3: lt bn sm tr sc gp														
4.5	262		473				0	5	A	0	0	3	5	9	2					
5.0	237				0.2															
5.5	228																			
6.0	237				0.1															
6.5	254																			
7.0	238		476		0.0	7.3-8.0: no recovery														
7.5	206																			
8.0																				
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
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22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 31 inches
4-8 feet: 40 inches

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results											
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	0	5	A	0	0	3	5	9	0		1.70	0.11	0.40	5.58	0.16	0.28	10.80	U	---	10.80		
1.0	0	5	A	0	0	3	5	9	1		0.75	J	0.08	0.24	0.95	J	0.06	0.24	8.12	UJ	---	8.12
1.5																						
2.0																						
2.5																						
3.0																						
3.5																						
4.0																						
4.5	0	5	A	0	0	3	5	9	2		ARCHIVED											
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	030
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750151	2164511	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/24/2000	03/03/2000	03/03/2000	03/03/2000
Time	13:06	8:30	15:23	15:23
Logger	C. Hales	S. Ng	J.Dekoskie	J.Dekoskie
Detector Model #	G1	SPA-3	Multi Rae	Multi Rae
Detector Serial #	C436E	CENAN 33401	CENAN 21811	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native @ 2.5'

4 to 8 feet = 2 inch diameter

<i>Field Original Signed</i>	02/24/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/03/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/03/2000
Signature (PID Logging)	Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results								
												Radium-226			Thorium-232			Uranium-238		
	X	X	X	#	#	#	#	#	#	DUP	pCi/g			pCi/g			pCi/g			
Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA												
0.0																				
0.5	0	5	A	0	0	3	5	9	3		1.52	0.09	0.30	4.21	0.12	0.22	8.50	U	---	8.50
1.0	0	5	A	0	0	3	5	9	4		0.96	0.08	0.24	1.35	0.07	0.28	9.60	U	---	9.60
1.5																				
2.0																				
2.5																				
3.0	0	5	A	0	0	3	5	9	5		ARCHIVED									
3.5																				
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PDI SOIL PROBE LOG SHEET				
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator			X X X	05A
Activity Designator			A A A	PDI
Field Measurement / Sample Collection Designator			V V	SP
Station Number			N N N	031
Media			m m	SB
Sample Type			n	0
Sequential Sample Number			# # # # #	(See Below)
Location		Northing (NAD 1927)	Easting (NAD 1927)	
		750143	2164490	
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/24/2000	03/03/2000	Date	03/03/2000
Time	13:25	8:55	Time	15:40
Logger	C. Hales	S. Ng	Logger	J.Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		
Comments: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> 0 to 4 feet = 2 inch diameter 4 to 8 feet = 2 inch diameter </div> <div style="width: 45%; text-align: right;"> native @ 2.2' </div> </div>				
<p style="text-align: center;"><i>Field Original Signed</i></p> <hr style="width: 100%;"/> <p style="text-align: center;">Signature (Down Hole Gamma Logging)</p>			<p style="text-align: center;"><u>02/24/2000</u></p> <p style="text-align: center;">Date</p>	
<p style="text-align: center;"><i>Field Original Signed</i></p> <hr style="width: 100%;"/> <p style="text-align: center;">Signature (Core Gamma Logging)</p>			<p style="text-align: center;"><u>03/03/2000</u></p> <p style="text-align: center;">Date</p>	
<p style="text-align: center;"><i>Field Original Signed</i></p> <hr style="width: 100%;"/> <p style="text-align: center;">Signature (PID Logging)</p>			<p style="text-align: center;"><u>03/03/2000</u></p> <p style="text-align: center;">Date</p>	

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results											
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	0	5	A	0	0	3	5	9	6		1.03	0.09	0.27	1.97	0.09	0.29	7.60	U	---	7.60		
1.0	0	5	A	0	0	3	5	9	7		0.87	J	0.12	0.36	1.10	J	0.09	0.35	11.20	UJ	---	11.20
1.5																						
2.0																						
2.5																						
3.0																						
3.5																						
4.0																						
4.5	0	5	A	0	0	3	5	9	8		ARCHIVED											
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	032
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750153	2164475	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/24/2000	03/03/2000	03/06/2000	
Time	13:40	9:20	8:20	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native @ 2.5'

4 to 8 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/06/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	05A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	033	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750274	2164455	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	02/24/2000	03/03/2000	Date 03/06/2000
Time	13:59	9:50	Time 8:45
Logger	C. Hales	S. Ng	Logger J.Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> 0 to 4 feet = 2 inch diameter 4 to 8 feet = 2 inch diameter </div> <div style="width: 45%;"> native @ 2.0 </div> </div>			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 02/24/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/03/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/06/2000 Date	

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	#	DUP			
0.0	---				1.1	0.0-0.4: bn sm w/grass														
0.5	370		608	549		0.4-1.2: bn gp w/sm	0	5	A	0	0	3	6	0	2					
1.0	289		481		0.4	1.2-2.7: bn sm tr sc	0	5	A	0	0	3	6	0	3					
1.5	205																			
2.0	211				0.2															
2.5	222		449			2.7-4.0: no recovery	0	5	A	0	0	3	6	0	4					
3.0	253				n/r															
3.5	215																			
4.0	215	221			0.5	4.0-5.0: bn sm														
4.5	194																			
5.0	219				0.5	5.0-7.0: bn sm w/sc														
5.5	187																			
6.0	182				0.3															
6.5	210																			
7.0	179				0.2	7.0-8.0: no recovery														
7.5	189																			
8.0																				
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
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20.0																				
20.5																				
21.0																				
21.5																				
22.0																				
22.5						Recovery														
23.0						0-4 feet: 33 inches														
23.5						4-8 feet: 36 inches														
24.0																				

PDI SOIL PROBE LOG SHEET				
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator			X X X	05A
Activity Designator			A A A	PDI
Field Measurement / Sample Collection Designator			V V	SP
Station Number			N N N	034
Media			m m	SB
Sample Type			n	0
Sequential Sample Number			#####	(See Below)
Location		Northing (NAD 1927)	Easting (NAD 1927)	
		750257	2164472	
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	02/24/2000	03/03/2000	Date	03/06/2000
Time	14:15	10:10	Time	9:02
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		
Comments: 0 to 4 feet = 2 inch diameter native @ 2.5' 4 to 8 feet = 2 inch diameter				
_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)			_____ 02/24/2000 Date	
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)			_____ 03/03/2000 Date	
_____ <i>Field Original Signed</i> Signature (PID Logging)			_____ 03/06/2000 Date	

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				9.4	0.0-1.0: bn sm w/grass tr sc														
0.5	1125		860	822			0	5	A	0	0	3	6	0	5					
1.0	876		464		1.4	1.0-2.5: bn sm tr sc	0	5	A	0	0	3	6	0	6					
1.5	256																			
2.0	217				0.4															
2.5	172		462			2.5-3.1: gy/bn sm tr sc														
3.0	188	218			0.4	3.1-4.0: no recovery														
3.5	181																			
4.0	178				2.6	4.0-5.3: gy/bn sc tr sm														
4.5	203		481				0	5	A	0	0	3	6	0	7					
5.0	195				2.3	5.3-7.8: bn/red sm tr sc														
5.5	167																			
6.0	197				2.3															
6.5	202																			
7.0			452		0.5															
7.5			475			7.8-8.0: no recovery														
8.0																				
8.5																				
9.0																				
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23.5																				
24.0																				

Recovery

0-4 feet: 38 inches
4-8 feet: 46 inches

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	5	A	0	0	3	6	0	5		1.96	0.11	0.43	8.91	0.19	0.28	11.30	U	---	11.30
1.0	0	5	A	0	0	3	6	0	6		0.41	0.05	0.19	0.68	0.05	0.19	6.21	U	---	6.21
1.5																				
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5	0	5	A	0	0	3	6	0	7		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	035
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750245	2164470	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		03/20/2000	03/20/2000	
Time		8:45	15:05	
Logger		S. Ng	J. Dekoskie	
Detector Model #		44-10	PID Model #	Multi Rae
Detector Serial #		21779	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 2 feet = 3/4 inch diameter
 2 to 3 feet = 3/4 inch diameter

_____ Signature (Down Hole Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/20/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	036
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750271	2164468	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		03/20/2000	03/20/2000	
Time		9:00	15:18	
Logger		S. Ng	J. Dekoskie	
Detector Model #		44-10	PID Model #	Multi Rae
Detector Serial #		21779	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 2 feet = 3/4 inch diameter	native @ 2.0'
2 to 3.5 feet = 3/4 inch diameter	

_____ Signature (Down Hole Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/20/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	037
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750287	2164501	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Date
Date	03/17/2000	03/20/2000	Date	03/20/2000
Time	11:35	9:50	Time	15:32
Logger	B. Miller	S. Ng	Logger	J.Dekoskie
Detector Model #	Bicron 3/8" NaI	44-10	PID Model #	Multi Rae
Detector Serial #	LG39	21779	PID Serial #	CENAN 21811
Scaler Model #	2221	2224		
Scaler Serial #	157026	132842		

Comments:

- 0 to 2 feet = 3/4 inch diameter native @ 1.0 '
- 2 to 4 feet = 3/4 inch diameter
- 4 to 6 feet = 3/4 inch diameter
- 6 to 8 feet = 3/4 inch diameter

<p><i>Field Original Signed</i> _____ Signature (Down Hole Gamma Logging)</p>	<p>03/17/2000 _____ Date</p>
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<p><i>Field Original Signed</i> _____ Signature (Core Gamma Logging)</p>	<p>03/20/2000 _____ Date</p>
--	--

<p><i>Field Original Signed</i> _____ Signature (PID Logging)</p>	<p>03/20/2000 _____ Date</p>
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Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	10.0				0.0	0.0-1.1: bn sm														
0.5	35		445																	
1.0	54		451	445	0.0	1.1-2.0: no recovery	0	5	A	0	0	3	6	1	4					
1.5	53																			
2.0	34				0.0	2.0-3.5: bn sm tr sc														
2.5	19		443				0	5	A	0	0	3	6	1	5					
3.0	14		449		0.0															
3.5	22					3.5-4.0: no recovery														
4.0	22				0.0	4.0-6.0: bn sm														
4.5	27		405																	
5.0	16		453		0.0		0	5	A	0	0	3	6	1	6					
5.5	16		451																	
6.0	27				0.0	6.0-7.3: bn sw														
6.5	35		380																	
7.0			447		0.0															
7.5																				
8.0																				
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21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-2 feet: 13 inches
 2-4 feet: 18 inches
 4-6 feet: 24 inches
 6-7.5 feet: 14 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750390	2164173	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/09/2000	02/10/2000	
Time	8:45	15:00	8:10	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	G436C	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:
 0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/10/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750351	2164210	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/09/2000	02/10/2000	9:00
Time	10:17	15:15	J. Dekoskie	Multi Rae
Logger	C. Hales	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	G436C	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/10/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750344	2164220	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/09/2000	02/10/2000	
Time	11:47	15:35	8:35	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	G436C	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/10/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)
Location	Northing (NAD 1927)	Easting (NAD 1927)
	750357	2164230

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/09/2000	02/10/2000	
Time	11:02	15:55	9:50	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	G436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/10/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750335	21624240	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/10/2000	Date	02/10/2000
Time	13:35	9:45	Time	10:15
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	G436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/10/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750304	2164367	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/10/2000	Date	02/10/2000
Time	13:04	9:15	Time	10:25
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	G436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:
 0 to 4 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/10/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750333	2164253	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/10/2000	Date	02/10/2000
Time	13:21	9:30	Time	10:30
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	G436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/10/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	--					0-0.5: bn sm w/gp														
0.5	370		520			0.5-2.1: red/bn sm w/sandstone														
1.0	364		531		0.0	gravel														
1.5	323		665			all fill material														
2.0	311		863	887	0.0		0	5	B	0	0	3	8	1	8					
2.5	440																			
3.0	627				0.0															
3.5	658																			
4.0																				
4.5																				
5.0																				
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23.5																				
24.0																				

Recovery

0-4 feet: 26 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750308	2164269

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	02/08/2000	02/10/2000	Date	02/10/2000
Time	12:37	10:30	Time	11:15
Logger	C. Hales	S. Ng	Logger	J. Lincoln
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	G436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

4 to 8 feet = 1 inch diameter
 1 to 4 feet = 2 inch diameter

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	02/08/2000 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	02/10/2000 Date
<i>Field Original Signed</i> Signature (PID Logging)	02/10/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	5	B	0	0	3	8	2	3		2.17	0.12	0.42	7.84	0.19	0.31	2.60	J	3.97	13.30
1.0																				
1.5																				
2.0																				
2.5																				
3.0	0	5	B	0	0	3	8	2	4		1.35	0.08	0.12	1.34	0.06	0.16	6.39	U	---	6.39
3.5																				
4.0																				
4.5																				
5.0	0	5	B	0	0	3	8	2	5		ARCHIVED									
5.5																				
6.0																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750483	2164344	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/10/2000	02/10/2000	
Time	13:56	10:55	11:50	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	G436C	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments: 0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/10/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750473	2164361	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/10/2000	02/10/2000	
Time	14:14	11:15	13:10	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	G436C	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/10/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	05B	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	012	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750472	2164505	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	02/08/2000	02/10/2000	Date 02/10/2000
Time	14:38	11:35	Time 13:50
Logger	C. Hales	S. Ng	Logger J. Lincoln
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	G436C	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> 0 to 4 feet = 2 inch diameter 4 to 8 feet = 1 inch diameter </div> <div style="width: 45%;"> native @ 1.0' Depth to groundwater at 6.6 feet </div> </div>			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 02/08/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 02/10/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 02/10/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750515	2164488	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/10/2000	02/10/2000	
Time	14:55	11:50	14:15	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	G436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/10/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
---	---

Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	015
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750474	2164456	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/16/2000	02/17/2000	
Time	8:15	14:25	8:30	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	G436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

native at 1.5'

<i>Field Original Signed</i> <hr style="width: 80%; margin: auto;"/> Signature (Down Hole Gamma Logging)	<hr style="width: 80%; margin: auto;"/> 02/10/2000 Date
<i>Field Original Signed</i> <hr style="width: 80%; margin: auto;"/> Signature (Core Gamma Logging)	<hr style="width: 80%; margin: auto;"/> 02/16/2000 Date
<i>Field Original Signed</i> <hr style="width: 80%; margin: auto;"/> Signature (PID Logging)	<hr style="width: 80%; margin: auto;"/> 02/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	016
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750583	2164399	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/16/2000	02/17/2000	
Time	8:38	14:40	8:55	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	G436C	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native at 2.5'
4 to 8 feet = 2 inch diameter	

<u>Field Original Signed</u> _____ Signature (Down Hole Gamma Logging)	<u>02/10/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (Core Gamma Logging)	<u>02/16/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (PID Logging)	<u>02/17/2000</u> _____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	018
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750522	2164392	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/16/2000	02/17/2000	
Time	9:30	15:20	9:25	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native material 6.0' -7.0'
4 to 8 feet = 2 inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/17/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	--				2.0	0.0-0.8: blk gravel														
0.5	200																			
1.0	297				2.5	0.8-1.7: bn sw														
1.5	253		479			1.7-4.0: no recovery														
2.0	283				1.0															
2.5	188																			
3.0	332				n/r															
3.5	399																			
4.0	449				n/r	4.0-7.8: bn medium sand														
4.5	389	335	497	532	0.0															
5.0	276		668				0	5	B	0	0	3	8	5	2					
5.5	253		543		0.0															
6.0	162		447				0	5	B	0	0	3	8	5	3					
6.5	179				0.0															
7.0	199		385				0	5	B	0	0	3	8	5	4					
7.5	210				0.0															
8.0					n/r	7.8-8.0: no recovery														
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
11.5																				
12.0																				
12.5																				
13.0																				
13.5																				
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18.5																				
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 20 inches
4-8 feet: 46 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	05B	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	019	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750583	2164362	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	02/10/2000	02/16/2000	Date 02/17/2000
Time	9:21	15:35	Time 19:45
Logger	C. Hales	S. Ng	Logger J. Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

native at 5.0'

Field Original Signed

 Signature (Down Hole Gamma Logging)

02/10/2000

 Date

Field Original Signed

 Signature (Core Gamma Logging)

02/16/2000

 Date

Field Original Signed

 Signature (PID Logging)

02/17/2000

 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	#	DUP			
0.0	--				0.0	0-1.0: blk gp w/sm														
0.5	229																			
1.0	390				0.0	1.0-1.8: bn sm														
1.5	416																			
2.0	359				0.0	1.8-3.1: dk bn sm tr sc														
2.5	467		702				0	5	B	0	0	3	8	5	5					
3.0	442				0.0	3.1-4.0: no recovery														
3.5	441				n/r															
4.0	300					4.0-4.8: bn/gy sm														
4.5	274		443	532	0.0		0	5	B	0	0	3	8	5	6					
5.0	313	299				4.8-5.8: red/bn sm														
5.5	469				0.0															
6.0	1305					5.8-7.4: gy/bn sm tr sc														
6.5	1437		755	824	0.0		0	5	B	0	0	3	8	5	7					
7.0	298		449																	
7.5	229				n/r	7.4-8.0: no recovery														
8.0																				
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
11.5																				
12.0																				
12.5																				
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19.5																				
20.0																				
20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 37 inches
4-8 feet: 41 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Tel: (201) 226-6600
FAX: (201) 226-6660

Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	020
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750578	2164238

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/16/2000	02/17/2000	
Time	9:48	15:50	11:25	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	G436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native at 6.5 feet
4 to 8 feet = 1 inch diameter	

Field Original Signed
 Signature (Down Hole Gamma Logging)

Field Original Signed
 Signature (Core Gamma Logging)

Field Original Signed
 Signature (PID Logging)

 02/10/2000
 Date

 02/16/2000
 Date

 02/17/2000
 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	021
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750588	2164482	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/22/2000	02/23/2000	
Time	8:35	14:00	10:55	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native at 4.0'
4 to 8 feet = 2 inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/23/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	#	DUP			
0.0	--				1.0	0-0.5: blk sm & gp														
0.5	143					0.5-0.9: gy/bn gp & sm														
1.0	251		530	533	0.0	0.9-1.9: bn/gy sm														
1.5	297		539	581			0	5	B	0	0	3	8	6	2					
2.0	317				n/r	1.9-4.0: no recovery	0	5	B	0	0	3	8	6	3	X				
2.5	368																			
3.0	367				n/r															
3.5	297	344																		
4.0	244				1.0	4.0-7.3: bn sm tr sc														
4.5	223		419				0	5	B	0	0	3	8	6	4					
5.0	221		448		1.0															
5.5	242		487																	
6.0	214		496		0.6															
6.5	263		463																	
7.0	267		500	527	0.0		0	5	B	0	0	3	8	6	5					
7.5	237					7.3-8.0: no recovery														
8.0																				
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
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21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 23 inches
4-8 feet: 39 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750998	2164236	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/21/2000	02/22/2000	
Time	8:59	15:20	8:20	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/22/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	05C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751000	2164199	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/21/2000	02/22/2000	8:55
Time	0:00	0:00	02/22/2000	8:55
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/22/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750992	2164357	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/21/2000	02/22/2000	9:10
Time	9:31	15:45	J.Dekoskie	Multi Rae
Logger	C. Hales	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C436E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

native @ 2.0'

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/22/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750772	2164406	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/21/2000	02/22/2000	
Time	10:11	16:35	10:15	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:
 0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/22/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)												
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP			
0.0	---				2.5	0.0-1.1: dk gy sm and gp													
0.5	215																		
1.0	428				0.5	1.1-2.1: dk gy sm w/ sc													
1.5	1385		1026	1049			0	5	C	0	0	4	0	1	4				
2.0	578		514		0.5	2.1-2.9: gy sm	0	5	C	0	0	4	0	1	5				
2.5	233																		
3.0	220				n/r	2.9-4.0: no recovery													
3.5	195																		
4.0	201	201			0.5	4.0-5.0: dk gy/blk sm w/sc													
4.5	206																		
5.0	180				0.5	5.0-6.5: lt bn sm													
5.5	191		409																
6.0	156				0.0		0	5	C	0	0	4	0	1	6				
6.5	114					6.5-8.0: bn sw tr sm													
7.0	168				0.0														
7.5	233																		
8.0					0.0														
8.5																			
9.0																			
9.5																			
10.0																			
10.5																			
11.0																			
11.5																			
12.0																			
12.5																			
13.0																			
13.5																			
14.0																			
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16.5																			
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20.0																			
20.5																			
21.0																			
21.5																			
22.0																			
22.5																			
23.0																			
23.5																			
24.0																			

Recovery

0-4 feet: 34 inches
4-8 feet: 48 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	05C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750831	2164416	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/21/2000	02/22/2000	
Time	10:46	17:00	10:40	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/22/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	05C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750776	2164428	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/21/2000	02/22/2000	
Time	11:05	17:10	11:05	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/22/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
---	---

Site Designator	X X X	05C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750740	2164396	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/21/2000	02/22/2000	
Time	11:40	17:20	11:45	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

native @ 3.0'

<u>Field Original Signed</u> _____ Signature (Down Hole Gamma Logging)	<u>02/15/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (Core Gamma Logging)	<u>02/21/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (PID Logging)	<u>02/22/2000</u> _____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling		
Site Designator	X X X	05C		
Activity Designator	A A A	PDI		
Field Measurement / Sample Collection Designator	V V	SP		
Station Number	N N N	009		
Media	m m	SB		
Sample Type	n	0		
Sequential Sample Number	# # # # #	(See Below)		
Location	Northing (NAD 1927)	Easting (NAD 1927)		
	750687	2164399		
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/15/2000	02/22/2000	Date	02/22/2000
Time	12:52	9:20	Time	15:15
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native @ 1.0'
4 to 8 feet = 2 inch diameter

_____ *Field Original Signed* _____ 02/15/2000
Signature (Down Hole Gamma Logging) Date

_____ *Field Original Signed* _____ 02/22/2000
Signature (Core Gamma Logging) Date

_____ *Field Original Signed* _____ 02/22/2000
Signature (PID Logging) Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	05C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750644	2164439	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/22/2000		
Time	13:27	9:35		
Logger	C. Hales	S. Ng		
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/22/2000 Date
_____ Signature (PID Logging)	_____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator		X X X	05C
Activity Designator		A A A	PDI
Field Measurement / Sample Collection Designator		V V	SP
Station Number		N N N	011
Media		m m	SB
Sample Type		n	0
Sequential Sample Number		# # # # #	(See Below)
Location		Northing (NAD 1927)	Easting (NAD 1927)
		750619	2164421
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	02/15/2000	02/22/2000	Date
Time	13:45	10:15	Time
Logger	C. Hales	S. Ng	Logger
Detector Model #	G1	SPA-3	PID Model #
Detector Serial #	C436E	CENAN 33401	PID Serial #
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> 0 to 4 feet = 2 inch diameter 4 to 8 feet = 1 inch diameter </div> <div style="width: 45%;"> native @ 2.5' </div> </div>			
<i>Field Original Signed</i> <hr style="width: 100%;"/> Signature (Down Hole Gamma Logging)		02/15/2000 <hr style="width: 100%;"/> Date	
<i>Field Original Signed</i> <hr style="width: 100%;"/> Signature (Core Gamma Logging)		02/22/2000 <hr style="width: 100%;"/> Date	
<i>Field Original Signed</i> <hr style="width: 100%;"/> Signature (PID Logging)		02/23/2000 <hr style="width: 100%;"/> Date	

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				1.0	0.0-0.8: bn sw tr sm														
0.5	145					0.8-1.9: bn red sm														
1.0	214				0.2															
1.5	310																			
2.0	497		898	839	1.0	1.9-2.1: dk gy sc and sm														
2.5	1710					2.1-4.0: no recovery														
3.0	6047				n/r															
3.5	5456																			
4.0	5847	5833			1.0	4.0-4.8: dk gy sw tr sm														
4.5	1901		2836	2756		4.8-6.7: bn/red sm tr gp	0	5	C	0	0	4	0	3	7					
5.0	427				0.2															
5.5	243		417				0	5	C	0	0	4	0	3	8					
6.0	233				0.0															
6.5	233					6.7-8.0: no recovery														
7.0	230				n/r															
7.5	214				n/r															
8.0					n/r															
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
11.5																				
12.0																				
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19.0																				
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20.0																				
20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 26 inches
4-8 feet: 33 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	05C		
Activity Designator	A A A	PDI		
Field Measurement / Sample Collection Designator	V V	SP		
Station Number	N N N	013		
Media	m m	SB		
Sample Type	n	0		
Sequential Sample Number	#####	(See Below)		
Location	Northing (NAD 1927)	Easting (NAD 1927)		
	750628	2164401		
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Date
Date	02/15/2000	02/22/2000	02/23/2000	
Time	14:36	10:45	9:00	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native @ 4.0
 4 to 8 feet = 1 inch diameter

<hr style="border: 0.5px solid black; margin: 0;"/> <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	<hr style="border: 0.5px solid black; margin: 0;"/> 02/15/2000 Date
<hr style="border: 0.5px solid black; margin: 0;"/> <i>Field Original Signed</i> Signature (Core Gamma Logging)	<hr style="border: 0.5px solid black; margin: 0;"/> 02/22/2000 Date
<hr style="border: 0.5px solid black; margin: 0;"/> <i>Field Original Signed</i> Signature (PID Logging)	<hr style="border: 0.5px solid black; margin: 0;"/> 02/23/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.6	0.0-0.3: blk gp w/sm														
0.5	149		409			0.3-2.0: red/bn sm and sw														
1.0	173		435		0.2															
1.5	244		482																	
2.0	258		504		0.0	2.0-2.6: dk gy sw tr sm														
2.5	302		497	522		2.6-4.0: no recovery	0	5	C	0	0	4	0	3	9					
3.0	249				n/r															
3.5	209																			
4.0	197	206			1.2	4.0-4.9: red/bn sw tr sm														
4.5	224		385				0	5	C	0	0	4	0	4	0					
5.0	213		396		0.4	4.9-6.2: bn/gy sm tr sc														
5.5	206		471	401			0	5	C	0	0	4	0	4	1					
6.0	211		438		0.7	6.2-8.0: red bn sm tr sc														
6.5	207		409																	
7.0	189		415		0.0															
7.5	234																			
8.0					0.0															
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
11.5																				
12.0																				
12.5																				
13.0																				
13.5																				
14.0																				
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15.0																				
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21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 31 inches
4-8 feet: 48 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
---	---

Site Designator	X X X	05C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	014
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750624	2164371	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	02/15/2000	02/22/2000	Date	02/23/2000
Time	14:58	11:20	Time	9:40
Logger	C. Hales	S. Ng	Logger	J.Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

native @ 1.0'

<i>Field Original Signed</i> <hr style="border: 0.5px solid black;"/> Signature (Down Hole Gamma Logging)	<hr style="border: 0.5px solid black;"/> 02/15/2000 Date
<i>Field Original Signed</i> <hr style="border: 0.5px solid black;"/> Signature (Core Gamma Logging)	<hr style="border: 0.5px solid black;"/> 02/22/2000 Date
<i>Field Original Signed</i> <hr style="border: 0.5px solid black;"/> Signature (PID Logging)	<hr style="border: 0.5px solid black;"/> 02/23/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	05C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	015
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750663	2164173	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/22/2000	02/23/2000	
Time	8:08	12:00	10:20	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/23/2000 Date

APPENDIX 5-C

Environmental Boring Log Sheets

020526





GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: GWRI Job Number: 085750503 Activity: Direct-Push Sampling	
Site Designator	XXX		05a
Activity Designator	AAA		GWR
Field Measurement/Sample Collection Designator	VV		DP
Station Number	NNN		001
Media	m m		SB
Sample Type	n		0, I, X
Sequential Sample Number	#####		(see Below)
Location		Northing (NAD 1927) 750394.573	Easting (NAD 1927) 2164417.985
		Elevation (NGVD 1929)	
		Photoionization Detector (PID) Logging	
		Gamma Logging	
	Down Hole	Core	
Date		3/22	Date
Time		1400	Time
Logger			Logger
Detector Model #			PID Model #
Detector Serial #			PID Serial #
Scaler Model #			
Scaler Serial #			

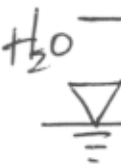
Comments:

1. MPI No. ENV-06-5019
2. Direct-push location grouted with BenSeal.

DRILLER
 1345-1400 SOIL SAMPLING 8'
 1400-1445 H₂O SAMPLE
 1445-1600 SOIL SAMPLING (DUPLICATE)
 1600-1630 STEAM CLEAN
 BAD DUPLICATE COLLECTED, MS/MSD (ORG., INORG.) COLLECTED

 _____ Signature (Core Gamma Logging)	 _____ Date
 _____ Signature (Logging)	 _____ Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)							
					X	X	X	#	#	#	#	#
0.0		↑	↑	90% RECV.	0	5	0	2	0	5	2	6
0.5		↑	↑	M-f SAND trace								
1.0		↑	↑	GRAVEL, SILT								
1.5		0.0	0.0									
2.0												
2.5												
3.0												
3.5												
4.0		↓	↓									
4.5		↓	↓									
5.0												
5.5												
6.0		0.0	0.0									
6.5												
7.0												
7.5												
8.0												
8.5				END OF SAMPLING								
9.0				@ 8'								
9.5												
10.0				OVER DRILLED TO								
10.5				12' for GW SAMPLE								
11.0												
11.5												
12.0												
12.5												
13.0												
13.5												
14.0												
14.5												
15.0												
15.5												
16.0												
16.5												
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18.5												
19.0												
19.5												
20.0												
20.5												
21.0												
21.5												
22.0												
22.5												
23.0												
23.5												
24.0												



¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
05a 020527

PROJECT: FUSRAP MAYWOOD	SITE: 05a	Page <u>1</u> of <u>1</u>
Project No: 0857053	Client: USACE	
Contractor: TERRA PROBE INC		SAMPLE DEPTH: 8'-12'
Start Date/Time: 3/22/00	Completion Date/Time:	Well Diameter:

Development Method/Equipment:

Logged by: _____ Water Level (ft bgs): **5.6'** Protection Level: **D**

Pre-development DTW (PVC) (ft): 5.6' DTB (PVC) (ft): 12'

Post-development DTW (PVC) (ft): _____

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.16 \text{ gal}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ _____)

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ _____)

Minimum Purge Volume (gal) (3 well volumes) = **0.48 gal**

Development Purge/Discharge Rate (gpm): _____

Maximum Drawdown During Purging (ft): \Rightarrow **4.8 gal** ~~ft~~

Total Quantity Purged: **2 gal**

Disposition of Purge Water: **STORED @ MISS**

Hours of Development: _____

Hours of Decon: _____

Hours of Standby: _____

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1 1408		5.6		11.6	7.36	1.39	999+	DO = 1.75
2 1410		5.6		11.0	7.29	1.42	375	DO = 2.15

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
DTW = depth to water gpm = gallons per minute

SCREEN @ 8'-12'

GWRI SOIL PROBE LOG SHEET

Maywood Superfund Site Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: GWRJ Job Number: 085750503 Activity: Direct-Push Sampling
--	---

Site Designator	XXX	056
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	mm	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)

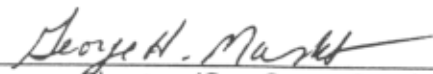
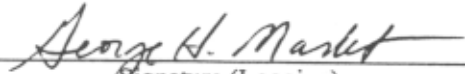
Location	Northing (NAD 1927) 750342.326	Easting (NAD 1927) 2164233.264	Elevation (NGVD 1929)
----------	--	--	-----------------------

Gamma Logging		Photoionization Detector (PID) Logging	
Date	Down Hole	Date	Core
		3/23	
		1015	
		G. MARKET	

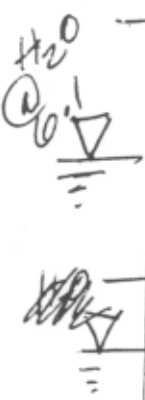
Comments:

- MPI No. **ENV-05-5002**
- Direct-push location grouted with BenSeal.

DRILLER
0730-1015 STAND BY
1015-1030 SOIL SAMPLE 12'
1030-1130 H₂O SAMPLE
1130-1200 STEAM CLEAN

 _____ Signature (Core Gamma Logging)	3/23/00 _____ Date
 _____ Signature (Logging)	3/23/00 _____ Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	95% RECV	0	5	6	0	2	0	5	2	8
0.5				TOP SOIL RED BY									
1.0		20	0.0	2m-f SAND, trace +									
1.5				GRAVEL									
2.0		↓	↓										
2.5													
3.0													
3.5		2→3											
4.0		↑	↑	100% RECV									
4.5													
5.0													
5.5		0.0	0.0										
6.0		↓	↓										
6.5													
7.0				GRAY SILTY CLAY									
7.5		↓	↓	6" lens 54R31									
8.0				GRAY m-f SAND									
8.5				poorly sorted, trace									
9.0				angular GRAVEL									
9.5													
10.0													
10.5													
11.0				LT BR GRAY									
11.5													
12.0													
12.5				END OF SAMPLING									
13.0				@ 12'									
13.5													
14.0													
14.5													
15.0													
15.5													
16.0				BOTTOM OF BORING									
16.5				FOR GW SAMPLE									
17.0				@ 16'									
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													



¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

**WELL DEVELOPMENT LOG -
STONE & WEBSTER ENGINEERING CORP.**

SAMPLE ID.
056020529

PROJECT: FUSRAP MAYWOOD	SITE: 056	Page 1 of 1
Project No: 0857053	Client: USACE	
Contractor: TERRA PROBE INC.	SAMPLE DEPTH:	
Start Date/Time: 3/23/00 1030	Completion Date/Time: 1130	Well Diameter:

Development Method/Equipment:

Logged by: G. MARKT	Water Level (ft bgs): 6.1	Protection Level: D
Pre-development DTW (PVC) (ft): 6.1	DTB (PVC) (ft): 16'	

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.247 \text{ gal}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ —)

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ —)

Minimum Purge Volume (gal) (3 well volumes) $\Rightarrow 0.7425 \text{ gal}$

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

Total Quantity Purged: 2 gal

Disposition of Purge Water: STORED @ MISS

Hours of Development: —

Hours of Decon: —

Hours of Standby: —

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1 1055		6.1	—	14.4	6.36	2.85	999+	
2 ↓		6.1	—	14.2	6.6	2.67	999+	
3 ↓		6.1	—	14.2	6.63	2.66	555	

Notes: = bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
DTW = depth to water gpm = gallons per minute

SCREEN @ 12'-16'

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607	Task Description: GWRI Job Number: 085750503 Activity: Direct-Push Sampling
---	---

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	05a
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	mm	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)

Location	Northing (NAD 1927) 750682.064	Easting (NAD 1927) 2164432.515
----------	-----------------------------------	-----------------------------------

Gamma Logging		Photoionization Detector (PID) Logging	
Date	Down Hole	Date	Core
		3/23	
		1230	
		G. MARKT	

Comments:

1. MPI No. ENV-05-5024
2. Direct-push location grouted with BenSeal.

DRILLER

1230-1245 SOIL SAMPLE 8'
 1245-1415 H₂O SAMPLE
 1415-1430 STEAM CLEAN



 Signature (Core Gamma Logging)

3/23/00

 Date



 Signature (Logging)

3/23/00

 Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	95% RECV 54R3/2	0	5	0	0	2	0	5	3	0
0.5		↑	↑	BLK C-M-F SAND									
1.0				PROCESS STONE									
1.5		0.0	0.0										
2.0													
2.5		↓	↓	54R4/2									
3.0													
3.5		1.5											
4.0													
4.5		↑	↑	40% RECV 54R4/2									
5.0				M-F SAND trace SILT									
5.5		0.0	0.0	occasional f GRAVEL									
6.0													
6.5		↓	↓	COURSE ANGULAR GRAVEL									
7.0		↓	↓	9 M-F SAND									
7.5													
8.0				END OF SAMPLING									
8.5				@ 8.0'									
9.0													
9.5													
10.0													
10.5													
11.0													
11.5													
12.0													
12.5				BOTTOM OF BOREHOLE									
13.0				@ 12' for 60 SAMPLE									
13.5													
14.0													
14.5													
15.0													
15.5													
16.0													
16.5													
17.0													
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

H₂O
 @ 4.3' ↓
 #/

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG.
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
05c 020531

PROJECT: FUSRAP MAYWOOD	SITE: 05c	Page 1 of 1
Project No: 0857053	Client: USACE	
Contractor: TERRA PROBE INC -	SAMPLE DEPTH:	
Start Date/Time: 3/23/01 1245	Completion Date/Time: 1415	Well Diameter:
Development Method/Equipment:		
Logged by: G. MARKT	Water Level (ft bgs): 4.3'	Protection Level: D
Pre-development DTW (PVC) (ft): 4.0'	DTB (PVC) (ft): 11'	

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.1675 \text{ gal}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ _____

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ _____

Minimum Purge Volume (gal) (3 well volumes) $\Rightarrow 0.50 \text{ gal}$

Development Purge/Discharge Rate (gpm):

*Maximum Drawdown During Purging (ft):

Total Quantity Purged: 2 gal

Disposition of Purge Water: STORED @ MISS

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1 1245		4.3'	-	13.7	7.77	.974	999+	
2 1245		4.3'	-	13.8	7.74	.972	285	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
DTW = depth to water gpm = gallons per minute

SCREEN @ 8'-11'

PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 6 – Revision 1

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

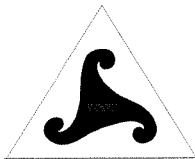
SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18

Submitted to:

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U.S. Army Engineer District, New York
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Submitted by:



Stone & Webster, Inc.
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**PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 6 – Revision 1**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18**

RECORD OF REVISIONS

Revision 0: Original Issue

Revision 1: The Final PDI Report (Revision 0) was submitted in July 2000. Revision 1 to the Final PDI Report incorporates the following significant changes: revision to text headers and footers; addition of results of confirmatory radiological analyses to [Table 6-4](#); and addition of Toxicity Characteristic Leaching Procedure (TCLP) data to [Table 6-5](#).

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- 6-3 Cluster No. 6 Sample Location Map**
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ACRONYMS AND ABBREVIATIONS

AT&T	American Telephone & Telegraph
BNI	Bechtel National, Inc.
C	Degrees Centigrade
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
Conc.	Concentration
CQCP	Contractor Quality Control Plan
DOE	U.S. Department of Energy
EPP	Environmental Protection Plan
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	grams
GMS	Groundwater Modeling System
GPR	Ground Penetrating Radar
GPS	Global Positioning System
ID	Identification
ISOCS	In Situ Object Counting System
keV	kilo electron volts
kg	kilogram
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCW	Maywood Chemical Works
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
mg	milligram
MHTDP	Materials Handling, Transportation and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJVIS	New Jersey Vehicle Inspection Station
NYS&W	New York, Susquehanna & Western Railway
ORNL	Oak Ridge National Laboratories
pCi	picoCurie
PDI	Pre-Design Investigation
PDIWP	Pre-Design Investigation Work Plan
PID	Photoionization Detector
PVC/PET	Polyvinyl Chloride/Polyethylene Teraphthalate
QA	Quality Assurance
QC	Quality Control
QCSR	Quality Control Summary Report
Ra-226	Radium-226
Rn-222	Radon-222

RCRA	Resource Conservation and Recovery Act
RESRAD	Department of Energy Computer Code; RESidual RADioactivity
ROC	Radionuclides of Concern
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
St.	Street
Th-232	Thorium-232
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
ug	microgram
U-238	Uranium-238
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank

1.0 SITE BACKGROUND AND PHYSICAL SETTING

1.1 General Site Overview

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (hereafter referred to as the Maywood Site) is located in a highly developed area of Bergen County in northeastern New Jersey, in the Boroughs of Maywood and Lodi and the Township of Rochelle Park (Figure 6-1). Portions of the Maywood Site are radiologically impacted from process wastes and residues associated with the recovery and refining of thorium and thorium compounds from monazite ores by the Maywood Chemical Works (MCW) from 1916 to 1956 (Bechtel National, Inc., BNI, 1992).

Waste produced at MCW was a fine sand-like material containing residual thorium with lesser amounts of uranium and its daughter products including radium. Wastes and residues were disposed in low-lying areas west of processing facilities. In the early 1930s, a portion of these wastes and residues was separated from the main property by construction of New Jersey State Highway 17 (NJ Route 17). Additionally, the former channel of Lodi Brook runs through the majority of the properties making up the Maywood Site. Some of the contaminated materials are assumed to have eroded from the facility area and were transported downstream via Lodi Brook (Figure 6-2). In addition, from 1928 to 1944, local residents were known to use process waste in their lawns and gardens and as fill material (BNI, 1992). These are the major mechanisms for distribution of radiologically-contaminated materials on the Maywood Site.

The Maywood Site consists of 88 designated residential, commercial, municipal, and state or federal properties. All 64 Phase I properties (including all residential and municipal properties) have either been remediated by the U.S. Department of Energy (DOE) or U.S. Army Corps of Engineers (USACE) or are currently being addressed under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). The remaining 24 Phase II properties are being addressed by the Stone & Webster Team (i.e., Team).

1.2 Pre-Design Investigation Scope

On December 29, 1998, the USACE issued a Scope of Services for the design and remediation of the remaining 24 commercial and government properties. These properties potentially contain deposits of radioactive material in surface and subsurface soils resulting from operations of the former MCW. They have been designated as the Phase II properties.

A Pre-Design Investigation Work Plan (PDIWP, Stone & Webster, 1999a) was submitted in October 1999 for the Phase II properties. The purpose of the PDIWP was to address data gaps necessary to complete remedial design efforts. In determining additional data needs, it was assumed that remediation of radiologically-impacted soils would be conducted on “accessible soils” only. Accessible soils are defined as soils not under permanent structures such as buildings and roadways. Data acquisition was limited to accessible soils only.

A preliminary evaluation was performed to determine the human health risk from leaving subsurface radiologically-impacted soils proximate to these structures. The RESidual RADioactivity (RESRAD) computer code was utilized to quantify the dose and risk under a

number of assumed conditions. Based on the preliminary results, it was determined that any radioactive residues left adjacent to existing buildings, roadways, and railways would need a minimum of two feet of clean soil cover to be protective of human health. As such, it has been assumed that where radiologically-contaminated soils exist at depth adjacent to structures, at least the top two feet of radiologically-contaminated soil would be removed adjacent to the structure to a six foot horizontal setback, and then sloped at two horizontal to one vertical (2H:1V) to the required depth. However, it is recognized that site-specific calculations will need to be made during the remedial design phase in order to determine the actual depth of excavation adjacent to each structure, the horizontal setback, and the slope to final excavation depths (Stone & Webster, 1999a).

In preparing the PDIWP, the 24 Phase II properties were sub-divided into 12 clusters. The purpose of the clustering was to take a 'collective' view of a set of contiguous properties to efficiently secure needed pre-design investigation (PDI) information for those properties. [Table 6-1](#) lists the 12 clusters for the Phase II properties, from south to north. The reader is directed to the PDIWP for additional background information (Stone & Webster, 1999a).

The purpose of this PDI Report is to present data collected during the PDI for Cluster No. 6. The evaluation of PDI data, along with data collected by others during previous investigations, is documented separately.

2.0 PDI FIELD ACTIVITIES

PDI activities were performed by the following Team members:

Stone & Webster, Inc.	Team leader and engineering services
Malcolm Pirnie, Inc.	Engineering services
Science & Ecology Corporation.....	Health physics services
Cabrera Services, Inc.	Radiological survey support
Canberra Industries, Inc.	Radiological survey support
Garden State Surveying, Engineering, and Planning, Inc.	Surveying and mapping
NAEVA Geophysics, Inc.	Geophysical investigation
TerraProbe, Inc.	Direct push services
Franklin Environmental Services, Inc.	Construction services
ThermoRetec	Radiological sample analysis
RECRA LabNet.....	Environmental sample analysis
Kestrel Environmental Technologies, Inc.	Data validation

PDI activities involved non-intrusive surveys followed by intrusive investigations. The preliminary, non-intrusive PDI activities (including surface gamma scans, surface In-Situ Object Counting System (ISOCS) readings, geophysical surveys and field surveying) were initiated in August 1999. The intrusive portion of the PDI program began in January 2000 and was completed in April 2000. [Table 6-2](#) presents a summary of PDI intrusive field activities. For logistical reasons, PDI environmental borings were performed at the outset of the Groundwater Remedial Investigation program during the latter part of March and beginning of April 2000.

PDI field activities were conducted in accordance with the PDIWP, and in compliance with procedures established in the following project documents: Contractor Quality Control Plan (CQCP), Site Safety and Health Plan (SSHP), General Environmental Protection Plan (EPP), Chemical Data Quality Management Plan (CDQMP), and the Materials Handling, Transportation and Disposal Plan (MHTDP), (Stone & Webster, 1999b, c, and d, 2000a, 2000b, respectively). Variances in methodology and sample locations between the PDIWP and the actual PDI execution are discussed below.

2.1 Variances from PDIWP

This section discusses deviations in methodologies and sample locations from the approved PDIWP.

2.1.1 Methodology Variances

Methodology variances from the PDIWP were as follows:

- The PDIWP called for the use of an ISOCS utilizing germanium gamma spectroscopy to quantify radionuclide activity in soil. Following approval of the PDIWP, regulatory concerns regarding the use of ISOCS for subsurface investigation were raised. The PDIWP was subsequently modified by replacing intrusive ISOCS sampling with conventional sample

collection using direct push methods to collect soil cores for laboratory analysis. Due to this change, Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled “Soil Probe Investigation” was developed and followed. Refer to the USACE letters dated December 8, 1999 from the Project Manager, Mr. Allen Roos, informing the U.S. Environmental Protection Agency (USEPA) Project Manager, Ms. Angela Carpenter, and the New Jersey Department of Environmental Protection (NJDEP) Case Manager, Ms. Donna Gaffigan, of the modification, as presented in [Appendix 6-A](#). The USEPA approved use of SOP-SW-MWD-509-0 on December 29, 1999 and NJDEP approved it on January 20, 2000.

- A Bicon® Model G1 one-inch by one-inch (1” x 1”) sodium iodide (NaI) detector was substituted for the originally proposed 3/8” x 3/8” NaI detector for downhole gamma logging. This substitution was needed to provide greater detector sensitivity through the soil probe casing. Due to the addition of this detector, SOP number SW-MWD-509-0 entitled “Soil Probe Investigation” was revised. These revisions are outlined in [Table 1-A](#) in [Appendix 6-A](#). The 3/8” x 3/8” NaI detector was used only when the manual direct push method was employed. Manual direct push methodology was required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- The CDQMP originally specified a frequency of 10% for field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. This corresponds to the USACE internal quality control standard. However, due to the significant number of samples to be collected as part of the PDI program (totaling approximately 2000 soil samples and in excess of 10,000 gamma count rate and photoionization detector (PID) readings), the USACE agreed to reduce the frequency to 5%, which is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and USEPA guidelines for MS/MSD analysis. USEPA Region II does not have a specific guideline for field duplicate samples. Refer to the USACE and USEPA/NJDEP correspondence in [Appendix 6-A](#).
- The PDIWP stipulates that geotechnical borings with associated laboratory testing may be required in order to provide design parameters in locations where excavation may impact adjacent structures. Since radiological clean-up criteria have yet to be finalized, final assessment of limits of radiological contamination cannot be made at this time. The geotechnical investigation program was suspended from the PDI. During the design process, existing geotechnical information will be evaluated for design and a determination will be made if supplemental data are needed.

2.1.2 Sample Location Variances

The PDIWP was developed with the intent that proposed sample locations would be deleted, added, or moved as additional information regarding site features and contamination distribution became available during the course of the PDI implementation. In accordance with this approach, sample locations as proposed in the PDIWP were deleted, added, or moved for the following reasons:

- Base mapping developed subsequent to completion of the PDIWP provided additional information regarding underground utility locations and other site features. Proposed sample

locations proximate to these utilities and site features were moved in order to minimize impacts.

- Review of surface gamma survey data collected as part of the PDI, coupled with additional review of data from previous investigations performed by BNI and ORNL, indicated that certain proposed intrusive locations should either be moved or could be deleted. To address potential areas of surface radiological contamination not previously identified as areas of concern, a protocol was established for determining the need for additional intrusive sampling locations. Refer to “Protocol For Addressing Gamma Scan Anomalies” in [Appendix 6-A](#).

Specific rationale for the deletion, addition, or movement of locations proposed in the PDIWP are summarized in [Appendix 6-A](#).

2.2 Geophysical Surveys

Between September 20, 1999 and March 2, 2000, NAEVA Geophysics, Inc. conducted geophysical investigations on the Maywood Site. The purpose of these investigations was to delineate surface traces of detectable underground utilities in the vicinity of proposed exploratory boring sites. Equipment selected for this investigation included: a Fisher TW-6 Pipe and Cable Locator; a Radiodetection RD432PDL-2 Utility Locator; a Subsite 75 Utility Locator, a 3M Dynatel 2250 Cable Locator, and a GSSI SIR-3 ground penetrating radar (GPR) system with a 300 MHz antenna. Details of the surveys are presented in the NAEVA report (NAEVA, 2000).

2.3 Sample Locations

In October 1999, Garden State Engineering, Surveying, and Planning, Inc. performed a ground survey of the Maywood Site properties. Results of the ground survey were combined with aerial mapping prepared by GEOD Corporation to produce new base mapping for the Maywood Site. This new base mapping replaced the mapping used to generate the PDIWP drawings.

Sample points for the surface gamma survey, surface ISOCS measurements, direct push (Geoprobe[®]) sampling, and environmental sampling were located in the field using a Global Positioning System (GPS). A Trimble 4800 Site Surveyor system with a 4700 base receiver, GPS antenna, radio antenna, and ancillary equipment were used to perform GPS surveys. Base stations were set up and calibrated at specified bench-mark locations established by the surveyor. Following base receiver set up, sampling points were located. Field markings (spray paint, flags, and stakes) were used to identify intrusive sampling locations for radiological and environmental direct push mobile rigs, as well as surface ISOCS locations.

Coordinates for intrusive sample locations were determined from new PDI sample location maps which reflected updated base mapping and modified sample locations; surface ISOCS locations were identified based on original PDIWP mapping. For the surface gamma survey, GPS was used to record locations of gamma scan measurements. Where GPS instrumentation could not be utilized due to signal disruption (e.g., tree coverage, building interference, non-availability of satellites, or poor satellite reception due to weather conditions), sample locations were based on identification of site features and scaling off base mapping.

2.4 Surface Gamma Surveys

Surface gamma surveys for all of the Phase II properties were conducted from August 1999 to March 2000. Surveys were conducted to obtain distribution of surface radiological contamination for health and safety reasons, as well as to verify existing data. Measurements were collected by suspending a 1" x 1" NaI gamma scintillation detector coupled to a Ludlum Model 12 ratemeter within a few inches of the ground surface. A health physics technician walked transects (approximately four to six feet wide) covering the properties while slowly swinging the detector in a serpentine motion. Transects were spaced to assure full areal coverage with some overlap. Gamma count measurements were taken approximately every 15 to 20 feet; measurement frequency was increased in areas exhibiting elevated gamma counts. Minimum detectable concentrations (MDCs) for this detector for the radionuclides of concern (ROC) are approximately 4.7 picoCurie per gram (pCi/g) for Radium-226 (Ra-226), 3.0 pCi/g for Thorium-232 (Th-232), and 121.0 pCi/g for Uranium-238 (U-238), correcting for volume and distance from the source (Multi-Agency Radiation Survey and Site Investigation Manual, MARSSIM, 1997). Gamma count data were stored with associated locations in the GPS recorder. In some instances where locations could not be recorded with a GPS (as stipulated above), measurements were manually recorded on the PDI maps.

2.5 Surface ISOCS Measurements

Surface ISOCS measurements were collected at selected locations where environmental, geotechnical, and radiological shallow boreholes were proposed in the PDIWP. Surface ISOCS measurements were collected to identify and quantify radionuclide activity in surface soil, beneath shielded areas (e.g., areas covered with gravel, asphalt, and concrete), and in areas proposed for environmental borings.

Gamma spectroscopy measurements of surface soil were collected using the Canberra high-purity germanium ISOCS and assuming uniform radioactivity distribution in soil. The high-purity germanium detector was positioned in a "downward-looking" direction perpendicular to the ground surface at a height of three feet. The detector was collimated using a lead shield subtending a 90-degree angle, which provided a surface soil viewing area approximately six feet in diameter. The back and side of the detector were shielded with two-inch thick lead O-rings. The detector collimator and shielding were used to ensure that radioactivity detected by the probe originated only from the six-foot diameter area beneath the detector, hence minimizing one possible source of error in the measurements.

2.6 Direct Push Soil Probes

Direct push soil probes (using truck-mounted model 5400 Geoprob[®] or track-mounted model 54DT Geoprob[®]) were used to collect soil samples for radiological and environmental parameter analysis. Two types of direct push soil probes were used: a single rod system (i.e., Macro-Core[®]) and a dual tube (or cased) system. The latter system utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Samples were collected in four-foot soil cores within polyvinyl chloride/polyethylene terephthalate (PVC/PET) liners, marked with the appropriate field identification number, sealed with rubber end caps, and placed

into a two-inch inner diameter PVC container (including PVC end caps) for transport and storage.

For sample locations that were inaccessible to the mounted direct push rigs, soil cores were collected using a manual direct push method. Two-foot cores approximately one inch in diameter were collected using an electric powered hand-held vibratory hammer.

Prior to commencing intrusive sampling, underground utilities in the vicinity of the proposed boring locations were identified by reviewing PDI geophysical survey data, and by contacting the appropriate authorized parties (i.e., New Jersey One-Call System, and the property owner). In addition, a safe working distance from overhead utilities was maintained.

Sampling equipment (the rig, direct push soil probe casing and tools) was decontaminated prior to use and following each borehole installation using pressure or manual washing. Each soil probe hole was backfilled for the full length using Benseal[®] bentonite in accordance with project requirements. For areas covered by asphalt, cold patch was placed at the surface.

2.6.1 Downhole Gamma Logging

Measurements were taken with a Bicron[®] Model G1 1" x 1" NaI gamma detector sealed in a waterproof stainless steel container. The instrument MDCs are approximately 3.6 pCi/g for Ra-226, 2.3 pCi/g for Th-232, and 92.0 pCi/g for U-238, which are approximately 75% of the surface MDCs listed in Section 2.4. This estimate assumes a geometry factor of 0.50, where a four pi geometry (i.e., a sphere) when scanning downhole is approximately half of a two pi geometry (i.e., a hemisphere) when scanning the ground surface. However, this reduction in the MDCs is modified by the 0.3-inch steel casing in the hole, which results in an approximate 33% reduction in the gammas seen by the detector as calculated by the computer code Microshield[™]. The correction factor is therefore calculated by dividing the geometry factor (0.50) by the steel casing reduction factor (0.66), yielding approximately 0.75. The NaI detector was connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector[™] multi-channel analyzer/amplifier/high voltage power supply. The system was controlled, and the data stored, via notebook computer. Ten-second integrated gross gamma measurements were recorded at each 6-inch depth increment in the cased soil probe holes and data entered onto the PDI Soil Probe Log Sheets (see [Appendix 6-B](#)). In areas where samples were collected using the manual direct push method, a Bicron[®] 3/8" x 3/8" NaI gamma detector coupled to a Ludlum Model 2221 scaler/ratemeter was used to take 30 to 60-second gross gamma measurements in uncased soil probe holes. The MDCs for this instrument are estimated to be approximately 1.9 pCi/g for Ra-226 and 2.3 pCi/g for Th-232, as provided by the vendor. There is no correction factor for these MDCs.

2.6.2 Direct Push Core Screening/Sample Collection

Sealed PVC containers collected from direct push mobile and manual rigs were transported to the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation added to the PDI Soil Probe Log Sheets (see [Appendix 6-B](#)) included soil column description and soil screening data. Field screening for radiological activity was performed on soil cores contained in the PVC/PET liner. A collimated Eberline

SPA-3 2" x 2" NaI detector (or Ludlum Model 44-10) coupled to a Ludlum Model 2221 scaler/ratemeter was used to measure gamma activity. The detector was positioned approximately 0.5 inch above the soil core, on a guide, to ensure that this distance was maintained over the entire length of each soil core. Continuous scanning of the soil core was performed at an approximate rate of three inches per second. The instrument MDC, taken from MARSSIM, is estimated to be 2.8 pCi/g for Ra-226, 1.8 pCi/g for Th-232, and 80 pCi/g for U-238 (MARSSIM, 1997). Although the MARSSIM MDC values are based upon an open area, it was assumed that the slower scan time compensated for the different geometry. An indelible marker was used to mark the liner where elevated readings were identified during scanning. Total integrated gross gamma counts were accumulated over a 30-second interval and recorded.

Soil cores were also screened for total volatile organic vapors using a PID. A series of small perforations were made along the PVC/PET liner at 12-inch increments to expose soil to the PID. Perforations were sealed with tape after PID screening. Screening results were recorded on the PDI Soil Probe Logs.

Prior to obtaining samples, each core was photographed using a digital camera. A brief soil field classification description of each core was entered onto the PDI Soil Probe Log Sheet.

Soil samples were selected from each direct push location for analysis of the ROC: Th-232, Ra-226, and U-238. Samples were selected based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample was taken at the highest reading location (suspected FUSRAP waste, if present, as defined in the Federal Facilities Agreement dated November, 1991; DOE and USEPA, 1991); a second soil sample was collected where the readings approached a constant value (suspected transition zone, if present); and a third soil sample was collected within the zone of constant readings (below suspected transition zone). When soil cores exhibited uniform count rates (i.e., elevated gamma measurements were not identified), three samples per soil probe location were collected.

Selected samples were obtained from each core sufficient to fill a 300-milliliter sample container. Samples were labeled and capped at either end with plastic caps. Caps were color-coded for 'top' and 'bottom' of the original hole. Each extracted section of the soil core was replaced with a wooden spacer to indicate what portion of the soil core was sampled. The spacer was labeled with the sample identification number of the soil removed for testing. After screening and sample extraction, remaining portions of each soil core were placed back into the appropriate PVC container, with the wooden spacer in its appropriate location, and stored on-site for future reference. The section of core tube containing the sample was then transferred to the MISS on-site laboratory for sample preparation and analysis.

Evaluation of all gamma log data led to the archiving of selected samples. That is, a number of the direct push soil probes exhibited 'constant' count rates over the depth interval. In these cases, rather than having all samples analyzed at this time, the deepest prepared sample was not counted but archived. By doing this, as laboratory results confirm that radiological contamination does not exist at that soil probe location, unnecessary analytical work is

prevented. Samples that were archived are noted on the PDI Soil Logs in [Appendix 6-B](#) and on [Table 6-4](#).

As described above, a collimated Eberline SPA-3 or Ludlum Model 44-10 2" x 2" NaI detector was used to measure gamma activity for the soil cores, while a Bicron[®] Model G1 1" x 1" NaI gamma detector was used for the downhole measurements. The 2" x 2" NaI detector (Eberline SPA-3 or Ludlum Model 44-10) provided confirmation of downhole measurements and greater sensitivity for sample selection than the 1" x 1" NaI gamma detector.

2.6.3 Sample Preparation

Soil samples were screened to remove small debris and oven-dried to obtain moisture content and to facilitate grinding. Grinding assured sample homogenization. Samples were then transferred to a 300-milliliter commercially supplied metal can. Lids were secured on cans, after which they were shelved for 21 days. The 21-day period was required to allow radon and its daughter products to in-grow and establish secular equilibrium between Ra-226, Radon-222 (Rn-222), and the gamma-emitting daughters.

2.6.4 Laboratory Data

Analysis for ROC on selected samples was performed at the MISS on-site field laboratory using a Canberra high-purity germanium detector. All testing in the MISS on-site field laboratory was completed in accordance with the procedures outlined in the CDQMP. MISS on-site field laboratory data have been entered onto the PDI Soil Probe Log sheets (see [Appendix 6-B](#)).

The Project Chemist evaluated 10% of the MISS on-site field laboratory radiological data packages; the evaluation is included in the PDI Quality Control Summary Report (QCSR; Stone & Webster, 2000d). The laboratory qualified the reported data when the germanium detector measurement system fell outside of one of the control limits during quality control check runs. Data qualification procedures are described in the PDI QCSR.

Ten percent of the samples analyzed by the MISS on-site field laboratory were sent to a USACE-approved off-site laboratory (ThermoRetec) for confirmatory analysis of the ROC. Following analysis, all soil samples were returned to the Maywood Site for storage and future reference. Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the off-site confirmatory radiological data. Radiological data were evaluated using the USACE's Radiological Data Quality Evaluation Guidance, as presented in the CDQMP. The data validation reports for the radiological confirmatory sample results are provided in the PDI QCSR.

2.7 Environmental Sampling

A limited number of soil samples were collected for environmental analyses in order to identify potential chemical contamination commingled with the radioactive waste. This information would aid in assessing waste classification (i.e., whether hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), is commingled with radioactive waste) as well as provide data for worker health and safety. Samples for environmental analysis were

collected using direct push Macro-Core[®] methodology. Sampling depths were based on the anticipated depth of radiological contamination. Soils exhibiting the highest PID readings or visual contamination were collected and sent for laboratory analysis by a USACE and NJDEP certified laboratory (RECRA LabNet). Samples were analyzed for RCRA disposal characteristics (ignitability, reactivity, corrosivity, and toxicity characteristic leaching procedure TCLP), the Target Compound List (TCL) and the Target Analyte List (TAL) with chromium speciation.

During performance of environmental borings, environmental boring log sheets were completed for each boring. Copies of the completed log sheets are included in [Appendix 6-C](#).

Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the environmental data. Environmental data were evaluated using the USACE's Data Quality Evaluation Guidance, as presented in the CDQMP. In addition, the USEPA Region II SOP No. HW-24, Revision I, June 1999, was also applied. The data validation reports for the environmental sample results are provided in the PDI QCSR.

2.8 Geotechnical Sampling

Radiological cleanup criteria have yet to be finalized, therefore final assessment of the extent of radiological contamination cannot be made at this time. The geotechnical investigation program was therefore suspended from the PDI. Following approximate determination of limits of excavation during the design phase, existing geotechnical information will be evaluated for remedial design purposes. If it is decided that additional information is required, then the geotechnical program will be reinstated, as necessary.

2.9 Quality Assurance/Quality Control

Field and laboratory activities were completed in accordance with the CQCP and the CDQMP. Data reflecting adherence to the Quality Assurance / Quality Control (QA/QC) program was documented and presented in the PDI QCSR.

2.10 Health and Safety

All PDI investigation activities were conducted in compliance with the SSHP and associated protocols and directives. Field crews received daily briefings at 'Plan of the Day' meetings prior to any work activities. These meetings reviewed daily health and safety issues such as potential inclement weather, as well as reviews of general site health and safety directives.

3.0 CLUSTER DESCRIPTION AND PDI RESULTS

3.1 Cluster No. 6 Description

Cluster No. 6 consists of five properties in the Borough of Maywood:

- Property No. 06A – 85-101 NJ Route 17 North (Architectural Windows)
- Property No. 06B – 137 NJ Route 17 North (Ramsey Auto Group)
- Property No. 06C – 167 NJ Route 17 North (Sunoco Station - Inactive)
- Property No. 06D – 239 NJ Route 17 North (Gulf Station)
- Property No. 06E – 29 Essex St. (Federal Express Corporation)

The paragraphs below provide detailed descriptions of each property.

3.1.1 Property No. 06A – 85-101 NJ Route 17 North

Property No. 06A occupies Block 124, Lot 4 in the Borough of Maywood, and is approximately 4.7 acres in area. The property slopes gently from the southeast to the north and west, and consists of a 96,000 square foot cinder block and brick veneer office building with grassy areas to the west and a bituminous concrete driveway to the east. The cinder block building at Property No. 06A (also known as the Hunter Douglas Building) is owned by a development company (SWS Realty Associates) and is leased to the following tenants: Computer Service Center (Kenitec) and Architectural Window Manufacturing Corporation (Stone & Webster, 1999e). The property is bordered to the east by Property No. 08A (the Maywood Furniture Company) and a drainage swale which runs east-west off the northwest boundary of the property (BNI, 1987a). The property is bordered to the south and west by Property No. 06E (the Federal Express Corporation property) and NJ Route 17, respectively. To the north, the property is bordered by a drainage swale and by Cluster No. 9 (Sears Logistical Services, 149-151 Maywood Ave.).

3.1.2 Property No. 06B – 137 NJ Route 17 North

Property No. 06B occupies Block 124, Lot 3 in the Borough of Maywood. The property is owned by AMP Realty and was previously occupied by Uniform Fashions, which relocated April 2000 (Stone & Webster, 1999e). The current tenant is Ramsey Auto Group. The property occupies approximately 1.5 acres and contains a one-story cinder block and brick veneer building. The remaining area of the property is covered by asphalt pavement.

Property No. 06B is bordered to the northeast by an aboveground section of the Lodi Brook. Property No. 06C (a former Sunoco station) lies to the north, Cluster No. 9 is to the east, Property No. 06A (the Hunter Douglas Building) lies to the south and NJ Route 17 is to the west. A drainage swale is located along the eastern boundary of the property (BNI, 1987b).

3.1.3 Property No. 06C – 167 NJ Route 17 North

Property No. 06C occupies Block 124, Lot 2 in the Borough of Maywood and is owned and operated by Sunoco. The property, which is currently inactive, is approximately 1.7 acres in area and contains a gasoline service area and a one-story 800 square foot cinder block building. The gasoline service area contains two concrete pads and gas pumps. The area adjacent to NJ Route 17 is covered by asphalt pavement, and the remaining property is covered by packed gravel and some concrete. The southern portion of the property contains gasoline underground storage tanks (USTs) and natural gas and sewer lines covered by asphalt and concrete. An existing waste oil UST (capacity unknown) is located on the west side of the existing building. Three USTs containing gasoline were formerly located south of the existing building (CH2M Hill, 1994). One UST located northeast of the building was removed, leaving an open excavation. The excavation is rectangular, surrounded by a chain-link fence, and is shored on four sides with steel sheet-piling. The excavation is filled with water, and its depth is unknown. A debris pile, believed to be derived from the excavation, is southeast of the excavation. The debris pile was left on the site due to the potential for radiological contamination.

The property is bordered to the southeast by Lodi Brook (the brook and other filling activities are primary mechanisms for the transport of radioactive contamination found on the property). The property is bordered to the north by Property No. 06D, to the south by Property No. 06B, to the northeast by Cluster No. 9, and to the west by NJ Route 17. Due to heavy rainfall in September 1999 (associated with Hurricane Floyd), the brook and drainage swale were recently upgraded under a time-critical removal action to reduce the potential for sediment contaminant transport (Stone & Webster, 2000c). Lodi Brook enters a conduit under NJ Route 17 and continues flowing to the west. A second storm water conduit is buried along the northwestern property boundary and also extends under NJ Route 17. Convergence of these two drainage conduits into the Lodi Brook occurs just west of NJ Route 17 within Cluster No. 5 (BNI, 1987c).

3.1.4 Property No. 06D – 239 NJ Route 17 North

Property No. 06D occupies Block 124, Lot 1 in the Borough of Maywood. The property is currently an active Gulf Service Station owned by Cumberland Farms, and operates 24 hours per day, seven days per week. The property is approximately 0.4 acres in area and is occupied by a one-story brick veneer building and two gasoline service islands. The building is approximately 800 square feet and is divided into three sections: a storage room, a center office area, and a maintenance room with a sink and miscellaneous supplies. The area surrounding the building is completely covered by asphalt pavement except for two landscape planters containing shrubs and a strip of grass at the rear of the building (BNI, 1994).

The property is bordered on the north by Cluster No. 9, on the west by NJ Route 17, and on the southeast by Property No. 06C.

3.1.5 Property No. 06E – 29 Essex St.

Property No. 06E occupies Block 124, Lot 5 in the Borough of Maywood. The property comprises approximately 4.7 acres in area and contains a 50,000 square foot combination office-warehouse owned by Federal Express Corporation. The majority of the property is paved, with

the exception of the front lawn, which is located along NJ Route 17. A small detention pond and unpaved area are located on the northeast part of the property behind the building.

Property No. 06E is bounded to the north by Cluster No. 8, to the east by residential properties, to the south by NJ Route 17 commercial properties, and to the west by Property No. 06A. This Federal Express property is classified as a small quantity generator (EDR, 1999).

Refer to [Figure 6-3](#) for more specific details of site features.

3.2 Radiological Data

3.2.1 Surface Gamma Survey

A surface gamma survey was performed at Cluster No. 6. Data, recorded using GPS, was entered into the Groundwater Modeling System (GMS) software package and contoured to a two-dimensional grid using the “Natural Neighbor” contouring protocol. “Natural Neighbor” interpolation is based on the Thiessen polygon network of the scatter point set. Data are interpolated based on distance as well as topological relationships (Boss International, Inc., 2000).

Results of the gamma scan survey for Cluster No. 6 are presented graphically on [Figure 6-4](#) and [Figure 6-A1](#) (Appendix 6-A). [Figure 6-4](#) presents surface gamma scan data in context of the Maywood Site: the upper limit of the contour range is the maximum gamma count measurement detected at the Maywood Site, and the lower contour range represents 1.5 times the background gamma count rate for Cluster No. 6 (background is approximately 2,000 counts per minute for Cluster No. 6). [Figure 6-A1](#) provides a more detailed, cluster-specific, presentation of the gamma scan data, with contoured ranges corresponding to actual minimum and maximum measured gross gamma counts recorded at Cluster No. 6.

3.2.2 Surface ISOCS Measurements

Surface ISOCS measurements were taken at 29 locations on Cluster No. 6; locations are shown on [Figure 6-3](#). Results of surface ISOCS measurements are tabulated on [Table 6-3](#).

3.2.3 Direct Push Soil Probes

Sixty (60) direct push probes were performed at Cluster No. 6 for radiological purposes. Locations of the probes are shown on [Figure 6-3](#).

3.2.3.1 Downhole Gamma Logging

Results from downhole gamma logging measurements taken at the direct push probe locations are presented on the PDI Soil Probe Logs included in [Appendix 6-B](#).

3.2.3.2 Direct Push Core Screening/Sample Collection

Results of the soil core screening activities performed at the MISS on-site field laboratory are recorded on the PDI Soil Probe Logs included in [Appendix 6-B](#).

3.2.3.3 MISS On-Site Field Laboratory Data and ThermoRetec Confirmatory Data

One-hundred and eighty (180) soil samples were collected for laboratory analysis from the 60 soil probe locations at Cluster No. 6. One-hundred and thirteen (113) of the 180 samples were sent for analysis (including 18 duplicates); 67 were archived. Laboratory data consisting of soil concentrations of the ROC are presented on the soil probe logs in [Appendix 6-B](#), and summarized on [Table 6-4](#). Archived samples are also recorded on the logs and the table.

Twenty-two of the soil samples analyzed by the MISS on-site field laboratory were sent to ThermoRetec for confirmatory analysis. Results of the confirmatory analyses performed by ThermoRetec are shown in [Table 6-4](#).

As part of the data quality objective process, a comparison study was performed between the MISS on-site field laboratory and the ThermoRetec laboratory data. The results of the comparison can be found under separate cover (Stone & Webster, 2000e).

3.3 Environmental Data

Six environmental borings were drilled at Cluster No. 6, and six soil samples were collected for environmental analysis. A summary of the environmental analytical data is presented on [Table 6-5](#). [Figure 6-3](#) shows the location of the borings. In addition, the environmental boring log sheets are included in [Appendix 6-C](#).

4.0 REFERENCES

- Bechtel National, Inc. Radiological and Limited Chemical Characterization Report for the Hunter Douglas Property, DE-AC05-81OR20722; July 1987a.
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Taylor Wiseman Taylor. *Site/Remedial Investigation Report, Essex Street Over State Route 17*. Borough of Maywood and Lodi, Township of Rochelle Park, Bergen County, New Jersey. Mt. Laurel, NJ; January 2000.

U.S. Department of Energy and U.S. Environmental Protection Agency. *Federal Facility Agreement for the Maywood Interim Storage Site*; November, 1991.

Table 6-1: Properties Comprising Each Cluster

Cluster No.	Property No.	Properties (occupant)	Township/Borough	Property Block & Lot
1	01A	72 Sidney St. (Vacant)	Lodi	Block 164, Lots 1 and 5
2	02A	100 Hancock Street (AT&T)	Lodi	Block 205.03, Lot 2.04
	02B	80 Hancock Street (Vacant)	Lodi	Block 205.03, Lot 2.03
	02C	80 Industrial Road (American Jewel Windows)	Lodi	Block 205.02, Lot 4.02
	02D	8 Mill St. (NJVIS)	Lodi	Block 205.02, Lot 1.05
3	03A	170 Gregg Street (Bergen Cable)	Lodi	Block 205, Lot 1.02
4	04A	160/174 Essex Street (Bank of New York)	Lodi	Block 186.01, Lot 1 and Block 174, Lot 1.02
	04B	I-80 Westbound Right-of-Way (NJDOT)	Lodi	Not Applicable
5	05A	99 Essex Street (Joseph Muscarelle, Inc.)	Maywood	Block 125, Lot 1
	05B	113 Essex Street (Bank of New York)	Maywood	Block 125, Lot 2
	05C	200 NJ Route 17 South (Sears Appliance Repair)	Maywood	Block 125, Lot 3
6	06A	85-101 NJ Route 17 North (Architectural Windows)	Maywood	Block 124, Lot 4
	06B	137 NJ Route 17 North (Ramsey Auto Group)	Maywood	Block 124, Lot 3
	06C	167 NJ Route 17 North (Sunoco Station - Inactive)	Maywood	Block 124, Lot 2
	06D	239 NJ Route 17 North (Gulf Station)	Maywood	Block 124, Lot 1
	06E	29 Essex Street (Federal Express Corporation)	Maywood	Block 124, Lot 5
7	07A	111 Essex Street (Scanel Company, Inc.)	Maywood	Block 131, Lots 1,2,3,4
	07B	New York, Susquehanna & Western Railway - Lodi Branch	Maywood	Block 131, Lot 8
8	08A	23 West Howcroft Road (Maywood Furniture, Inc.)	Maywood	Block 124, Lot 17
9	09A	149-151 Maywood Avenue (Sears Logistical Services)	Maywood; Rochelle Park	Block 124, Lot 30; Block 17.02, Lot 1
10	10A	100 West Hunter Avenue (Stepan Company)	Maywood; Rochelle Park	Block 124, Lot 10; Block 18.02, Lot 2
11	11A	205 Maywood Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
	11B	61 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 50
	11C	50 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
12	12A	New York, Susquehanna & Western Railway	Maywood; Rochelle Park	Block 124, Lot 55 and Block 110, Lot 1
	12B	100 West Hunter Avenue (MISS)	Maywood; Rochelle Park	Block 124, Lot 46 and Block 20.01, Lot 1
	12C	New Jersey Route 17 (NJDOT)	Rochelle Park	Not Applicable

Table 6-2: Summary of PDI Intrusive Field Activities

Cluster No.	Property No.	Property Address	Occupant	Planned			Actual			Schedule (Year 2000)
				Probe Locations	Depth (ft)	Footage (ft)	Probe Locations	Depth (ft)	Footage (ft)	
1	01A	72 Sydney Street	Vacant	13	12	156	15	12	188	Jan. 11, 12, Mar. 31
2	02A	100 Hancock Street	AT&T	17	16	272	17	6 - 12	194	Jan. 27, Feb. 1, 2, Mar. 16
	02B	80 Hancock Street	Vacant	18	16	288	Pending Right of Entry Agreement			
	02C	80 Industrial Road	American Jewel Windows	23	16	368	20	12	272	Jan. 21, 24, 28, Feb. 1
	02D	8 Mill Street	NJVIS	38	16	608	44	12 - 16	593	Jan. 13, 14, 18, 19, 20, 21
3	03A	170 Gregg Street	Bergen Cable	10	8	80	10	8	62	Jan. 12, 13
4	04A	160/174 Essex Street	Bank of New York	25	12	300	23	4 - 12	427	Feb. 2, 3, 4
	04B	I-80 Right-of-Way	NJDOT	7	12	84	7	8 - 12	69	Feb. 2, 4, Mar. 31
5	05A	99 Essex Street	Joseph Muscarelle, Inc.	38	8	304	38	8	318	Feb. 23, 24, Mar. 17
	05B	113 Essex Street	Bank of New York	18	8	144	21	4 - 16	171	Feb. 8, 10, 16
	05C	200 NJ Route 17 South	Sears Appliance Repair	23	8	184	16	8 - 10	129	Feb. 15, 16, Mar. 2
6	06A	85-101 NJ Route 17 North	Architectural Windows	17	12	204	17	8 - 18	196	Feb. 9, 10, 16, Mar. 16
	06B	137 NJ Route 17 North	Ramsey Auto Group	15	12	190	13	10 - 12	145	Feb. 9, 16, 25
	06C	167 NJ Route 17 North	Sunoco Station - Inactive	27	12	324	19	3 - 14	239	Feb. 11, Mar. 8
	06D	239 NJ Route 17 North	Gulf Station	19	12	228	2	11 - 12	23	Feb. 16
	06E	29 Essex Street	Federal Express Corporation	7	12	84	9	7 - 12	95	Feb. 16, Mar. 31
7	07A	111 Essex Street	Scanel Company, Inc.	12	16	192	12	12 - 22	161	Feb. 21, 22, 23
	07B	NYS&W - Lodi Branch	NYS&W - Lodi Branch	16	16	256	11	6 - 16	115	Feb. 21, 22
8	08A	23 West Howcroft Street	Maywood Furniture, Inc.	26	16	416	25	7 - 16	321	Feb. 17, 21
9	09A	149-151 Maywood Avenue	Sears Logistical Services	131	16	2096	72	4 - 16	574	Mar. 2, 3, 6, 7, 8, 9, 15
10	10A	100 West Hunter Avenue	Stepan Company	106	24	2544	92	4 - 24	1076	Feb. 25, 28, 29, Mar. 1, 2, 6, 7, 9, 16, 30
11	11A	205 Maywood Avenue	Myron Manufacturing	5	8	40	5	8 - 12	44	Feb. 16
	11B	61 West Hunter Avenue	Myron Manufacturing	9	8	72	10	8 - 16	87	Feb. 15, 21
	11C	50 West Hunter Avenue	Myron Manufacturing	1	8	8	1	8	8	Feb. 15
12	12A	NYS&W	NYS&W	31	24	744	27	12 - 27	335	Feb. 18, 22, 24, Mar. 16, 30
	12B	100 West Hunter Avenue	MISS	120	24	2880	100	7 - 26	1769	Feb. 4, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24, 25, 29, Mar. 1, 7, 8, 9
	12C	NJ Route 17	NJDOT	0	0	0	0	0	0	<i>No investigations planned.</i>
TOTALS:				772		13,066	626		7,611	

Table 6-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
	pCi/g	%	pCi/g	pCi/g	%	pCi/g	pCi/g	%	pCi/g
6A-SI001-SS-0-1	0.17	39.6	0.03	0.37	28.8	0.08	< 4.19	----	4.19
6A-SI002-SS-0-1	0.27	29.7	0.20	0.58	23.8	0.06	< 5.11	----	5.11
6A-SI003-SS-0-1	1.12	14.5	0.20	1.99	13.7	0.01	< 6.80	----	6.80
6A-SI004-SS-0-1	1.05	15.5	0.30	2.23	12.8	0.10	< 6.80	----	6.80
6A-SI005-SS-0-1	1.21	14.0	0.34	2.04	13.0	0.10	< 7.13	----	7.13
6A-SI006-SS-0-1	1.51	13.6	0.31	2.56	11.9	0.01	< 7.79	----	7.79
6A-SI007-SS-0-1	2.02	12.0	0.42	3.79	10.6	0.14	< 8.13	----	8.13
6A-SI008-SS-0-1 (1)	0.14	40.0	0.12	0.58	20.7	0.08	< 2.40	----	2.40
6A-SI008-SS-1-1 (1)	0.15	39.9	0.12	0.53	22.0	0.04	< 2.87	----	2.87
6A-SI009-SS-0-1	0.17	42.8	0.16	0.25	47.0	0.01	< 4.52	----	4.52
6A-SI010-SS-0-1	0.20	34.7	0.16	0.35	32.6	0.06	< 4.92	----	4.92
6B-SI001-SS-0-1	0.67	27.7	0.36	0.89	29.0	0.14	< 11.20	----	11.20
6B-SI002-SS-0-1 (1)	0.24	29.0	0.21	0.26	39.0	0.11	< 4.92	----	4.92
6B-SI002-SS-1-1 (1)	0.21	33.0	0.18	0.25	26.8	0.01	< 3.96	----	3.96
6B-SI003-SS-0-1	1.32	13.9	0.24	2.66	11.7	0.10	< 7.19	----	7.19
6B-SI004-SS-0-1	0.44	34.0	0.36	0.59	34.0	0.13	< 7.75	----	7.75
6C-SI001-SS-0-1	1.85	18.9	0.97	10.17	8.9	0.26	< 14.80	----	14.80
6C-SI002-SS-0-1 (1)	18.38	14.4	5.83	124.20	6.2	1.06	< 99.10	----	99.10
6C-SI002-SS-1-1 (1)	12.73	19.0	6.51	121.50	6.0	0.91	< 93.10	----	93.10
6C-SI003-SS-0-1	1.41	16.6	0.76	2.40	15.8	0.02	< 10.90	----	10.90
6C-SI004-SS-0-1	0.56	22.0	0.35	4.12	10.0	0.12	< 6.39	----	6.39
6D-SI001-SS-0-1 (1)	0.54	20.0	0.34	3.00	10.5	0.16	< 6.40	----	6.40
6D-SI001-SS-1-1 (1)	0.49	21.5	0.31	2.84	10.7	0.01	< 6.33	----	6.33
6D-SI002-SS-0-1	0.75	18.0	0.40	5.82	8.3	0.14	< 7.37	----	7.37
6E-SI001-SS-0-1	0.20	45.0	0.32	2.24	12.0	0.01	< 4.71	----	4.71
6E-SI002-SS-0-1	0.30	29.6	0.26	1.51	13.9	0.01	< 3.92	----	3.92
6E-SI003-SS-0-1	0.43	21.0	0.27	1.32	15.9	0.18	< 5.57	----	5.57

Table 6-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
6E-SI004-SS-0-1 (1)	0.33	26.0	0.22	1.39	14.9	0.01	< 4.03	-----	4.03
6E-SI004-SS-1-1 (1)	0.32	26.9	0.26	1.25	15.8	0.12	< 4.00	-----	4.00
6E-SI005-SS-0-1	0.29	28.7	0.21	1.15	16.0	0.16	< 3.76	-----	3.76
6E-SI006-SS-0-1	0.33	25.6	0.26	1.43	14.9	0.13	< 3.91	-----	3.91
6E-SI007-SS-0-1	0.33	26.5	0.22	1.59	13.6	0.01	< 3.99	-----	3.99
6E-SI008-SS-0-1	0.32	30.7	0.28	2.20	12.0	0.01	< 6.47	-----	6.47
6E-SI009-SS-0-1	0.31	29.0	0.32	2.17	12.0	0.01	< 4.47	-----	4.47

* Reported data are taken from the Nuclide Identification Report

MDA : Minimum Detectable Activity

Error: 2 sigma (95% confidence interval)

< : Nuclide undetected or less than the MDA. The nuclide is assumed to be present at the MDA Value.

----- Not Applicable

(1) Sample (-0-1) and its duplicate (-1-1)

**Table 6-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
06A-001	0.50	06A04200		1.84	0.09	0.30	3.79	0.11	0.22	8.03	U	---	8.03
<i>ThermoRetec</i> ⁽²⁾		06A04200		1.60	0.21	0.19	3.46	0.24	0.29	4.53		2.33	2.81
06A-001	1.00	06A04201		0.55	J 0.06	0.19	0.73	J 0.05	0.21	7.22	UJ	---	7.22
06A-001	2.50	06A04202		0.63	0.07	0.18	0.93	0.06	0.21	5.24	U	---	5.24
06A-002	2.00	06A04203		0.60	0.07	0.16	0.80	0.05	0.19	4.95	U	---	4.95
06A-002	4.50	06A04204		0.72	J 0.08	0.21	0.98	J 0.06	0.25	8.07	UJ	---	8.07
06A-002	4.50	06A04205	X	0.61	0.07	0.19	0.85	0.06	0.20	4.67	U	---	4.67
06A-002	6.50	06A04206		ARCHIVED									
06A-003	1.50	06A04207		0.60	J 0.06	0.17	0.78	J 0.05	0.20	6.24	UJ	---	6.24
06A-003	4.50	06A04208		0.55	0.06	0.14	0.69	0.05	0.19	1.96		1.32	4.35
06A-003	6.00	06A04209		ARCHIVED									
06A-004	2.50	06A04210		0.68	J 0.07	0.21	0.99	J 0.07	0.25	8.48	UJ	---	8.48
06A-004	3.50	06A04211		0.91	0.07	0.18	1.12	0.06	0.20	5.18	U	---	5.18
06A-004	4.50	06A04212		0.68	J 0.07	0.20	1.06	J 0.05	0.15	7.27	UJ	---	7.27
06A-004	4.50	06A04213	X	ARCHIVED									
06A-005	3.50	06A04214		0.94	0.08	0.20	1.13	0.06	0.18	6.36	U	---	6.36
06A-005	4.50	06A04215		0.88	J 0.08	0.26	1.13	J 0.07	0.26	8.90	UJ	---	8.90
06A-005	5.50	06A04216		ARCHIVED									
06A-006	2.50	06A04217		1.23	0.08	0.33	3.75	0.12	0.20	8.42	U	---	8.42
06A-006	4.50	06A04218		0.81	J 0.08	0.23	1.29	J 0.08	0.26	9.72	UJ	---	9.72
<i>ThermoRetec</i> ⁽²⁾		06A04218		0.82	0.20	0.32	1.00	0.18	0.23	6.64		2.08	2.68
06A-006	4.50	06A04219	X	0.59	0.08	0.21	1.02	0.07	0.23	5.77	U	---	5.77
<i>ThermoRetec</i> ⁽²⁾		06A04219		0.64	0.14	0.17	1.34	0.14	0.24	0.53	U	2.24	2.16
06A-006	5.50	06A04220		ARCHIVED									
06A-007	2.00	06A04221		0.87	J 0.08	0.21	1.03	J 0.06	0.24	8.52	UJ	---	8.52
06A-007	3.50	06A04222		0.38	0.05	0.14	0.32	0.04	0.15	4.03	U	---	4.03
06A-007	4.50	06A04223		ARCHIVED									
06A-008	3.00	06A04224		0.97	J 0.08	0.26	1.15	J 0.06	0.18	8.30	UJ	---	8.30
06A-008	6.00	06A04225		0.63	0.07	0.18	0.85	0.06	0.23	5.69	U	---	5.69
06A-008	7.50	06A04226		ARCHIVED									
06A-009	3.50	06A04227		0.94	J 0.08	0.22	1.07	J 0.07	0.25	8.01	UJ	---	8.01
06A-009	4.50	06A04228		0.61	0.06	0.19	0.76	0.05	0.13	5.14	U	---	5.14
06A-009	4.50	06A04229	X	0.57	0.06	0.18	0.76	0.05	0.13	4.88	U	---	4.88
06A-009	5.50	06A04230		ARCHIVED									

**Table 6-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
06A-010	1.50	06A04231		3.27	J	0.14	0.51	15.57	J	0.28	0.39	21.40	UJ	---	21.40
<i>ThermoRetec</i> ⁽²⁾		06A04231		2.69		0.29	0.30	13.86		0.68	0.45	7.81	J	4.92	5.05
06A-010	2.50	06A04232		0.86	J	0.06	0.24	0.98	J	0.06	0.17	8.09	UJ	---	8.09
06A-010	4.50	06A04233		ARCHIVED											
06A-011	0.50	06A04234		1.51		0.08	0.24	2.31		0.09	0.20	7.21	U	---	7.21
06A-011	1.00	06A04235		0.40		0.06	0.18	0.57		0.05	0.19	4.58	U	---	4.58
06A-011	4.50	06A04236		ARCHIVED											
06A-012	2.50	06A04237		1.01	J	0.06	0.22	1.35	J	0.06	0.18	8.78	UJ	---	8.78
06A-012	4.50	06A04238		0.77	J	0.09	0.29	1.08	J	0.08	0.29	9.99	UJ	---	9.99
06A-012	4.50	06A04239	X	0.40		0.05	0.15	0.39		0.04	0.16	4.27	U	---	4.27
06A-012	6.00	06A04240		ARCHIVED											
06A-013	0.50	06A04241		1.67		0.13	0.38	5.04		0.15	0.27	10.90	U	---	10.90
<i>ThermoRetec</i> ⁽²⁾		06A04241		1.35		0.22	0.23	4.88		0.43	0.33	1.90	UJ	2.43	3.48
06A-013	1.50	06A04242		1.50		0.13	0.37	2.13		0.10	0.24	14.48		3.03	8.89
06A-013	5.50	06A04243		0.52		0.06	0.16	0.74		0.05	0.17	4.75	U	---	4.75
06A-014	1.00	06A04244		1.50		0.09	0.36	4.43		0.13	0.24	7.04	J	2.61	8.33
06A-014	1.50	06A04245		0.59		0.07	0.17	0.88		0.06	0.19	6.01		1.53	4.62
06A-014	4.50	06A04246		TBD											
06A-015	1.00	06A04247		0.81		0.08	0.22	1.44		0.08	0.27	7.44	U	---	7.44
06A-015	2.00	06A04248		1.12		0.09	0.26	1.31		0.07	0.23	10.80	U	---	10.80
06A-015	2.00	06A04249	X	1.09		0.11	0.26	0.97		0.08	0.33	6.45	J	2.36	7.43
06A-015	6.00	06A04250		ARCHIVED											
06A-016	1.50	06A04251		34.73	J	0.73	1.96	188.28	J	2.23	1.51	77.40	UJ	---	77.40
<i>ThermoRetec</i> ⁽²⁾		06A04251		30.14		1.85	1.13	180.00		6.80	1.66	42.11		13.94	16.87
06A-016	5.50	06A04252		0.87		0.07	0.20	1.31		0.06	0.15	8.13	U	---	8.13
06A-016	7.00	06A04253		0.50		0.05	0.09	0.65		0.04	0.11	4.57	U	---	4.57
06A-017	3.00	06A04254		0.78		0.07	0.24	1.00		0.06	0.24	8.27	U	---	8.27
06A-017	4.50	06A04255		0.65		0.07	0.20	0.71		0.06	0.19	5.33	U	---	5.33
06B-001	2.50	06B04400		0.76		0.07	0.19	0.84		0.06	0.22	1.58	J	1.64	5.49
06B-001	4.50	06B04401		0.53		0.05	0.17	0.65		0.05	0.19	6.43	U	---	6.43
06B-001	6.00	06B04402		ARCHIVED											

**Table 6-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
06B-002	2.50	06B04403	X	0.62	0.06	0.21	0.60	0.05	0.20	4.93	U	---	4.93
06B-002	2.50	06B04404		0.96	0.07	0.21	0.85	0.05	0.16	8.21	U	---	8.21
06B-002	4.50	06B04405		0.53	0.06	0.17	0.49	0.05	0.18	4.33	U	---	4.33
06B-002	9.50	06B04406		ARCHIVED									
06B-003	5.00	06B04407		0.72	0.05	0.17	0.79	0.06	0.21	7.14	U	---	7.14
06B-003	5.50	06B04408		0.41	0.06	0.19	0.55	0.05	0.18	4.25	U	---	4.25
06B-003	10.50	06B04409		0.87	0.07	0.25	1.76	0.08	0.29	9.16	U	---	9.16
06B-004	2.00	06B04410		0.54	0.06	0.16	0.71	0.05	0.20	4.87	U	---	4.87
06B-004	4.50	06B04411		0.45	0.06	0.19	0.78	0.05	0.19	6.66	U	---	6.66
06B-004	6.50	06B04412		ARCHIVED									
06B-005	2.00	06B04413		0.91	0.07	0.24	1.23	0.07	0.25	5.91	U	---	5.91
06B-005	4.50	06B04414		1.07	0.08	0.20	1.35	0.07	0.26	8.61	U	---	8.61
06B-005	6.50	06B04415		ARCHIVED									
06B-006	2.50	06B04416	X	1.35	0.09	0.27	2.31	0.11	0.33	9.45	U	---	9.45
06B-006	4.50	06B04417		1.37	0.10	0.27	1.33	0.08	0.20	8.55	U	---	8.55
<i>ThermoRetec</i> ⁽²⁾		06B04417		1.32	0.19	0.20	1.36	0.15	0.28	5.43	J	2.41	3.34
06B-006	4.50	06B04418		1.58	0.11	0.25	1.27	0.08	0.23	0.00	J	2.73	9.36
<i>ThermoRetec</i> ⁽²⁾		06B04418		1.53	0.18	0.18	1.22	0.15	0.27	4.42	J	3.01	3.16
06B-006	6.00	06B04419		ARCHIVED									
06B-007	6.00	06B04420		1.34	0.07	0.22	1.58	0.07	0.27	8.54	U	---	8.54
06B-007	6.50	06B04421		1.01	0.07	0.22	1.20	0.06	0.14	5.23	U	---	5.23
06B-007	8.50	06B04422		1.25	0.09	0.23	1.29	0.07	0.27	8.79	U	---	8.79
06B-008	9.50	06B04423		0.85	0.08	0.20	1.11	0.06	0.22	5.59	U	---	5.59
06B-008	10.00	06B04424		1.19	0.08	0.20	1.51	0.06	0.18	8.30	U	---	8.30
06B-008	11.00	06B04425		1.30	0.07	0.17	1.58	0.07	0.18	8.88	U	---	8.88
06B-009	2.50	06B04426	X	1.03	0.08	0.23	1.04	0.05	0.14	5.63	U	---	5.63
06B-009	4.50	06B04427		1.00	0.07	0.17	1.15	0.06	0.16	7.72	U	---	7.72
06B-009	4.50	06B04428		0.83	0.08	0.20	0.84	0.06	0.21	5.28	U	---	5.28
06B-009	7.50	06B04429		ARCHIVED									
06B-010	5.50	06B04430		1.06	0.09	0.29	2.59	0.10	0.34	11.20	U	---	11.20
06B-010	6.00	06B04431		0.58	0.05	0.17	0.50	0.03	0.10	4.25	U	---	4.25
06B-010	8.50	06B04432		ARCHIVED									

**Table 6-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results								
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
06B-011	2.50	06B04433		9.43	0.41	2.32	261.35	2.96	1.76	90.38	18.73	79.10
<i>ThermoRetec</i> ⁽²⁾		06B04433		7.59	1.02	1.46	239.50	9.01	2.15	51.92	15.75	21.41
06B-011	6.50	06B04434		0.40	0.07	0.24	0.74	0.05	0.19	4.94	U	---
06B-011	8.50	06B04435		1.13	J	0.09	0.24	1.33	J	0.07	0.24	10.90
06B-012	1.00	06B04436		116.08	1.93	3.14	624.70	6.43	2.69	101.00	U	---
<i>ThermoRetec</i> ⁽²⁾		06B04436		94.99	5.09	2.03	537.20	19.52	3.00	77.04	24.16	28.75
06B-012	5.00	06B04437		0.71	0.06	0.21	0.83	0.06	0.22	5.06	U	---
06B-012	8.50	06B04438		0.49	J	0.07	0.21	0.76	J	0.05	0.22	7.16
06B-013	1.00	06B04439		0.85	0.07	0.28	3.30	0.10	0.26	10.20	U	---
<i>ThermoRetec</i> ⁽²⁾		06B04439		0.74	0.14	0.17	3.12	0.30	0.26	2.24	U	2.24
06B-013	1.50	06B04440		0.57	0.06	0.17	0.68	0.05	0.18	4.89	U	---
06B-013	4.50	06B04441		ARCHIVED								
06C-001	2.50	06C04600		3.74	0.15	0.57	26.69	0.40	0.42	16.20	U	---
06C-001	5.50	06C04601		0.96	J	0.07	0.22	0.85	J	0.05	0.17	8.41
06C-001	7.00	06C04602		0.87	0.09	0.26	0.96	0.07	0.29	9.91	U	---
06C-002	6.50	06C04603		1.05	0.08	0.27	3.44	0.11	0.32	7.54	U	---
06C-002	8.50	06C04604		0.63	0.07	0.18	0.74	0.06	0.22	5.23	U	---
06C-002	9.50	06C04605		ARCHIVED								
06C-003	0.50	06C04606		0.55	0.05	0.14	0.32	0.04	0.16	5.41	U	---
06C-003	2.50	06C04607		0.78	0.06	0.21	0.98	0.06	0.22	5.09	U	---
06C-003	2.50	06C04608	X	0.78	0.06	0.19	1.38	0.06	0.15	7.77	U	---
06C-003	6.50	06C04609		ARCHIVED								
06C-004	NO HOLE- REFUSAL											
06C-005	NO HOLE- REFUSAL											
06C-006	1.50	06C04610		4.53	J	0.17	0.57	23.54	J	0.39	0.44	24.80
<i>ThermoRetec</i> ⁽²⁾		06C04610		3.75	0.39	0.32	20.73	0.94	0.53	10.66	4.34	5.49
06C-006	5.00	06C04611		0.60	0.06	0.17	0.68	0.05	0.19	4.91	U	---
06C-006	6.50	06C04612		1.04	J	0.06	0.21	1.15	J	0.06	0.17	8.06
06C-007	1.00	06C04613		2.09	0.10	0.30	6.19	0.14	0.26	13.30	U	---
06C-007	4.50	06C04614		1.08	0.15	0.43	2.01	0.13	0.45	11.10	U	---
06C-007	4.50	06C04615	X	0.72	0.08	0.21	1.00	0.06	0.24	8.39	U	---
06C-007	6.50	06C04616		ARCHIVED								

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 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
06C-008	4.50	06C04617		4.31	0.17	0.58	19.64	0.34	0.41	1.24	J	5.03	16.80		
06C-008	5.50	06C04618		0.55	0.06	0.19	0.58	0.05	0.17	4.44	U	---	4.44		
06C-008	7.00	06C04619		0.65	J	0.08	0.24	0.92	J	0.06	0.24	8.27	UJ	---	8.27
06C-009	4.50	06C04620		1.72	0.09	0.29	4.53	0.12	0.22	9.14	U	---	9.14		
<i>ThermoRetec</i> ⁽²⁾		06C04620		1.52	0.20	0.22	4.61	0.36	0.34	5.61		3.66	3.53		
06C-009	5.00	06C04621		0.81	J	0.07	0.21	0.87	J	0.06	0.23	7.55	UJ	---	7.55
06C-009	7.00	06C04622		ARCHIVED											
06C-010	1.50	06C04623		5.28	0.18	0.60	26.91	0.41	0.47	18.50	U	---	18.50		
06C-010	5.00	06C04624		0.60	J	0.08	0.26	0.98	J	0.07	0.26	8.30	UJ	---	8.30
<i>ThermoRetec</i> ⁽²⁾		06C04624		0.63	0.11	0.12	1.01	0.12	0.19	0.35	U	1.04	1.87		
06C-010	5.00	06C04625	X	0.95	0.08	0.31	3.75	0.11	0.32	11.40	U	---	11.40		
06C-010	8.50	06C04626		0.64	0.07	0.18	0.97	0.06	0.21	5.41	U	---	5.41		
06C-011	1.50	06C04627		1.05	0.08	0.23	1.92	0.08	0.17	6.55	U	---	6.55		
06C-011	3.00	06C04628		2.62	J	0.13	0.39	3.00	J	0.19	0.29	20.12	J	4.69	14.50
06C-011	4.50	06C04629		1.26	0.11	0.28	1.41	0.09	0.33	8.06	U	---	8.06		
06C-012	1.50	06C04630		0.63	0.07	0.20	0.76	0.06	0.20	4.72	U	---	4.72		
06C-012	2.50	06C04631		0.67	J	0.07	0.17	0.86	J	0.06	0.23	7.99	UJ	---	7.99
06C-012	4.50	06C04632		ARCHIVED											
06C-013	2.50	06C04633		0.50	0.06	0.17	0.66	0.05	0.18	4.48	U	---	4.48		
06C-013	5.00	06C04634		1.31	0.09	0.27	1.22	0.06	0.16	6.70	U	---	6.70		
<i>ThermoRetec</i> ⁽²⁾		06C04634		1.28	0.14	0.13	1.14	0.12	0.18	7.26		2.28	2.39		
06C-013	5.00	06C04635	X	1.43	J	0.09	0.22	1.45	J	0.06	0.19	10.20	UJ	---	10.20
<i>ThermoRetec</i> ⁽²⁾		06C04635		1.17	0.18	0.16	1.19	0.13	0.19	4.81	J	2.59	2.94		
06C-013	7.00	06C04636		ARCHIVED											
06C-014	1.00	06C04637		0.69	0.08	0.24	1.14	0.07	0.24	6.03	U	---	6.03		
06C-014	2.00	06C04638		1.01	J	0.09	0.25	1.51	J	0.08	0.29	10.20	UJ	---	10.20
06C-014	5.50	06C04639		ARCHIVED											
06C-015	1.50	06C04640		3.42	0.14	0.52	19.79	0.29	0.40	15.60	U	---	15.60		
06C-015	6.50	06C04641		0.53	0.07	0.22	0.66	0.06	0.20	5.22	U	---	5.22		
06C-015	6.50	06C04642	X	0.66	0.06	0.22	0.85	0.06	0.22	8.10	U	---	8.10		
06C-015	8.50	06C04643		ARCHIVED											

**Table 6-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
06C-016	2.00	06C04644		13.79	0.33	1.12	93.97	1.15	0.90	45.50	U	---	45.50		
<i>ThermoRetec</i> ⁽²⁾		06C04644		9.29	0.67	0.56	71.37	2.81	0.86	11.02	J	7.17	8.92		
06C-016	4.50	06C04645		0.78	0.07	0.22	1.25	0.06	0.14	5.56	U	---	5.56		
06C-016	5.50	06C04646		ARCHIVED											
06C-017	2.00	06C04647		0.85	J	0.07	0.23	1.19	J	0.07	0.25	8.41	UJ	---	8.41
06C-017	5.00	06C04648		0.59		0.06	0.16	0.64		0.05	0.18	4.79	U	---	4.79
06C-017	6.00	06C04649		ARCHIVED											
06C-018	2.00	06C04650		1.05		0.07	0.20	1.42		0.06	0.18	5.69	J	2.55	8.27
06C-018	2.00	06C04651	X	0.80		0.08	0.25	1.27		0.07	0.22	6.73	U	---	6.73
06C-018	4.50	06C04652		0.70	J	0.05	0.18	0.91	J	0.05	0.17	7.89	UJ	---	7.89
06C-018	8.50	06C04653		0.73		0.07	0.21	1.14		0.07	0.25	8.65	U	---	8.65
06C-019	2.00	06C04654		2.32		0.11	0.32	3.42		0.11	0.22	15.53		2.98	8.96
06C-019	5.00	06C04655		0.53	J	0.05	0.19	0.77	J	0.06	0.22	6.99	UJ	---	6.99
06C-019	6.50	06C04656		0.57		0.07	0.16	0.87		0.06	0.20	5.06	U	---	5.06
06D-001	4.50	06D04800		4.09		0.17	0.63	28.03		0.43	0.49	27.10	U	---	27.10
06D-001	5.50	06D04801		1.00	J	0.07	0.19	0.96	J	0.05	0.18	7.94	UJ	---	7.94
<i>ThermoRetec</i> ⁽²⁾		06D04801		0.77		0.13	0.14	0.84		0.10	0.19	3.72	J	1.55	2.22
06D-001	5.50	06D04802	X	0.75		0.07	0.23	1.01		0.06	0.21	5.38	U	---	5.38
<i>ThermoRetec</i> ⁽²⁾		06D04802		0.79		0.11	0.13	1.04		0.11	0.16	2.18	J	1.34	1.98
06D-001	7.50	06D04803		ARCHIVED											
06D-002	5.00	06D04804		7.26	J	0.27	1.16	102.66	J	1.24	0.91	49.20	UJ	---	49.20
<i>ThermoRetec</i> ⁽²⁾		06D04804		5.97		0.68	0.74	86.43		3.92	1.09	11.60	J	8.29	11.85
06D-002	9.00	06D04805		0.38		0.06	0.20	1.03		0.06	0.19	4.87	U	---	4.87
06D-002	10.00	06D04806		ARCHIVED											
06E-001	2.00	06E05000		0.77		0.08	0.20	1.18		0.06	0.22	7.72	U	---	7.72
06E-001	4.50	06E05001		0.66		0.08	0.23	0.92		0.06	0.22	5.03	U	---	5.03
06E-001	6.50	06E05002		0.89	J	0.07	0.23	1.24	J	0.05	0.15	8.00	UJ	---	8.00
06E-002	0.50	06E05003		0.37		0.06	0.27	2.21		0.09	0.26	5.99	U	---	5.99
06E-002	2.00	06E05004		0.81		0.07	0.20	1.00		0.05	0.14	5.14	U	---	5.14
<i>ThermoRetec</i> ⁽²⁾		06E05004		0.60		0.11	0.12	0.93		0.14	0.18	0.29	U	1.01	1.78
06E-002	2.00	06E05005	X	0.81	J	0.07	0.20	1.32	J	0.06	0.24	2.19	J	2.04	6.78
<i>ThermoRetec</i> ⁽²⁾		06E05005		0.72		0.11	0.11	1.16		0.10	0.19	2.16	J	1.47	1.80
06E-002	4.50	06E05006		0.53		0.06	0.24	1.28		0.07	0.21	5.25	U	---	5.25

**Table 6-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
06E-003	0.50	06E05007		0.49	0.05	0.19	2.58	0.08	0.16	6.03	U	---	6.03		
06E-003	1.00	06E05008		0.76	0.06	0.23	0.91	0.06	0.22	7.46	U	---	7.46		
06E-003	3.00	06E05009		ARCHIVED											
06E-004	0.50	06E05010		0.47	J	0.05	0.21	1.67	J	0.07	0.21	7.64	UJ	---	7.64
06E-004	1.00	06E05011		0.43		0.06	0.15	0.70		0.05	0.19	4.75	U	---	4.75
06E-004	4.50	06E05012		ARCHIVED											
06E-005	0.50	06E05013		0.35		0.05	0.14	1.69		0.07	0.20	5.00	U	---	5.00
06E-005	1.50	06E05014		0.71		0.07	0.21	0.95		0.05	0.13	5.21	U	---	5.21
06E-005	1.50	06E05015	X	0.85		0.08	0.21	0.94		0.06	0.24	8.01	U	---	8.01
06E-005	4.50	06E05016		0.77	J	0.08	0.22	1.01	J	0.07	0.26	8.50	UJ	---	8.50
06E-006	1.00	06E05017		0.34		0.05	0.14	1.03		0.06	0.20	4.89	U	---	4.89
06E-006	1.50	06E05018		0.36		0.05	0.15	0.49		0.05	0.19	6.43	U	---	6.43
06E-006	6.50	06E05019		ARCHIVED											
06E-007	0.50	06E05020		0.26	J	0.09	0.28	3.12		0.10	0.27	6.67	U	---	6.67
06E-007	1.00	06E05021		0.69		0.06	0.21	0.94		0.05	0.12	5.12	U	---	5.12
06E-007	3.00	06E05022		ARCHIVED											
06E-008	0.50	06E05023		0.41	U	---	0.41	3.41		0.12	0.29	8.32	U	---	8.32
06E-008	1.50	06E05024		0.77		0.07	0.20	0.89		0.06	0.24	8.29	U	---	8.29
06E-008	3.00	06E05025		0.68		0.06	0.20	0.80		0.05	0.14	4.53	U	---	4.53
06E-009	0.50	06E05026		0.67		0.07	0.25	1.90		0.09	0.28	9.67	U	---	9.67
06E-009	1.50	06E05027		0.54		0.07	0.22	0.92		0.06	0.19	5.02	U	---	5.02
06E-009	3.00	06E05028		0.54		0.06	0.17	0.67		0.05	0.20	7.00	U	---	7.00

Error: 2 sigma (95% confidence interval)

- Not Applicable
- U Undetected or Negative Concentration Less Than the MDA
- J Estimated
- MDA Minimum Detectable Activity

- (1) The sample marked with an "X" for duplicate is a duplicate of the sample listed directly above it. Duplicate samples are prepared by homogenizing soil above and below the centerpoint and then separating for analysis. The depth listed is the center point.
- (2) Approximately 10% of all radiological soil samples collected under the PDI Program were sent to ThermoRetec, an off-site laboratory, for confirmatory radiological analyses. Results from ThermoRetec are presented in this table in italicized font immediately below the MISS On-Site field laboratory result for that same sample.

Table 6-5: Summary of Environmental Analytical Data

Parameter	Sample ID	06A-020532	06B-020534	06C-020536
	Sample Location	06A-001	06B-001	06C-001
	Sample Depth (feet)	4 - 8	6 - 8	5 - 7
	Sample Date	03/23/00	03/24/00	03/24/00
	Units			
Miscellaneous				
Chromium VI	mg/kg	0.44U	0.44U	0.45U
Corrosivity by pH	Soil pH	8.2	8.6	11.3
Cyanide, Reactive	mg/kg	0.50U	0.50U	0.50U
Cyanide, Total	mg/kg	0.38U	0.56U	0.56U
Sulfide, Reactive	mg/kg	24.0U	24.0U	24.0U
PCBs and Pesticides				
4,4'-DDD	ug/kg	3.8U	3.7U	3.7U
4,4'-DDE	ug/kg	3.8U	3.7U	3.7U
4,4'-DDT	ug/kg	3.8U	3.7U	3.7U
Aldrin	ug/kg	1.9U	1.8U	1.9U
Alpha-BHC	ug/kg	1.9U	1.8U	1.9U
Alpha-Chlordane	ug/kg	1.9U	1.8U	1.9U
Aroclor-1016	ug/kg	38U	37U	37U
Aroclor-1221	ug/kg	77U	74U	74U
Aroclor-1232	ug/kg	38U	37U	37U
Aroclor-1242	ug/kg	38U	37U	37U
Aroclor-1248	ug/kg	38U	37U	37U
Aroclor-1254	ug/kg	38U	37U	37U
Aroclor-1260	ug/kg	38U	37U	37U
Beta-BHC	ug/kg	1.9U	1.8U	1.9U
Delta-BHC	ug/kg	1.9U	1.8U	1.9U
Dieldrin	ug/kg	3.8U	3.7U	3.7U
Endosulfan I	ug/kg	1.9U	1.8U	1.9U
Endosulfan II	ug/kg	3.8U	3.7U	3.7U
Endosulfan sulfate	ug/kg	3.8U	3.7U	3.7U
Endrin	ug/kg	3.8U	3.7U	3.7U
Endrin aldehyde	ug/kg	3.8U	3.7U	3.7U
Endrin ketone	ug/kg	3.8U	3.7U	3.7U
gamma-BHC (Lindane)	ug/kg	1.9U	1.8U	1.9U
gamma-Chlordane	ug/kg	1.9U	1.8U	1.9U
Heptachlor	ug/kg	1.9U	1.8U	1.9U
Heptachlor epoxide	ug/kg	1.9U	1.8U	1.9U
Methoxychlor	ug/kg	19U	18U	19U
Toxaphene	ug/kg	190U	180U	190U

Table 6-5: Summary of Environmental Analytical Data

Parameter	Sample ID	06A-020532	06B-020534	06C-020536
	Sample Location	06A-001	06B-001	06C-001
	Sample Depth (feet)	4 - 8	6 - 8	5 - 7
	Sample Date	03/23/00	03/24/00	03/24/00
	Units			
Rare Earth Metals				
Cerium, Total	mg/kg	19.9	25.2	19.5
Dysprosium, Total	mg/kg	1.1	1.5	1.4
Lanthanum, Total	mg/kg	8.6	10.8	9.5
Neodymium, Total	mg/kg	9.7	12	11
Yttrium, Total	mg/kg	4.6	6.3	5.7
Semivolatile Organics				
1,2,4-Trichlorobenzene	ug/kg	380U	370U	370U
1,2-Dichlorobenzene	ug/kg	380U	370U	370U
1,3-Dichlorobenzene	ug/kg	380U	370U	370U
1,4-Dichlorobenzene	ug/kg	380U	370U	370U
2,2'-oxybis(1-Chloropropane)	ug/kg	380U	370U	370U
2,4,5-Trichlorophenol	ug/kg	950U	920U	930U
2,4,6-Trichlorophenol	ug/kg	380U	370U	370U
2,4-Dichlorophenol	ug/kg	380U	370U	370U
2,4-Dimethylphenol	ug/kg	380U	370U	370U
2,4-Dinitrophenol	ug/kg	950U	920U	930U
2,4-Dinitrotoluene	ug/kg	380U	370U	370U
2,6-Dinitrotoluene	ug/kg	380U	370U	370U
2-Chloronaphthalene	ug/kg	380U	370U	370U
2-Chlorophenol	ug/kg	380U	370U	370U
2-Methylnaphthalene	ug/kg	380U	370U	370U
2-Methylphenol	ug/kg	380U	370U	370U
2-Nitroaniline	ug/kg	950U	920U	930U
2-Nitrophenol	ug/kg	380U	370U	370U
3,3'-Dichlorobenzidine	ug/kg	380U	370U	370U
3-Nitroaniline	ug/kg	950U	920U	930U
4,6-Dinitro-2-methylphenol	ug/kg	950U	920U	930U
4-Bromophenyl-phenylether	ug/kg	380U	370U	370U
4-Chloro-3-methylphenol	ug/kg	380U	370U	370U
4-Chloroaniline	ug/kg	380U	370U	370U
4-Chlorophenyl-phenylether	ug/kg	380U	370U	370U
4-Methylphenol	ug/kg	380U	370U	370U
4-Nitroaniline	ug/kg	950U	920U	930U
4-Nitrophenol	ug/kg	950U	920U	930U
Acenaphthene	ug/kg	380U	370U	370U
Acenaphthylene	ug/kg	380U	370U	370U
Anthracene	ug/kg	380U	370U	370U
Benzo(a)anthracene	ug/kg	380U	370U	370U
Benzo(a)pyrene	ug/kg	380U	370U	370U
Benzo(b)fluoranthene	ug/kg	380U	370U	370U

Table 6-5: Summary of Environmental Analytical Data

Parameter	Sample ID	06A-020532	06B-020534	06C-020536
	Sample Location	06A-001	06B-001	06C-001
	Sample Depth (feet)	4 - 8	6 - 8	5 - 7
	Sample Date	03/23/00	03/24/00	03/24/00
Units				
Semivolatile Organics (continued)				
Benzo(g,h,i)perylene	ug/kg	380U	370U	370U
Benzo(k)fluoranthene	ug/kg	380U	370U	370U
bis(2-Chloroethoxy)methane	ug/kg	380U	370U	370U
bis(2-Chloroethyl)ether	ug/kg	380U	370U	370U
bis(2-Ethylhexyl)phthalate	ug/kg	380U	31JB	44JB
Butylbenzylphthalate	ug/kg	380U	370U	370U
Carbazole	ug/kg	380U	370U	370U
Chrysene	ug/kg	380U	370U	370U
Di-n-butylphthalate	ug/kg	380U	370U	370U
Di-n-octyl phthalate	ug/kg	380U	370U	370U
Dibenz(a,h)anthracene	ug/kg	380U	370U	370U
Dibenzofuran	ug/kg	380U	370U	370U
Diethylphthalate	ug/kg	380U	370U	370U
Dimethylphthalate	ug/kg	380U	370U	370U
Fluoranthene	ug/kg	380U	370U	370U
Fluorene	ug/kg	380U	370U	370U
Hexachlorobenzene	ug/kg	380U	370U	370U
Hexachlorobutadiene	ug/kg	380U	370U	370U
Hexachlorocyclopentadiene	ug/kg	380U	370U	370U
Hexachloroethane	ug/kg	380U	370U	370U
Indeno(1,2,3-cd)pyrene	ug/kg	380U	370U	370U
Isophorone	ug/kg	380U	370U	370U
N-Nitroso-di-n-propylamine	ug/kg	380U	370U	370U
N-Nitrosodiphenylamine (1)	ug/kg	380U	370U	370U
Naphthalene	ug/kg	380U	370U	370U
Nitrobenzene	ug/kg	380U	370U	370U
Pentachlorophenol	ug/kg	950U	920U	930U
Phenanthrene	ug/kg	380U	370U	370U
Phenol	ug/kg	380U	370U	370U
Pyrene	ug/kg	380U	370U	370U
Total Metals				
Aluminum, Total	mg/kg	2080	3430	2600
Antimony, Total	mg/kg	0.16U	0.16U	0.14U
Arsenic, Total	mg/kg	1.9	8.1	8.2
Barium, Total	mg/kg	68.1	127	203
Beryllium, Total	mg/kg	0.17	0.31	0.33
Boron, Total	mg/kg	1.3	2.4	1.9
Cadmium, Total	mg/kg	0.03U	0.03U	0.02U
Calcium, Total	mg/kg	984	2680	3530
Chromium, Total	mg/kg	7.1	9	6.2

Table 6-5: Summary of Environmental Analytical Data

Parameter	Sample ID	06A-020532	06B-020534	06C-020536
	Sample Location	06A-001	06B-001	06C-001
	Sample Depth (feet)	4 - 8	6 - 8	5 - 7
	Sample Date	03/23/00	03/24/00	03/24/00
	Units			
Total Metals (continued)				
Cobalt, Total	mg/kg	2.3	3.8	2.8
Copper, Total	mg/kg	4.1	6	5.8
Iron, Total	mg/kg	5870	9900	9490
Lead, Total	mg/kg	2.2	4.1	3.7
Lithium, Total	mg/kg	3.2	4.8	4.3
Magnesium, Total	mg/kg	948	1490	1040
Manganese, Total	mg/kg	61.7	111	96.4
Mercury, Total	mg/kg	0.02U	0.02U	0.02U
Nickel, Total	mg/kg	4.7	7.6	5.3
Potassium, Total	mg/kg	250	517	897
Selenium, Total	mg/kg	0.38U	0.38U	0.35U
Silver, Total	mg/kg	0.08U	0.08U	0.07U
Sodium, Total	mg/kg	61	107	62.1
Thallium, Total	mg/kg	0.32U	0.32U	0.30U
Vanadium, Total	mg/kg	9.5	18	15.5
Zinc, Total	mg/kg	11.4	17.9	15.3
Volatile Organics				
1,1,1-Trichloroethane	ug/kg	580U	560U	880U
1,1,2,2-Tetrachloroethane	ug/kg	580U	560U	880U
1,1,2-Trichloroethane	ug/kg	580U	560U	880U
1,1-Dichloroethane	ug/kg	580U	560U	880U
1,1-Dichloroethene	ug/kg	580U	560U	880U
1,2-Dichloroethane	ug/kg	580U	560U	880U
1,2-Dichloroethene (total)	ug/kg	580U	560U	880U
1,2-Dichloropropane	ug/kg	580U	560U	880U
2-Butanone	ug/kg	1200U	1100U	1800U
2-Hexanone	ug/kg	1200U	1100U	1800U
4-Methyl-2-pentanone	ug/kg	1200U	1100U	1800U
Acetone	ug/kg	770JB	630JB	970JB
Benzene	ug/kg	580U	560U	880U
Bromodichloromethane	ug/kg	580U	560U	880U
Bromoform	ug/kg	580U	560U	880U
Bromomethane	ug/kg	1200U	1100U	1800U
Carbon Disulfide	ug/kg	580U	560U	880U
Carbon Tetrachloride	ug/kg	580U	560U	880U
Chlorobenzene	ug/kg	580U	560U	880U
Chloroethane	ug/kg	1200U	1100U	1800U
Chloroform	ug/kg	580U	560U	880U

Table 6-5: Summary of Environmental Analytical Data

Parameter	Sample ID	06A-020532	06B-020534	06C-020536
	Sample Location	06A-001	06B-001	06C-001
	Sample Depth (feet)	4 - 8	6 - 8	5 - 7
	Sample Date	03/23/00	03/24/00	03/24/00
	Units			
<i>Volatile Organics (continued)</i>				
Chloromethane	ug/kg	210J	1100U	570J
cis-1,3-Dichloropropene	ug/kg	580U	560U	880U
Dibromochloromethane	ug/kg	580U	560U	880U
Ethylbenzene	ug/kg	580U	560U	880U
Methylene Chloride	ug/kg	580U	750B	290JB
Styrene	ug/kg	580U	560U	880U
Tetrachloroethene	ug/kg	580U	560U	880U
Toluene	ug/kg	580U	560U	880U
Trans-1,3-Dichloropropene	ug/kg	580U	560U	880U
Trichloroethene	ug/kg	580U	560U	880U
Vinyl Chloride	ug/kg	1200U	1100U	1800U
Xylene (total)	ug/kg	580U	560U	880U
<i>TCLP Metals</i>				
Arsenic	ug/L	24U	44.1	39.4U
Barium	ug/L	734	1050	1240
Cadmium	ug/L	4.1U	4.1U	4.1U
Chromium	ug/L	3.4U	6.1U	3.4U
Lead	ug/L	26.6U	26.6U	26.6U
Mercury	ug/L	0.1U	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U	49.7U
Silver	ug/L	3.7U	3.7U	3.7U
<i>TCLP Pesticides</i>				
Alpha-Chlordane	ug/L	0.5U	0.5U	0.5U
Endrin	ug/L	1U	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5U	0.5U	0.5U
Heptachlor	ug/L	0.5U	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5U	0.5U	0.5U
Methoxychlor	ug/L	5U	5U	5U
Toxaphene	ug/L	50U	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U	5U
2,4-D	ug/L	10U	10U	10U

Table 6-5: Summary of Environmental Analytical Data

Parameter	Sample ID	06A-020532	06B-020534	06C-020536
	Sample Location	06A-001	06B-001	06C-001
	Sample Depth (feet)	4 - 8	6 - 8	5 - 7
	Sample Date	03/23/00	03/24/00	03/24/00
	Units			
<i>TCLP Volatiles</i>				
1,1-Dichloroethene	mg/L	0.025U	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U	0.05U
Benzene	mg/L	0.039	0.025U	0.025U
Carbon tetrachloride	mg/L	0.025U	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>				
1,4-Dichlorobenzene	mg/L	0.05U	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U	0.05U

Table 6-5: Summary of Environmental Analytical Data

Parameter	Sample ID	06C-020538	06D-020540	06E-020542
	Sample Location	06C-002	06D-001	06E-001
	Sample Depth (feet)	4.5 - 7	6 - 9	6 - 9
	Sample Date	03/27/00	03/28/00	03/28/00
	Units			
Miscellaneous				
Chromium VI	mg/kg	9.1U	0.97U	0.44U
Corrosivity by pH	Soil pH	7	7.6	6.6
Cyanide, Reactive	mg/kg	0.50U	0.50U	0.50U
Cyanide, Total	mg/kg	0.42U	0.60U	0.54U
Sulfide, Reactive	mg/kg	24.0U	24.0U	24.0U
PCBs and Pesticides				
4,4'-DDD	ug/kg	3.8U	4.0U	3.6U
4,4'-DDE	ug/kg	3.8U	4.0U	3.6U
4,4'-DDT	ug/kg	3.8U	4.0U	3.6U
Aldrin	ug/kg	1.9U	2.0U	1.8U
Alpha-BHC	ug/kg	1.9U	2.0U	1.8U
Alpha-Chlordane	ug/kg	1.9U	2.0U	1.8U
Aroclor-1016	ug/kg	37U	41U	37U
Aroclor-1221	ug/kg	75U	81U	73U
Aroclor-1232	ug/kg	37U	41U	37U
Aroclor-1242	ug/kg	37U	41U	37U
Aroclor-1248	ug/kg	37U	41U	37U
Aroclor-1254	ug/kg	37U	41U	37U
Aroclor-1260	ug/kg	37U	41U	37U
Beta-BHC	ug/kg	1.9U	2.0U	1.8U
Delta-BHC	ug/kg	1.9U	2.0U	1.8U
Dieldrin	ug/kg	3.8U	4.0U	3.6U
Endosulfan I	ug/kg	1.9U	2.0U	1.8U
Endosulfan II	ug/kg	3.8U	4.0U	3.6U
Endosulfan sulfate	ug/kg	3.8U	4.0U	3.6U
Endrin	ug/kg	3.8U	4.0U	3.6U
Endrin aldehyde	ug/kg	3.8U	4.0U	3.6U
Endrin ketone	ug/kg	3.8U	4.0U	3.6U
gamma-BHC (Lindane)	ug/kg	1.9U	2.0U	1.8U
gamma-Chlordane	ug/kg	1.9U	2.0U	1.8U
Heptachlor	ug/kg	1.9U	2.0U	1.8U
Heptachlor epoxide	ug/kg	1.9U	2.0U	1.8U
Methoxychlor	ug/kg	19U	20U	18U
Toxaphene	ug/kg	190U	200U	180U

Table 6-5: Summary of Environmental Analytical Data

Parameter	Sample ID	06C-020538	06D-020540	06E-020542
	Sample Location	06C-002	06D-001	06E-001
	Sample Depth (feet)	4.5 - 7	6 - 9	6 - 9
	Sample Date	03/27/00	03/28/00	03/28/00
	Units			
Rare Earth Metals				
Cerium, Total	mg/kg	33.4	98.2	16.1
Dysprosium, Total	mg/kg	2.1	2.7	1.2
Lanthanum, Total	mg/kg	16.3	51.1	8.9
Neodymium, Total	mg/kg	16.8	37.1	11.1
Yttrium, Total	mg/kg	9.5	10.6	5.6
Semivolatile Organics				
1,2,4-Trichlorobenzene	ug/kg	380U	810U	360U
1,2-Dichlorobenzene	ug/kg	380U	810U	360U
1,3-Dichlorobenzene	ug/kg	380U	810U	360U
1,4-Dichlorobenzene	ug/kg	380U	810U	360U
2,2'-oxybis(1-Chloropropane)	ug/kg	380U	810U	360U
2,4,5-Trichlorophenol	ug/kg	940U	2000U	910U
2,4,6-Trichlorophenol	ug/kg	380U	810U	360U
2,4-Dichlorophenol	ug/kg	380U	810U	360U
2,4-Dimethylphenol	ug/kg	380U	810U	360U
2,4-Dinitrophenol	ug/kg	940U	2000U	910U
2,4-Dinitrotoluene	ug/kg	380U	810U	360U
2,6-Dinitrotoluene	ug/kg	380U	810U	360U
2-Chloronaphthalene	ug/kg	380U	810U	360U
2-Chlorophenol	ug/kg	380U	810U	360U
2-Methylnaphthalene	ug/kg	380U	810U	360U
2-Methylphenol	ug/kg	380U	810U	360U
2-Nitroaniline	ug/kg	940U	2000U	910U
2-Nitrophenol	ug/kg	380U	810U	360U
3,3'-Dichlorobenzidine	ug/kg	380U	810U	360U
3-Nitroaniline	ug/kg	940U	2000U	910U
4,6-Dinitro-2-methylphenol	ug/kg	940U	2000U	910U
4-Bromophenyl-phenylether	ug/kg	380U	810U	360U
4-Chloro-3-methylphenol	ug/kg	380U	810U	360U
4-Chloroaniline	ug/kg	380U	810U	360U
4-Chlorophenyl-phenylether	ug/kg	380U	810U	360U
4-Methylphenol	ug/kg	380U	810U	360U
4-Nitroaniline	ug/kg	940U	2000U	910U
4-Nitrophenol	ug/kg	940U	2000U	910U
Acenaphthene	ug/kg	380U	810U	360U
Acenaphthylene	ug/kg	380U	810U	360U
Anthracene	ug/kg	24J	90J	360U
Benzo(a)anthracene	ug/kg	28J	170J	360U
Benzo(a)pyrene	ug/kg	380U	200J	360U
Benzo(b)fluoranthene	ug/kg	21J	160J	360U

Table 6-5: Summary of Environmental Analytical Data

Parameter	Sample ID	06C-020538	06D-020540	06E-020542
	Sample Location	06C-002	06D-001	06E-001
	Sample Depth (feet)	4.5 - 7	6 - 9	6 - 9
	Sample Date	03/27/00	03/28/00	03/28/00
	Units			
<i>Semivolatile Organics (continued)</i>				
Benzo(g,h,i)perylene	ug/kg	380U	130J	360U
Benzo(k)fluoranthene	ug/kg	24J	180J	360U
bis(2-Chloroethoxy)methane	ug/kg	380U	810U	360U
bis(2-Chloroethyl)ether	ug/kg	380U	810U	360U
bis(2-Ethylhexyl)phthalate	ug/kg	380U	130JB	50JB
Butylbenzylphthalate	ug/kg	380U	810U	360U
Carbazole	ug/kg	380U	810U	360U
Chrysene	ug/kg	31J	230J	360U
Di-n-butylphthalate	ug/kg	380U	810U	360U
Di-n-octyl phthalate	ug/kg	380U	810U	360U
Dibenz(a,h)anthracene	ug/kg	380U	810U	360U
Dibenzofuran	ug/kg	380U	810U	360U
Diethylphthalate	ug/kg	380U	810U	360U
Dimethylphthalate	ug/kg	380U	810U	360U
Fluoranthene	ug/kg	80J	380J	360U
Fluorene	ug/kg	380U	48J	360U
Hexachlorobenzene	ug/kg	380U	810U	360U
Hexachlorobutadiene	ug/kg	380U	810U	360U
Hexachlorocyclopentadiene	ug/kg	380U	810U	360U
Hexachloroethane	ug/kg	380U	810U	360U
Indeno(1,2,3-cd)pyrene	ug/kg	380U	110J	360U
Isophorone	ug/kg	380U	810U	360U
N-Nitroso-di-n-propylamine	ug/kg	380U	810U	360U
N-Nitrosodiphenylamine (1)	ug/kg	380U	810U	360U
Naphthalene	ug/kg	380U	810U	360U
Nitrobenzene	ug/kg	380U	810U	360U
PentachloropHenol	ug/kg	940U	2000U	910U
Phenanthrene	ug/kg	89J	300J	360U
Phenol	ug/kg	380U	810U	360U
Pyrene	ug/kg	58J	370J	360U
<i>Total Metals</i>				
Aluminum, Total	mg/kg	6180	4850	2410
Antimony, Total	mg/kg	0.18U	1.2	0.16U
Arsenic, Total	mg/kg	1.9	6.1	0.94
Barium, Total	mg/kg	168	198	25.1
Beryllium, Total	mg/kg	0.44	0.31	0.32
Boron, Total	mg/kg	2.5	1.9	2.1
Cadmium, Total	mg/kg	0.03	0.03U	0.03U
Calcium, Total	mg/kg	1510	1620	1040
Chromium, Total	mg/kg	12	796	6.7

Table 6-5: Summary of Environmental Analytical Data

Parameter	Sample ID	06C-020538	06D-020540	06E-020542
	Sample Location	06C-002	06D-001	06E-001
	Sample Depth (feet)	4.5 - 7	6 - 9	6 - 9
	Sample Date	03/27/00	03/28/00	03/28/00
	Units			
Total Metals (continued)				
Cobalt, Total	mg/kg	3.9	3.3	3.3
Copper, Total	mg/kg	9.9	14.5	3.9
Iron, Total	mg/kg	8020	6700	8060
Lead, Total	mg/kg	5.2	27.4	5
Lithium, Total	mg/kg	17.9	12.3	2.4
Magnesium, Total	mg/kg	1620	1220	791
Manganese, Total	mg/kg	69.2	63.3	274
Mercury, Total	mg/kg	0.02U	0.4	0.01U
Nickel, Total	mg/kg	9.2	6.7	5.7
Potassium, Total	mg/kg	577	307	393
Selenium, Total	mg/kg	0.43U	0.64	0.38U
Silver, Total	mg/kg	0.09U	0.1U	0.08U
Sodium, Total	mg/kg	64.7	96.3	72.1
Thallium, Total	mg/kg	0.36U	0.41U	0.32U
Vanadium, Total	mg/kg	21.9	17.6	7.6
Zinc, Total	mg/kg	23.5	23.4	14.1
Volatile Organics				
1,1,1-Trichloroethane	ug/kg	570U	720U	560U
1,1,2,2-Tetrachloroethane	ug/kg	570U	720U	560U
1,1,2-Trichloroethane	ug/kg	570U	720U	560U
1,1-Dichloroethane	ug/kg	570U	720U	560U
1,1-Dichloroethene	ug/kg	570U	720U	560U
1,2-Dichloroethane	ug/kg	570U	720U	560U
1,2-Dichloroethene (total)	ug/kg	570U	720U	560U
1,2-Dichloropropane	ug/kg	570U	720U	560U
2-Butanone	ug/kg	1100U	1400U	1100U
2-Hexanone	ug/kg	1100U	1400U	1100U
4-Methyl-2-pentanone	ug/kg	1100U	1400U	1100U
Acetone	ug/kg	1100U	1200B	1100U
Benzene	ug/kg	570U	720U	560U
Bromodichloromethane	ug/kg	570U	720U	560U
Bromoform	ug/kg	570U	720U	560U
Bromomethane	ug/kg	1100U	1400U	1100U
Carbon Disulfide	ug/kg	570U	720U	560U
Carbon Tetrachloride	ug/kg	570U	720U	560U
Chlorobenzene	ug/kg	570U	720U	560U
Chloroethane	ug/kg	1100U	1400U	1100U
Chloroform	ug/kg	570U	720U	560U

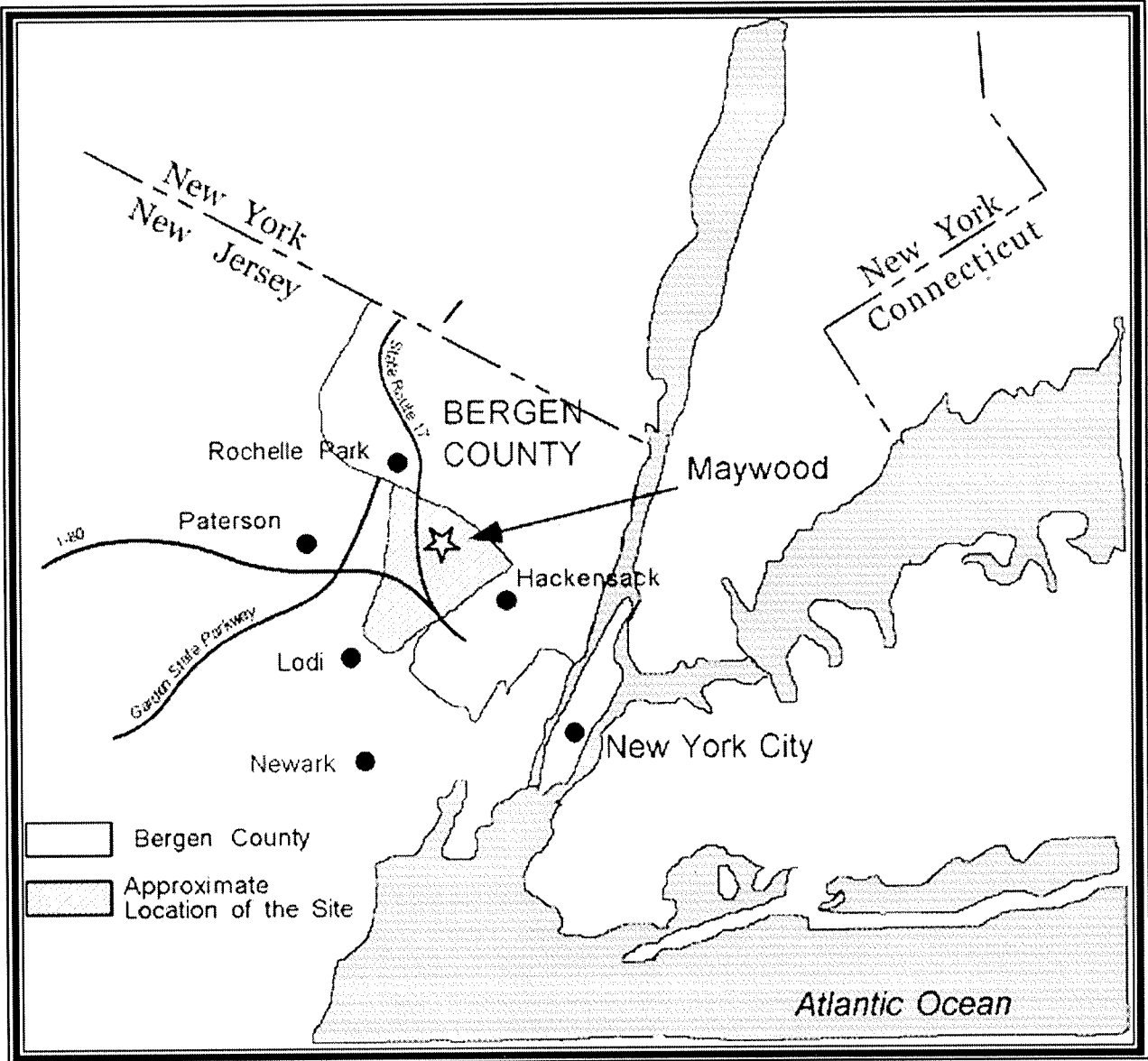
Table 6-5: Summary of Environmental Analytical Data

Parameter	Sample ID	06C-020538	06D-020540	06E-020542
	Sample Location	06C-002	06D-001	06E-001
	Sample Depth (feet)	4.5 - 7	6 - 9	6 - 9
	Sample Date	03/27/00	03/28/00	03/28/00
	Units			
<i>Volatile Organics (continued)</i>				
Chloromethane	ug/kg	1100U	1400	1100U
cis-1,3-Dichloropropene	ug/kg	570U	720U	560U
Dibromochloromethane	ug/kg	570U	720U	560U
Ethylbenzene	ug/kg	570U	720U	560U
Methylene Chloride	ug/kg	210BJ	850B	560U
Styrene	ug/kg	570U	720U	560U
Tetrachloroethene	ug/kg	570U	720U	560U
Toluene	ug/kg	570U	720U	560U
Trans-1,3-Dichloropropene	ug/kg	570U	720U	560U
Trichloroethene	ug/kg	570U	720U	560U
Vinyl Chloride	ug/kg	1100U	1400U	1100U
Xylene (total)	ug/kg	570U	720U	560U
<i>TCLP Metals</i>				
Arsenic	ug/L	22.9U	46.8U	28.1U
Barium	ug/L	1130	660	224
Cadmium	ug/L	17.6U	4.1U	16U
Chromium	ug/L	3.4U	28.4U	3.4U
Lead	ug/L	26.6U	51U	26.6U
Mercury	ug/L	0.1U	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U	49.7U
Silver	ug/L	3.7U	3.7U	3.7U
<i>TCLP Pesticides</i>				
Alpha-Chlordane	ug/L	0.5U	0.5U	0.5U
Endrin	ug/L	1U	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5U	0.5U	0.5U
Heptachlor	ug/L	0.5U	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5U	0.5U	0.5U
Methoxychlor	ug/L	5U	5U	5U
Toxaphene	ug/L	50U	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U	5U
2,4-D	ug/L	10U	10U	10U

Table 6-5: Summary of Environmental Analytical Data

Parameter	Sample ID	06C-020538	06D-020540	06E-020542
	Sample Location	06C-002	06D-001	06E-001
	Sample Depth (feet)	4.5 - 7	6 - 9	6 - 9
	Sample Date	03/27/00	03/28/00	03/28/00
	Units			
<i>TCLP Volatiles</i>				
1,1-Dichloroethene	mg/L	0.025U	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U	0.05U
Benzene	mg/L	0.029	0.025U	0.022J
Carbon tetrachloride	mg/L	0.025U	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>				
1,4-Dichlorobenzene	mg/L	0.05U	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U	0.05U

B (inorganics) Value Between Method Detection Limit and Reporting Limit
 B (organics) Found in Associated Blank
 U Undetected Values
 J Estimated Value
 BJ Found in Blank; is an Estimated Value



NOT TO SCALE

<p>U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS NEW YORK DISTRICT</p>	<p>STONE & WEBSTER, INC.</p>
<p>US ARMY CORPS OF ENGINEERS FUSRAP FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM</p>	<p>Prepared by: MALCOLM PIRNE</p> <p>File Name: MPI-CH6</p>

**LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY**

PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

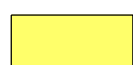
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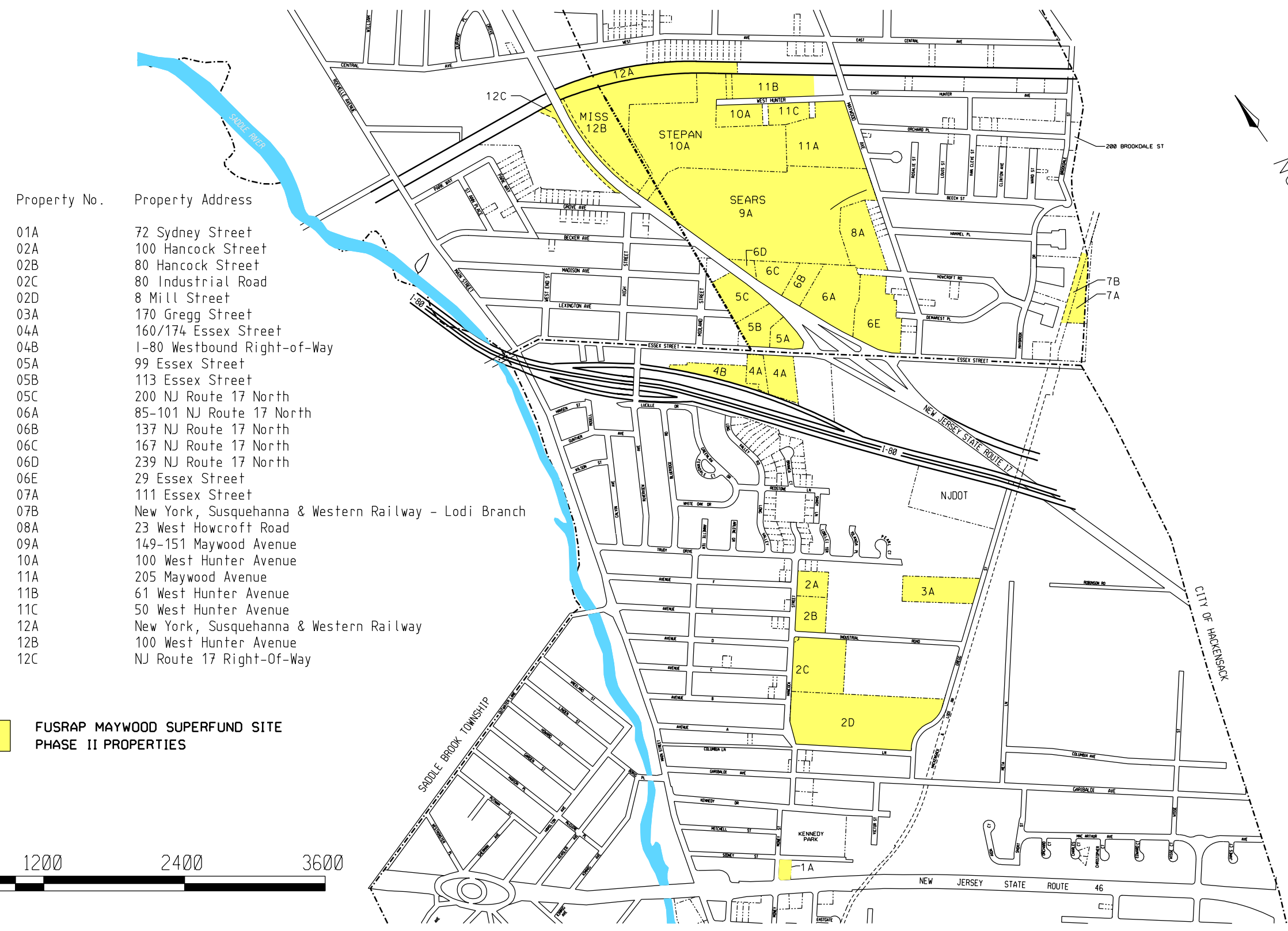
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WAD# 3

WBS# 18

Figure Number:
FIGURE 6-1

Cluster No.	Property No.	Property Address
1	01A	72 Sydney Street
2	02A	100 Hancock Street
	02B	80 Hancock Street
	02C	80 Industrial Road
	02D	8 Mill Street
3	03A	170 Gregg Street
4	04A	160/174 Essex Street
5	04B	1-80 Westbound Right-of-Way
	05A	99 Essex Street
6	05B	113 Essex Street
	05C	200 NJ Route 17 North
	06A	85-101 NJ Route 17 North
	06B	137 NJ Route 17 North
	06C	167 NJ Route 17 North
7	06D	239 NJ Route 17 North
	06E	29 Essex Street
8	07A	111 Essex Street
	07B	New York, Susquehanna & Western Railway - Lodi Branch
9	08A	23 West Howcroft Road
10	09A	149-151 Maywood Avenue
11	10A	100 West Hunter Avenue
	11A	205 Maywood Avenue
	11B	61 West Hunter Avenue
12	11C	50 West Hunter Avenue
	12A	New York, Susquehanna & Western Railway
	12B	100 West Hunter Avenue
	12C	NJ Route 17 Right-Of-Way

 FUSRAP MAYWOOD SUPERFUND SITE
PHASE II PROPERTIES




U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT



US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

STONE & WEBSTER, INC.



Prepared by:
**MALCOLM
PIRNIE**

File Name:
\\MAYWOOD\TASK0318\CLUSTER REPORT\REV 1\FIGURE6-2.DGN

LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY

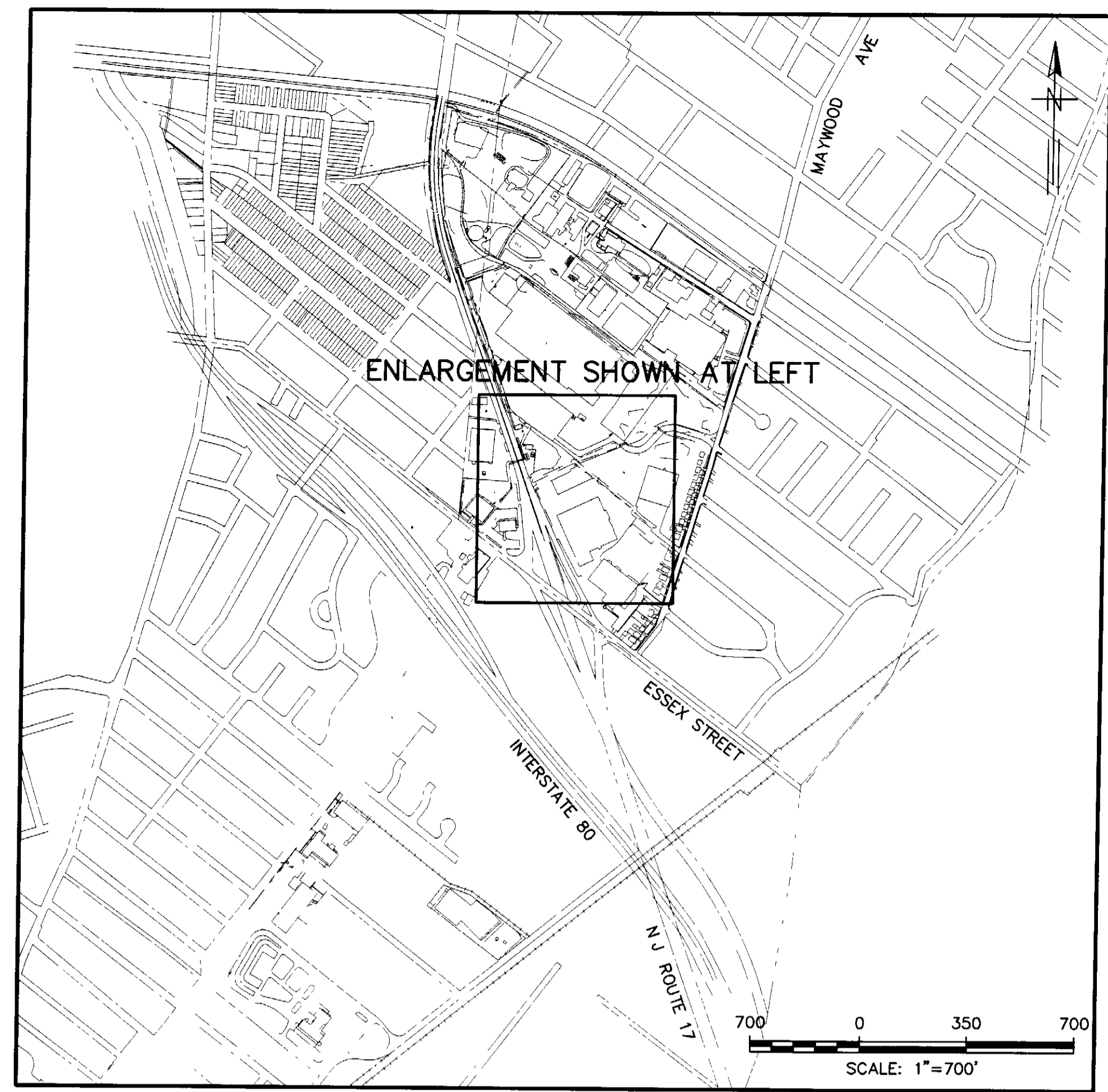
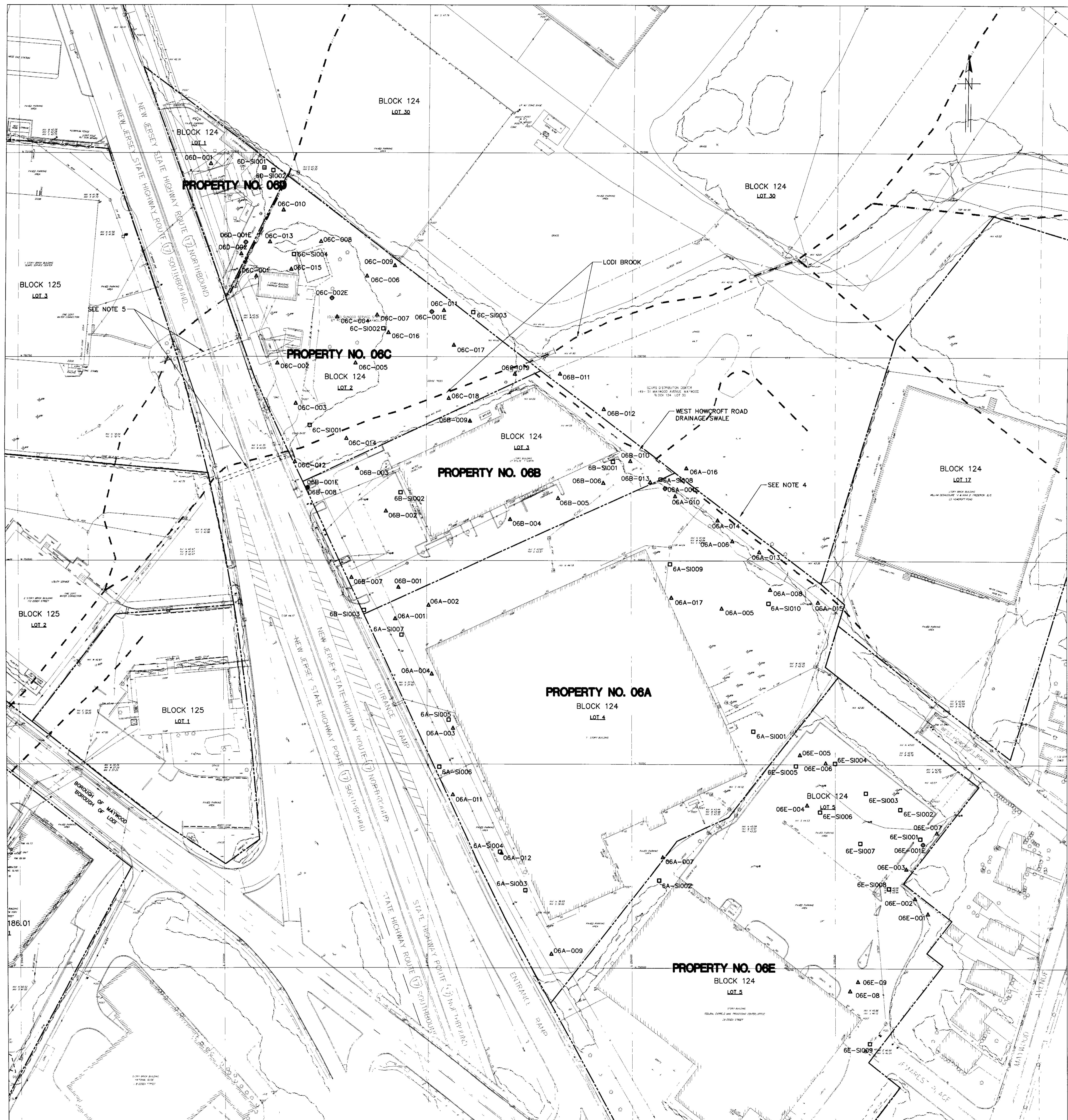
PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

Contract Number:
DACW41-99-D-9001

Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 6-2



KEY MAP

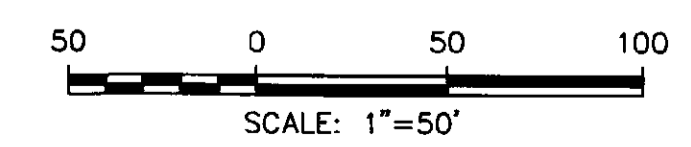
LEGEND

- PROPERTY BOUNDARY
- ▨ EXISTING BUILDING
- - - EXISTING 1" CONTOUR
- - - APPROXIMATE LOCATION OF HISTORIC LODI BROOK CHANNEL
- - - BOROUGH BOUNDARY

SAMPLE SYMBOL	SAMPLE TYPE	NUMBER OF SAMPLING LOCATIONS
▲	DIRECT PUSH SOIL PROBE LOCATIONS (RADIOLOGICAL)	60
□	SURFACE ISOCs LOCATIONS	29
⊕	DIRECT PUSH SOIL PROBE LOCATION (ENVIRONMENTAL)	6

- NOTES:
- THIS SURVEY SHOWS CONDITIONS AS OF OCTOBER 1999 BASED ON AERIAL MAPPING PREPARED BY GEO CORP. AND GROUND SURVEY BY GARDEN STATE ENGINEERING SURVEYING AND PLANNING
 - VERTICAL DATUM IS REFERENCED TO NGVD 1929.
 - HORIZONTAL DATUM IS REFERENCED TO NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 1927.
 - THE LOCATION OF THE HISTORIC LODI BROOK SHOWN ON THIS SHEET WAS APPROXIMATED BASED UPON REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS FROM APRIL 6, 1940.
 - CONCRETE BOX CULVERTS SHOWN UNDER NJ ROUTE 17 ARE AS SHOWN ON SHEET 1 OF 1 AS INCLUDED IN TAYLOR WISEMAN TAYLOR, SITE/REMEDIATION INVESTIGATION REPORT, ESSEX STREET OVER STATE ROUTE 17, BOROUGH OF MAYWOOD AND LODI, TOWNSHIP OF ROCHELLE PARK, BERGEN COUNTY, NEW JERSEY PREPARED FOR TAYLOR WISEMAN TAYLOR, BY ENVIRONMENTAL RESOLUTIONS, INC., JANUARY, 2000. LOCATIONS AND DIMENSIONS ARE APPROXIMATE

CLUSTER NO. 6
 85-101 ROUTE 17 NORTH (06A)
 137 ROUTE 17 NORTH (06B)
 187 ROUTE 17 NORTH (06C)
 239 ROUTE 17 NORTH (06D)
 29 ESSEX STREET (06E)



U.S. ARMY ENGINEER DIVISION
 CORPS OF ENGINEERS
 NEW YORK DISTRICT
FUSRAP
 FORMERLY UTILIZED SITES
 REMEDIAL ACTION PROGRAM

STONE & WEBSTER, INC.
 Prepared by: _____ Date: _____
 Drawn by: MALCOLM PIERCE Date: 7/21/00
 CS File Name: MPI-C6

CLUSTER NO. 6
 SAMPLE LOCATION MAP
 PRE-DESIGN INVESTIGATION REPORT
 FUSRAP MAYWOOD SUPERFUND SITE
 MAYWOOD, NJ
 ROCHELLE PARK, NEW JERSEY
 SHEET 18
 Figure Number
6-3

11-1-2000 10:45 AM 40401 E:\1\40401\PROJ\AS\276000\WORKSHEET_06.DWG Scale: 1:1 Date: 07/21/2000 Time: 11:00



Lower Contour Limit = 1.5 X Background = 1.5 X 2000 = 3000 counts per minute

Upper Contour Limit = Highest measurement across entire Maywood Site: approx. 500,000 counts per minute

Property Cluster No. 6: 29 Essex St. (Federal Express Corporation); 85-101 NJ Route 17N (Architectural Windows); 137 NJ Route 17N (Ramsey Auto Group); 167 NJ Route 17N (Sunoco - Inactive); and 239 NJ Route 17N (Gulf) Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 6-4

APPENDIX 6-A

Variations from the PDI Work Plan

**Letters Informing EPA and NJDEP of Use of Geoprobes⁰
In Lieu of Downhole ISOCS**



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Angela Carpenter
Remedial Project Manager
Federal Facilities Section
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Dear Ms. Carpenter:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in your December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Donna Gaffigan, NJDEP



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

December 8, 1999

REPLY TO
ATTENTION OF

Programs and Project Management Division

Ms. Donna Gaffigan
Case Manager
Bureau of Case Management
New Jersey Department of Environmental Protection
401 E State St
Trenton, NJ 08625-0600

Dear Ms. Gaffigan:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in USEPA's December 1, 1999, letter under separate cover.

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depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

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We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

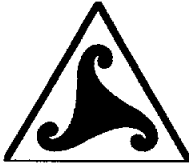
ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Angela Carpenter, EPA

Revisions to Standard Operating Procedure No. SW-MWD-509-0



**STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION**

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE: 1 of 8 plus Attachment 1
	DATE: February 2000

APPROVED:

Prepared by:
Project Chemist

Reviewed by:
PDI Task Manager
Richard Skyness 2/29/00
Project Engineer
[Signature] 2/29/00
Project Manager

1.0 PURPOSE

This Stone & Webster Standard Operating Procedure (SOP), **Soil Probe Investigation** shall be employed when collecting subsurface soil samples using the direct push soil probe method at the FUSRAP Maywood Superfund Site (hereafter referred to as the Maywood Site) properties with known or suspected soil and/or groundwater contamination.

2.0 SCOPE

This procedure details the materials, equipment, and methods common to soil probe investigation activities. Consult the site-specific project plans and work plans for proposed soil probe locations. Always consult site-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Task Manager prior to implementation and shall be documented in project field logbooks.**

3.0 REFERENCES

- Stone & Webster Maywood SOP 102 - Downhole Gamma Radiation Logging
- Stone & Webster Maywood SOP 307 - Surface and Shallow Subsurface Soil Sampling
- Stone & Webster Maywood SOP 308 - Soil Borings and Sampling
- Stone & Webster Maywood SOP 401 - Photoionization Detector (PID)
- Stone & Webster Maywood SOP 504 - Labeling, Packaging, and Shipping Environmental Samples
- Stone & Webster Maywood SOP 505 - Cuttings and Fluids Management
- Stone & Webster Maywood SOP 506 - Decontamination
- Stone & Webster Maywood SOP 507 - Field Notebook Content and Control
- U.S.E.P.A., A Compendium of Superfund Field Operation Methods, Document EPA/540/P-87/001, December, 1987.

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	2 of 8

DEFINITIONS

Stone & Webster Team – personnel of the Stone & Webster Team that includes for this SOP: Stone & Webster, Malcolm Pirnie, Franklin Environmental Services, Inc., Safety & Ecology Corporation (SEC), and Garden State Surveying, Engineering and Planning, Inc. The Stone & Webster Team shall perform soil probe investigation activities, except those activities specified as performed by the Subcontractor.

Subcontractor – personnel of the direct push soil probe firm.

Direct Push Soil Probe – generic name for advancing media sampling piping/tubes with only direct mechanical force. They are typically hollow steel rods advanced using a percussive force (powered hammer) and driven directly into unconsolidated soil. There are two types of direct push soil probes. One is a single rod system (i.e., macrocore) and the other is a dual tube or cased system. The latter, which will be the method of choice for most Maywood Site investigations, utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Drive rods used with the cased system are usually made from a high-grade steel alloy and are retracted after sampling.

4.0 RESPONSIBILITIES

5.1 Project Manager - Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 Project Environmental Engineer - Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for direct push soil probe activities.

5.3 Project Superintendent - Designated by the Project Manager to supervise investigative activities by Stone & Webster Team and Subcontractor personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in monitoring soil probe investigation activities in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each workday. The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil probe investigation activities and deviations from this SOP.

5.4 Site Personnel (including the data logger) - Required to read and sign the Maywood Site Safety and Health Plan (SSHP), have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil probe investigation activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

5.5 Site Safety & Health Officer - Responsible for ensuring that all site workers (Stone & Webster and Subcontractor) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.6 Task Manager – Responsible to plan, implement, and closeout field work requiring direct push technology.

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE 3 of 8

5.7 Subcontractor - Required to read and sign the SSHP, have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. Subcontractors shall report directly to the Task Manager or his designee.

6.0 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS FOR SOIL PROBE INVESTIGATION

The following is a list of equipment and material that is commonly used on all projects when the direct push probe technique is performed in the unconsolidated soils. Refer also to related SOP equipment and material requirements to ensure completeness.

Items required by Subcontractor:

- Direct push probe equipment - of appropriate size and direct push probe and sampling capabilities; vehicle mounted; direct push probe sampling tools used to advance boring (i.e., direct push small diameter rods; and augers, if required) equipment, labor, and supplies to maintain optimal efficiency
- Environmentally-safe lubricants
- Backfill material for probe holes, as required
- Soil sample collection and logging supplies – **See Stone & Webster Maywood SOP 308, Soil Borings and Sampling**
- Decontamination supplies - **See Stone & Webster Maywood SOP 506, Decontamination**

Items carried by Stone & Webster Team on-site personnel

- **SSHP To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Clipboard
- Pencils
- Six-foot-ruler
- Pocket knife
- Camera (optional), check with Project Manager if required
- Volatile organic compound vapor meter equipped with photoionization detector (PID) and other air surveillance monitoring equipment, as required by the SSHP
- Radiation meter
- Site boring logs
- Blank soil probe logs
- Weighted measuring tape
- Water level measuring device - **See Stone & Webster Maywood SOP 410, Groundwater Level Measurement**, Interface probe, if needed
- Paper towels
- Chain of Custody forms

7.0 DIRECT PUSH PROBE ACTIVITIES

7.1 General Considerations

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	4 of 8

Prior to selecting the direct push probe method for a specific property, the objectives of the field investigation must be established. These property-specific objectives shall include one or more of the following Maywood Pre-Design Investigation (PDI) program objectives:

- Soil classification/evaluation - the direct push soil probe technique will be able to accommodate the collection of soils for characterization purposes.
- Characterization of hydrogeologic conditions - the direct push soil probe technique shall allow for the characterization of each stratigraphic zone, and water level measurements.
- Evaluation of soil contamination - the direct push soil probe technique shall provide the appropriate sample collection methods, must not introduce contaminants into the probe hole or otherwise alter the existing soil or groundwater chemistry, and should not result in subsurface cross contamination during or after installation of direct push probe.

7.2 Direct Push Probe Activities

Prior to commencing direct push soil probe fieldwork, several activities should be performed. These activities, which include both pre-mobilization office tasks and pre-installation field tasks, are discussed below. Once the pre-installation activities are completed, direct push soil probe installation may commence.

7.2.1 Pre-Mobilization Tasks

1. The Stone & Webster Team and Subcontractor shall acquire as much geologic and hydrogeologic information about the site as possible. This information may include possible soil and groundwater contamination present, groundwater table depths and fluctuations, surficial and bedrock geology, approximate thickness of the unconsolidated zone, depth to top of weathered rock, depth to competent rock, and site access.
2. Soil probe locations shall be marked in the field by the Stone & Webster Team with either paint or flags/stakes during pre-mobilization tasks, and surveyed using a global positioning system (GPS). The Stone & Webster Team shall check and verify that the soil probe location corresponds to the location on the project plans. The Stone & Webster Team and Subcontractor shall check to see if visible structures will prevent the completion of proposed soil probes at specific locations.
3. The Stone & Webster Team shall communicate with the Subcontractor regarding the requirements of the direct push soil probe program and required geologic and environmental information. Inform the Subcontractor of the environmental sampling program that the project shall follow. This information includes sampling frequency, sampling depths, type of sample required (soil or groundwater), the length of casing, direct push soil probe method (i.e., macrocore, dual tube, etc.), number and type of soil samplers required, and special sampling techniques. Ensure that probe hole backfill is selected in accordance with the project specifications.
4. The Subcontractor shall ensure that all utilities in the vicinity of the proposed boring(s) have been cleared by the appropriate authorized parties (e.g., New Jersey One-Call System at 1-800-272-1000, owner, etc.) or, if utilities exist, are visibly marked on the ground surface in the area of the proposed boring. In addition, keep a safe working distance (pursuant to OSHA) from overhead utilities. **NOTE: The party responsible for having utilities cleared shall be identified. If the responsible party is not clearly identified then the Task Manager shall establish the responsible party. Ensure that utilities have been cleared prior to installation of soil probe.**

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	5 of 8

7.2.2 Pre-Installation Field Tasks

Sampling equipment shall be decontaminated prior to use, using pressure or manual washing of the rig, direct push soil probe, and tools, as required to prevent introducing off-site contamination. The direct push soil probe related equipment shall be decontaminated on site prior to direct push soil probe activities. Refer to **Stone & Webster Maywood SOP 506, Decontamination** for specific instructions.

7.3 General Direct Push Soil Probe Method Procedures

The following sections outline general direct push soil probe procedures used in unconsolidated soil materials.

1. Assuming a vertical soil probe, the Subcontractor shall set the direct push rig over the proposed soil probe location. Level the direct push rig and ensure that the direct push rods used to advance the soil probe are in a vertical position directly above the hole.
2. The inspecting Stone & Webster Team shall obtain and record measurements of tools to be used for direct push probe operations. Down-hole measurements taken by the Subcontractors shall be to the nearest 0.1 foot.
3. The Subcontractor shall begin sampling or advancement of soil probe to the desired depth utilizing the direct push method described below. Samples shall be taken using the steps described in Section 8.1.1.
4. When the direct push advancement tools are lowered into the probe hole, the Stone & Webster Team shall keep track of tool lengths to check Subcontractor's stated depth of soil probe.
5. The Stone & Webster Team shall make certain that the Subcontractor is performing depth measurements with a ruler and known tool lengths and not visually judging ("eyeballing") casing and tool projections above the ground. The Stone & Webster Team shall maintain a mental note of depth to bottom of soil probe by keeping track of the linear feet of tools in and above the ground. By mentally subtracting the "stick-up" above the ground, the Stone & Webster Team can maintain a constant approximate check on the soil probe depth and Subcontractor's indicated depths.
6. The breathing zone shall be screened by a designee of the Stone & Webster Team Site Safety and Health Officer for total volatile organic vapors using an organic vapor analyzer as outlined in the SSHP. A lower explosive limit meter (LEL) shall be employed if required in SSHP. Record the measured readings at the depth and time of reading on the boring log.
7. During direct push probe activities, both the Stone & Webster Team and Subcontractor shall record production, mechanical and/or sampling difficulties and the sequence of activities. Also record rig mobilization time, rig set-up time, and probe commencement and completion times. This information should be recorded in a field log book. The Stone & Webster Team shall also record pertinent details on the soil probe log (See Attachment A for blank soil probe log).
8. Refusal of direct push probe advancement tools (i.e., casing refusal) is defined as when the probe hole cannot be advanced using regular advancement methods. Generally, refusal can be identified by the following characteristics:
 - Advancement of probe hole is not noticeable or is very slow
 - A change in the frequency/pitch of the direct push probe equipment
 - The direct push probe downpressure may be significantly higher than under "normal" conditions. The direct push rig may be lifted off the ground surface.
9. If refusal is encountered in the soil probe, refer to **Stone & Webster Maywood SOP 308, Soil Borings and Sampling** for specific instructions. If the probe hole cannot be advanced, relocate the probe hole within approximately 5 feet distant from the original location and start with the

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work in Section Paragraph 7.2.1. Measure the distance and direction from the original location, and record this information in the field logbook. The actual distance of movement necessary may be greater depending on the site conditions. If the required movement is greater than 5 feet, contact the Task Manager for direction.

10. Downhole gamma radiation logging will be performed, *where feasible* by the Stone & Webster Team as described in Section 8.1.1 below (**See Stone & Webster Maywood SOP 102, Downhole Gamma Radiation Logging**).
11. When the probe hole is completed and the area is cleaned up, all contaminated equipment, including down-hole tools, hand tools, and direct push rig shall be decontaminated by the Subcontractor (**See Stone & Webster Maywood SOP 506, Decontamination**) and as directed by the Radiation Safety Officer (RSO).
12. The Stone & Webster Team shall record the soil probe location on the project drawings.

8.0 METHOD-SPECIFIC SOIL SCREENING AND SAMPLING

In this section, the soil screening and sampling procedure for the direct push soil probe method is described.

8.1 Direct Push Probe Services

The direct push probe rig is a hydraulically powered percussion/direct push machine used for small diameter subsurface investigations. It can obtain continuous soil cores, discreet soil samples, groundwater samples and vapor samples along with installation of permanent sparge points.

8.1.1 Procedures for Screening and Sampling Direct Push Probe Soil Samples

Following is the procedure to be used at the Maywood Site for screening and sampling direct push probe soil cores.

1. Each 4-foot soil core sample will remain in the polyvinyl chloride/polyethylene terephthalate (PVC/PETG) liner and marked with the appropriate field identification number, sealed with rubber end caps for liners, and placed into a designated (2 inch ID) PVC container (including PVC end caps) supplied by the Subcontractor for storage. Pertinent sample data will also be marked on the PVC container.
2. Downhole gamma logging will be accomplished, *where feasible* by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.
3. Each soil probe hole will be backfilled for the full length, in accordance with project requirements.
4. The sealed PVC containers will be transported by the Stone & Webster Team to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. All Building 76 sample documentation, field screening, and sampling tasks shall be performed by the Stone & Webster Team. Sample documentation will include the preparation of a soil probe log containing the following pertinent field documentation: soil probe identification number and location; soil column description; soil screening data, and photo-documentation. **Stone & Webster Maywood SOP 507, Field Notebook Content and Control**, shall be followed. Sample documentation information shall be recorded electronically.
5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each

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soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integration taken at each marked location and recorded.

6. The soil cores will then be screened for total volatile organic vapors using a PID (see **Stone & Webster Maywood SOP 401, Photoionization Detector (PID)**). A series of small perforations will be made through the liner at 12-inch increments.
7. The soil cores will be described generally in accordance with the Unified Soil Classification system, based on visual observations through the liners and soil extracted from the small perforations. Prior to storage, these perforations will be sealed with tape. The soil descriptions developed will be marked with an "FC" note to define the description as a field classification.
8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.
9. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.
11. Extracted samples shall be prepared in accordance with the Safety and Ecology Corporation (SEC) on-site field laboratory soil preparation practice/SOP.
12. Analysis for ROC on extracted sections of the soil core will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector, or equivalent. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.
14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.
15. Sampling tools will be decontaminated before each boring, after collecting each soil sample, and after each boring.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term "blind duplicates"), thus eliminating potential bias in the test measurement.

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If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.

ATTACHMENT 1

PDI SOIL PROBE LOG SHEET				
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling		
Site Designator		XXX		
Activity Designator		AAA		PDI
Field Measurement/Sample Collection Designator		VV		SP
Station Number		N N N		
Media		m m		SB
Sample Type		n		
Sequential Sample Number		# # # # #		(see Below)
		Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location				
		Gamma Logging		Photoionization Detector (PID) Logging
		Down Hole	Core	
Date				Date
Time				Time
Logger				Logger
Detector Model #		SPA-3	PID Model #	Multi-RAE
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		
Comments:				
1. MPI No. _____.				
2. Direct-push location grouted with BenSeal.				
_____		_____		
Signature (Down Hole Gamma Logging)		Date		
_____		_____		
Signature (Core Gamma Logging)		Date		
_____		_____		
Signature (PID Logging)		Date		

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)									
					X	X	X	#	#	#	#	#	#	
0.0														
0.5														
1.0														
1.5														
2.0														
2.5														
3.0														
3.5														
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23.5														
24.0														

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 G:\3674009\PDI Report\AppdxA\SOP509FINAL.doc

TABLE 1-A: REVISIONS TO SOP SW-MWD-509-0

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>Section 8.1.1 Procedures for Screening and Sampling Direct Push Soil Samples 2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a Bicon 3/8- inch x 3/8- inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. The detector shall be positioned below the bottom of the casing to allow gamma log readings in the uncased portion of the probe hole. The casing shall be extracted at 6-inch increments and a 30-second count reading shall be taken at each increment.</p>	<p>2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. The sodium iodide detector preamplifier is connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector™ multi-channel analyzer/amplifier/high voltage power supply. The system is controlled, and the data stored, via a notebook computer. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.</p>	<p>Cabrera Services, Inc. developed this procedure as a cost effective site characterization method. Better sensitivity of the 1-inch x 1-inch detector used by Cabrera Services, Inc. allows gross gamma measurements through the soil probe casings, thereby increasing soil probe production rates.</p>	<p>January 11, 2000, without waterproof container. Sealed solid casing installed following extraction of MacroCore or Dual Tube system. January 28, 2000, with waterproof container. Eliminated need of sealed solid casing.</p>
<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The acetate liner shall be marked off at 6-inch intervals. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Readings shall consist of 10-second integrations taken every six inches and recorded.</p>	<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the PVC/PET liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integrations taken at the marked locations and recorded.</p>	<p>Continuous scanning of the soil core provides complete coverage, longer counting time at the regions of interest, and minimizes redundancy of the downhole gamma measurements.</p>	<p>January 11, 2000</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>8. A minimum of three soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238 based on field radiological screening and gamma logging values. At a minimum, one soil sample will be taken at the highest reading location (suspected FUSRAP waste); a second soil sample shall be collected where the readings approach a constant value (suspected transition zone); and a third soil sample shall be collected within the zone of constant readings (below suspected transition zone). Additional samples may be taken based on the Task Manager's direction.</p>	<p>8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.</p>	<p>Suspected FUSRAP waste and suspected transition zones may not be present in each direct push location.</p>	<p>Selection of archived samples began February 21, 2000.</p>
<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored in Building 76 for future reference.</p>	<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.</p>	<p>Based on laboratory analysis there may be the need to collect additional samples from the stored soil cores.</p>	<p>January 11, 2000</p>
<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a USACE-certified off-site laboratory, for confirmatory ROC analysis. Soil samples shall be placed in labeled containers provided by the laboratory, then placed in coolers maintained at 4°C. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>Samples will be sealed in containers provided by the SEC on-site field laboratory.</p> <p>Preservation (i.e., 4°C) is not required for ROC analysis.</p>	<p>February 28, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>14. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.</p>	<p>14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.</p>	<p>Sample storage will be returned to the FUSRAP Maywood Superfund Site for future disposition.</p>	<p>January 11, 2000</p>
<p>9.0 QUALITY ASSURANCE/QUALITY CONTROL Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment rinsate blanks and duplicates. Equipment rinsate blanks must be collected each day that sampling occurs or each decontamination event, whichever is less, per matrix per parameter per field crew, per equipment type (assuming reusable sampling equipment is used). This QA/QC requirement may be modified based on conversations with USACE, USEPA, and NJDEP. Field duplicate samples must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement. Field duplicate samples must represent no less than 10 % of the total number of samples per matrix per parameter per area of study. Field duplicate gamma radiation readings shall also be recorded at a frequency of 10% of the total gamma radiation readings.</p> <p>Matrix spike/matrix duplicate (MS/MD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat</p>	<p>Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement.</p> <p>If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given</p>	<p>Swipe sample is a more representative QC check of loose surface alpha radioactivity than aqueous rinsate sample.</p> <p>Reduction from 10% to 5% duplicate samples based on large number of soil samples proposed for PDI. In addition, 5% is consistent with NJDEP Field Sampling Procedures Manual for field duplicates and EPA guidelines for MS/MSD analysis. Electronic mail sent to EPA and NJDEP regarding reduction in duplicate percentage on January 28, 2000.</p>	<p>Equipment blank revision implemented on January 11, 2000.</p> <p>Reduction from 10% to 5% duplicate samples implemented week of February 7, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
no less than 10% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.	method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.		

Revised PDI Work Plan Table 5-1

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

PROPERTY CLUSTER NUMBER ⁽⁸⁾	NUMBER OF SAMPLING LOCATIONS						NUMBER OF SAMPLES FOR ANALYSIS BY PARAMETER ⁽⁶⁾								
	RADIOLOGICAL SURVEY				GEOTECH	ENVIR	GEOTECHNICAL					CHEMICAL ANALYSES			
	SOIL PROBES ⁽¹⁾	SOIL PROBE DEPTHS (FT) (ESTIMATED)	SOIL PROBE RADIOLOGICAL ANALYSES ⁽²⁾	SURFACE SOIL RADIOLOGICAL ANALYSES ⁽³⁾	SOIL BORINGS ⁽⁴⁾	SOIL BORINGS ^(4,5)	SPECIFIC GRAVITY	ATTERBERG LIMITS	GRAIN SIZE	TRIAXIAL TESTS ⁽⁷⁾	CONSOLID. TESTS ⁽⁷⁾	WATER CONTENT	CHROMIUM SPECIATION	TCL/TAL	FULL RCRA CHAR.
1	13	12	39	5	3	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
2	96	16	288	50	22	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
3	10	8	30	5	2	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
4	32	12	96	15	4	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
5	79	8	237	40	8	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
6	85	16	255	40	12	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
7	28	16	84	15	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
8	26	16	78	15	6	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
9	131	16	393	65	17	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
10	106	24	318	55	16	6	TBD	TBD	TBD	TBD	TBD	TBD	6	6	6
11	16	8	48	10	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
12	151	24	453	75	17	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
TOTALS	773	N/A	2319	390	115	47	---	---	---	---	---	---	47	47	47

NOTES:

- 1 Soil probes installed using direct-push method, to the depth shown or refusal.
- 2 At a minimum, three separate soil samples (one soil sample from within the suspected FUSRAP waste, one in transition zone, and one below the transition zone) will be selected for analysis of the ROC by the on-site field laboratory. A total of 2319 subsurface soil samples (i.e., 3 X 773) will be selected for ROC analysis by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 3 Five surface soil samples will be randomly collected from up to 10% of the 773 soil probe locations for radiological analyses and comparative evaluation of surface ISOCs measurement. A total of 390 surface soil samples (i.e., 5 X 78) will be selected for ROC analyses by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 4 Depths and quantities to be determined in field based on radiological data, structure foundations depths, etc.
- 5 Advanced to depth of radiological contamination.
- 6 Sample Analyses Rationale:
 - 6a Chromium Speciation - Speciation of trivalent and hexavalent chromium for health and safety purposes.
 - 6b TCL/TAL - Detection of organic and inorganic constituents to assess the potential for the presence of commingled radiological and chemical contamination.

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

6c	RCRA Characteristics - To support transportation & disposal activities
6d	Geotechnical Parameters (Specific Gravity, Atterberg Limits, Grain Size, Water Content) - To characterize physical properties of soil for excavation and remediation.
7	Triaxial tests and consolidation tests will be performed on undisturbed tube samples to determine strength and consolidation parameters of fine-grained materials, where present. These parameters will be used to perform bearing capacity and settlement analyses where excavations are adjacent to structures.
8	Property Clusters are defined as follows: <i>PROPERTY CLUSTER NO. 1: 72 SIDNEY ST. (A.K.A 88 MONEY ST.)</i> <i>PROPERTY CLUSTER NO. 2: 100, 80 HANCOCK ST., 80 INDUSTRIAL RD., AND NJVIS</i> <i>PROPERTY CLUSTER NO. 3: 170 GREGG ST.</i> <i>PROPERTY CLUSTER NO. 4: 160/174 ESSEX ST., I-80 RIGHT-OF-WAY</i> <i>PROPERTY CLUSTER NO. 5: 99 ESSEX ST, 113 ESSEX ST., 200 ROUTE 17 SOUTH</i> <i>PROPERTY CLUSTER NO. 6: 29 ESSEX ST., 85-101 ROUTE 17 NORTH, 137 ROUTE 17 NORTH, 167 ROUTE 17 NORTH, 239 ROUTE 17 NORTH</i> <i>PROPERTY CLUSTER NO. 7: 111 ESSEX ST. - SCANEL/HACKENSACK AND LODI RAILROAD</i> <i>PROPERTY CLUSTER NO. 8: 23 WEST HOWCROFT RD.</i> <i>PROPERTY CLUSTER NO.9: 149-151 MAYWOOD AVE.</i> <i>PROPERTY CLUSTER NO.10: 100 W. HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.11: 205 MAYWOOD AVENUE AND 50 & 61 WEST HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.12: 100 W. HUNTER AVE., NY, SUSQUEHANNA AND WESTERN RAILROAD, AND NJ ROUTE 17</i>

Rationale of Intrusive Sample Location Relocations

PDI Soil Probe Variance Log

Cluster No.: 6

Property Addresses: Property No. 06A -85-101 NJ Route 17 North (Architectural Windows)
Property No. 06B -137 NJ Route 17 North (Ramsey Auto Group)
Property No. 06C -167 NJ Route 17 North (Sunoco Station - Inactive)
Property No. 06D -239 NJ Route 17 North (Gulf Station)
Property No. 06E – 29 Essex St. (Federal Express Corporation)

Sample Location Map: Figure 6-3

Number of Revised Soil Probe Locations: 44

Rationale for Revisions

- Location 6038 originally proposed in the PDIWP close to the West Howcroft Road Drainage Swale (“the Swale”) was inaccessible and was deleted.
- Sample locations 06A-013, 06A-014 and 06A-015 were moved to the south edge of the Swale; location 06A-016 was moved to the north edge of the swale. These locations were moved due to the implementation of the Time Critical Removal Action (Stone & Webster, 2000c) which changed the configuration of the Swale.
- An additional soil probe, 06A-017, was located on the northeast side of the building to investigate an elevated gamma count area.
- Locations 6019 and 6048 originally proposed in the PDIWP close to the Swale were inaccessible and were deleted. Their areal coverage was through 06B-011 and 06B-012 (next bullet).
- Sample locations 06B-011 and 06B-012 were moved to Cluster No. 9 (Sears Logistical Services) along the northeast side of the Swale to better distribute the soil probe locations after implementation of the Time Critical Removal Action (Stone & Webster, 2000c). It was assumed that radiological contamination on both sides of the swale is similar.
- Locations 6004, 6058, 6059, 6067, 6070, 6071, 6078, and 6081 originally proposed in the PDIWP were deleted under the assumption that the entire Property No. 06D site would be remediated and associated volume of soil would be removed. This assumption was based on historical use of the property by the MCW and prior data collected at the contiguous boundary of Cluster No. 9.
- Sample location 06C-013 was moved from the adjacent Property No. 06D to a point midway on the western boundary of Property No. 06C to provide better coverage of the sub-area.
- Sample location 06C-015 was moved from Property No. 06D to a location near the northeast corner of the Property No. 06C garage building slightly to the west of the excavation to investigate an area exhibiting elevated gamma counts.

- Locations 6001, 6002, 6003, 6083, 0684, 6085, 6087, 6088, 6089, 6092, 6093, 6094, 6095, 6096, and 6102 originally proposed in the PDIWP were deleted under the assumption that the entire Sunoco property would be remediated and associated volume of soil would be removed. This assumption is based on historical use of the property by the MCW and prior data collected at the contiguous boundary of Cluster No. 9. Additionally, much of the property is inaccessible due to utility lines, underground storage tanks, the guard rail and current work activities (an active property). Elimination of these locations eliminates the associated health and safety liability.
- Sample locations 06E-004, 06E-005 and 06E-006 were moved about 100 feet north to investigate an area with elevated gamma counts.
- Samples locations 06E-008 and 06E-009 are new locations added to investigate an area with anomalous elevated gamma counts approximately 20 feet due north of the northeast corner of the building.

Notes:

1. This list provides specific rationale for the relocation/deletion/addition of intrusive radiological sampling locations due to revised understanding of anticipated radiological contamination. This revised understanding was based on further review of previous data collected by others, and review of surface gamma survey and ISOCS data collected by the Team under this PDI program.
2. Base mapping used in the PDIWP (Stone & Webster, 1999a) has been revised by the Team. Accordingly, a number of intrusive sample locations needed to be relocated due to previously unforeseen physical restrictions (i.e., presence of underground utilities, unacceptable proximity to buildings/roadways, revisions to previously mapped property limits). This table is not intended to provide detailed rationale for points moved due to new mapping.

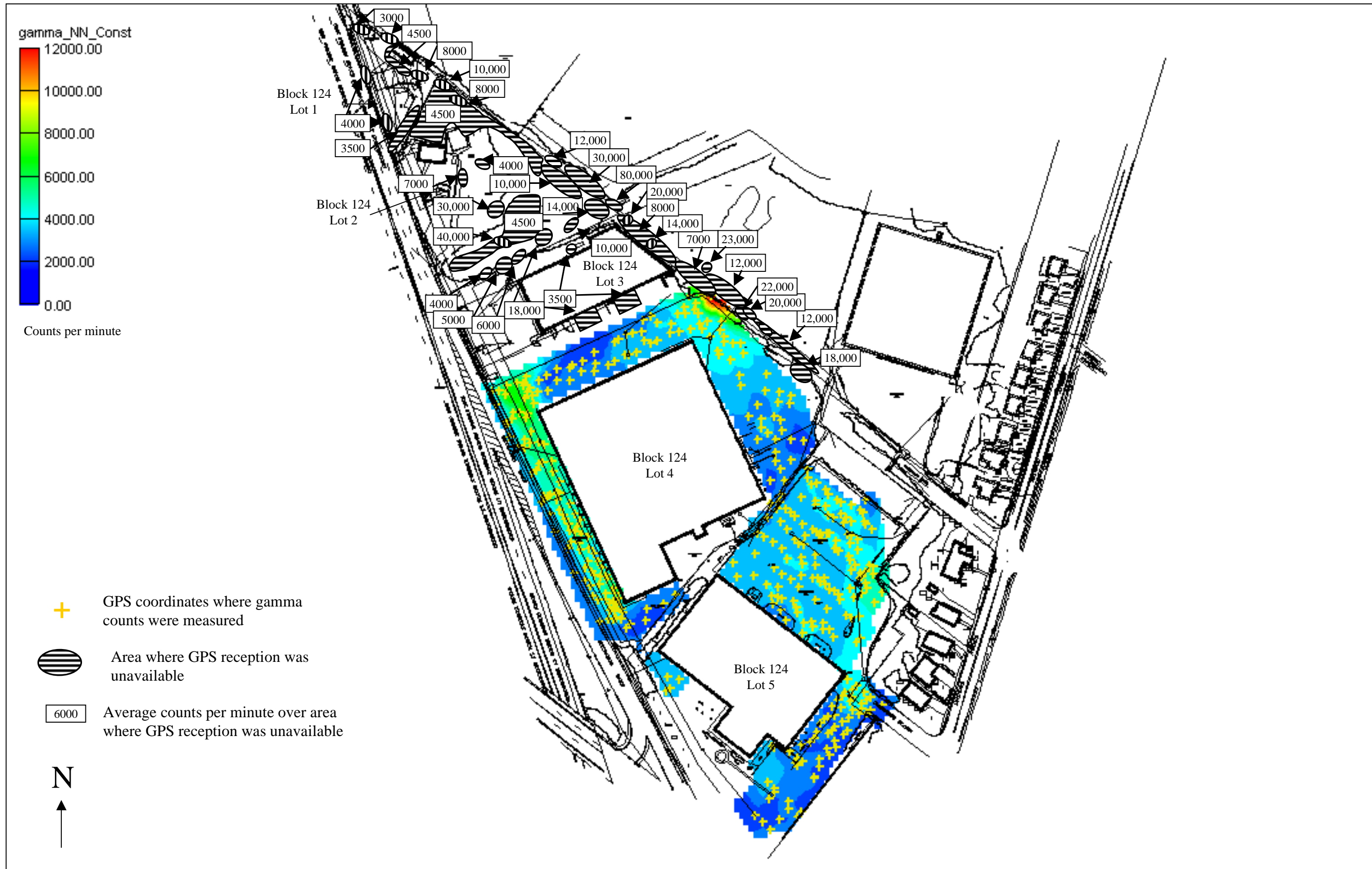
Outlier Protocol (Gamma Scan Anomalies)

Protocol for Addressing Gamma Scan Anomalies (Outliers)

Maywood FUSRAP Superfund Site

Pre-Design Investigation

1. Anomalous surface gamma scan measurements **greater than 2500 cpm for shielded areas (e.g. asphalt covered surfaces), or 3500 cpm for unshielded areas (e.g. bare soil) but, less than 6,000 cpm (1" x 1" NaI detector)** will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL. Note, these count rates are approximately one and one-half times background on shielded and unshielded surfaces.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization (i.e., eliminates the potential for elevated levels of radiological contamination at depth or provides adequate information on the existence of radiological contamination with depth) **will not be further investigated during the PDI.**
 - C. Anomalous areas that do not have previous data that are adequate for characterization **will only be investigated during the PDI if proposed soil probe locations can be moved to these locations without compromising the quality of the data from the proposed locations.** Additional soil probe locations **will not be added** to the program.
 - D. Anomalous areas where additional PDI investigations (based on 1.C) will be performed but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
2. Anomalous areas exhibiting a surface gamma count rate **greater than or equal to 6,000 cpm** (based on a 1" x 1" NaI detector) will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be as follows: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization **will not be further investigated during the PDI.**
 - C. Anomalous areas with previous data that are not adequate for characterization **will be investigated further during the PDI.** Proposed soil probe locations **will be moved** to these locations if possible, or additional soil probe locations **will be added** to the PDI program. These additional soil probes will be used to define the nature and extent of contamination within these previously unidentified areas; the quantity of additional borings is to be determined on a site-by-site basis.
 - D. Anomalous areas that require additional PDI investigations (based on 2.C) but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
3. All anomalous areas and their dispositions will be documented in the PDI.



Property Cluster No. 6: 29 Essex St. (Federal Express Corporation); 85-101 NJ Route 17N (Architectural Windows); 137 NJ Route 17N (Ramsey Auto Group); 167 NJ Route 17N (Sunoco - Inactive); and 239 NJ Route 17N (Gulf) Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 6-A1

Reduction in Field Duplicate and MS/MSD Frequency

Navon, Daria

Subject: FW: Reduction in field duplicate and MS/MSD frequency request

----- Forwarded by David Doyle/Environmental/SWEC on 01/28/2000
02:54 PM -----

"Shonkwiler, Glen D NWK" <Glen.D.Shonkwiler@nwk02.usace.army.mil> on 01/28/2000
02:00:15 PM

To: "carpenter.angela@epamail.epa.gov" <carpenter.angela@epamail.epa.gov>, "dgaffica@dep.state.nj.us" <dgaffica@dep.state.nj.us>
cc: "Roos, Allen D NAN02" <Allen.D.Roos@nan02.usace.army.mil>, "Medary, Richard T NWK" <Richard.T.Medary@nwk02.usace.army.mil>, "Mellema, Doug W NWK" <Doug.W.Mellema@nwk02.usace.army.mil>, "Speckin, Paul D NWK" <Paul.D.Speckin@nwk02.usace.army.mil> (bcc: David Doyle/Environmental/SWEC)

Subject: Reduction in field duplicate and MS/MSD frequency request

Angela/Donna, with this email, USACE is notifying EPA and NJDEP of our intent to reduce the number of field duplicates and MS/MSD samples required in the Maywood Chemical Site CDQMP for the PDI sampling from 10% to 5%. The 10% frequency is a USACE-internal QC standard which USACE plans to reduce based on the large number of soil samples collected during the Pre-Design Investigation (PDI). The reduction in frequency would affect field duplicate samples collected for radionuclides of concern (ROC) and analysis by the on-site field laboratory; field duplicate gamma radiation readings (both downhole and core sample); photoionization detector (PID) or flame ionization (FID) readings; and MS/MSD samples analyzed by the off-site laboratory. It is anticipated that greater than 2000 soil samples will be analyzed by the on-site field laboratory and gamma radiation and PID readings will exceed 10,000 measurements.

Five percent is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and EPA guidelines for MS/MSD analysis. EPA Region II does not have a specific QA/QC guideline for field duplicate samples. The guideline is therefore on a case-by-case basis, in accordance with the site-specific project plans.

Please note that the 10 percent of the samples analyzed by the on-site field laboratory will still be sent to a certified off-site laboratory for confirmatory ROC analysis.

We will continue to adhere to the current 10 percent until EPA and NJ notifies USACE of its concurrence with this deviation from the CDQMP (for the PDI only). Your attention to this matter is greatly appreciated, since reduction of this QA/QC guideline will help to increase production during the Pre-Design Investigation without, in the opinion of USACE, impacting

quality and usability of the data.

Thanks,
Glen Shonkwiler
Remedial Investigations & Remedial Design Manager
Hazardous, Toxic, & Radioactive Waste Branch
U. S. Army Corps of Engineers
CENWK-EC-EA RM 610
601 E 12th St
Kansas City, MO 64106
(816) 983-3561
(816) 426-5550/5949 (fax)
glen.d.shonkwiler@usace.army.mil

APPENDIX 6-B

**PDI Soil Probe Log Sheets
(Radiological Data)**

PDI Soil Probe Log Sheet
LEGEND

List of Abbreviations:

--- = not applicable	lt = light
blk = black	MDA = minimum detectable activity
bn = brown	med = medium
cl = clay	n/r = no recovery
cnts = counts	pCi/g = picoCuries per gram
Conc. = concentration	ppm = parts per million
dk = dark	SAA = same as above
DUP = duplicate	sc = clayey sand
f = fine	sec = seconds
gm = silty gravel	sm = silty sand
gp = poorly-graded gravel	sp = poorly-graded sand
gw = well-graded gravel	sw = well-graded sand
gy = gray	tr = trace
J = estimated	U = unidentified or negative conc. less than MDA
lg = large	wht = white

List of General Comments:

- 4x4 truck-mounted model 5400 and track-mounted model 54DT Geoprobe[®] were used to collect samples. Manual direct push methodology required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- Holes were grouted with BenSeal[®]
- Gamma measurements were taken at center point
- Duplicate samples marked with an "X" for duplicate were prepared by homogenizing soil above and below the center point and then separating for analysis.
- The depth listed is the center point
- Error: 2 sigma (95% confidence interval)

Tube Types

1-inch diameter = Dual Tube (actual 1.3-inch diameter)

2-inch diameter = Macro-Core[®] (actual 1.7-inch diameter)

Sample Intervals

Dual Tube – 13 inches

Macro-Core[®] – 8 inches

Manual Direct Push – 24 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750428	2164711	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/11/2000	02/11/2000	13:20
Time	10:31	10:00	13:20	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436C	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 3.0

4 to 8 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/11/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750445	2164752	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/11/2000	02/11/2000	13:40
Time	10:40	10:55	13:40	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/11/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750294	2164782	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/11/2000	02/11/2000	14:05
Time	11:31	11:20	14:05	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436C	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/11/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750360	2164756	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/11/2000	02/11/2000	
Time	13:11	13:35	14:20	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/11/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750441	2165111	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/11/2000	02/14/2000	
Time	13:39	15:00	15:30	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 1.5
4 to 8 feet = 2-inch diameter	
8 to 12 feet = 2-inch diameter	depth to groundwater at 4.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/14/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750524	2165125	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/11/2000	02/14/2000	
Time	13:45	15:10	16:00	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/14/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750136	2165038	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/11/2000	02/14/2000	
Time	14:21	15:25	16:20	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	G436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

depth to groundwater at 4.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/14/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750464	2165171	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/14/2000	02/15/2000	8:10
Time	14:30	8:25	J. Dekoskie	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 3.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/15/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750017	2164902	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/14/2000	02/15/2000	
Time	14:46	8:50	9:00	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	G436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 4.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/15/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750579	2165054	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/14/2000	02/15/2000	
Time	15:10	9:05	9:30	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 2.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/15/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750212	2164781	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/16/2000	02/16/2000	15:10
Time	8:40	12:05	15:10	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 2.5 feet

<i>Field Original Signed</i>	02/10/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/16/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/16/2000
Signature (PID Logging)	Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---					0.0-1.0: blk gp w/ sm														
0.5	234		530	527	0.5		0	6	A	0	0	4	2	3	4					
1.0	168		402		0.0	1.0-2.3: dk bn sm tr sc	0	6	A	0	0	4	2	3	5					
1.5	164		464																	
2.0	157				0.0															
2.5	168					2.3-3.4: gy sm														
3.0	170				0.0	3.4-4.0: no recovery														
3.5	130																			
4.0	133				0.0	4.0-7.6: bn/gy sw tr sm														
4.5	175		411				0	6	A	0	0	4	2	3	6					
5.0	157				0.0															
5.5	142																			
6.0	130				0.0															
6.5	148	164																		
7.0	130				0.0															
7.5	92					7.6-8.0: no recovery														
8.0	101				0.0	8.0-10.8: gy bn sw														
8.5	92		440																	
9.0	91				0.0															
9.5	88																			
10.0	109				0.0															
10.5	102					10.8-12.0: no recovery														
11.0	101				0.0															
11.5																				
12.0																				
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				
18.5																				
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5						Recovery														
22.0						0-4 feet: 39 inches														
22.5						4-8 feet: 44 inches														
23.0						8-12 feet: 33 inches														
23.5																				
24.0																				

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results								
												Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	6	A	0	0	4	2	3	4		1.51	0.08	0.24	2.31	0.09	0.20	7.21	U	---	7.21
1.0	0	6	A	0	0	4	2	3	5		0.40	0.06	0.18	0.57	0.05	0.19	4.58	U	---	4.58
1.5																				
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5	0	6	A	0	0	4	2	3	6		ARCHIVED									
5.0																				
5.5																				
6.0																				
6.5																				
7.0																				
7.5																				
8.0																				
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10.0																				
10.5																				
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22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750141	2164842	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/16/2000	02/16/2000	15:30
Time	8:20	12:50	J. Lincoln	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750510	2165158	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/23/2000	Date	02/23/2000
Time	8:25	10:50	Time	15:10
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 4.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/23/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	014
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750549	2165107	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/23/2000	02/24/2000	8:20
Time	9:05	11:10	J. Dekoskie	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 2-inch diameter
- 8 to 12 feet = 2-inch diameter
-
- native soil at 2.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	015
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750449	2165229	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/23/2000	02/24/2000	8:50
Time		13:50	Time	8:50
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

native soil at 4.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	016
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750613	2165068	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/23/2000	02/24/2000	9:25
Time	15:00	14:10		
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

depth to groundwater at 4.6 feet
 native soil at 6.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	017
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750454	2165049	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	03/17/2000		Date	03/17/2000
Time	8:10		Time	13:58
Logger	S. Ng		Logger	J. Dekoskie
Detector Model #	SPA-3		PID Model #	Multi-RAE
Detector Serial #	CENAN 33401		PID Serial #	CENAN 21811
Scaler Model #	2224			
Scaler Serial #	132842			

Comments:

0 to 2 feet = 3/4-inch diameter
 2 to 4 feet = 3/4-inch diameter
 4 to 6 feet = 3/4-inch diameter

native soil at 0.5 feet

Hole backfilled by Terra Probe before Gamma Logging could be performed.

<u>Field Original Signed</u> Signature (Down Hole Gamma Logging)	<u>03/16/2000</u> Date
<u>Field Original Signed</u> Signature (Core Gamma Logging)	<u>03/17/2000</u> Date
<u>Field Original Signed</u> Signature (PID Logging)	<u>03/17/2000</u> Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750467	2164715	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/14/2000	02/15/2000	
Time	8:45	11:50	10:00	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 2 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/15/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750561	2164700	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/14/2000	02/15/2000	
Time	8:48	14:40	10:30	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	G436C	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 3 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/15/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750613	2164665	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/14/2000	02/15/2000	
Time	9:43	15:00	11:25	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	G436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 2 feet

<i>Field Original Signed</i>	02/09/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/14/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/15/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750550	2164853	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/14/2000	02/15/2000	
Time	9:20	15:15	13:10	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 2-inch diameter
- 8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/15/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750577	2164912	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/14/2000	02/15/2000	
Time	9:50	15:35	13:50	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 4.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/15/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750595	2164967	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/14/2000	02/15/2000	
Time	10:20	15:50	15:00	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 4.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/15/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750479	2164658	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/15/2000	02/15/2000	15:20
Time	11:20	8:35	15:20	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 1.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/15/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750589	2164604	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/15/2000	02/16/2000	
Time	12:40	9:00	7:15	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 5.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750671	2164803	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/09/2000	02/15/2000	02/16/2000	8:45
Time	13:20	9:35	J. Dekoskie	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750622	2164999	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/23/2000	02/24/2000	
Time	9:55	14:35	10:40	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 4 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750729	2164914	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/23/2000	02/24/2000	
Time	14:15	15:05	11:10	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

depth to groundwater at 8.6 feet
 native soil at 7 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750686	2164967	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/23/2000	02/24/2000	
Time	14:50	15:20	11:55	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

depth to groundwater at 6.7 feet
 native soil at 5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750596	2165023	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/24/2000	03/03/2000	03/06/2000	
Time	12:10	13:55	9:40	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

native soil at 1.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/06/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750849	2164540

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/11/2000	02/17/2000	Date	02/17/2000
Time	9:00	10:40	Time	14:15
Logger	E. Barbour	S. Ng	Logger	J. Lincoln
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native at 5 feet

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	02/11/2000 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	02/17/2000 Date
<i>Field Original Signed</i> Signature (PID Logging)	02/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750742	2164567

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		02/17/2000	Date	02/17/2000
Time		10:55	Time	14:30
Logger	C. Hales	S. Ng	Logger	J. Lincoln
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native at 4 feet

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	02/11/2000 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	02/17/2000 Date
<i>Field Original Signed</i> Signature (PID Logging)	02/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750693	2164590

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	02/11/2000	02/17/2000	Date	02/17/2000
Time	9:40	11:10	Time	14:45
Logger	E. Barbour	S. Ng	Logger	J. Lincoln
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native at 1 feet

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	02/11/2000 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	02/17/2000 Date
<i>Field Original Signed</i> Signature (PID Logging)	02/17/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results								
												Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	6	C	0	0	4	6	0	6		0.55	0.05	0.14	0.32	0.04	0.16	5.41	U	---	5.41
1.0																				
1.5																				
2.0																				
2.5	0	6	C	0	0	4	6	0	7		0.78	0.06	0.21	0.98	0.06	0.22	5.09	U	---	5.09
3.0	0	6	C	0	0	4	6	0	8	X	0.78	0.06	0.19	1.38	0.06	0.15	7.77	U	---	7.77
3.5																				
4.0																				
4.5																				
5.0																				
5.5																				
6.0																				
6.5	0	6	C	0	0	4	6	0	9		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750799	2164640	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date			Date	
Time			Time	
Logger			Logger	
Detector Model #		SPA-3	PID Model #	Multi Rae
Detector Serial #		33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

NO HOLE- REFUSAL

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750742	2164663

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date			Date	
Time			Time	
Logger			Logger	
Detector Model #		SPA-3	PID Model #	Multi Rae
Detector Serial #		33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

NO HOLE- REFUSAL

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750849	2164676	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/11/2000	02/17/2000	Date	02/17/2000
Time	10:16	11:35	Time	15:00
Logger	C. Hales	S. Ng	Logger	J. Lincoln
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native at 5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750801	2164688

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/11/2000	02/17/2000	Date	02/17/2000
Time	10:15	12:00	Time	15:00
Logger	E. Barbour	S. Ng	Logger	J. Lincoln
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native at 1.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750891	2164619

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/11/2000	02/17/2000	Date	02/18/2000
Time	11:00	14:25	Time	7:20
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native at 5 feet

<i>Field Original Signed</i>	02/11/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/17/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/18/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750862	2164710

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/11/2000	02/17/2000	Date	02/18/2000
Time	11:21	14:40	Time	7:40
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native at 4 feet

<i>Field Original Signed</i>	02/11/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/17/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/18/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750930	2164573

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/11/2000	02/17/2000	Date	02/18/2000
Time	12:00	14:55	Time	8:00
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native at 5 feet

<i>Field Original Signed</i>	02/11/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/17/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/18/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750807	2164770

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/11/2000	02/17/2000	Date	02/18/2000
Time	12:21	15:10	Time	8:25
Logger	C.Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native at 4.5 feet

<i>Field Original Signed</i>	02/11/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/17/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/18/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750621	2164589	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/11/2000	02/17/2000	Date	02/18/2000
Time	13:34	15:25	Time	8:40
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet= 2-inch diameter

Native at 2.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/18/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750891	2164557

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/11/2000	02/17/2000	Date	02/18/2000
Time	14:15	15:35	Time	9:05
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/18/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	014
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750650	2164652

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/11/2000	02/17/2000	Date	02/18/2000
Time	13:35	17:50	Time	9:25
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native at 4.0 feet

<i>Field Original Signed</i>	02/11/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/17/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/18/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	015
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750857	2164583

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/11/2000	02/18/2000	Date	02/18/2000
Time	14:15	7:50	Time	9:55
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:
 0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet= 2-inch diameter

Native at 5.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/18/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	016
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750779	2164702

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	02/23/2000	03/03/2000	Date	03/06/2000
Time	11:29	14:10	Time	10:02
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
4 to 8 feet = 1-inch diameter
8 to 12 feet = 1-inch diameter

depth to groundwater at 11.5 feet

Native at 4.0 feet

<i>Field Original Signed</i>	02/23/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/03/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/06/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	017
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750764	2164783

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/23/2000	03/03/2000	Date	03/06/2000
Time	12:01	14:25	Time	10:20
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

Native at 2.0 feet

<i>Field Original Signed</i>	02/23/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/03/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/06/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	018
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750699	2164777

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	03/08/2000	03/09/2000	Date	03/09/2000
Time	13:10	7:40	Time	11:12
Logger	J. Marsda	S. Ng	Logger	J. Lincoln
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

<i>Field Original Signed</i>	03/08/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/09/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/09/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	06C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	019
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750729	2164859

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	03/08/2000	03/09/2000	Date	03/09/2000
Time	13:35	8:05	Time	11:25
Logger	J. Marsda	S. Ng	Logger	J. Lincoln
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	03/08/2000 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	03/09/2000 Date
<i>Field Original Signed</i> Signature (PID Logging)	03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750987	2164484	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/16/2000	02/24/2000	Date	02/24/2000
Time	10:35	8:15	Time	12:20
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native at 5.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	06D
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750876	2164521

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	02/16/2000	02/24/2000	Date	02/24/2000
Time	11:15	8:50	Time	13:30
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native at 6 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06E
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750067	2165365	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/24/2000	02/24/2000	13:50
Time	9:52	9:15	13:50	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

native soil at 1.0 feet

<i>Field Original Signed</i>	02/16/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/24/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/24/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06E
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750085	2165349	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/24/2000	Date	02/24/2000
Time	10:14	9:40	Time	14:20
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

depth to groundwater at 6.7 feet
 native soil at 1.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06E
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750122	2165338	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/24/2000	02/24/2000	15:05
Time	10:53	10:45	15:05	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

depth to groundwater at 12.0 feet
 native soil at 3.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/24/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0					1.0	0.0-0.7: dk gy sm and gp														
0.5	528		627	659		0.7-3.5: red sm w/ gp	0	6	E	0	0	5	0	0	7					
1.0	319		467		1.0		0	6	E	0	0	5	0	0	8					
1.5	235																			
2.0	247				1.0															
2.5	243																			
3.0	247		470		0.6		0	6	E	0	0	5	0	0	9					
3.5	248	243				3.5-4.0: no recovery														
4.0	251				2.5	4.0-4.5: SAA (0.7-3.5)														
4.5	235		357			4.5-7.7: red sm w/ gp														
5.0	233				4.0															
5.5	219																			
6.0	220				1.5															
6.5	233																			
7.0	256				0.3															
7.5	246	229				7.7-8.0: no recovery														
8.0	235				0.0	8.0-10.4: red sm w/ gp														
8.5	172																			
9.0	184				0.0															
9.5	180																			
10.0	194		456		0.0	10.4-12.0: no recovery														
10.5	223																			
11.0	203				n/r															
11.5	209																			
12.0					n/r															
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				
18.5																				
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5						Recovery														
22.0						0-4 feet: 43 inches														
22.5						4-8 feet: 45 inches														
23.0						8-12 feet: 28 inches														
23.5																				
24.0																				

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	6	E	0	0	5	0	0	7		0.49	0.05	0.19	2.58	0.08	0.16	6.03	U	---	6.03
1.0	0	6	E	0	0	5	0	0	8		0.76	0.06	0.23	0.91	0.06	0.22	7.46	U	---	7.46
1.5																				
2.0																				
2.5																				
3.0	0	6	E	0	0	5	0	0	9		ARCHIVED									
3.5																				
4.0																				
4.5																				
5.0																				
5.5																				
6.0																				
6.5																				
7.0																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06E
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750200	2165215

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/24/2000	02/25/2000	
Time	11:29	11:00	7:40	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

depth to groundwater at 7.1 feet
 native soil at 6.0 feet

<i>Field Original Signed</i>	02/16/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/24/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/25/2000
Signature (PID Logging)	Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0					0.7	0.0-0.5: dk bn sm														
0.5	296		471	493		0.5-3.0: bn sm w/ gp	0	6	E	0	0	5	0	1	0					
1.0	225		454		0.7		0	6	E	0	0	5	0	1	1					
1.5	199																			
2.0	191				0.7															
2.5	200																			
3.0	222		431		0.5	3.0-3.5: gy gp and sm														
3.5	156					3.5-4.0: no recovery														
4.0	205	162			0.5	4.0-5.8: bn sm														
4.5	248		435				0	6	E	0	0	5	0	1	2					
5.0	221		400		0.2															
5.5	191					5.8-6.6: red/bn sm tr gp														
6.0	189				0.0															
6.5	185					6.6-8.0: no recovery														
7.0	206				n/r															
7.5	170																			
8.0					0.0	8.0-9.5: red/bn sm tr gp														
8.5			445																	
9.0			422		0.0															
9.5						9.5-12.0: no recovery														
10.0					n/r															
10.5																				
11.0					n/r															
11.5																				
12.0					n/r															
12.5																				
13.0																				
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19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5						Recovery														
22.0						0-4 feet: 41 inches														
22.5						4-8 feet: 31 inches														
23.0						8-12 feet: 18 inches														
23.5																				
24.0																				

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results										
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g				
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA		
0.0																					
0.5	0	6	E	0	0	5	0	1	0	0.47	J	0.05	0.21	1.67	J	0.07	0.21	7.64	UJ	---	7.64
1.0	0	6	E	0	0	5	0	1	1	0.43		0.06	0.15	0.70		0.05	0.19	4.75	U	---	4.75
1.5																					
2.0																					
2.5																					
3.0																					
3.5																					
4.0																					
4.5	0	6	E	0	0	5	0	1	2	ARCHIVED											
5.0																					
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24.0																					

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	06E
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750261	2165207	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/24/2000	02/25/2000	
Time	12:23	11:20	8:25	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

depth to groundwater at 11.8 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/25/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	06E
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750251	2165238	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/24/2000	02/25/2000	9:00
Time	12:56	11:40		
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

depth to groundwater at 11.3 feet
 native soil at 5.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	02/25/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06E
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750166	2165376	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/24/2000	02/25/2000	
Time	13:18	12:00	9:40	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter

native soil at 2.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/25/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	--				1.0	0.0-0.8: blk gp tr sm														
0.5	386		628	612		0.8-3.3: red/bn sm	0	6	E	0	0	5	0	2	0					
1.0	210		439		1.0		0	6	E	0	0	5	0	2	1					
1.5	187																			
2.0	208				1.0															
2.5	229																			
3.0	245	216	470		0.5	3.3-4.0: no recovery	0	6	E	0	0	5	0	2	2					
3.5	250																			
4.0	240				0.6	4.0-7.0: red/bn sm tr gp														
4.5	208		406																	
5.0	283				0.4															
5.5	226																			
6.0	232				0.2															
6.5	248		374																	
7.0	281				n/r	7.0-8.0: no recovery														
7.5																				
8.0					n/r															
8.5																				
9.0																				
9.5																				
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19.5																				
20.0																				
20.5																				
21.0																				
21.5						Recovery														
22.0						0-4 feet: 39 inches														
22.5						4-8 feet: 36 inches														
23.0																				
23.5																				
24.0																				

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results										
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g				
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA		
0.0																					
0.5	0	6	E	0	0	5	0	2	0		0.26	J	0.09	0.28	3.12	0.10	0.27	6.67	U	---	6.67
1.0	0	6	E	0	0	5	0	2	1		0.69		0.06	0.21	0.94	0.05	0.12	5.12	U	---	5.12
1.5																					
2.0																					
2.5																					
3.0	0	6	E	0	0	5	0	2	2		ARCHIVED										
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06E
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749972	2165268	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/31/2000	04/03/2000	04/04/2000	
Time	10:48	14:55	11:30	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

native soil at 6.7 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/31/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 04/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 04/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	06E
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749983	2165278	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/31/2000	04/03/2000	04/04/2000	
Time	11:07	15:10	13:20	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	NA	2224		
Scaler Serial #	NA	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

native soil at 4.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/31/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 04/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 04/04/2000 Date

APPENDIX 6-C

Environmental Boring Log Sheets

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	
Activity Designator	AAA	06a GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	mm	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)



	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	750588.771	2165041.566	


	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		3/23	Date	3/23
Time		1430	Time	1430
Logger		G. MARKT	Logger	G. MARKT
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

- MPI No. ENV-06-6013
- Direct-push location grouted with BenSeal.

DRILLER
 1430 - 1445 SOIL SAMPLING - 8'
 1445 - 1530 H₂O SAMPLE
 1530 - 1545 STEAM CLEAN

 _____ Signature (Core Gamma Logging)	3/23/00 _____ Date
 _____ Signature (Logging)	3/23/00 _____ Date

H₂O
@ 3.7' 

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	70% RECV	0	0	2	0	2	0	5	3	2
0.5		↑	↑	TOP SOIL									
1.0		0.0	0.0	RD BK 0-1m f SAND									
1.5				some SILT									
2.0		↓	↓	BLK 0-1m f SAND									
2.5				little SILT, organic MAT									
3.0		↓	↓										
3.5				LT GRAY 0 SILT									
4.0		↑	↑	100% RECV.									
4.5													
5.0		↑	↑	RD BK f-1m SAND									
5.5		0.0	0.0	some SILT trace f									
6.0				GRAVEL poorly									
6.5		↓	↓	sorted									
7.0													
7.5		↓	↓										
8.0				END OF SAMPLING									
8.5				@ 8'									
9.0				BOTTOM OF BORING									
9.5				@ 8'									
10.0													
10.5													
11.0													
11.5													
12.0													
12.5													
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24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
06a020533
 Page 1 of 1

PROJECT: **FUSRAP NI44WOOD** SITE: **06a**
 Project No: **0857053** Client: **USACE**
 Contractor: **TERRA PROBE INC** SAMPLE DEPTH:
 Start Date/Time: **3/23/00 1445** Completion Date/Time: **1530** Well Diameter:

Development Method/Equipment:
 Logged by: **S, MARKT** Water Level (ft bgs): **3.7'** Protection Level: **D**
 Pre-development DTW (PVC) (ft): **3.7'** DTB (PVC) (ft): **8'**

Post-development DTW (PVC) (ft):
 Standing Well Volume (gal) = $D^2(ft)/4 \times \pi \times (DTB-DTW)(ft) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.1075 \text{ gal}$
 (2-inch well = $0.164 \times (DTB-DTW)(ft)$) = —
 (2.5-inch well = $0.255 \times (DTB-DTW)(ft)$) = —
 Minimum Purge Volume (gal) (3 well volumes) $\Rightarrow 0.322 \text{ gal}$
 Development Purge/Discharge Rate (gpm):
 Maximum Drawdown During Purging (ft):
 Total Quantity Purged: **2 gal**
 Disposition of Purge Water: **STORED @ MISS**
 Hours of Development: —
 Hours of Decon: —
 Hours of Standby: —

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1445		3.7'	—	11.4	7.11	1.18	31	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

SCREEN @ 4'-8'

020534

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	06B
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	mm	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)
Location	Northing (NAD 1927) 750589.493	Easting (NAD 1927) 2164604.466
	Gamma Logging	Photoionization Detector (PID) Logging
	Down Hole	Core
Date	3/24	Date
Time	0830	Time
Logger	G. MARKT	Logger
Detector Model #		PID Model #
Detector Serial #		PID Serial #
Scaler Model #		
Scaler Serial #		

Comments:

- MPI No. EW 06-6042
- Direct-push location grouted with BenSeal.

DRILLER

0815-0830 SOIL SAMPLE 6'-8'
 0830-1000 H₂O SAMPLE
 1000-1015 STEAM CLEAN

George H. Markt
 Signature (Core Gamma Logging)

3/24/00
 Date

George H. Markt
 Signature (Logging)

3/24/00
 Date

H₂O
@ 4.1
↓

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)															
					X	X	X	#	#	#	#	#								
0.0																				
0.5		↑	↑	95% RECV	0	6	0	2	0	5	3	4								
1.0				5P 54R 25/1																
1.5			0.0																	
2.0		0.0		?																
2.5				5M 54R 4/4																
3.0																				
3.5		↓	↓																	
4.0				60% RECV																
4.5		↑	↑																	
5.0																				
5.5		0.0	0.0																	
6.0																				
6.5				6M 54R 3/4, moist																
7.0																				
7.5		↓	↓																	
8.0																				
8.5																				
9.0																				
9.5																				
10.0																				
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¹ Location of Core Gamma Reading Based on Initial Continuous Scan
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WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID:
066 020535

PROJECT: FUSRAP MAYWOOD	SITE: 06B	Page <u>1</u> of <u>1</u>
Project No: 0857053	Client: USA	
Contractor: TERRA PROBE INC		SAMPLE DEPTH:
Start Date/Time: 3/24/08 30	Completion Date/Time: 1000	Well Diameter:
Development Method/Equipment:		
Logged by: G. MARKT	Water Level (ft bgs): 4.1	Protection Level: D
Pre-development DTW (PVC) (ft): 4.1	DTB (PVC) (ft): 10.8	

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.167 \text{ gal}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) = \text{---}$)

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) = \text{---}$)

Minimum Purge Volume (gal) (3 well volumes) = **0.50 gal**

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

Total Quantity Purged: **2 gal**

Disposition of Purge Water: **STORED @ MISS**

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1 0915		4.1	-	9.8	7.3	1.43	999+	
2 0920		4.1		9.9	7.2	1.43	112	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
DTW = depth to water gpm = gallons per minute

SCREEN @ 2-6'

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX		
Activity Designator	AAA		06c GWR
Field Measurement/Sample Collection Designator	VV		DP
Station Number	NNN		002 001 19
Media	m m		SB
Sample Type	n		
Sequential Sample Number	#####		(see Below)
Location	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		3/24	Date	3/24
Time		1400	Time	1400
Logger		G. MARKET	Logger	G. MARKET
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

- MPI No. ENV-06-6010
- Direct-push location grouted with BenSeal.

1345-1400 - SOIL SAMPLE 5'-7'
 1400-1515 - H₂O SAMPLE
 1515-1530 - STEAM CLEAN

George H. Markt
 Signature (Core Gamma Logging)

3/24/00
 Date

George H. Markt
 Signature (Logging)

3/24/00
 Date

H₂O
@
6.1'



Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0	↑	↑	↑	60% RECV	0	6	0	0	2	0	5	3	6
0.5				SM 5YR 2.5/1 FILL									
1.0													
1.5	0.0	0.0	0.0	concrete									
2.0		↓	↓										
2.5				SM 5YR 3/4 FILL									
3.0		↓	↓										
3.5		↓	↓										
4.0		A	↑	100% RECV, SM 5YR 4/1									
4.5			0.0	SM 5YR 2.5/1									
5.0													
5.5		0.0	↓										
6.0			.1	SP 5YR 2.5/1 (1" lens)									
6.5		↓	↑										
7.0			0.0										
7.5		↓	↓										
8.0				END OF SAMPLING									
8.5				@ 8'									
9.0													
9.5													
10.0													
10.5													
11.0													
11.5													
12.0													
12.5				BOTTOM OF BORING									
13.0				FOR GW SAMPLE									
13.5				@ 12'									
14.0													
14.5													
15.0													
15.5													
16.0													
16.5													
17.0													
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
06c 020537

PROJECT: FUSRAP MAYWOOD	SITE: 06c	Page <u>1</u> of <u>1</u>
Project No: 0857053	Client: USACE	
Contractor: TERRA PROBE INC.	SAMPLE DEPTH:	
Start Date/Time: 3/24/00	Completion Date/Time:	Well Diameter:
Development Method/Equipment:		
Logged by:	Water Level (ft bgs): 6.1	Protection Level: D
Pre-development DTW (PVC) (ft): 6.1	DTB (PVC) (ft): 12'	

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.147 \text{ gal}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) = \text{---}$)

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) = \text{---}$)

Minimum Purge Volume (gal) (3 well volumes) = $> 0.44 \text{ gal}$

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

Total Quantity Purged: **2 gal**

Disposition of Purge Water: **STORED @ MISS**

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
		6.1	—	13.0	6.45	1.35	378	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
DTW = depth to water gpm = gallons per minute

SCREEN 8'-12'

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Site Designator	XXX	06c
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	002
Media	mm	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)
Location	Northing (NAD 1927) 750821.837	Easting (NAD 1927) 2164633.015
	Elevation (NGVD 1929)	
	Gamma Logging	
	Down Hole	Core
Date	3/27	Date
Time	0830	Time
Logger	G.MARKT	Logger
Detector Model #		PID Model #
Detector Serial #		PID Serial #
Scaler Model #		
Scaler Serial #		

Comments:

1. MPI No. ENV-06-6005
2. Direct-push location grouted with BenSeal.

0835 - 0845 - SOIL SAMPLE 4.5' to 7'

0845 - 0945 - H₂O SAMPLE
 - - STEAM CLEAN

George H. Markt
 Signature (Core Gamma Logging)

3/27/00
 Date

George H. Markt
 Signature (Logging)

3/27/00
 Date

H₂O @ 33'

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)							
					X	X	X	#	#	#	#	#
0.0		↑	↑	75% RECV. SP (fill)	0	0	0	0	20	5	3	8
0.5				pieces of wood + concrete								
1.0				SYR 4/4								
1.5		8.0	0.0									
2.0				↓								
2.5												
3.0		↓	↓	SM SYR 2.5/1 rotting								
3.5				leafs ↓								
4.0		↑	↑	100% RECV. SC 1 GREY								
4.5				5/10Y								
5.0												
5.5		7.0	0.0									
6.0												
6.5												
7.0												
7.5		↓	↓									
8.0												
8.5				END OF SAMPLING								
9.0				@ 8'								
9.5												
10.0												
10.5												
11.0												
11.5												
12.0												
12.5												
13.0												
13.5												
14.0												
14.5												
15.0												
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22.0												
22.5												
23.0												
23.5												
24.0												

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
06C020539

PROJECT: FUSRAP MAYWOOD	SITE: 06c	Page <u>1</u> of <u>1</u>
Project No: 0875053	Client: USACE	
Contractor: TERRA PROBE		SAMPLE DEPTH: 6-10'
Start Date/Time: 3/24/00 0845	Completion Date/Time: 3/24/00 0945	Well Diameter:
Development Method/Equipment: PERISTALTIC PUMP		
Logged by: G. MARKT	Water Level (ft bgs): 3.3	Protection Level: D
Pre-development DTW (PVC) (ft): 3.5	DTB (PVC) (ft): 8'	

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.11 \text{ gal}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ —

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ —

Minimum Purge Volume (gal) (3 well volumes) = **0.33 gal**

Development Purge/Discharge Rate (gpm): —

Maximum Drawdown During Purging (ft): —

Total Quantity Purged: **0.5 gal**

Disposition of Purge Water: \Rightarrow **TRANSPORTED TO MISS**

Hours of Development: —

Hours of Decon: —

Hours of Standby: —

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1 0845	1	3.3		10.6	6.79	.942	999+	
2	2	3.3		10.2	6.76	.928	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

- 1 DO = 4.84 SCREEN @ 4' → 8'
- 2 DO = 4.32

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	06d
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	m m	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)

Location	Northing (NAD 1927) 750890.229	Easting (NAD 1927) 2164526.867	Elevation (NGVD 1929)
----------	-----------------------------------	-----------------------------------	-----------------------

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		3/24	Date	3/24
Time		1115	Time	1115
Logger		G. MARKT	Logger	G. MARKT
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

- MPI No. ENV-06-6017
 - Direct-push location grouted with BenSeal.
- 1100 - 1115 SOIL SAMPLE 6' - 9'
 1115 - 1130 H₂O SAMPLE
 1130 - 1200 STEAM CLEAN

<u>George H. Markt</u> Signature (Core Gamma Logging)	<u>3/24/00</u> Date
<u>George H. Markt</u> Signature (Logging)	<u>3/24/00</u> Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)									
					X	X	X	#	#	#	#	#		
0.0				70% REC'd										
0.5		↑	↑	SW 54R 2.5/1	0	6	d	0	2	0	6	4	0	
1.0														
1.5														
2.0		0.0	0.0											
2.5				SW 54R 4/8										
3.0														
3.5		↓	↓											
4.0		↑		80% REC'd										
4.5														
5.0		0.0		SM 54R 2.5/1										
5.5														
6.0		↓												
6.5														
7.0	H ₂ O @ 7.2	6.0												
7.5		↑												
8.0		0.0		100% REC'd										
8.5				SM 54R 2.5/1										
9.0														
9.5		↓												
10.0		3.0												
10.5		↓												
11.0				SP 54R 4/4										
11.5				REFUSAL @ 11.2'										
12.0				END OF SAMPLING										
12.5														
13.0														
13.5														
14.0														
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24.0														

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
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WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
06d 020541
Page 1 of 1

PROJECT: FUSRAP MAYWOOD SITE: 06d

Project No: 0857053 Client: USACE

Contractor: TERRA PROBE INC - SAMPLE DEPTH:

Start Date/Time: 3/24 1115 Completion Date/Time: Well Diameter:

Development Method/Equipment:

Logged by: G. MARKT Water Level (ft bgs): 7.2' Protection Level: D

Pre-development DTW (PVC) (ft): 7.2' DTB (PVC) (ft): 11.2'

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.1 \text{ gal}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) = _____

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) = _____

Minimum Purge Volume (gal) (3 well volumes) => 0.3 gal

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

Total Quantity Purged: 2 gal

Disposition of Purge Water: STORED @ MISS

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1 1150	1.0	7.2	-	15.7	7.23	1.59	205	
2 1155		7.2	-	15.0	7.33	1.59	121	

Notes: = be bgs = below ground surface D = well diameter
PVC = below top of PVC DTB = depth to bottom of well D (2-inch well) = 0.167 feet
DTW = depth to water gpm = gallons per minute D (2.5-inch well) = 0.208 feet

SCREEN @ 5'-9'

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

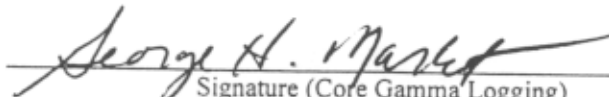

Site Designator	XXX	06E
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	m m	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)
Location	Northing (NAD 1927) 760152.136	Easting (NAD 1927) 2165358.991
		Elevation (NGVD 1929)

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		3/28	Date	3/28
Time		1445	Time	1445
Logger		G. MARKS	Logger	G. MARKS
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				


Comments:

1. MPI No. ENV 06-6014
2. Direct-push location grouted with BenSeal.

1445-1500 - SOIL SAMPLE 6'-9'
 1500-1530 - H₂O SAMPLE
 1530-1600 - STEAM CLEAN

 Signature (Core Gamma Logging)	3/28/00 Date
 Signature (Logging)	3/28/00 Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	90% REC 2 BLEY	0	4	E	0	2	0	5	4	2
0.5				4/10g SW									
1.0				SM SYR 5/6									
1.5		0.0	0.0										
2.0													
2.5		↓	↓										
3.0													
3.5		↓	↓	GC SYR 4/4									
4.0		↑	↑	90% REC V.									
4.5													
5.0													
5.5		0.0	0.0										
6.0		↓	↓										
6.5													
7.0		↓	↓										
7.5													
8.0		↓	↓										
8.5		↑	↑	90% REC V.									
9.0													
9.5		0.0	0.0										
10.0													
10.5		↓	↓										
11.0													
11.5		↓	↓										
12.0				END OF POKING @ 12'									
12.5													
13.0													
13.5													
14.0													
14.5													
15.0													
15.5													
16.0													
16.5													
17.0													
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21.0													
21.5													
22.0													
22.5													
23.0													
23.5 *													
24.0													

H₂O @ 6.6


¹ Location of Core Gamma Reading Based on Initial Continuous Scan
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WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
06E 020543

PROJECT: **FUSEAP MAYWOOD** SITE: **06E** Page 1 of 1

Project No: **08575053** Client: **USACE**

Contractor: **TERRA PROBE INC.** SAMPLE DEPTH:

Start Date/Time: **3/8** Completion Date/Time: Well Diameter:

Development Method/Equipment:

Logged by: **G. MARKT** Water Level (ft bgs): **6.6'** Protection Level: **D**

Pre-development DTW (PVC) (ft): 6.6' DTB (PVC) (ft): 12'

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) =

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) =

Minimum Purge Volume (gal) (3 well volumes) =

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

tal Quantity Purged:

Disposition of Purge Water:

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1530		6.6'		11.3	6.46	.55	999+	

Notes: = bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

SCREEN @ 8'-12'
 do = *4.0
 * VARIES

PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 7 – Revision 1

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

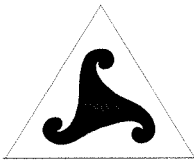
SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18

Submitted to:

Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
FUSRAP Project Office
26 Federal Plaza
New York, New York 10278

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Submitted by:



Stone & Webster, Inc.
100 West Hunter Ave.
Maywood, NJ 07607
May 2001

Reviewed/
Approved by:

Sam Rice Date: 5/31/01
Sam Rice, P.E.
Project Manager

Reviewed/
Approved by:

Kevin F. Donnelly Date: 5/31/01
Kevin F. Donnelly, P.E.
Project Environmental Engineer

Reviewed/
Approved by:

Alan F. Brown Date: 5-30-01
Alan F. Brown, P.E.
Task Manager

Reviewed/
Prepared by:

Edward A. Dudek Date: 5-31-01
Edward Dudek, P.E.
Task Leader

Reviewed/
Prepared by:

Michael Ciminera Date: 5-30-2001
Michael Ciminera
Field Operations Leader

**PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 7 – Revision 1**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18**

RECORD OF REVISIONS

Revision 0: Original Issue

Revision 1: The Final PDI Report (Revision 0) was submitted in July 2000. Revision 1 to the Final PDI Report incorporates the following significant changes: revision to text headers and footers; addition of results of confirmatory radiological analyses to [Table 7-4](#); and addition of Toxicity Characteristic Leaching Procedure (TCLP) data to [Table 7-5](#).

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ACRONYMS AND ABBREVIATIONS

AT&T	American Telephone & Telegraph
BNI	Bechtel National, Inc.
C	Degrees Centigrade
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
Conc.	Concentration
CQCP	Contractor Quality Control Plan
DOE	U.S. Department of Energy
EPP	Environmental Protection Plan
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	grams
GMS	Groundwater Modeling System
GPR	Ground Penetrating Radar
GPS	Global Positioning System
ID	Identification
ISOCS	In Situ Object Counting System
keV	kilo electron volts
kg	kilogram
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCW	Maywood Chemical Works
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
mg	milligram
MHTDP	Materials Handling, Transportation and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJVIS	New Jersey Vehicle Inspection Station
NYS&W	New York, Susquehanna & Western Railway
ORNL	Oak Ridge National Laboratories
pCi	picoCurie
PDI	Pre-Design Investigation
PDIWP	Pre-Design Investigation Work Plan
PID	Photoionization Detector
PVC/PET	Polyvinyl Chloride/Polyethylene Teraphthalate
QA	Quality Assurance
QC	Quality Control
QCSR	Quality Control Summary Report
Ra-226	Radium-226
Rn-222	Radon-222

RCRA	Resource Conservation and Recovery Act
RESRAD	Department of Energy Computer Code; RESidual RADioactivity
ROC	Radionuclides of Concern
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
St.	Street
Th-232	Thorium-232
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
ug	microgram
U-238	Uranium-238
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency

1.0 SITE BACKGROUND AND PHYSICAL SETTING

1.1 General Site Overview

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (hereafter referred to as the Maywood Site) is located in a highly developed area of Bergen County in northeastern New Jersey, in the Boroughs of Maywood and Lodi and the Township of Rochelle Park (Figure 7-1). Portions of the Maywood Site are radiologically impacted from process wastes and residues associated with the recovery and refining of thorium and thorium compounds from monazite ores by the Maywood Chemical Works (MCW) from 1916 to 1956 (Bechtel National, Inc., BNI, 1992).

Waste produced at MCW was a fine sand-like material containing residual thorium with lesser amounts of uranium and its daughter products including radium. Wastes and residues were disposed in low-lying areas west of processing facilities. In the early 1930s, a portion of these wastes and residues was separated from the main property by construction of New Jersey State Highway 17 (NJ Route 17). Additionally, the former channel of Lodi Brook runs through the majority of the properties making up the Maywood Site. Some of the contaminated materials are assumed to have eroded from the facility area and were transported downstream via Lodi Brook (Figure 7-2). In addition, from 1928 to 1944, local residents were known to use process waste in their lawns and gardens and as fill material (BNI, 1992). These are the major mechanisms for distribution of radiologically-contaminated materials on the Maywood Site.

The Maywood Site consists of 88 designated residential, commercial, municipal, and state or federal properties. All 64 Phase I properties (including all residential and municipal properties) have either been remediated by the U.S. Department of Energy (DOE) or U.S. Army Corps of Engineers (USACE) or are currently being addressed under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). The remaining 24 Phase II properties are being addressed by the Stone & Webster Team (i.e., Team).

1.2 Pre-Design Investigation Scope

On December 29, 1998, the USACE issued a Scope of Services for the design and remediation of the remaining 24 commercial and government properties. These properties potentially contain deposits of radioactive material in surface and subsurface soils resulting from operations of the former MCW. They have been designated as the Phase II properties.

A Pre-Design Investigation Work Plan (PDIWP, Stone & Webster, 1999a) was submitted in October 1999 for the Phase II properties. The purpose of the PDIWP was to address data gaps necessary to complete remedial design efforts. In determining additional data needs, it was assumed that remediation of radiologically-impacted soils would be conducted on “accessible soils” only. Accessible soils are defined as soils not under permanent structures such as buildings and roadways. Data acquisition was limited to accessible soils only.

A preliminary evaluation was performed to determine the human health risk from leaving subsurface radiologically-impacted soils proximate to these structures. The RESidual RADioactivity (RESRAD) computer code was utilized to quantify the dose and risk under a

number of assumed conditions. Based on the preliminary results, it was determined that any radioactive residues left adjacent to existing buildings, roadways, and railways would need a minimum of two feet of clean soil cover to be protective of human health. As such, it has been assumed that where radiologically-contaminated soils exist at depth adjacent to structures, at least the top two feet of radiologically-contaminated soil would be removed adjacent to the structure to a six foot horizontal setback, and then sloped at two horizontal to one vertical (2H:1V) to the required depth. However, it is recognized that site-specific calculations will need to be made during the remedial design phase in order to determine the actual depth of excavation adjacent to each structure, the horizontal setback, and the slope to final excavation depths (Stone & Webster, 1999a).

In preparing the PDIWP, the 24 Phase II properties were sub-divided into 12 clusters. The purpose of the clustering was to take a 'collective' view of a set of contiguous properties to efficiently secure needed pre-design investigation (PDI) information for those properties. [Table 7-1](#) lists the 12 clusters for the Phase II properties, from south to north. The reader is directed to the PDIWP for additional background information (Stone & Webster, 1999a).

The purpose of this PDI Report is to present data collected during the PDI for Cluster No. 7. The evaluation of PDI data, along with data collected by others during previous investigations, is documented separately.

2.0 PDI FIELD ACTIVITIES

PDI activities were performed by the following Team members:

Stone & Webster, Inc.	Team leader and engineering services
Malcolm Pirnie, Inc.	Engineering services
Science & Ecology Corporation.....	Health physics services
Cabrera Services, Inc.	Radiological survey support
Canberra Industries, Inc.	Radiological survey support
Garden State Surveying, Engineering, and Planning, Inc.	Surveying and mapping
NAEVA Geophysics, Inc.	Geophysical investigation
TerraProbe, Inc.	Direct push services
Franklin Environmental Services, Inc.	Construction services
ThermoRetec	Radiological sample analysis
RECRA LabNet.....	Environmental sample analysis
Kestrel Environmental Technologies, Inc.....	Data validation

PDI activities involved non-intrusive surveys followed by intrusive investigations. The preliminary, non-intrusive PDI activities (including surface gamma scans, surface In-Situ Object Counting System (ISOCS) readings, geophysical surveys and field surveying) were initiated in August 1999. The intrusive portion of the PDI program began in January 2000 and was completed in April 2000. [Table 7-2](#) presents a summary of PDI intrusive field activities. For logistical reasons, PDI environmental borings were performed at the outset of the Groundwater Remedial Investigation program during the latter part of March and beginning of April 2000.

PDI field activities were conducted in accordance with the PDIWP, and in compliance with procedures established in the following project documents: Contractor Quality Control Plan (CQCP), Site Safety and Health Plan (SSHP), General Environmental Protection Plan (EPP), Chemical Data Quality Management Plan (CDQMP), and the Materials Handling, Transportation and Disposal Plan (MHTDP), (Stone & Webster, 1999b, c, and d, 2000a, 2000b, respectively). Variances in methodology and sample locations between the PDIWP and the actual PDI execution are discussed below.

2.1 Variances from PDIWP

This section discusses deviations in methodologies and sample locations from the approved PDIWP.

2.1.1 Methodology Variances

Methodology variances from the PDIWP were as follows:

- The PDIWP called for the use of an ISOCS utilizing germanium gamma spectroscopy to quantify radionuclide activity in soil. Following approval of the PDIWP, regulatory concerns regarding the use of ISOCS for subsurface investigation were raised. The PDIWP was subsequently modified by replacing intrusive ISOCS sampling with conventional sample

collection using direct push methods to collect soil cores for laboratory analysis. Due to this change, Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled “Soil Probe Investigation” was developed and followed. Refer to the USACE letters dated December 8, 1999 from the Project Manager, Mr. Allen Roos, informing the U.S. Environmental Protection Agency (USEPA) Project Manager, Ms. Angela Carpenter, and the New Jersey Department of Environmental Protection (NJDEP) Case Manager, Ms. Donna Gaffigan, of the modification, as presented in [Appendix 7-A](#). The USEPA approved use of SOP-SW-MWD-509-0 on December 29, 1999 and NJDEP approved it on January 20, 2000.

- A Bicon® Model G1 one-inch by one-inch (1” x 1”) sodium iodide (NaI) detector was substituted for the originally proposed 3/8” x 3/8” NaI detector for downhole gamma logging. This substitution was needed to provide greater detector sensitivity through the soil probe casing. Due to the addition of this detector, SOP number SW-MWD-509-0 entitled “Soil Probe Investigation” was revised. These revisions are outlined in [Table 1-A](#) in [Appendix 7-A](#). The 3/8” x 3/8” NaI detector was used only when the manual direct push method was employed. Manual direct push methodology was required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- The CDQMP originally specified a frequency of 10% for field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. This corresponds to the USACE internal quality control standard. However, due to the significant number of samples to be collected as part of the PDI program (totaling approximately 2000 soil samples and in excess of 10,000 gamma count rate and photoionization detector (PID) readings), the USACE agreed to reduce the frequency to 5%, which is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and USEPA guidelines for MS/MSD analysis. USEPA Region II does not have a specific guideline for field duplicate samples. Refer to the USACE and USEPA/NJDEP correspondence in [Appendix 7-A](#).
- The PDIWP stipulates that geotechnical borings with associated laboratory testing may be required in order to provide design parameters in locations where excavation may impact adjacent structures. Since radiological clean-up criteria have yet to be finalized, final assessment of limits of radiological contamination cannot be made at this time. The geotechnical investigation program was suspended from the PDI. During the design process, existing geotechnical information will be evaluated for design and a determination will be made if supplemental data are needed.

2.1.2 Sample Location Variances

The PDIWP was developed with the intent that proposed sample locations would be deleted, added, or moved as additional information regarding site features and contamination distribution became available during the course of the PDI implementation. In accordance with this approach, sample locations as proposed in the PDIWP were deleted, added, or moved for the following reasons:

- Base mapping developed subsequent to completion of the PDIWP provided additional information regarding underground utility locations and other site features. Proposed sample

locations proximate to these utilities and site features were moved in order to minimize impacts.

- Review of surface gamma survey data collected as part of the PDI, coupled with additional review of data from previous investigations performed by BNI and ORNL, indicated that certain proposed intrusive locations should either be moved or could be deleted. To address potential areas of surface radiological contamination not previously identified as areas of concern, a protocol was established for determining the need for additional intrusive sampling locations. Refer to “Protocol For Addressing Gamma Scan Anomalies” in [Appendix 7-A](#).

Specific rationale for the deletion, addition, or movement of locations proposed in the PDIWP are summarized in [Appendix 7-A](#).

2.2 Geophysical Surveys

Between September 20, 1999 and March 2, 2000, NAEVA Geophysics, Inc. conducted geophysical investigations on the Maywood Site. The purpose of these investigations was to delineate surface traces of detectable underground utilities in the vicinity of proposed exploratory boring sites. Equipment selected for this investigation included: a Fisher TW-6 Pipe and Cable Locator; a Radiodetection RD432PDL-2 Utility Locator; a Subsite 75 Utility Locator, a 3M Dynatel 2250 Cable Locator, and a GSSI SIR-3 ground penetrating radar (GPR) system with a 300 MHz antenna. Details of the surveys are presented in the NAEVA report (NAEVA, 2000).

2.3 Sample Locations

In October 1999, Garden State Engineering, Surveying, and Planning, Inc. performed a ground survey of the Maywood Site properties. Results of the ground survey were combined with aerial mapping prepared by GEOD Corporation to produce new base mapping for the Maywood Site. This new base mapping replaced the mapping used to generate the PDIWP drawings.

Sample points for the surface gamma survey, surface ISOCS measurements, direct push (Geoprobe[®]) sampling, and environmental sampling were located in the field using a Global Positioning System (GPS). A Trimble 4800 Site Surveyor system with a 4700 base receiver, GPS antenna, radio antenna, and ancillary equipment were used to perform GPS surveys. Base stations were set up and calibrated at specified bench-mark locations established by the surveyor. Following base receiver set up, sampling points were located. Field markings (spray paint, flags, and stakes) were used to identify intrusive sampling locations for radiological and environmental direct push mobile rigs, as well as surface ISOCS locations.

Coordinates for intrusive sample locations were determined from new PDI sample location maps which reflected updated base mapping and modified sample locations; surface ISOCS locations were identified based on original PDIWP mapping. For the surface gamma survey, GPS was used to record locations of gamma scan measurements. Where GPS instrumentation could not be utilized due to signal disruption (e.g., tree coverage, building interference, non-availability of satellites, or poor satellite reception due to weather conditions), sample locations were based on identification of site features and scaling off base mapping.

2.4 Surface Gamma Surveys

Surface gamma surveys for all of the Phase II properties were conducted from August 1999 to March 2000. Surveys were conducted to obtain distribution of surface radiological contamination for health and safety reasons, as well as to verify existing data. Measurements were collected by suspending a 1" x 1" NaI gamma scintillation detector coupled to a Ludlum Model 12 ratemeter within a few inches of the ground surface. A health physics technician walked transects (approximately four to six feet wide) covering the properties while slowly swinging the detector in a serpentine motion. Transects were spaced to assure full areal coverage with some overlap. Gamma count measurements were taken approximately every 15 to 20 feet; measurement frequency was increased in areas exhibiting elevated gamma counts. Minimum detectable concentrations (MDCs) for this detector for the radionuclides of concern (ROC) are approximately 4.7 picoCurie per gram (pCi/g) for Radium-226 (Ra-226), 3.0 pCi/g for Thorium-232 (Th-232), and 121.0 pCi/g for Uranium-238 (U-238), correcting for volume and distance from the source (Multi-Agency Radiation Survey and Site Investigation Manual, MARSSIM, 1997). Gamma count data were stored with associated locations in the GPS recorder. In some instances where locations could not be recorded with a GPS (as stipulated above), measurements were manually recorded on the PDI maps.

2.5 Surface ISOCS Measurements

Surface ISOCS measurements were collected at selected locations where environmental, geotechnical, and radiological shallow boreholes were proposed in the PDIWP. Surface ISOCS measurements were collected to identify and quantify radionuclide activity in surface soil, beneath shielded areas (e.g., areas covered with gravel, asphalt, and concrete), and in areas proposed for environmental borings.

Gamma spectroscopy measurements of surface soil were collected using the Canberra high-purity germanium ISOCS and assuming uniform radioactivity distribution in soil. The high-purity germanium detector was positioned in a "downward-looking" direction perpendicular to the ground surface at a height of three feet. The detector was collimated using a lead shield subtending a 90-degree angle, which provided a surface soil viewing area approximately six feet in diameter. The back and side of the detector were shielded with two-inch thick lead O-rings. The detector collimator and shielding were used to ensure that radioactivity detected by the probe originated only from the six-foot diameter area beneath the detector, hence minimizing one possible source of error in the measurements.

2.6 Direct Push Soil Probes

Direct push soil probes (using truck-mounted model 5400 Geoprob[®] or track-mounted model 54DT Geoprob[®]) were used to collect soil samples for radiological and environmental parameter analysis. Two types of direct push soil probes were used: a single rod system (i.e., Macro-Core[®]) and a dual tube (or cased) system. The latter system utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Samples were collected in four-foot soil cores within polyvinyl chloride/polyethylene terephthalate (PVC/PET) liners, marked with the appropriate field identification number, sealed with rubber end caps, and placed

into a two-inch inner diameter PVC container (including PVC end caps) for transport and storage.

For sample locations that were inaccessible to the mounted direct push rigs, soil cores were collected using a manual direct push method. Two-foot cores approximately one inch in diameter were collected using an electric powered hand-held vibratory hammer.

Prior to commencing intrusive sampling, underground utilities in the vicinity of the proposed boring locations were identified by reviewing PDI geophysical survey data, and by contacting the appropriate authorized parties (i.e., New Jersey One-Call System, and the property owner). In addition, a safe working distance from overhead utilities was maintained.

Sampling equipment (the rig, direct push soil probe casing and tools) was decontaminated prior to use and following each borehole installation using pressure or manual washing. Each soil probe hole was backfilled for the full length using Benseal[®] bentonite in accordance with project requirements. For areas covered by asphalt, cold patch was placed at the surface.

2.6.1 Downhole Gamma Logging

Measurements were taken with a Bicron[®] Model G1 1" x 1" NaI gamma detector sealed in a waterproof stainless steel container. The instrument MDCs are approximately 3.6 pCi/g for Ra-226, 2.3 pCi/g for Th-232, and 92.0 pCi/g for U-238, which are approximately 75% of the surface MDCs listed in Section 2.4. This estimate assumes a geometry factor of 0.50, where a four pi geometry (i.e., a sphere) when scanning downhole is approximately half of a two pi geometry (i.e., a hemisphere) when scanning the ground surface. However, this reduction in the MDCs is modified by the 0.3-inch steel casing in the hole, which results in an approximate 33% reduction in the gammas seen by the detector as calculated by the computer code Microshield[™]. The correction factor is therefore calculated by dividing the geometry factor (0.50) by the steel casing reduction factor (0.66), yielding approximately 0.75. The NaI detector was connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector[™] multi-channel analyzer/amplifier/high voltage power supply. The system was controlled, and the data stored, via notebook computer. Ten-second integrated gross gamma measurements were recorded at each 6-inch depth increment in the cased soil probe holes and data entered onto the PDI Soil Probe Log Sheets (see [Appendix 7-B](#)). In areas where samples were collected using the manual direct push method, a Bicron[®] 3/8" x 3/8" NaI gamma detector coupled to a Ludlum Model 2221 scaler/ratemeter was used to take 30 to 60-second gross gamma measurements in uncased soil probe holes. The MDCs for this instrument are estimated to be approximately 1.9 pCi/g for Ra-226 and 2.3 pCi/g for Th-232, as provided by the vendor. There is no correction factor for these MDCs.

2.6.2 Direct Push Core Screening/Sample Collection

Sealed PVC containers collected from direct push mobile and manual rigs were transported to the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation added to the PDI Soil Probe Log Sheets (see [Appendix 7-B](#)) included soil column description and soil screening data. Field screening for radiological activity was performed on soil cores contained in the PVC/PET liner. A collimated Eberline

SPA-3 2" x 2" NaI detector (or Ludlum Model 44-10) coupled to a Ludlum Model 2221 scaler/ratemeter was used to measure gamma activity. The detector was positioned approximately 0.5 inch above the soil core, on a guide, to ensure that this distance was maintained over the entire length of each soil core. Continuous scanning of the soil core was performed at an approximate rate of three inches per second. The instrument MDC, taken from MARSSIM, is estimated to be 2.8 pCi/g for Ra-226, 1.8 pCi/g for Th-232, and 80 pCi/g for U-238 (MARSSIM, 1997). Although the MARSSIM MDC values are based upon an open area, it was assumed that the slower scan time compensated for the different geometry. An indelible marker was used to mark the liner where elevated readings were identified during scanning. Total integrated gross gamma counts were accumulated over a 30-second interval and recorded.

Soil cores were also screened for total volatile organic vapors using a PID. A series of small perforations were made along the PVC/PET liner at 12-inch increments to expose soil to the PID. Perforations were sealed with tape after PID screening. Screening results were recorded on the PDI Soil Probe Logs.

Prior to obtaining samples, each core was photographed using a digital camera. A brief soil field classification description of each core was entered onto the PDI Soil Probe Log Sheet.

Soil samples were selected from each direct push location for analysis of the ROC: Th-232, Ra-226, and U-238. Samples were selected based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample was taken at the highest reading location (suspected FUSRAP waste, if present, as defined in the Federal Facilities Agreement dated November, 1991; DOE and USEPA, 1991); a second soil sample was collected where the readings approached a constant value (suspected transition zone, if present); and a third soil sample was collected within the zone of constant readings (below suspected transition zone). When soil cores exhibited uniform count rates (i.e., elevated gamma measurements were not identified), three samples per soil probe location were collected.

Selected samples were obtained from each core sufficient to fill a 300-milliliter sample container. Samples were labeled and capped at either end with plastic caps. Caps were color-coded for 'top' and 'bottom' of the original hole. Each extracted section of the soil core was replaced with a wooden spacer to indicate what portion of the soil core was sampled. The spacer was labeled with the sample identification number of the soil removed for testing. After screening and sample extraction, remaining portions of each soil core were placed back into the appropriate PVC container, with the wooden spacer in its appropriate location, and stored on-site for future reference. The section of core tube containing the sample was then transferred to the MISS on-site laboratory for sample preparation and analysis.

Evaluation of all gamma log data led to the archiving of selected samples. That is, a number of the direct push soil probes exhibited 'constant' count rates over the depth interval. In these cases, rather than having all samples analyzed at this time, the deepest prepared sample was not counted but archived. By doing this, as laboratory results confirm that radiological contamination does not exist at that soil probe location, unnecessary analytical work is

prevented. Samples that were archived are noted on the PDI Soil Logs in [Appendix 7-B](#) and on [Table 7-4](#).

As described above, a collimated Eberline SPA-3 or Ludlum Model 44-10 2" x 2" NaI detector was used to measure gamma activity for the soil cores, while a Bicron[®] Model G1 1" x 1" NaI gamma detector was used for the downhole measurements. The 2" x 2" NaI detector (Eberline SPA-3 or Ludlum Model 44-10) provided confirmation of downhole measurements and greater sensitivity for sample selection than the 1" x 1" NaI gamma detector.

2.6.3 Sample Preparation

Soil samples were screened to remove small debris and oven-dried to obtain moisture content and to facilitate grinding. Grinding assured sample homogenization. Samples were then transferred to a 300-milliliter commercially supplied metal can. Lids were secured on cans, after which they were shelved for 21 days. The 21-day period was required to allow radon and its daughter products to in-grow and establish secular equilibrium between Ra-226, Radon-222 (Rn-222), and the gamma-emitting daughters.

2.6.4 Laboratory Data

Analysis for ROC on selected samples was performed at the MISS on-site field laboratory using a Canberra high-purity germanium detector. All testing in the MISS on-site field laboratory was completed in accordance with the procedures outlined in the CDQMP. MISS on-site field laboratory data have been entered onto the PDI Soil Probe Log sheets (see [Appendix 1-B](#)).

The Project Chemist evaluated 10% of the MISS on-site field laboratory radiological data packages; the evaluation is included in the PDI Quality Control Summary Report (QCSR; Stone & Webster, 2000c). The laboratory qualified the reported data when the germanium detector measurement system fell outside of one of the control limits during quality control check runs. Data qualification procedures are described in the PDI QCSR.

Ten percent of the samples analyzed by the MISS on-site field laboratory were sent to a USACE-approved off-site laboratory (ThermoRetec) for confirmatory analysis of the ROC. Following analysis, all soil samples were returned to the Maywood Site for storage and future reference. Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the off-site confirmatory radiological data. Radiological data were evaluated using the USACE's Radiological Data Quality Evaluation Guidance, as presented in the CDQMP. The data validation reports for the radiological confirmatory sample results are provided in the PDI QCSR.

2.7 Environmental Sampling

A limited number of soil samples were collected for environmental analyses in order to identify potential chemical contamination commingled with the radioactive waste. This information would aid in assessing waste classification (i.e., whether hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), is commingled with radioactive waste) as well as provide data for worker health and safety. Samples for environmental analysis were

collected using direct push Macro-Core[®] methodology. Sampling depths were based on the anticipated depth of radiological contamination. Soils exhibiting the highest PID readings or visual contamination were collected and sent for laboratory analysis by a USACE and NJDEP certified laboratory (RECRA LabNet). Samples were analyzed for RCRA disposal characteristics (ignitability, reactivity, corrosivity, and toxicity characteristic leaching procedure TCLP), the Target Compound List (TCL) and the Target Analyte List (TAL) with chromium speciation.

During performance of environmental borings, environmental boring log sheets were completed for each boring. Copies of the completed log sheets are included in [Appendix 7-C](#).

Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the environmental data. Environmental data were evaluated using the USACE's Data Quality Evaluation Guidance, as presented in the CDQMP. In addition, the USEPA Region II SOP No. HW-24, Revision I, June 1999, was also applied. The data validation reports for the environmental sample results are provided in the PDI QCSR.

2.8 Geotechnical Sampling

Radiological cleanup criteria have yet to be finalized, therefore final assessment of the extent of radiological contamination cannot be made at this time. The geotechnical investigation program was therefore suspended from the PDI. Following approximate determination of limits of excavation during the design phase, existing geotechnical information will be evaluated for remedial design purposes. If it is decided that additional information is required, then the geotechnical program will be reinstated, as necessary.

2.9 Quality Assurance/Quality Control

Field and laboratory activities were completed in accordance with the CQCP and the CDQMP. Data reflecting adherence to the Quality Assurance / Quality Control (QA/QC) program was documented and presented in the PDI QCSR.

2.10 Health and Safety

All PDI investigation activities were conducted in compliance with the SSHP and associated protocols and directives. Field crews received daily briefings at 'Plan of the Day' meetings prior to any work activities. These meetings reviewed daily health and safety issues such as potential inclement weather, as well as reviews of general site health and safety directives.

3.0 CLUSTER DESCRIPTION AND PDI RESULTS

3.1 Cluster No. 7 Description

Cluster No. 7 consists of two properties in the Borough of Maywood:

- Property No. 07A – 111 Essex St. (Scanel Company, Inc.)
- Property No. 07B – New York, Susquehanna & Western Railway (NYS&W) – Lodi Branch

Property No. 07A is a 1.5-acre vacant lot in Maywood, New Jersey (Block 131, Lots 1,2,3 and 4). The property is triangular in shape, with the northern and southern sides of the triangle measuring about 750 feet, and the west side about 180 feet. The point of the triangle on the east side of the property narrows to a width of about 15 feet (BNI, 1986). The north side of the property borders on Property No. 07B, the right-of-way to NYS&W – Lodi Branch. The southern side borders on Coles Brook, which serves as a drainage pathway from Essex Street. The border for the City of Hackensack is adjacent to Coles Brook, beyond which is a residential garden apartment complex. Coles Brook flows north to the Hackensack River. The property is located behind Jax Car Wash (107B Essex Street) and the Bon Buffet Chinese Restaurant (107A Essex Street).

The owner of 111 Essex Street currently uses the property as a staging area for his construction company. The lot is landlocked but there are ingress/egress easements on either side of the Jax Car Wash property directly to the south at 107B Essex Street (Stone & Webster, 1999e). According to the property owner, building demolition material from the Stepan Company property (Cluster No. 10) was placed at this site during the 1950s and 1960s. Prior investigators speculate that process waste or fill was brought to this property (BNI, 1986). There is visual evidence of debris in areas adjacent to the railway.

Property No. 07B is the right-of-way for the NYS&W – Lodi Branch. A single-line spur and a siding are located on this property. The right-of-way is bordered on the south by Property No. 07A (111 Essex Street) and on the north by a residential garden apartment complex. Radiological contamination on this property has been noted by prior investigators (BNI, 1986).

Refer to [Figure 7-3](#) for more specific details of site features.

3.2 Radiological Data

3.2.1 Surface Gamma Survey

A surface gamma survey was performed at Cluster No. 7. Data, recorded using GPS, was entered into the Groundwater Modeling System (GMS) software package and contoured to a two-dimensional grid using the “Natural Neighbor” contouring protocol. “Natural Neighbor” interpolation is based on the Thiessen polygon network of the scatter point set. Data are interpolated based on distance as well as topological relationships (Boss International, Inc., 2000).

Results of the gamma scan survey for Cluster No. 7 are presented graphically on [Figure 7-4](#) and [Figure 7-A1](#) (Appendix 7-A). [Figure 7-4](#) presents surface gamma scan data in context of the Maywood Site: the upper limit of the contour range is the maximum gamma count measurement detected at the Maywood Site, and the lower contour range represents 1.5 times the background gamma count rate for Cluster No. 7 (background is approximately 1,800 counts per minute for Cluster No. 7). [Figure 7-A1](#) provides a more detailed, cluster-specific, presentation of the gamma scan data, with contoured ranges corresponding to actual minimum and maximum measured gross gamma counts recorded at Cluster No. 7.

3.2.2 *Surface ISOCS Measurements*

Surface ISOCS measurements were taken at three locations on Cluster No. 7; locations are shown on [Figure 7-3](#). Results of surface ISOCS measurements are tabulated on [Table 7-3](#).

3.2.3 *Direct Push Soil Probes*

Twenty-three (23) direct push soil probes were performed at Cluster No. 7 for radiological purposes. Soil probe locations are shown on [Figure 7-3](#).

3.2.3.1 Downhole Gamma Logging

Results from downhole gamma logging measurements taken at the soil probe locations are presented on the PDI Soil Probe Logs included in [Appendix 7-B](#).

3.2.3.2 Direct Push Core Screening/Sample Collection

Results of soil core screening activities performed at the MISS on-site field laboratory are recorded on PDI Soil Probe Logs included in [Appendix 7-B](#).

3.2.3.3 MISS On-Site Field Laboratory Data and ThermoRetec Confirmatory Data

Sixty-nine (69) soil samples were collected for laboratory analysis from the 23 soil probe locations at Cluster No. 7. Fifty-one (51) of the 69 samples were sent for analysis (including four duplicates); 18 were archived. Laboratory data consisting of soil concentrations of the ROC are presented on the soil probe logs in [Appendix 7-B](#), and summarized on [Table 7-4](#). Archived samples are also recorded on the logs and the table.

Ten of the soil samples analyzed by the MISS on-site field laboratory were sent to ThermoRetec for confirmatory analysis. Results of the confirmatory analyses performed by ThermoRetec are shown in [Table 7-4](#).

As part of the data quality objective process, a comparison study was performed between the MISS on-site field laboratory and the ThermoRetec laboratory data. The results of the comparison can be found under separate cover (Stone & Webster, 2000d).

3.3 Environmental Data

One environmental boring was drilled at Cluster No. 7, and one soil sample was collected for environmental analysis. A summary of the environmental analytical data is presented on [Table 7-5](#). [Figure 7-3](#) shows the location of the boring. In addition, the environmental boring log sheet is included in [Appendix 7-C](#).

4.0 REFERENCES

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NAEVA Geophysics, Inc. Results of Subsurface Investigation for the FUSRAP Maywood Superfund Site; 2000.

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Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Quality Control Summary Report*, FUSRAP Maywood Superfund Site. Boston, MA; March 2000c.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Radiological Data Comparison Study*, FUSRAP Maywood Superfund Site. Boston, MA; December 2000d.

U.S. Department of Energy and U.S. Environmental Protection Agency. Federal Facility Agreement for the Maywood Interim Storage Site; November, 1991.

Table 7-1: Properties Comprising Each Cluster

Cluster No.	Property No.	Properties (occupant)	Township/Borough	Property Block & Lot
1	01A	72 Sidney St. (Vacant)	Lodi	Block 164, Lots 1 and 5
2	02A	100 Hancock Street (AT&T)	Lodi	Block 205.03, Lot 2.04
	02B	80 Hancock Street (Vacant)	Lodi	Block 205.03, Lot 2.03
	02C	80 Industrial Road (American Jewel Windows)	Lodi	Block 205.02, Lot 4.02
	02D	8 Mill St. (NJVIS)	Lodi	Block 205.02, Lot 1.05
3	03A	170 Gregg Street (Bergen Cable)	Lodi	Block 205, Lot 1.02
4	04A	160/174 Essex Street (Bank of New York)	Lodi	Block 186.01, Lot 1 and Block 174, Lot 1.02
	04B	I-80 Westbound Right-of-Way (NJDOT)	Lodi	Not Applicable
5	05A	99 Essex Street (Joseph Muscarelle, Inc.)	Maywood	Block 125, Lot 1
	05B	113 Essex Street (Bank of New York)	Maywood	Block 125, Lot 2
	05C	200 NJ Route 17 South (Sears Appliance Repair)	Maywood	Block 125, Lot 3
6	06A	85-101 NJ Route 17 North (Architectural Windows)	Maywood	Block 124, Lot 4
	06B	137 NJ Route 17 North (Ramsey Auto Group)	Maywood	Block 124, Lot 3
	06C	167 NJ Route 17 North (Sunoco Station - Inactive)	Maywood	Block 124, Lot 2
	06D	239 NJ Route 17 North (Gulf Station)	Maywood	Block 124, Lot 1
	06E	29 Essex Street (Federal Express Corporation)	Maywood	Block 124, Lot 5
7	07A	111 Essex Street (Scanel Company, Inc.)	Maywood	Block 131, Lots 1,2,3,4
	07B	New York, Susquehanna & Western Railway - Lodi Branch	Maywood	Block 131, Lot 8
8	08A	23 West Howcroft Road (Maywood Furniture, Inc.)	Maywood	Block 124, Lot 17
9	09A	149-151 Maywood Avenue (Sears Logistical Services)	Maywood; Rochelle Park	Block 124, Lot 30; Block 17.02, Lot 1
10	10A	100 West Hunter Avenue (Stepan Company)	Maywood; Rochelle Park	Block 124, Lot 10; Block 18.02, Lot 2
11	11A	205 Maywood Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
	11B	61 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 50
	11C	50 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
12	12A	New York, Susquehanna & Western Railway	Maywood; Rochelle Park	Block 124, Lot 55 and Block 110, Lot 1
	12B	100 West Hunter Avenue (MISS)	Maywood; Rochelle Park	Block 124, Lot 46 and Block 20.01, Lot 1
	12C	New Jersey Route 17 (NJDOT)	Rochelle Park	Not Applicable

Table 7-2: Summary of PDI Intrusive Field Activities

Cluster No.	Property No.	Property Address	Occupant	Planned			Actual			Schedule (Year 2000)
				Probe Locations	Depth (ft)	Footage (ft)	Probe Locations	Depth (ft)	Footage (ft)	
1	01A	72 Sydney Street	Vacant	13	12	156	15	12	188	Jan. 11, 12, Mar. 31
2	02A	100 Hancock Street	AT&T	17	16	272	17	6 - 12	194	Jan. 27, Feb. 1, 2, Mar. 16
	02B	80 Hancock Street	Vacant	18	16	288	Pending Right of Entry Agreement			
	02C	80 Industrial Road	American Jewel Windows	23	16	368	20	12	272	Jan. 21, 24, 28, Feb. 1
	02D	8 Mill Street	NJVIS	38	16	608	44	12 - 16	593	Jan. 13, 14, 18, 19, 20, 21
3	03A	170 Gregg Street	Bergen Cable	10	8	80	10	8	62	Jan. 12, 13
4	04A	160/174 Essex Street	Bank of New York	25	12	300	23	4 - 12	427	Feb. 2, 3, 4
	04B	I-80 Right-of-Way	NJDOT	7	12	84	7	8 - 12	69	Feb. 2, 4, Mar. 31
5	05A	99 Essex Street	Joseph Muscarelle, Inc.	38	8	304	38	8	318	Feb. 23, 24, Mar. 17
	05B	113 Essex Street	Bank of New York	18	8	144	21	4 - 16	171	Feb. 8, 10, 16
	05C	200 NJ Route 17 South	Sears Appliance Repair	23	8	184	16	8 - 10	129	Feb. 15, 16, Mar. 2
6	06A	85-101 NJ Route 17 North	Architectural Windows	17	12	204	17	8 - 18	196	Feb. 9, 10, 16, Mar. 16
	06B	137 NJ Route 17 North	Ramsey Auto Group	15	12	190	13	10 - 12	145	Feb. 9, 16, 25
	06C	167 NJ Route 17 North	Sunoco Station - Inactive	27	12	324	19	3 - 14	239	Feb. 11, Mar. 8
	06D	239 NJ Route 17 North	Gulf Station	19	12	228	2	11 - 12	23	Feb. 16
	06E	29 Essex Street	Federal Express Corporation	7	12	84	9	7 - 12	95	Feb. 16, Mar. 31
7	07A	111 Essex Street	Scanel Company, Inc.	12	16	192	12	12 - 22	161	Feb. 21, 22, 23
	07B	NYS&W - Lodi Branch	NYS&W - Lodi Branch	16	16	256	11	6 - 16	115	Feb. 21, 22
8	08A	23 West Howcroft Street	Maywood Furniture, Inc.	26	16	416	25	7 - 16	321	Feb. 17, 21
9	09A	149-151 Maywood Avenue	Sears Logistical Services	131	16	2096	72	4 - 16	574	Mar. 2, 3, 6, 7, 8, 9, 15
10	10A	100 West Hunter Avenue	Stepan Company	106	24	2544	92	4 - 24	1076	Feb. 25, 28, 29, Mar. 1, 2, 6, 7, 9, 16, 30
11	11A	205 Maywood Avenue	Myron Manufacturing	5	8	40	5	8 - 12	44	Feb. 16
	11B	61 West Hunter Avenue	Myron Manufacturing	9	8	72	10	8 - 16	87	Feb. 15, 21
	11C	50 West Hunter Avenue	Myron Manufacturing	1	8	8	1	8	8	Feb. 15
12	12A	NYS&W	NYS&W	31	24	744	27	12 - 27	335	Feb. 18, 22, 24, Mar. 16, 30
	12B	100 West Hunter Avenue	MISS	120	24	2880	100	7 - 26	1769	Feb. 4, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24, 25, 29, Mar. 1, 7, 8, 9
	12C	NJ Route 17	NJDOT	0	0	0	0	0	0	<i>No investigations planned.</i>
TOTALS:				772		13,066	626		7,611	

Table 7-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
	pCi/g	%	pCi/g	pCi/g	%	pCi/g	pCi/g	%	pCi/g
7-SI001-SS-0-1	0.64	17.9	0.20	0.85	20.0	0.07	< 6.32	-----	6.32
7-SI002-SS-0-1	1.11	17.0	0.48	12.37	7.0	0.15	< 9.40	-----	9.40
7-SI003-SS-0-1	3.10	16.7	1.47	27.85	6.6	0.36	< 29.60	-----	29.60

* Reported data are taken from the Nuclide Identification Report

MDA : Minimum Detectable Activity

Error: 2 sigma (95% confidence interval)

< : Nuclide undetected or less than the MDA. The nuclide is assumed to be present at the MDA Value.

----- Not Applicable

**Table 7-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
07A-001	6.00	07A05200		1.78	0.10	0.32	2.56	0.10	0.26	14.10	U	---	14.10		
07A-001	8.50	07A05201		1.71	0.16	0.36	1.12	0.10	0.40	10.08		3.69	11.70		
07A-001	10.00	07A05202		ARCHIVED											
07A-002	0.50	07A05203		2.40	0.16	0.55	11.12	0.27	0.66	23.80	U	---	23.80		
07A-002	1.50	07A05204		0.76	0.07	0.21	1.05	0.05	0.13	5.41	U	---	5.41		
		<i>ThermoRetec</i> ⁽²⁾		0.68	0.13	0.14	1.00	0.11	0.19	1.88	UJ	1.93	2.29		
07A-002	1.50	07A05205	X	0.67	0.07	0.17	0.84	0.05	0.23	7.33	U	---	7.33		
		<i>ThermoRetec</i> ⁽²⁾		0.66	0.10	0.11	0.66	0.08	0.16	0.58	UJ	1.08	1.51		
07A-002	3.00	07A05206		ARCHIVED											
07A-003	0.50	07A05207		2.48	J	0.11	0.29	2.71	J	0.09	0.23	11.80	UJ	---	11.80
07A-003	2.00	07A05208		0.73		0.07	0.20	0.91		0.06	0.21	5.07	U	---	5.07
07A-003	5.50	07A05209		ARCHIVED											
07A-004	2.50	07A05210		2.87	J	0.14	0.53	10.84	J	0.24	0.38	20.80	UJ	---	20.80
07A-004	4.50	07A05211		0.98		0.21	0.70	2.54		0.18	0.65	15.50	U	---	15.50
		<i>ThermoRetec</i> ⁽²⁾		1.50		0.34	0.48	2.96		0.36	0.56	9.56		5.32	6.15
07A-004	6.00	07A05212		1.27		0.22	0.65	2.26		0.19	0.67	26.34		6.70	20.10
07A-005	4.50	07A05213		4.78		0.18	0.67	24.93		0.40	0.47	18.40	U	---	18.40
07A-005	8.50	07A05214		4.07		0.34	1.08	1.53		0.23	1.07	85.11		9.91	32.50
07A-005	10.50	07A05215		1.14		0.07	0.22	0.72		0.04	0.14	2.96	J	1.55	5.06
07A-006	4.50	07A05216		14.59		0.54	2.73	447.95		4.77	2.05	-16.72	U	24.73	81.90
		<i>ThermoRetec</i> ⁽²⁾		10.36		1.22	1.58	391.20		15.18	2.33	17.03	UJ	17.68	23.95
07A-006	9.00	07A05217		0.30	U	---	0.30	0.53		0.05	0.16	4.48	U	---	4.48
07A-006	12.50	07A05218		ARCHIVED											
07A-007	4.50	07A05219		10.52		0.48	2.09	164.69		2.06	1.43	56.50	U	---	56.50
07A-007	6.00	07A05220		11.66		0.52	1.81	27.37		0.69	1.25	190.81		18.36	61.20
07A-007	8.50	07A05221		2.39		0.11	0.15	0.80		0.06	0.20	8.88	U	---	8.88
07A-008	1.50	07A05222		1.53		0.15	0.45	2.42		0.12	0.40	10.10	U	---	10.10
07A-008	4.50	07A05223		2.80	J	0.17	0.54	1.77	J	0.15	0.60	37.40	J	5.30	18.70
07A-008	6.00	07A05224		0.26		0.06	0.19	0.45		0.04	0.14	4.17	U	---	4.17
07A-009	5.50	07A05225		9.46	J	0.30	1.31	118.76	J	1.41	1.04	54.30	UJ	---	54.30
		<i>ThermoRetec</i> ⁽²⁾		9.27		0.90	0.93	130.30		5.07	1.41	19.72		11.56	14.71
07A-009	12.50	07A05226		0.71	J	0.06	0.17	0.64	J	0.04	0.15	6.35	UJ	---	6.35

**Table 7-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
07A-010	1.50	07A05227		1.27	0.10	0.28	1.75	0.09	0.33	11.10	U	---	11.10		
07A-010	2.00	07A05228		1.58	0.23	0.70	4.25	0.22	0.79	25.10	U	---	25.10		
07A-010	4.50	07A05229		1.94	0.11	0.32	1.23	0.07	0.26	17.73		2.90	10.20		
07A-011	8.50	07A05230		36.41	0.74	1.86	173.23	1.93	1.45	74.50	U	---	74.50		
<i>ThermoRetec</i> ⁽²⁾		07A05230		32.17	2.07	1.33	178.80	6.87	2.04	47.34		18.65	19.97		
07A-011	10.00	07A05231		0.59	0.06	0.18	0.71	0.05	0.19	4.26	U	---	4.26		
07A-012	2.00	07A05232		0.94	J	0.06	0.22	1.65	J	0.07	0.23	8.09	UJ	---	8.09
07A-012	4.50	07A05233		3.44		0.38	1.14	5.58		0.32	1.24	35.20	J	11.31	35.60
<i>ThermoRetec</i> ⁽²⁾		07A05233		2.61		0.52	0.63	4.63		0.55	0.98	19.72		7.40	10.39
07A-012	6.00	07A05234		1.80		0.12	0.31	1.05		0.08	0.35	5.95	J	3.44	11.30
07B-001	2.00	07B05300		1.06		0.07	0.20	0.82		1.05	0.15	7.68	U	---	7.68
07B-001	2.00	07B05301	X	1.04		0.08	0.25	0.85		0.05	0.17	3.61	J	1.79	7.20
07B-001	4.50	07B05302		1.10		0.09	0.23	1.02		0.07	0.27	6.39	U	---	6.39
07B-001	6.00	07B05303		ARCHIVED											
07B-002	1.00	07B05304		1.60		0.09	0.27	1.10		0.06	0.23	9.41		2.91	9.17
07B-002	4.50	07B05305		1.15		0.09	0.26	1.07		0.07	0.27	9.08	U	---	9.08
07B-002	6.00	07B05306		ARCHIVED											
07B-003	2.00	07B05307		1.45		0.09	0.24	0.86		0.06	0.14	10.73		2.30	6.88
07B-003	4.50	07B05308		1.15		0.10	0.26	0.88		0.07	0.31	6.84	J	3.03	9.80
07B-003	6.00	07B05309		ARCHIVED											
07B-004	1.00	07B05310		1.75		0.12	0.31	2.22		0.11	0.42	13.70	U	---	13.70
07B-004	2.00	07B05311		2.75		0.19	0.40	0.69	U	---	0.69	29.03		4.89	13.70
07B-004	6.00	07B05312		0.85		0.08	0.18	0.90		0.06	0.22	5.49	U	---	5.49
07B-005	0.50	07B05313		1.94		0.09	0.29	2.16		0.09	0.22	11.90	U	---	11.90
07B-005	1.50	07B05314		1.11		0.08	0.19	0.99		0.05	0.14	5.60	U	---	5.60
07B-005	5.00	07B05315		ARCHIVED											
07B-006	8.50	07B05316		1.60		0.08	0.26	1.76		0.07	0.19	8.93	U	---	8.93
<i>ThermoRetec</i> ⁽²⁾		07B05316		1.14		0.15	0.14	1.45		0.14	0.19	1.18	UJ	1.77	2.04
07B-006	8.50	07B05317	X	1.35		0.08	0.29	1.68		0.07	0.18	6.76	U	---	6.76
<i>ThermoRetec</i> ⁽²⁾		07B05317		1.06		0.16	0.14	1.44		0.29	0.47	2.09	J	1.85	2.17
07B-006	9.50	07B05318		1.45		0.07	0.29	1.72		0.07	0.20	9.30	U	---	9.30
07B-006	10.50	07B05319		1.63		0.09	0.26	1.70		0.07	0.17	6.78	U	---	6.78

**Table 7-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
07B-007	0.50	07B05320		2.19	0.11	0.32	2.30	0.09	0.20	8.47	U	---	8.47
07B-007	1.50	07B05321		0.53	0.06	0.18	0.57	0.04	0.11	-0.53	U	1.40	4.85
07B-007	4.50	07B05322		ARCHIVED									
07B-008	2.50	07B05323		4.71	0.20	0.37	1.30	0.09	0.33	109.68		7.20	18.30
<i>ThermoRetec⁽²⁾</i>		<i>07B05323</i>		<i>3.55</i>	<i>0.34</i>	<i>0.24</i>	<i>0.77</i>	<i>0.35</i>	<i>0.57</i>	<i>105.00</i>		<i>12.23</i>	<i>10.27</i>
07B-008	4.50	07B05324		1.21	0.07	0.20	1.04	0.06	0.17	8.42	U	---	8.42
07B-008	5.50	07B05325		ARCHIVED									
07B-009	2.50	07B05326		4.79	0.18	0.41	1.52	0.09	0.32	59.83		5.25	17.30
07B-009	4.50	07B05327		1.33	0.07	0.20	1.88	0.08	0.16	6.57	U	---	6.57
07B-009	5.50	07B05328		ARCHIVED									
07B-010	2.00	07B05329		2.89	0.14	0.36	1.17	0.07	0.23	51.02		4.12	11.40
07B-010	4.50	07B05330		1.29	0.08	0.20	0.96	0.05	0.16	4.34	J	2.09	6.77
07B-010	5.50	07B05331		ARCHIVED									
07B-011	2.50	07B05332		1.40	0.09	0.32	1.89	0.08	0.23	10.60	U	---	10.60
07B-011	4.50	07B05333		0.41	0.06	0.17	0.54	0.05	0.17	4.59	U	---	4.59
07B-011	4.50	07B05334	X	0.40	0.06	0.19	0.52	0.05	0.18	4.41	U	---	4.41
07B-011	6.00	07B05335		ARCHIVED									

Error: 2 sigma (95% confidence interval)

- Not Applicable
- U Undetected or Negative Concentration Less Than the MDA
- J Estimated
- MDA Minimum Detectable Activity

- (1) The sample marked with an "X" for duplicate is a duplicate of the sample listed directly above it. Duplicate samples are prepared by homogenizing soil above and below the centerpoint and then separating for analysis. The depth listed is the center point.
- (2) Approximately 10% of all radiological soil samples collected under the PDI Program were sent to ThermoRetec, an off-site laboratory, for confirmatory radiological analyses. Results from ThermoRetec are presented in this table in italicized font immediately below the MISS On-Site field laboratory result for that same sample.

Table 7-5: Summary of Environmental Analytical Data

Parameter	Sample ID Sample Location Sample Depth (feet) Sample Date	07A-020544 07A-001 5 - 8 03/23/00
Units		
<i>Miscellaneous</i>		
Chromium VI	mg/kg	1.4U
Corrosivity by pH	Soil pH	7.8
Cyanide, Reactive	mg/kg	0.50U
Cyanide, Total	mg/kg	0.80U
Sulfide, Reactive	mg/kg	24.0U
<i>PCBs</i>		
4,4'-DDD	ug/kg	25
4,4'-DDE	ug/kg	11U
4,4'-DDT	ug/kg	11U
Aldrin	ug/kg	5.6U
Alpha-BHC	ug/kg	5.6U
alpha-Chlordane	ug/kg	5.6U
Aroclor-1016	ug/kg	57U
Aroclor-1221	ug/kg	110U
Aroclor-1232	ug/kg	57U
Aroclor-1242	ug/kg	57U
Aroclor-1248	ug/kg	57U
Aroclor-1254	ug/kg	57U
Aroclor-1260	ug/kg	65
Beta-BHC	ug/kg	5.6U
Delta-BHC	ug/kg	5.6U
Dieldrin	ug/kg	11U
Endosulfan I	ug/kg	5.6U
Endosulfan II	ug/kg	11U
Endosulfan sulfate	ug/kg	11U
Endrin	ug/kg	11U
Endrin aldehyde	ug/kg	11U
Endrin ketone	ug/kg	11U
gamma-BHC (Lindane)	ug/kg	5.6U
gamma-Chlordane	ug/kg	5.6U
Heptachlor	ug/kg	5.6U
Heptachlor epoxide	ug/kg	5.6U
Methoxychlor	ug/kg	56U
Toxaphene	ug/kg	560U

Table 7-5: Summary of Environmental Analytical Data

Parameter	Sample ID	07A-020544
	Sample Location	07A-001
	Sample Depth (feet)	5 - 8
	Sample Date	03/23/00
Units		
<i>Rare Earth Metals</i>		
Cerium, Total	mg/kg	992
Dysprosium, Total	mg/kg	5.5
Lanthanum, Total	mg/kg	428
Neodymium, Total	mg/kg	430
Yttrium, Total	mg/kg	13.7
<i>Semivolatile Organics</i>		
1,2,4-Trichlorobenzene	ug/kg	2800U
1,2-Dichlorobenzene	ug/kg	2800U
1,3-Dichlorobenzene	ug/kg	2800U
1,4-Dichlorobenzene	ug/kg	2800U
2,2'-oxybis(1-Chloropropane)	ug/kg	2800U
2,4,5-Trichlorophenol	ug/kg	7000U
2,4,6-Trichlorophenol	ug/kg	2800U
2,4-Dichlorophenol	ug/kg	2800U
2,4-Dimethylphenol	ug/kg	2800U
2,4-Dinitrophenol	ug/kg	7000U
2,4-Dinitrotoluene	ug/kg	2800U
2,6-Dinitrotoluene	ug/kg	2800U
2-Chloronaphthalene	ug/kg	2800U
2-Chlorophenol	ug/kg	2800U
2-Methylnaphthalene	ug/kg	230J
2-Methylphenol	ug/kg	490J
2-Nitroaniline	ug/kg	7000U
2-Nitrophenol	ug/kg	2800U
3,3'-Dichlorobenzidine	ug/kg	2800U
3-Nitroaniline	ug/kg	7000U
4,6-Dinitro-2-methylphenol	ug/kg	7000U
4-Bromophenyl-phenylether	ug/kg	2800U
4-Chloro-3-methylphenol	ug/kg	2800U
4-Chloroaniline	ug/kg	2800U
4-Chlorophenyl-phenylether	ug/kg	2800U
4-Methylphenol	ug/kg	580J
4-Nitroaniline	ug/kg	7000U
4-Nitrophenol	ug/kg	7000U
Acenaphthene	ug/kg	2800U
Acenaphthylene	ug/kg	2800U
Anthracene	ug/kg	730J
Benzo(a)anthracene	ug/kg	1600J
Benzo(a)pyrene	ug/kg	1700J
Benzo(b)fluoranthene	ug/kg	1300J

Table 7-5: Summary of Environmental Analytical Data

Parameter	Sample ID	07A-020544
	Sample Location	07A-001
	Sample Depth (feet)	5 - 8
	Sample Date	03/23/00
Units		
<i>Semivolatile Organics (continued)</i>		
Benzo(g,h,i)perylene	ug/kg	1300J
Benzo(k)fluoranthene	ug/kg	1500J
bis(2-Chloroethoxy)methane	ug/kg	2800U
bis(2-Chloroethyl)ether	ug/kg	2800U
bis(2-Ethylhexyl)phthalate	ug/kg	2800U
Butylbenzylphthalate	ug/kg	2800U
Carbazole	ug/kg	2800U
Chrysene	ug/kg	2300J
Di-n-butylphthalate	ug/kg	2800U
Di-n-octyl phthalate	ug/kg	2800U
Dibenz(a,h)anthracene	ug/kg	2800U
Dibenzofuran	ug/kg	2800U
Diethylphthalate	ug/kg	2800U
Dimethylphthalate	ug/kg	2800U
Fluoranthene	ug/kg	3900
Fluorene	ug/kg	520J
Hexachlorobenzene	ug/kg	2800U
Hexachlorobutadiene	ug/kg	2800U
Hexachlorocyclopentadiene	ug/kg	2800U
Hexachloroethane	ug/kg	2800U
Indeno(1,2,3-cd)pyrene	ug/kg	890J
Isophorone	ug/kg	2800U
N-Nitroso-di-n-propylamine	ug/kg	2800U
N-Nitrosodiphenylamine (1)	ug/kg	180J
Naphthalene	ug/kg	570J
Nitrobenzene	ug/kg	2800U
Pentachlorophenol	ug/kg	7000U
phenanthrene	ug/kg	3500
phenol	ug/kg	2800U
Pyrene	ug/kg	4300
<i>Total Metals</i>		
Aluminum, Total	mg/kg	4230
Antimony, Total	mg/kg	0.26U
Arsenic, Total	mg/kg	22
Barium, Total	mg/kg	78.5
Beryllium, Total	mg/kg	0.44
Boron, Total	mg/kg	6.6
Cadmium, Total	mg/kg	0.11
Calcium, Total	mg/kg	32300
Chromium, Total	mg/kg	19.6

Table 7-5: Summary of Environmental Analytical Data

Parameter	Sample ID Sample Location Sample Depth (feet) Sample Date	07A-020544 07A-001 5 - 8 03/23/00
Units		
<i>Total Metals (continued)</i>		
Cobalt, Total	mg/kg	3.1
Copper, Total	mg/kg	35.8
Iron, Total	mg/kg	8460
Lead, Total	mg/kg	276
Lithium, Total	mg/kg	13.2
Magnesium, Total	mg/kg	8840
Manganese, Total	mg/kg	204
Mercury, Total	mg/kg	1.3
Nickel, Total	mg/kg	8.8
Potassium, Total	mg/kg	534
Selenium, Total	mg/kg	0.63U
Silver, Total	mg/kg	0.13U
Sodium, Total	mg/kg	558
Thallium, Total	mg/kg	0.53U
Vanadium, Total	mg/kg	15.4
Zinc, Total	mg/kg	159
<i>Volatile Organics</i>		
1,1,1-Trichloroethane	ug/kg	1600U
1,1,2,2-Tetrachloroethane	ug/kg	1600U
1,1,2-Trichloroethane	ug/kg	1600U
1,1-Dichloroethane	ug/kg	1600U
1,1-Dichloroethene	ug/kg	1600U
1,2-Dichloroethane	ug/kg	1600U
1,2-Dichloroethene (total)	ug/kg	1600U
1,2-Dichloropropane	ug/kg	1600U
2-Butanone	ug/kg	3300U
2-Hexanone	ug/kg	3300U
4-Methyl-2-pentanone	ug/kg	3300U
Acetone	ug/kg	2200BJ
Benzene	ug/kg	1600U
Bromodichloromethane	ug/kg	1600U
Bromoform	ug/kg	1600U
Bromomethane	ug/kg	3300U
Carbon Disulfide	ug/kg	1600U
Carbon Tetrachloride	ug/kg	1600U
Chlorobenzene	ug/kg	1600U
Chloroethane	ug/kg	3300U
Chloroform	ug/kg	1600U

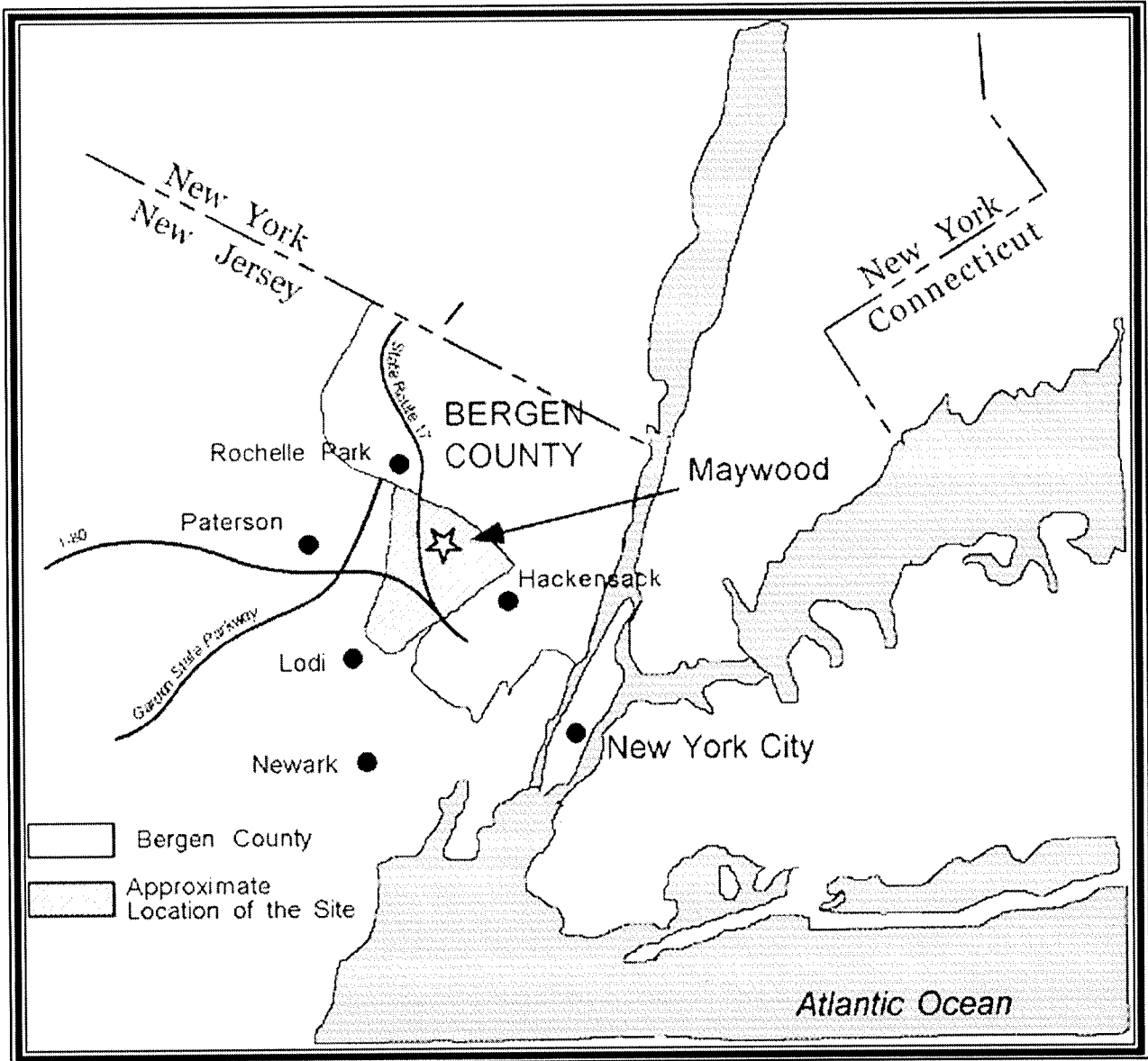
Table 7-5: Summary of Environmental Analytical Data

Parameter	Sample ID Sample Location Sample Depth (feet) Sample Date	07A-020544 07A-001 5 - 8 03/23/00
Units		
<i>Volatile Organics (continued)</i>		
Chloromethane	ug/kg	3300U
cis-1,3-Dichloropropene	ug/kg	1600U
Dibromochloromethane	ug/kg	1600U
Ethylbenzene	ug/kg	1600U
Methylene Chloride	ug/kg	880BJ
Styrene	ug/kg	1600U
Tetrachloroethene	ug/kg	1600U
Toluene	ug/kg	1600U
Trans-1,3-Dichloropropene	ug/kg	1600U
Trichloroethene	ug/kg	1600U
Vinyl Chloride	ug/kg	3300U
Xylene (total)	ug/kg	1600U
<i>TCLP Metals</i>		
Arsenic	ug/L	22.9U
Barium	ug/L	270
Cadmium	ug/L	4.1U
Chromium	ug/L	3.4U
Lead	ug/L	204J
Mercury	ug/L	0.1U
Selenium	ug/L	49.7U
Silver	ug/L	3.7U
<i>TCLP Pesticides</i>		
Alpha-Chlordane	ug/L	0.5U
Endrin	ug/L	1U
Gamma-BHC (Lindane)	ug/L	0.5U
Gamma-Chlordane	ug/L	0.5U
Heptachlor	ug/L	0.5U
Heptachlor epoxide	ug/L	0.5U
Methoxychlor	ug/L	5U
Toxaphene	ug/L	50U
2,4,5-TP (Silvex)	ug/L	5U
2,4-D	ug/L	10U


Table 7-5: Summary of Environmental Analytical Data

Parameter	Sample ID Sample Location Sample Depth (feet) Sample Date	07A-020544 07A-001 5 - 8 03/23/00
Units		
<i>TCLP Volatiles</i>		
1,1-Dichloroethene	mg/L	0.025U
1,2-Dichloroethane	mg/L	0.025U
2-Butanone	mg/L	0.05U
Benzene	mg/L	0.025U
Carbon tetrachloride	mg/L	0.025U
Chlorobenzene	mg/L	0.025U
Chloroform	mg/L	0.025U
Tetrachloroethene	mg/L	0.025U
Trichloroethene	mg/L	0.025U
Vinyl Chloride	mg/L	0.05U
<i>TCLP Semi-Volatiles</i>		
1,4-Dichlorobenzene	mg/L	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U
2,4-Dinitrotoluene	mg/L	0.05U
2-Methylphenol	mg/L	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U
Hexachlorobenzene	mg/L	0.05U
Hexachlorobutadiene	mg/L	0.05U
Hexachloroethane	mg/L	0.05U
Nitrobenzene	mg/L	0.05U
Pentachlorophenol	mg/L	0.12U
Pyridine	mg/L	0.05U

Value Between Method Detection Limit and Reporting Limit
 B (inorganics) Found in Associated Blank
 B (organics) Undetected Values
 U Estimated Value
 J Found in Blank; is an Estimated Value
 BJ



NOT TO SCALE

<p>U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS NEW YORK DISTRICT</p> <p>US ARMY CORPS OF ENGINEERS FUSRAP FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM</p>	<p> STONE & WEBSTER, INC.</p> <p>Prepared by: MALCOLM PIRNE</p> <p>File Name: MPI-CH7</p>
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**LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY**

PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

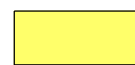
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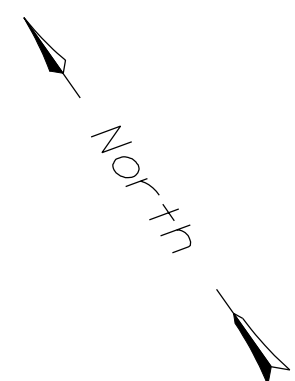
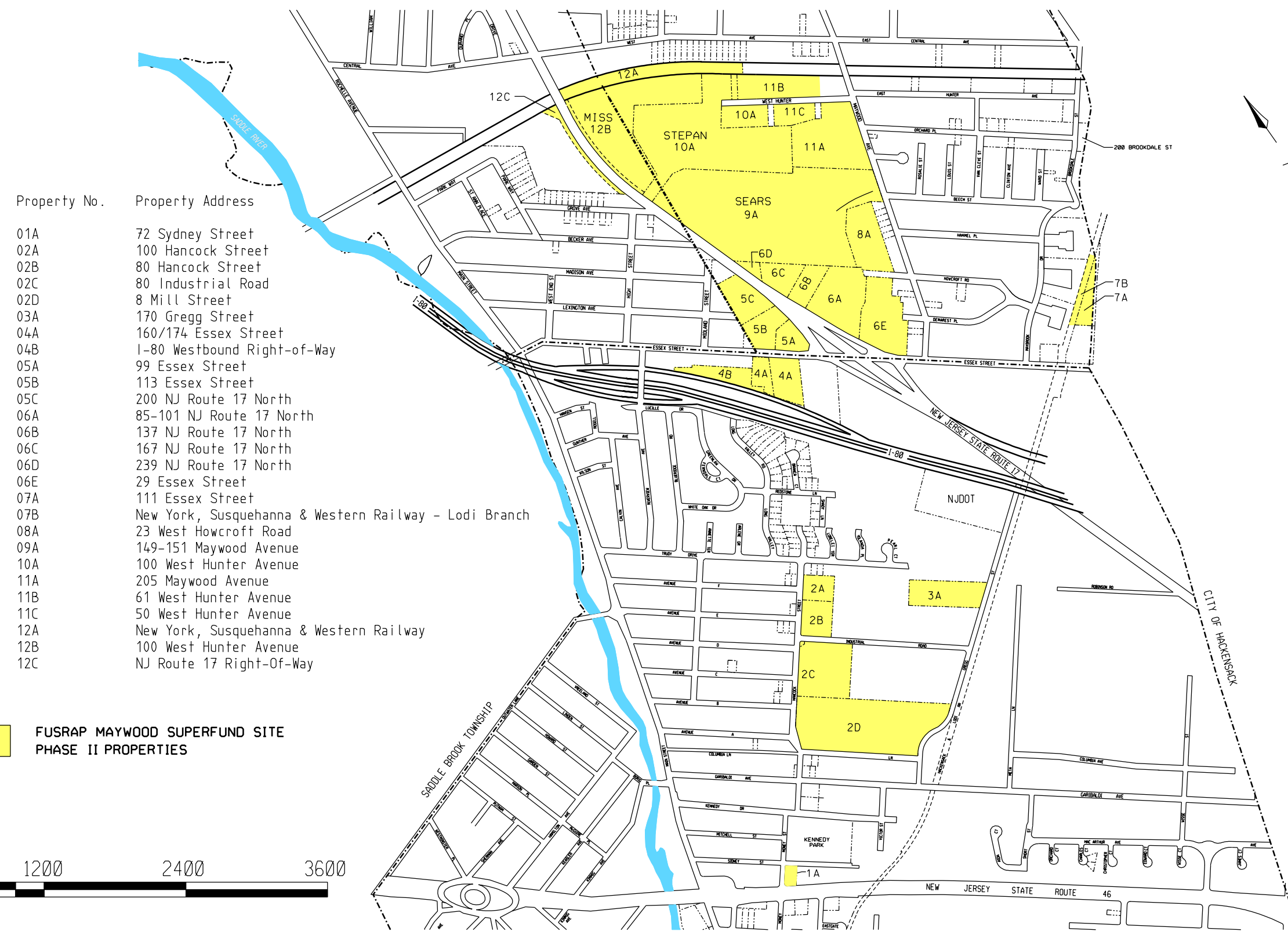
Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 7-1

Cluster No.	Property No.	Property Address
1	01A	72 Sydney Street
2	02A	100 Hancock Street
	02B	80 Hancock Street
	02C	80 Industrial Road
	02D	8 Mill Street
3	03A	170 Gregg Street
4	04A	160/174 Essex Street
5	04B	1-80 Westbound Right-of-Way
	05A	99 Essex Street
6	05B	113 Essex Street
	05C	200 NJ Route 17 North
	06A	85-101 NJ Route 17 North
	06B	137 NJ Route 17 North
	06C	167 NJ Route 17 North
7	06D	239 NJ Route 17 North
	06E	29 Essex Street
8	07A	111 Essex Street
	07B	New York, Susquehanna & Western Railway - Lodi Branch
9	08A	23 West Howcroft Road
10	09A	149-151 Maywood Avenue
11	10A	100 West Hunter Avenue
	11A	205 Maywood Avenue
	11B	61 West Hunter Avenue
12	11C	50 West Hunter Avenue
	12A	New York, Susquehanna & Western Railway
	12B	100 West Hunter Avenue
	12C	NJ Route 17 Right-Of-Way


 FUSRAP MAYWOOD SUPERFUND SITE
PHASE II PROPERTIES



U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT



US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

 **STONE & WEBSTER, INC.**

Prepared by:
**MALCOLM
PIRNIE**

File Name:
\\MAYWOOD\TASK0318\CLUSTER REPORT\REV 1\FIGURE7-2.DGN

LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY

PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

Contract Number:
DACW41-99-D-9001

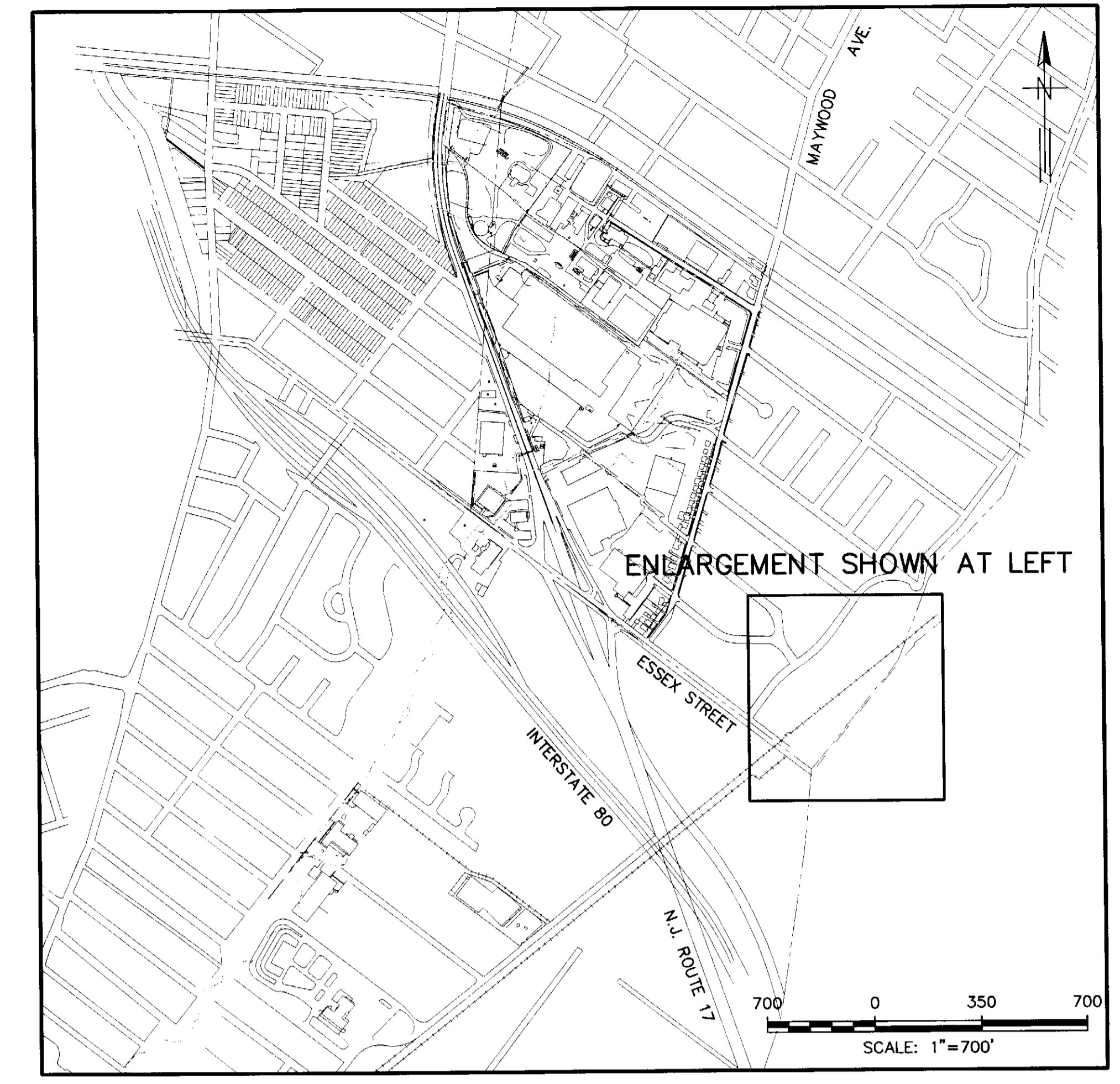
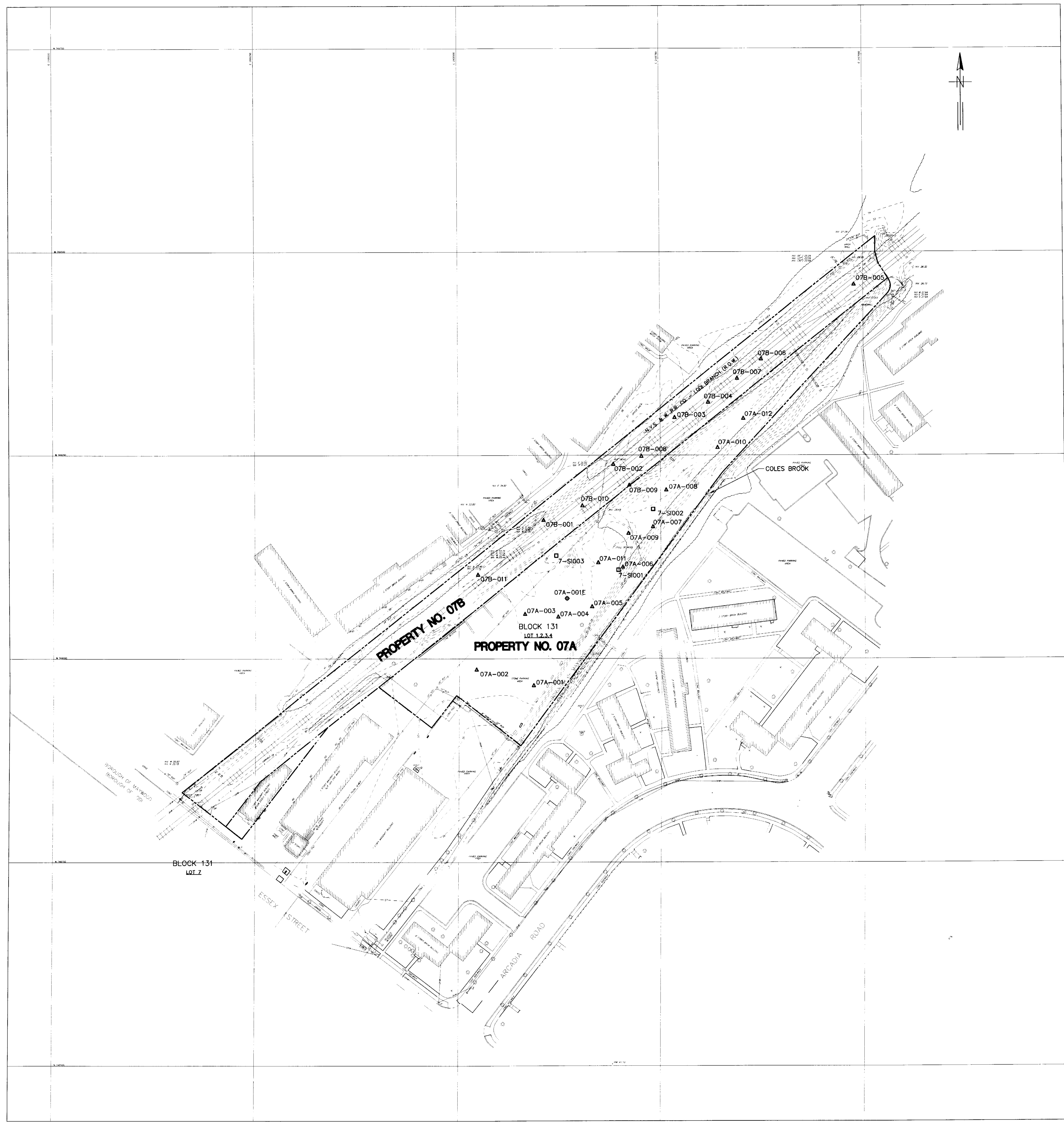
Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 7-2

A B C D E F G H I J K L M N O P Q R S T U V

15
14
13
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2
1



LEGEND

- PROPERTY BOUNDARY
- EXISTING BUILDING
- EXISTING 1' CONTOUR

SAMPLE SYMBOL	SAMPLE TYPE	NUMBER OF SAMPLING LOCATIONS
	DIRECT PUSH SOIL PROBE LOCATIONS (RADIOLOGICAL)	23
	SURFACE ISOCs LOCATIONS	3
	DIRECT PUSH SOIL PROBE LOCATION (ENVIRONMENTAL)	1

- NOTES:**
- THIS SURVEY SHOWS CONDITIONS AS OF OCTOBER 1999 BASED ON AERIAL MAPPING PREPARED BY GEOD CORP. AND GROUND SURVEY BY GARDEN STATE ENGINEERING SURVEYING AND PLANNING.
 - VERTICAL DATUM IS REFERENCED TO NCGVD 1929.
 - HORIZONTAL DATUM IS REFERENCED TO NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 1927.

**CLUSTER NO. 7 111 ESSEX STREET (07A)
NEW YORK, SUSQUEHANNA &
WESTERN RAILWAY - LODI BRANCH (07B)**

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT

FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

STONE & WEBSTER, INC.
Project No. 051001
Reviewed by: _____ Date: _____

Drawn by CS Date: 7/21/04 File Name: \$MPI-C7

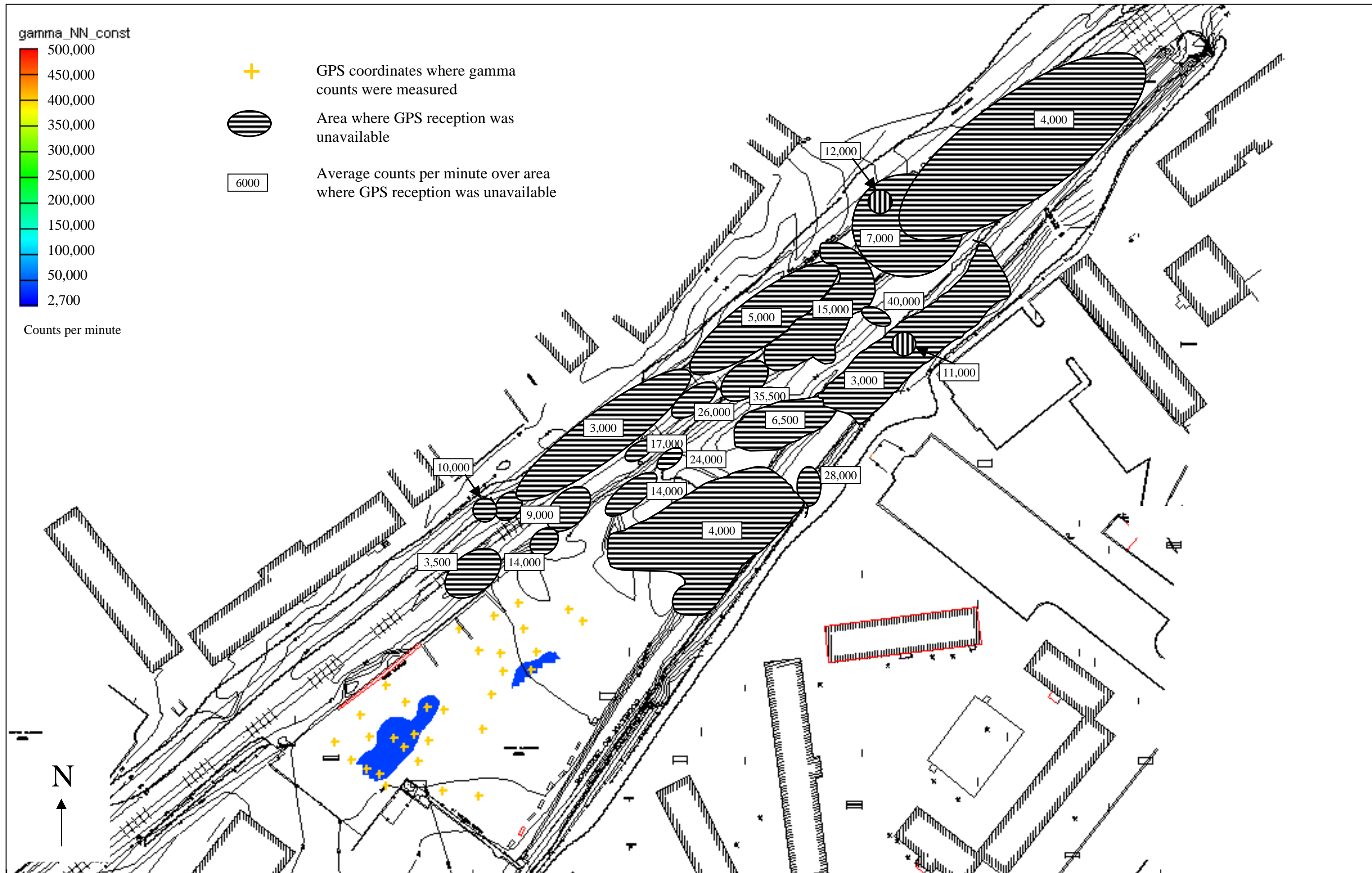
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**CLUSTER NO. 7
SAMPLE LOCATION MAP**

PRE-DESIGN INVESTIGATION REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, COX AND
ROCHELLE PARK, NEW JERSEY

Figure Number: **7-3**

D:\projects\104\104001\104001.dwg Plot Date: 08/25/2004 11:47



Lower Contour Limit = $1.5 \times \text{Background} = 1.5 \times 1800 = 2700$ counts per minute
 Upper Contour Limit = Highest measurement across entire Maywood Site: approx. 500,000 counts per minute

Property Cluster No. 7: 111 Essex St. (Scanel)
 New York, Susquehanna & Western Railway - Lodi Branch
 Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 7-4

APPENDIX 7-A

Variations from the PDI Work Plan

**Letters Informing EPA and NJDEP of Use of Geoprobes⁰
In Lieu of Downhole ISOCS**



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Angela Carpenter
Remedial Project Manager
Federal Facilities Section
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Dear Ms. Carpenter:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in your December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Donna Gaffigan, NJDEP



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Donna Gaffigan
Case Manager
Bureau of Case Management
New Jersey Department of Environmental Protection
401 E State St
Trenton, NJ 08625-0600

Dear Ms. Gaffigan:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in USEPA's December 1, 1999, letter under separate cover.

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1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Angela Carpenter, EPA

Revisions to Standard Operating Procedure No. SW-MWD-509-0



**STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION**

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE: 1 of 8 plus Attachment 1
	DATE: February 2000

APPROVED:

Prepared by:
Project Chemist
Reviewed by:
PDI Task Manager
Richard Skyness 2/29/00
Project Engineer
[Signature] 2/29/00
Project Manager

1.0 PURPOSE

This Stone & Webster Standard Operating Procedure (SOP), **Soil Probe Investigation** shall be employed when collecting subsurface soil samples using the direct push soil probe method at the FUSRAP Maywood Superfund Site (hereafter referred to as the Maywood Site) properties with known or suspected soil and/or groundwater contamination.

2.0 SCOPE

This procedure details the materials, equipment, and methods common to soil probe investigation activities. Consult the site-specific project plans and work plans for proposed soil probe locations. Always consult site-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Task Manager prior to implementation and shall be documented in project field logbooks.**

3.0 REFERENCES

- Stone & Webster Maywood SOP 102 - Downhole Gamma Radiation Logging
- Stone & Webster Maywood SOP 307 - Surface and Shallow Subsurface Soil Sampling
- Stone & Webster Maywood SOP 308 - Soil Borings and Sampling
- Stone & Webster Maywood SOP 401 - Photoionization Detector (PID)
- Stone & Webster Maywood SOP 504 - Labeling, Packaging, and Shipping Environmental Samples
- Stone & Webster Maywood SOP 505 - Cuttings and Fluids Management
- Stone & Webster Maywood SOP 506 - Decontamination
- Stone & Webster Maywood SOP 507 - Field Notebook Content and Control
- U.S.E.P.A., A Compendium of Superfund Field Operation Methods, Document EPA/540/P-87/001, December, 1987.

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
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DEFINITIONS

Stone & Webster Team – personnel of the Stone & Webster Team that includes for this SOP: Stone & Webster, Malcolm Pirnie, Franklin Environmental Services, Inc., Safety & Ecology Corporation (SEC), and Garden State Surveying, Engineering and Planning, Inc. The Stone & Webster Team shall perform soil probe investigation activities, except those activities specified as performed by the Subcontractor.

Subcontractor – personnel of the direct push soil probe firm.

Direct Push Soil Probe – generic name for advancing media sampling piping/tubes with only direct mechanical force. They are typically hollow steel rods advanced using a percussive force (powered hammer) and driven directly into unconsolidated soil. There are two types of direct push soil probes. One is a single rod system (i.e., macrocore) and the other is a dual tube or cased system. The latter, which will be the method of choice for most Maywood Site investigations, utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Drive rods used with the cased system are usually made from a high-grade steel alloy and are retracted after sampling.

4.0 RESPONSIBILITIES

5.1 Project Manager - Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 Project Environmental Engineer - Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for direct push soil probe activities.

5.3 Project Superintendent - Designated by the Project Manager to supervise investigative activities by Stone & Webster Team and Subcontractor personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in monitoring soil probe investigation activities in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each workday. The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil probe investigation activities and deviations from this SOP.

5.4 Site Personnel (including the data logger) - Required to read and sign the Maywood Site Safety and Health Plan (SSHP), have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil probe investigation activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

5.5 Site Safety & Health Officer - Responsible for ensuring that all site workers (Stone & Webster and Subcontractor) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.6 Task Manager – Responsible to plan, implement, and closeout field work requiring direct push technology.

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	PAGE 3 of 8

5.7 Subcontractor - Required to read and sign the SSHP, have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. Subcontractors shall report directly to the Task Manager or his designee.

6.0 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS FOR SOIL PROBE INVESTIGATION

The following is a list of equipment and material that is commonly used on all projects when the direct push probe technique is performed in the unconsolidated soils. Refer also to related SOP equipment and material requirements to ensure completeness.

Items required by Subcontractor:

- Direct push probe equipment - of appropriate size and direct push probe and sampling capabilities; vehicle mounted; direct push probe sampling tools used to advance boring (i.e., direct push small diameter rods; and augers, if required) equipment, labor, and supplies to maintain optimal efficiency
- Environmentally-safe lubricants
- Backfill material for probe holes, as required
- Soil sample collection and logging supplies – **See Stone & Webster Maywood SOP 308, Soil Borings and Sampling**
- Decontamination supplies - **See Stone & Webster Maywood SOP 506, Decontamination**

Items carried by Stone & Webster Team on-site personnel

- **SSHP To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Clipboard
- Pencils
- Six-foot-ruler
- Pocket knife
- Camera (optional), check with Project Manager if required
- Volatile organic compound vapor meter equipped with photoionization detector (PID) and other air surveillance monitoring equipment, as required by the SSHP
- Radiation meter
- Site boring logs
- Blank soil probe logs
- Weighted measuring tape
- Water level measuring device - **See Stone & Webster Maywood SOP 410, Groundwater Level Measurement**, Interface probe, if needed
- Paper towels
- Chain of Custody forms

7.0 DIRECT PUSH PROBE ACTIVITIES

7.1 General Considerations

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Prior to selecting the direct push probe method for a specific property, the objectives of the field investigation must be established. These property-specific objectives shall include one or more of the following Maywood Pre-Design Investigation (PDI) program objectives:

- Soil classification/evaluation - the direct push soil probe technique will be able to accommodate the collection of soils for characterization purposes.
- Characterization of hydrogeologic conditions - the direct push soil probe technique shall allow for the characterization of each stratigraphic zone, and water level measurements.
- Evaluation of soil contamination - the direct push soil probe technique shall provide the appropriate sample collection methods, must not introduce contaminants into the probe hole or otherwise alter the existing soil or groundwater chemistry, and should not result in subsurface cross contamination during or after installation of direct push probe.

7.2 Direct Push Probe Activities

Prior to commencing direct push soil probe fieldwork, several activities should be performed. These activities, which include both pre-mobilization office tasks and pre-installation field tasks, are discussed below. Once the pre-installation activities are completed, direct push soil probe installation may commence.

7.2.1 Pre-Mobilization Tasks

1. The Stone & Webster Team and Subcontractor shall acquire as much geologic and hydrogeologic information about the site as possible. This information may include possible soil and groundwater contamination present, groundwater table depths and fluctuations, surficial and bedrock geology, approximate thickness of the unconsolidated zone, depth to top of weathered rock, depth to competent rock, and site access.
2. Soil probe locations shall be marked in the field by the Stone & Webster Team with either paint or flags/stakes during pre-mobilization tasks, and surveyed using a global positioning system (GPS). The Stone & Webster Team shall check and verify that the soil probe location corresponds to the location on the project plans. The Stone & Webster Team and Subcontractor shall check to see if visible structures will prevent the completion of proposed soil probes at specific locations.
3. The Stone & Webster Team shall communicate with the Subcontractor regarding the requirements of the direct push soil probe program and required geologic and environmental information. Inform the Subcontractor of the environmental sampling program that the project shall follow. This information includes sampling frequency, sampling depths, type of sample required (soil or groundwater), the length of casing, direct push soil probe method (i.e., macrocore, dual tube, etc.), number and type of soil samplers required, and special sampling techniques. Ensure that probe hole backfill is selected in accordance with the project specifications.
4. The Subcontractor shall ensure that all utilities in the vicinity of the proposed boring(s) have been cleared by the appropriate authorized parties (e.g., New Jersey One-Call System at 1-800-272-1000, owner, etc.) or, if utilities exist, are visibly marked on the ground surface in the area of the proposed boring. In addition, keep a safe working distance (pursuant to OSHA) from overhead utilities. **NOTE: The party responsible for having utilities cleared shall be identified. If the responsible party is not clearly identified then the Task Manager shall establish the responsible party. Ensure that utilities have been cleared prior to installation of soil probe.**

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7.2.2 Pre-Installation Field Tasks

Sampling equipment shall be decontaminated prior to use, using pressure or manual washing of the rig, direct push soil probe, and tools, as required to prevent introducing off-site contamination. The direct push soil probe related equipment shall be decontaminated on site prior to direct push soil probe activities. Refer to **Stone & Webster Maywood SOP 506, Decontamination** for specific instructions.

7.3 General Direct Push Soil Probe Method Procedures

The following sections outline general direct push soil probe procedures used in unconsolidated soil materials.

1. Assuming a vertical soil probe, the Subcontractor shall set the direct push rig over the proposed soil probe location. Level the direct push rig and ensure that the direct push rods used to advance the soil probe are in a vertical position directly above the hole.
2. The inspecting Stone & Webster Team shall obtain and record measurements of tools to be used for direct push probe operations. Down-hole measurements taken by the Subcontractors shall be to the nearest 0.1 foot.
3. The Subcontractor shall begin sampling or advancement of soil probe to the desired depth utilizing the direct push method described below. Samples shall be taken using the steps described in Section 8.1.1.
4. When the direct push advancement tools are lowered into the probe hole, the Stone & Webster Team shall keep track of tool lengths to check Subcontractor's stated depth of soil probe.
5. The Stone & Webster Team shall make certain that the Subcontractor is performing depth measurements with a ruler and known tool lengths and not visually judging ("eyeballing") casing and tool projections above the ground. The Stone & Webster Team shall maintain a mental note of depth to bottom of soil probe by keeping track of the linear feet of tools in and above the ground. By mentally subtracting the "stick-up" above the ground, the Stone & Webster Team can maintain a constant approximate check on the soil probe depth and Subcontractor's indicated depths.
6. The breathing zone shall be screened by a designee of the Stone & Webster Team Site Safety and Health Officer for total volatile organic vapors using an organic vapor analyzer as outlined in the SSHP. A lower explosive limit meter (LEL) shall be employed if required in SSHP. Record the measured readings at the depth and time of reading on the boring log.
7. During direct push probe activities, both the Stone & Webster Team and Subcontractor shall record production, mechanical and/or sampling difficulties and the sequence of activities. Also record rig mobilization time, rig set-up time, and probe commencement and completion times. This information should be recorded in a field log book. The Stone & Webster Team shall also record pertinent details on the soil probe log (See Attachment A for blank soil probe log).
8. Refusal of direct push probe advancement tools (i.e., casing refusal) is defined as when the probe hole cannot be advanced using regular advancement methods. Generally, refusal can be identified by the following characteristics:
 - Advancement of probe hole is not noticeable or is very slow
 - A change in the frequency/pitch of the direct push probe equipment
 - The direct push probe downpressure may be significantly higher than under "normal" conditions. The direct push rig may be lifted off the ground surface.
9. If refusal is encountered in the soil probe, refer to **Stone & Webster Maywood SOP 308, Soil Borings and Sampling** for specific instructions. If the probe hole cannot be advanced, relocate the probe hole within approximately 5 feet distant from the original location and start with the

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work in Section Paragraph 7.2.1. Measure the distance and direction from the original location, and record this information in the field logbook. The actual distance of movement necessary may be greater depending on the site conditions. If the required movement is greater than 5 feet, contact the Task Manager for direction.

10. Downhole gamma radiation logging will be performed, *where feasible* by the Stone & Webster Team as described in Section 8.1.1 below (**See Stone & Webster Maywood SOP 102, Downhole Gamma Radiation Logging**).
11. When the probe hole is completed and the area is cleaned up, all contaminated equipment, including down-hole tools, hand tools, and direct push rig shall be decontaminated by the Subcontractor (**See Stone & Webster Maywood SOP 506, Decontamination**) and as directed by the Radiation Safety Officer (RSO).
12. The Stone & Webster Team shall record the soil probe location on the project drawings.

8.0 METHOD-SPECIFIC SOIL SCREENING AND SAMPLING

In this section, the soil screening and sampling procedure for the direct push soil probe method is described.

8.1 Direct Push Probe Services

The direct push probe rig is a hydraulically powered percussion/direct push machine used for small diameter subsurface investigations. It can obtain continuous soil cores, discreet soil samples, groundwater samples and vapor samples along with installation of permanent sparge points.

8.1.1 Procedures for Screening and Sampling Direct Push Probe Soil Samples

Following is the procedure to be used at the Maywood Site for screening and sampling direct push probe soil cores.

1. Each 4-foot soil core sample will remain in the polyvinyl chloride/polyethylene terephthalate (PVC/PETG) liner and marked with the appropriate field identification number, sealed with rubber end caps for liners, and placed into a designated (2 inch ID) PVC container (including PVC end caps) supplied by the Subcontractor for storage. Pertinent sample data will also be marked on the PVC container.
2. Downhole gamma logging will be accomplished, *where feasible* by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.
3. Each soil probe hole will be backfilled for the full length, in accordance with project requirements.
4. The sealed PVC containers will be transported by the Stone & Webster Team to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. All Building 76 sample documentation, field screening, and sampling tasks shall be performed by the Stone & Webster Team. Sample documentation will include the preparation of a soil probe log containing the following pertinent field documentation: soil probe identification number and location; soil column description; soil screening data, and photo-documentation. **Stone & Webster Maywood SOP 507, Field Notebook Content and Control**, shall be followed. Sample documentation information shall be recorded electronically.
5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each

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soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integration taken at each marked location and recorded.

6. The soil cores will then be screened for total volatile organic vapors using a PID (see **Stone & Webster Maywood SOP 401, Photoionization Detector (PID)**). A series of small perforations will be made through the liner at 12-inch increments.
7. The soil cores will be described generally in accordance with the Unified Soil Classification system, based on visual observations through the liners and soil extracted from the small perforations. Prior to storage, these perforations will be sealed with tape. The soil descriptions developed will be marked with an "FC" note to define the description as a field classification.
8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.
9. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.
11. Extracted samples shall be prepared in accordance with the Safety and Ecology Corporation (SEC) on-site field laboratory soil preparation practice/SOP.
12. Analysis for ROC on extracted sections of the soil core will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector, or equivalent. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.
14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.
15. Sampling tools will be decontaminated before each boring, after collecting each soil sample, and after each boring.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term "blind duplicates"), thus eliminating potential bias in the test measurement.

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If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.

ATTACHMENT 1

PDI SOIL PROBE LOG SHEET																
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling													
Site Designator			XXX													
Activity Designator			AAA PDI													
Field Measurement/Sample Collection Designator			VV SP													
Station Number			N N N													
Media			m m SB													
Sample Type			n													
Sequential Sample Number			# # # # # (see Below)													
Location		Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)												
		Gamma Logging		Photoionization Detector (PID) Logging												
		Down Hole	Core													
Date				Date												
Time				Time												
Logger				Logger												
Detector Model #		SPA-3	PID Model #	Multi-RAE												
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811												
Scaler Model #		2224														
Scaler Serial #		132842														
Comments: 1. MPI No. _____. 2. Direct-push location grouted with BenSeal.																
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Signature (Core Gamma Logging)	Date															
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Signature (PID Logging)	Date															

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)															
					X	X	X	#	#	#	#	#	#							
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¹ Location of Core Gamma Reading Based on Initial Continuous Scan
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TABLE 1-A: REVISIONS TO SOP SW-MWD-509-0

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>Section 8.1.1 Procedures for Screening and Sampling Direct Push Soil Samples 2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a Bicon 3/8- inch x 3/8- inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. The detector shall be positioned below the bottom of the casing to allow gamma log readings in the uncased portion of the probe hole. The casing shall be extracted at 6-inch increments and a 30-second count reading shall be taken at each increment.</p>	<p>2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. The sodium iodide detector preamplifier is connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector™ multi-channel analyzer/amplifier/high voltage power supply. The system is controlled, and the data stored, via a notebook computer. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.</p>	<p>Cabrera Services, Inc. developed this procedure as a cost effective site characterization method. Better sensitivity of the 1-inch x 1-inch detector used by Cabrera Services, Inc. allows gross gamma measurements through the soil probe casings, thereby increasing soil probe production rates.</p>	<p>January 11, 2000, without waterproof container. Sealed solid casing installed following extraction of MacroCore or Dual Tube system. January 28, 2000, with waterproof container. Eliminated need of sealed solid casing.</p>
<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The acetate liner shall be marked off at 6-inch intervals. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Readings shall consist of 10-second integrations taken every six inches and recorded.</p>	<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the PVC/PET liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integrations taken at the marked locations and recorded.</p>	<p>Continuous scanning of the soil core provides complete coverage, longer counting time at the regions of interest, and minimizes redundancy of the downhole gamma measurements.</p>	<p>January 11, 2000</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>8. A minimum of three soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238 based on field radiological screening and gamma logging values. At a minimum, one soil sample will be taken at the highest reading location (suspected FUSRAP waste); a second soil sample shall be collected where the readings approach a constant value (suspected transition zone); and a third soil sample shall be collected within the zone of constant readings (below suspected transition zone). Additional samples may be taken based on the Task Manager's direction.</p>	<p>8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.</p>	<p>Suspected FUSRAP waste and suspected transition zones may not be present in each direct push location.</p>	<p>Selection of archived samples began February 21, 2000.</p>
<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored in Building 76 for future reference.</p>	<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.</p>	<p>Based on laboratory analysis there may be the need to collect additional samples from the stored soil cores.</p>	<p>January 11, 2000</p>
<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a USACE-certified off-site laboratory, for confirmatory ROC analysis. Soil samples shall be placed in labeled containers provided by the laboratory, then placed in coolers maintained at 4°C. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>Samples will be sealed in containers provided by the SEC on-site field laboratory.</p> <p>Preservation (i.e., 4°C) is not required for ROC analysis.</p>	<p>February 28, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>14. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.</p>	<p>14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.</p>	<p>Sample storage will be returned to the FUSRAP Maywood Superfund Site for future disposition.</p>	<p>January 11, 2000</p>
<p>9.0 QUALITY ASSURANCE/QUALITY CONTROL Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment rinsate blanks and duplicates. Equipment rinsate blanks must be collected each day that sampling occurs or each decontamination event, whichever is less, per matrix per parameter per field crew, per equipment type (assuming reusable sampling equipment is used). This QA/QC requirement may be modified based on conversations with USACE, USEPA, and NJDEP. Field duplicate samples must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement. Field duplicate samples must represent no less than 10 % of the total number of samples per matrix per parameter per area of study. Field duplicate gamma radiation readings shall also be recorded at a frequency of 10% of the total gamma radiation readings.</p> <p>Matrix spike/matrix duplicate (MS/MD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat</p>	<p>Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement.</p> <p>If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given</p>	<p>Swipe sample is a more representative QC check of loose surface alpha radioactivity than aqueous rinsate sample.</p> <p>Reduction from 10% to 5% duplicate samples based on large number of soil samples proposed for PDI. In addition, 5% is consistent with NJDEP Field Sampling Procedures Manual for field duplicates and EPA guidelines for MS/MSD analysis. Electronic mail sent to EPA and NJDEP regarding reduction in duplicate percentage on January 28, 2000.</p>	<p>Equipment blank revision implemented on January 11, 2000.</p> <p>Reduction from 10% to 5% duplicate samples implemented week of February 7, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
no less than 10% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.	method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.		

Revised PDI Work Plan Table 5-1

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

PROPERTY CLUSTER NUMBER ⁽⁸⁾	NUMBER OF SAMPLING LOCATIONS						NUMBER OF SAMPLES FOR ANALYSIS BY PARAMETER ⁽⁶⁾								
	RADIOLOGICAL SURVEY				GEOTECH	ENVIR	GEOTECHNICAL					CHEMICAL ANALYSES			
	SOIL PROBES ⁽¹⁾	SOIL PROBE DEPTHS (FT) (ESTIMATED)	SOIL PROBE RADIOLOGICAL ANALYSES ⁽²⁾	SURFACE SOIL RADIOLOGICAL ANALYSES ⁽³⁾	SOIL BORINGS ⁽⁴⁾	SOIL BORINGS ^(4,5)	SPECIFIC GRAVITY	ATTERBERG LIMITS	GRAIN SIZE	TRIAXIAL TESTS ⁽⁷⁾	CONSOLID. TESTS ⁽⁷⁾	WATER CONTENT	CHROMIUM SPECIATION	TCL/TAL	FULL RCRA CHAR.
1	13	12	39	5	3	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
2	96	16	288	50	22	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
3	10	8	30	5	2	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
4	32	12	96	15	4	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
5	79	8	237	40	8	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
6	85	16	255	40	12	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
7	28	16	84	15	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
8	26	16	78	15	6	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
9	131	16	393	65	17	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
10	106	24	318	55	16	6	TBD	TBD	TBD	TBD	TBD	TBD	6	6	6
11	16	8	48	10	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
12	151	24	453	75	17	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
TOTALS	773	N/A	2319	390	115	47	---	---	---	---	---	---	47	47	47

NOTES:

- 1 Soil probes installed using direct-push method, to the depth shown or refusal.
- 2 At a minimum, three separate soil samples (one soil sample from within the suspected FUSRAP waste, one in transition zone, and one below the transition zone) will be selected for analysis of the ROC by the on-site field laboratory. A total of 2319 subsurface soil samples (i.e., 3 X 773) will be selected for ROC analysis by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 3 Five surface soil samples will be randomly collected from up to 10% of the 773 soil probe locations for radiological analyses and comparative evaluation of surface ISOCs measurement. A total of 390 surface soil samples (i.e., 5 X 78) will be selected for ROC analyses by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 4 Depths and quantities to be determined in field based on radiological data, structure foundations depths, etc.
- 5 Advanced to depth of radiological contamination.
- 6 Sample Analyses Rationale:
 - 6a Chromium Speciation - Speciation of trivalent and hexavalent chromium for health and safety purposes.
 - 6b TCL/TAL - Detection of organic and inorganic constituents to assess the potential for the presence of commingled radiological and chemical contamination.

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

6c	RCRA Characteristics - To support transportation & disposal activities
6d	Geotechnical Parameters (Specific Gravity, Atterberg Limits, Grain Size, Water Content) - To characterize physical properties of soil for excavation and remediation.
7	Triaxial tests and consolidation tests will be performed on undisturbed tube samples to determine strength and consolidation parameters of fine-grained materials, where present. These parameters will be used to perform bearing capacity and settlement analyses where excavations are adjacent to structures.
8	Property Clusters are defined as follows: <i>PROPERTY CLUSTER NO. 1: 72 SIDNEY ST. (A.K.A 88 MONEY ST.)</i> <i>PROPERTY CLUSTER NO. 2: 100, 80 HANCOCK ST., 80 INDUSTRIAL RD., AND NJVIS</i> <i>PROPERTY CLUSTER NO. 3: 170 GREGG ST.</i> <i>PROPERTY CLUSTER NO. 4: 160/174 ESSEX ST., I-80 RIGHT-OF-WAY</i> <i>PROPERTY CLUSTER NO. 5: 99 ESSEX ST, 113 ESSEX ST., 200 ROUTE 17 SOUTH</i> <i>PROPERTY CLUSTER NO. 6: 29 ESSEX ST., 85-101 ROUTE 17 NORTH, 137 ROUTE 17 NORTH, 167 ROUTE 17 NORTH, 239 ROUTE 17 NORTH</i> <i>PROPERTY CLUSTER NO. 7: 111 ESSEX ST. - SCANEL/HACKENSACK AND LODI RAILROAD</i> <i>PROPERTY CLUSTER NO. 8: 23 WEST HOWCROFT RD.</i> <i>PROPERTY CLUSTER NO.9: 149-151 MAYWOOD AVE.</i> <i>PROPERTY CLUSTER NO.10: 100 W. HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.11: 205 MAYWOOD AVENUE AND 50 & 61 WEST HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.12: 100 W. HUNTER AVE., NY, SUSQUEHANNA AND WESTERN RAILROAD, AND NJ ROUTE 17</i>

Rationale of Intrusive Sample Location Relocations

PDI Soil Probe Variance Log

Cluster No.: 7

Property Addresses: Property No. 07A – 111 Essex Street (Scanel Company, Inc.)
Property No. 07B – NYS&W – Lodi Branch

Sample Location Map: Figure 7-3

Number of Revised Soil Probe Locations: 22

Rationale for Revisions

The locations of the soil probes on the Cluster No. 7 properties were extensively field-revised for several reasons. There is a debris pile that originated from Cluster No. 10, the Stepan Company (Stepan-originated waste which is assumed to include contaminated building debris from the MCW) which has short steep slopes, making it inaccessible. Smaller rock piles and solid debris piles on the property made those areas inaccessible. Ditches on the edges of the track and track sets were water-filled and frozen, presenting a hazard and making those areas inaccessible for sample collection. Locations within the track beds were inaccessible. Based on field checks with a portable gamma meter, sample points were relocated to accessible areas with locally elevated gamma counts. Specific revisions to sample locations are as follows:

- 07A-002 – Moved from north side of tracks (inaccessible ditch) to southern boundary of debris pile to better bracket volume of Stepan-originated waste
- 07A-003 – Moved southwest approximately 50 feet to better delineate Stepan-originated waste
- 07A-004 – Moved site-wide point 250 feet south from tip of property to elevated gamma area on Stepan-originated waste pile
- 07A-005 – Probe moved slightly north (5 feet) to base of Stepan-originated waste pile mound to allow access to the probe rig
- 07A-007 – Probe moved slightly northwest (5-7 feet) around pile of stones to base of Stepan-originated waste pile to allow access for probe rig
- 07A-009 – Moved slightly southwest to top of Stepan-originated waste pile – off steep short slope
- 07A-010 – Moved slightly west off steep, short slope
- 07A-011 – Moved slightly east (4-7 feet) off pile to level area
- 07A-012 – Moved about 30 feet north out of depression to flat portion of Stepan-originated waste pile
- 07B-004 – Moved out of drainage ditch south about 100 feet to an area exhibiting elevated gamma counts between the track sets.

- 07B-005 – Moved laterally out of inaccessible north drainage ditch to a location between the track sets
- 07B-006 - Moved laterally out of inaccessible north drainage ditch to a location between the track sets
- 07B-007 – Moved laterally out of inaccessible south drainage ditch to a location between the track sets
- 07B-008 - Moved laterally out of inaccessible south drainage ditch to a location between the track sets
- 07B-009 - Moved laterally out of inaccessible south drainage ditch to a location between the track sets
- 07B-010 – Moved west about 10 feet off steep short slope to flat area
- 07B-011 – Moved from east side of tracks to west side of tracks to investigate an area exhibiting elevated gamma counts
- Locations 7013, 7014, 7018, 7023, and 7032 originally proposed in the PDIWP were deleted as inaccessible or redundant, given the relocation of other geoprobes

Notes:

1. This list provides specific rationale for the relocation/deletion/addition of intrusive radiological sampling locations due to revised understanding of anticipated radiological contamination. This revised understanding was based on further review of previous data collected by others, and review of surface gamma survey and ISOCS data collected by the Team under this PDI program.
2. Base mapping used in the PDIWP (Stone & Webster, 1999a) has been revised by the Team. Accordingly, a number of intrusive sample locations needed to be relocated due to previously unforeseen physical restrictions (i.e., presence of underground utilities, unacceptable proximity to buildings/roadways, revisions to previously mapped property limits). This table is not intended to provide detailed rationale for points moved due to new mapping.

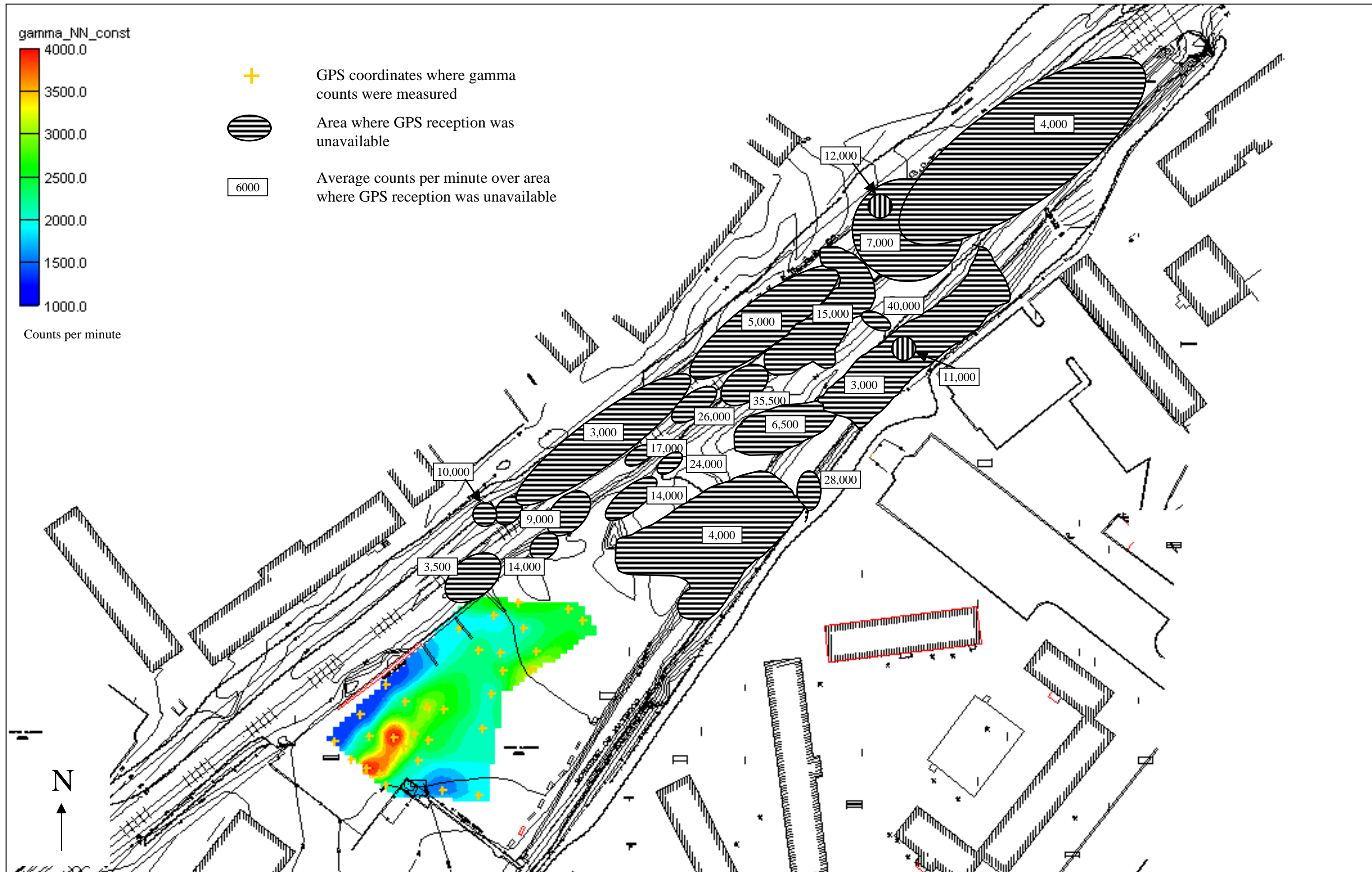
Outlier Protocol (Gamma Scan Anomalies)

Protocol for Addressing Gamma Scan Anomalies (Outliers)

Maywood FUSRAP Superfund Site

Pre-Design Investigation

1. Anomalous surface gamma scan measurements **greater than 2500 cpm for shielded areas (e.g. asphalt covered surfaces), or 3500 cpm for unshielded areas (e.g. bare soil) but, less than 6,000 cpm (1" x 1" NaI detector)** will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL. Note, these count rates are approximately one and one-half times background on shielded and unshielded surfaces.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization (i.e., eliminates the potential for elevated levels of radiological contamination at depth or provides adequate information on the existence of radiological contamination with depth) **will not be further investigated during the PDI.**
 - C. Anomalous areas that do not have previous data that are adequate for characterization **will only be investigated during the PDI if proposed soil probe locations can be moved to these locations without compromising the quality of the data from the proposed locations.** Additional soil probe locations **will not be added** to the program.
 - D. Anomalous areas where additional PDI investigations (based on 1.C) will be performed but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
2. Anomalous areas exhibiting a surface gamma count rate **greater than or equal to 6,000 cpm** (based on a 1" x 1" NaI detector) will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be as follows: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization **will not be further investigated during the PDI.**
 - C. Anomalous areas with previous data that are not adequate for characterization **will be investigated further during the PDI.** Proposed soil probe locations **will be moved** to these locations if possible, or additional soil probe locations **will be added** to the PDI program. These additional soil probes will be used to define the nature and extent of contamination within these previously unidentified areas; the quantity of additional borings is to be determined on a site-by-site basis.
 - D. Anomalous areas that require additional PDI investigations (based on 2.C) but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
3. All anomalous areas and their dispositions will be documented in the PDI.



Property Cluster No. 7: 111 Essex St. (Scanel)
New York, Susquehanna & Western Railway - Lodi Branch
Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 7-A1

Reduction in Field Duplicate and MS/MSD Frequency

Navon, Daria

Subject: FW: Reduction in field duplicate and MS/MSD frequency request

----- Forwarded by David Doyle/Environmental/SWEC on 01/28/2000
02:54 PM -----

"Shonkwiler, Glen D NWK" <Glen.D.Shonkwiler@nwk02.usace.army.mil> on 01/28/2000
02:00:15 PM

To: "carpenter.angela@epamail.epa.gov" <carpenter.angela@epamail.epa.gov>, "dgaffica@dep.state.nj.us" <dgaffica@dep.state.nj.us>
cc: "Roos, Allen D NAN02" <Allen.D.Roos@nan02.usace.army.mil>, "Medary, Richard T NWK" <Richard.T.Medary@nwk02.usace.army.mil>, "Mellema, Doug W NWK" <Doug.W.Mellema@nwk02.usace.army.mil>, "Speckin, Paul D NWK" <Paul.D.Speckin@nwk02.usace.army.mil> (bcc: David Doyle/Environmental/SWEC)

Subject: Reduction in field duplicate and MS/MSD frequency request

Angela/Donna, with this email, USACE is notifying EPA and NJDEP of our intent to reduce the number of field duplicates and MS/MSD samples required in the Maywood Chemical Site CDQMP for the PDI sampling from 10% to 5%. The 10% frequency is a USACE-internal QC standard which USACE plans to reduce based on the large number of soil samples collected during the Pre-Design Investigation (PDI). The reduction in frequency would affect field duplicate samples collected for radionuclides of concern (ROC) and analysis by the on-site field laboratory; field duplicate gamma radiation readings (both downhole and core sample); photoionization detector (PID) or flame ionization (FID) readings; and MS/MSD samples analyzed by the off-site laboratory. It is anticipated that greater than 2000 soil samples will be analyzed by the on-site field laboratory and gamma radiation and PID readings will exceed 10,000 measurements.

Five percent is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and EPA guidelines for MS/MSD analysis. EPA Region II does not have a specific QA/QC guideline for field duplicate samples. The guideline is therefore on a case-by-case basis, in accordance with the site-specific project plans.

Please note that the 10 percent of the samples analyzed by the on-site field laboratory will still be sent to a certified off-site laboratory for confirmatory ROC analysis.

We will continue to adhere to the current 10 percent until EPA and NJ notifies USACE of its concurrence with this deviation from the CDQMP (for the PDI only). Your attention to this matter is greatly appreciated, since reduction of this QA/QC guideline will help to increase production during the Pre-Design Investigation without, in the opinion of USACE, impacting

quality and usability of the data.

Thanks,
Glen Shonkwiler
Remedial Investigations & Remedial Design Manager
Hazardous, Toxic, & Radioactive Waste Branch
U. S. Army Corps of Engineers
CENWK-EC-EA RM 610
601 E 12th St
Kansas City, MO 64106
(816) 983-3561
(816) 426-5550/5949 (fax)
glen.d.shonkwiler@usace.army.mil

APPENDIX 7-B

**PDI Soil Probe Log Sheets
(Radiological Data)**

PDI Soil Probe Log Sheet
LEGEND

List of Abbreviations:

--- = not applicable	lt = light
blk = black	MDA = minimum detectable activity
bn = brown	med = medium
cl = clay	n/r = no recovery
cnts = counts	pCi/g = picoCuries per gram
Conc. = concentration	ppm = parts per million
dk = dark	SAA = same as above
DUP = duplicate	sc = clayey sand
f = fine	sec = seconds
gm = silty gravel	sm = silty sand
gp = poorly-graded gravel	sp = poorly-graded sand
gw = well-graded gravel	sw = well-graded sand
gy = gray	tr = trace
J = estimated	U = unidentified or negative conc. less than MDA
lg = large	wht = white

List of General Comments:

- 4x4 truck-mounted model 5400 and track-mounted model 54DT Geoprobe[®] were used to collect samples. Manual direct push methodology required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- Holes were grouted with BenSeal[®]
- Gamma measurements were taken at center point
- Duplicate samples marked with an "X" for duplicate were prepared by homogenizing soil above and below the center point and then separating for analysis.
- The depth listed is the center point
- Error: 2 sigma (95% confidence interval)

Tube Types

1-inch diameter = Dual Tube (actual 1.3-inch diameter)

2-inch diameter = Macro-Core[®] (actual 1.7-inch diameter)

Sample Intervals

Dual Tube – 13 inches

Macro-Core[®] – 8 inches

Manual Direct Push – 24 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	07A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	001	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748967	2166592	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	02/21/2000	03/03/2000	Date 03/06/2000
Time	11:05	16:00	Time 11:30
Logger	E. Barbour	S. Ng	Logger J.Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> 0 to 4 feet = 2 inch diameter 4 to 8 feet = 1 inch diameter 8 to 12 feet = 1 inch diameter 12 to 16 feet = 1 inch diameter </div> <div style="width: 45%;"> native at 2.5 feet depth to groundwater at 5.9 feet </div> </div>			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 02/21/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/03/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/06/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
---	---

Site Designator	X X X	07A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	748986	2166521	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	03/03/2000	03/06/2000	
Time	11:30	16:30	13:15	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native at 4.0 feet
4 to 8 feet = 1 inch diameter	
8 to 12 feet = 1 inch diameter	depth to groundwater at 14.7 feet
12 to 16 feet = 1 inch diameter	

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	02/21/2000 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	03/03/2000 Date
<i>Field Original Signed</i> Signature (PID Logging)	03/06/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	7	A	0	0	5	2	0	3		2.40	0.16	0.55	11.12	0.27	0.66	23.80	U	---	23.80
1.0																				
1.5	0	7	A	0	0	5	2	0	4		0.76	0.07	0.21	1.05	0.05	0.13	5.41	U	---	5.41
2.0	0	7	A	0	0	5	2	0	5	X	0.67	0.07	0.17	0.84	0.05	0.23	7.33	U	---	7.33
2.5																				
3.0	0	7	A	0	0	5	2	0	6		ARCHIVED									
3.5																				
4.0																				
4.5																				
5.0																				
5.5																				
6.0																				
6.5																				
7.0																				
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24.0																				

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	07A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749055	2166582	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	03/06/2000	03/06/2000	
Time	12:00	7:40	13:48	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native at 4.0 feet
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/06/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)											Laboratory Results										
												Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g				
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	0	7	A	0	0	5	2	0	7		2.48	J	0.11	0.29	2.71	J	0.09	0.23	11.80	UJ	---	11.80
1.0																						
1.5																						
2.0	0	7	A	0	0	5	2	0	8		0.73		0.07	0.20	0.91		0.06	0.21	5.07	U	---	5.07
2.5																						
3.0																						
3.5																						
4.0																						
4.5																						
5.0																						
5.5	0	7	A	0	0	5	2	0	9		ARCHIVED											
6.0																						
6.5																						
7.0																						
7.5																						
8.0																						
8.5																						
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24.0																						

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	07A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749051	2166623	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	03/06/2000	03/06/2000	
Time	12:18	8:05	14:10	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native at 9.5 feet
4 to 8 feet = 1 inch diameter	
8 to 12 feet = 1 inch diameter	depth to groundwater at 15.8 feet
12 to 16 feet = 1 inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/06/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	07A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	005	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749064	2166665	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	02/22/2000	03/06/2000	Date 03/06/2000
Time	14:52	8:30	Time 14:30
Logger	C. Hales	S. Ng	Logger J.Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> 0 to 4 feet = 2 inch diameter 4 to 8 feet = 1 inch diameter 8 to 12 feet = 1 inch diameter </div> <div style="width: 45%;"> native at 10.0 feet depth to groundwater at 5.7 feet </div> </div>			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 02/22/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/06/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/06/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	07A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749112	2166703	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/06/2000	03/06/2000	
Time	15:32	8:50	14:50	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native at 9.0 feet

4 to 8 feet = 1 inch diameter

8 to 12 feet = 2 inch diameter

12 to 16 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/06/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	07A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749162	2166740	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/06/2000	03/06/2000	
Time	15:20	10:05	15:15	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native at 4.0 feet
4 to 8 feet = 1 inch diameter	
8 to 12 feet = 1 inch diameter	depth to groundwater at 10.3 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/06/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	07A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749207	2166757	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/23/2000	03/06/2000	03/06/2000	
Time	8:26	11:20	16:50	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native at 5.0 feet
4 to 8 feet = 1 inch diameter	
8 to 12 feet = 1 inch diameter	depth to groundwater at 10.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/06/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	07A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749154	2166710	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/23/2000	03/06/2000	03/06/2000	
Time	8:35	11:45	17:15	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native at 8.0 feet
 4 to 8 feet = 2 inch diameter
 8 to 12 feet = 2 inch diameter
 12 to 16 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/06/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	07A		
Activity Designator	A A A	PDI		
Field Measurement / Sample Collection Designator	V V	SP		
Station Number	N N N	010		
Media	m m	SB		
Sample Type	n	0		
Sequential Sample Number	#####	(See Below)		
Location	Northing (NAD 1927)	Easting (NAD 1927)		
	749259	2166821		
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Date
Date	02/23/2000	03/06/2000	Date	03/06/2000
Time	8:56	12:05	Time	17:40
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native at 4.0 feet
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter depth to groundwater at 10.8 feet

<i>Field Original Signed</i>	02/23/2000
_____ Signature (Down Hole Gamma Logging)	_____ Date
<i>Field Original Signed</i>	03/06/2000
_____ Signature (Core Gamma Logging)	_____ Date
<i>Field Original Signed</i>	03/06/2000
_____ Signature (PID Logging)	_____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	07A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749118	2166673	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/23/2000	03/06/2000	03/06/2000	
Time	9:10	12:20	18:05	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native at 4.0 feet
4 to 8 feet = 1 inch diameter	
8 to 12 feet = 2 inch diameter	depth to groundwater at 5.6 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/06/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.4	0.0-2.7: bn sm w/gp tr sc														
0.5	181																			
1.0	216				0.1															
1.5	312																			
2.0	505	487			0.0															
2.5	1348		526	477		2.7-4.0: no recovery														
3.0	5107				n/r															
3.5	16849																			
4.0					0.0	4.0-5.1: bn sm w/gp														
4.5			3040																	
5.0			1456		0.0	5.1-8.0: no recovery														
5.5																				
6.0					n/r															
6.5																				
7.0					n/r															
7.5																				
8.0					0.0	8.0-8.4: bn sm w/red and white gp														
8.5			6192			8.4-12.0: no recovery	0	7	A	0	0	5	2	3	0					
9.0			775		0.0															
9.5			548																	
10.0			451		0.0		0	7	A	0	0	5	2	3	1					
10.5																				
11.0																				
11.5																				
12.0																				
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
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22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 32 inches
4-8 feet: 13 inches
8-12 feet: 27 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	07A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749295	2166852	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/23/2000	03/06/2000	03/06/2000	
Time	9:26	13:35	18:25	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native at 6.0 feet
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/06/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	07B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749170	2166606	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	03/06/2000	03/07/2000	
Time	12:25	14:20	8:15	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native at 4.0 feet
4 to 8 feet = 1 inch diameter	
8 to 12 feet = 1 inch diameter	depth to groundwater at 9.1 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	07B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749239	2166692	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	03/06/2000	03/07/2000	
Time	13:45	14:35	8:40	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native at 4.0 feet
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling		
Site Designator	X X X	07B			
Activity Designator	A A A	PDI			
Field Measurement / Sample Collection Designator	V V	SP			
Station Number	N N N	003			
Media	m m	SB			
Sample Type	n	0			
Sequential Sample Number	# # # # #	(See Below)			
Location	Northing (NAD 1927)	Easting (NAD 1927)			
	749296	2166768			
Gamma Logging		Photoionization Detector (PID) Logging			
	Down Hole	Core			
Date	02/21/2000	03/06/2000			
Time	14:25	14:55			
Logger	E. Barbour	S. Ng			
Detector Model #	G1	SPA-3			
Detector Serial #	C442E	CENAN 33401			
Scaler Model #	N/A	2224			
Scaler Serial #	N/A	132842			
Detector Model #	PID Model #				
	Multi Rae				
Detector Serial #	PID Serial #				
	CENAN 21811				

Comments:

0 to 4 feet = 2 inch diameter native at 4.0 feet
 4 to 8 feet = 1 inch diameter depth to groundwater at 5.2 feet

Field Original Signed

Signature (Down Hole Gamma Logging)

02/21/2000
 Date

Field Original Signed

Signature (Core Gamma Logging)

03/06/2000
 Date

Field Original Signed

Signature (PID Logging)

03/07/2000
 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	07B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749315	2166809	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	03/06/2000	03/07/2000	
Time	14:50	15:15	9:33	
Logger	E. Barbour	S. Ng	J.Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter		native at 4.0 feet
4 to 8 feet = 2 inch diameter		

<i>Field Original Signed</i> _____ Signature (Down Hole Gamma Logging)	02/21/2000 _____ Date
<i>Field Original Signed</i> _____ Signature (Core Gamma Logging)	03/06/2000 _____ Date
<i>Field Original Signed</i> _____ Signature (PID Logging)	03/07/2000 _____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	07B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749460	2166989	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/06/2000	03/07/2000	
Time	9:05	16:00	9:50	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter
 4 to 8 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/07/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.3	0.0-1.5: blk sm w/gp														
0.5	271		508	531			0	7	B	0	0	5	3	1	3					
1.0	404		460	510	1.0															
1.5	369		461			1.5-2.8: bn sm w/gp	0	7	B	0	0	5	3	1	4					
2.0	288				0.7															
2.5	264	266				2.8-4.0: no recovery														
3.0	349				n/r															
3.5	251																			
4.0	151				0.7	4.0-4.6: bn sm w/gp														
4.5	125		405	410		4.6-5.7: blk silt														
5.0	116		460		1.4		0	7	B	0	0	5	3	1	5					
5.5			476	453		5.7-8.0: no recovery														
6.0																				
6.5																				
7.0																				
7.5																				
8.0																				
8.5																				
9.0																				
9.5																				
10.0																				
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19.5																				
20.0																				
20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 33 inches
4-8 feet: 21 inches

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	7	B	0	0	5	3	1	3		1.94	0.09	0.29	2.16	0.09	0.22	11.90	U	---	11.90
1.0																				
1.5	0	7	B	0	0	5	3	1	4		1.11	0.08	0.19	0.99	0.05	0.14	5.60	U	---	5.60
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5																				
5.0	0	7	B	0	0	5	3	1	5		ARCHIVED									
5.5																				
6.0																				
6.5																				
7.0																				
7.5																				
8.0																				
8.5																				
9.0																				
9.5																				
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22.5																				
23.0																				
23.5																				
24.0																				

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	07B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749368	2166875	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/06/2000	03/07/2000	
Time	9:35	14:20	10:05	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native at 4.0 feet

4 to 8 feet = 2 inch diameter

8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	07B	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	007	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749344	2166845	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	02/22/2000	03/06/2000	Date 03/07/2000
Time	10:05	17:35	Time 10:22
Logger	E. Barbour	S. Ng	Logger J.Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> 0 to 4 feet = 2 inch diameter 4 to 8 feet = 1 inch diameter 8 to 12 feet = 1 inch diameter </div> <div style="width: 45%;"> native at 4.0 feet depth to groundwater at 9.4 feet </div> </div>			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 02/22/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/06/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/07/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	07B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749249	2166727	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/07/2000	03/07/2000	
Time	10:25	7:55	11:15	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter	native at 4.0 feet
4 to 8 feet = 1 inch diameter	
8 to 12 feet = 1 inch diameter	depth to groundwater at 9.9 feet

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	02/22/2000 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	03/07/2000 Date
<i>Field Original Signed</i> Signature (PID Logging)	03/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	07B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749213	2166712	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/07/2000	03/07/2000	
Time	10:50	8:20	11:50	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native at 5.0 feet
 4 to 11 feet = 1 inch diameter depth to groundwater at 8.8 feet

<i>Field Original Signed</i> _____ Signature (Down Hole Gamma Logging)	02/22/2000 _____ Date
<i>Field Original Signed</i> _____ Signature (Core Gamma Logging)	03/07/2000 _____ Date
<i>Field Original Signed</i> _____ Signature (PID Logging)	03/07/2000 _____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	07B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749188	2166654	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/07/2000	03/07/2000	
Time	11:10	8:40	12:10	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native at 4.0 feet
 4 to 8 feet = 1 inch diameter
 8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	07B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	749103	2166524	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/07/2000	03/07/2000	
Time	14:00	9:05	13:15	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2 inch diameter native at 4.0 feet

4 to 8 feet = 2 inch diameter

8 to 12 feet = 2 inch diameter

12 to 16 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/07/2000 Date

APPENDIX 7-C

Environmental Boring Log Sheets

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	07a
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	m m	SB
Sample Type	n	D
Sequential Sample Number	#####	(see Below)

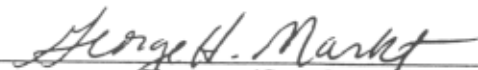

Location	Northing (NAD 1927) 744073.989	Easting (NAD 1927) 2166634.266	Elevation (NGVD 1929)
----------	-----------------------------------	-----------------------------------	-----------------------

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		3/27	Date	3/27
Time		1000	Time	1000
Logger			Logger	
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	101914 / CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

- MPI No. ENV-07-7002
- Direct-push location grouted with BenSeal.

0945 - 1000 - SOIL SAMPLE 5' - 8'
 1000 - 1115 - H₂O SAMPLE
 1115 - 1130 - STEAM CLEAN

 Signature (Core Gamma Logging)	3/27/00 Date
 Signature (Logging)	3/27/00 Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)														
					X	X	X	#	#	#	#	#							
0.0																			
0.5					85% REC. SP 5YR 3/4	0	7	0	2	0	5	4	4						
1.0																			
1.5		0.0																	
2.0																			
2.5					punch thru tin plate														
3.0					punch cement cinders														
3.5					SP 5YR 3/4														
4.0					60% REC. SW 5YR 2.5/1														
4.5		0.0																	
5.0																			
5.5																			
6.0					drilled thru cement concrete														
6.5					to brick fragments and														
7.0		15.0			coal														
7.5																			
8.0					100% REC. SW 5YR														
8.5					2.5/1														
9.0					SM 5YR 2.5/1														
9.5																			
10.0					SC 5YR 2.5/1														
10.5					SP 1 GREY 4/N c. lxs														
11.0					at 11.5'														
11.5																			
12.0					END OF SAMPLING														
12.5					@ 12'														
13.0																			
13.5																			
14.0																			
14.5																			
15.0																			
15.5																			
16.0																			
16.5																			
17.0																			
17.5																			
18.0																			
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21.5																			
22.0																			
22.5																			
23.0																			
23.5																			
24.0																			

H₂O
Si
=

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
07a 02054-5

PROJECT: FUSRAP MAYWOOD SITE: 07a Page 1 of 1

Project No: 08750503 Client: USACE

Contractor: TERRA PROBE INC - SAMPLE DEPTH:

Start Date/Time: Completion Date/Time: Well Diameter:

Development Method/Equipment:

Logged by: G. MARKT Water Level (ft bgs): 5.1' Protection Level: D

Pre-development DTW (PVC) (ft): 5.1' DTB (PVC) (ft): 12'

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.175 \text{ gal}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ —

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ —

Minimum Purge Volume (gal) (3 well volumes) = 0.525 gal

Development Purge/Discharge Rate (gpm): —

Maximum Drawdown During Purging (ft): —

tal Quantity Purged: $\Rightarrow 1 \text{ gal}$

Disposition of Purge Water: TRANSPORTED TO MISS

Hours of Development: —

Hours of Decon: — 0.25 hrs

Hours of Standby: .

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1030		5.1	—	15.6	7.52	3.0	109	low production well
		5.1	—	13.1	6.97	3.15	63	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
DTW = depth to water gpm = gallons per minute

SCREEN @ 5'-9'
DO = 3.36

PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 8 – Revision 1

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

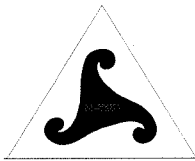
SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18

Submitted to:

Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
FUSRAP Project Office
26 Federal Plaza
New York, New York 10278

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Submitted by:



Stone & Webster, Inc.
100 West Hunter Ave.
Maywood, NJ 07607
May 2001

Reviewed/
Approved by:

Sam Rice Date: 5/31/91
Sam Rice, P.E.
Project Manager

Reviewed/
Approved by:

Kevin F. Donnelly Date: 5/31/01
Kevin F. Donnelly, P.E.
Project Environmental Engineer

Reviewed/
Approved by:

Alan F. Brown Date: 5-30-91
Alan F. Brown, P.E.
Task Manager

Reviewed/
Prepared by:

Edward A. Dudek Date: 5-31-01
Edward Dudek, P.E.
Task Leader

Reviewed/
Prepared by:

Michael Ciminera Date: 5-30-2001
Michael Ciminera
Field Operations Leader

**PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 8 – Revision 1**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18**

RECORD OF REVISIONS

Revision 0: Original Issue

Revision 1: The Final PDI Report (Revision 0) was submitted in July 2000. Revision 1 to the Final PDI Report incorporates the following significant changes: revision to text headers and footers; addition of results of confirmatory radiological analyses to [Table 8-4](#); and addition of Toxicity Characteristic Leaching Procedure (TCLP) data to [Table 8-5](#).

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1.0 SITE BACKGROUND AND PHYSICAL SETTING	1
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ACRONYMS AND ABBREVIATIONS

AT&T	American Telephone & Telegraph
BNI	Bechtel National, Inc.
C	Degrees Centigrade
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
Conc.	Concentration
CQCP	Contractor Quality Control Plan
DOE	U.S. Department of Energy
EPP	Environmental Protection Plan
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	grams
GMS	Groundwater Modeling System
GPR	Ground Penetrating Radar
GPS	Global Positioning System
ID	Identification
ISOCS	In Situ Object Counting System
keV	kilo electron volts
kg	kilogram
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCW	Maywood Chemical Works
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
mg	milligram
MHTDP	Materials Handling, Transportation and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJVIS	New Jersey Vehicle Inspection Station
NYS&W	New York, Susquehanna & Western Railway
ORNL	Oak Ridge National Laboratories
pCi	picoCurie
PDI	Pre-Design Investigation
PDIWP	Pre-Design Investigation Work Plan
PID	Photoionization Detector
PVC/PET	Polyvinyl Chloride/Polyethylene Teraphthalate
QA	Quality Assurance
QC	Quality Control
QCSR	Quality Control Summary Report
Ra-226	Radium-226
Rn-222	Radon-222

RCRA	Resource Conservation and Recovery Act
RESRAD	Department of Energy Computer Code; RESidual RADioactivity
ROC	Radionuclides of Concern
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
St.	Street
Th-232	Thorium-232
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
ug	microgram
U-238	Uranium-238
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank

1.0 SITE BACKGROUND AND PHYSICAL SETTING

1.1 General Site Overview

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (hereafter referred to as the Maywood Site) is located in a highly developed area of Bergen County in northeastern New Jersey, in the Boroughs of Maywood and Lodi and the Township of Rochelle Park (Figure 8-1). Portions of the Maywood Site are radiologically impacted from process wastes and residues associated with the recovery and refining of thorium and thorium compounds from monazite ores by the Maywood Chemical Works (MCW) from 1916 to 1956 (Bechtel National, Inc., BNI, 1992).

Waste produced at MCW was a fine sand-like material containing residual thorium with lesser amounts of uranium and its daughter products including radium. Wastes and residues were disposed in low-lying areas west of processing facilities. In the early 1930s, a portion of these wastes and residues was separated from the main property by construction of New Jersey State Highway 17 (NJ Route 17). Additionally, the former channel of Lodi Brook runs through the majority of the properties making up the Maywood Site. Some of the contaminated materials are assumed to have eroded from the facility area and were transported downstream via Lodi Brook (Figure 8-2). In addition, from 1928 to 1944, local residents were known to use process waste in their lawns and gardens and as fill material (BNI, 1992). These are the major mechanisms for distribution of radiologically-contaminated materials on the Maywood Site.

The Maywood Site consists of 88 designated residential, commercial, municipal, and state or federal properties. All 64 Phase I properties (including all residential and municipal properties) have either been remediated by the U.S. Department of Energy (DOE) or U.S. Army Corps of Engineers (USACE) or are currently being addressed under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). The remaining 24 Phase II properties are being addressed by the Stone & Webster Team (i.e., Team).

1.2 Pre-Design Investigation Scope

On December 29, 1998, the USACE issued a Scope of Services for the design and remediation of the remaining 24 commercial and government properties. These properties potentially contain deposits of radioactive material in surface and subsurface soils resulting from operations of the former MCW. They have been designated as the Phase II properties.

A Pre-Design Investigation Work Plan (PDIWP, Stone & Webster, 1999a) was submitted in October 1999 for the Phase II properties. The purpose of the PDIWP was to address data gaps necessary to complete remedial design efforts. In determining additional data needs, it was assumed that remediation of radiologically-impacted soils would be conducted on “accessible soils” only. Accessible soils are defined as soils not under permanent structures such as buildings and roadways. Data acquisition was limited to accessible soils only.

A preliminary evaluation was performed to determine the human health risk from leaving subsurface radiologically-impacted soils proximate to these structures. The RESidual RADioactivity (RESRAD) computer code was utilized to quantify the dose and risk under a

number of assumed conditions. Based on the preliminary results, it was determined that any radioactive residues left adjacent to existing buildings, roadways, and railways would need a minimum of two feet of clean soil cover to be protective of human health. As such, it has been assumed that where radiologically-contaminated soils exist at depth adjacent to structures, at least the top two feet of radiologically-contaminated soil would be removed adjacent to the structure to a six foot horizontal setback, and then sloped at two horizontal to one vertical (2H:1V) to the required depth. However, it is recognized that site-specific calculations will need to be made during the remedial design phase in order to determine the actual depth of excavation adjacent to each structure, the horizontal setback, and the slope to final excavation depths (Stone & Webster, 1999a).

In preparing the PDIWP, the 24 Phase II properties were sub-divided into 12 clusters. The purpose of the clustering was to take a 'collective' view of a set of contiguous properties to efficiently secure needed pre-design investigation (PDI) information for those properties. [Table 8-1](#) lists the 12 clusters for the Phase II properties, from south to north. The reader is directed to the PDIWP for additional background information (Stone & Webster, 1999a).

The purpose of this PDI Report is to present data collected during the PDI for Cluster No. 8. The evaluation of PDI data, along with data collected by others during previous investigations, is documented separately.

2.0 PDI FIELD ACTIVITIES

PDI activities were performed by the following Team members:

Stone & Webster, Inc.	Team leader and engineering services
Malcolm Pirnie, Inc.	Engineering services
Science & Ecology Corporation.....	Health physics services
Cabrera Services, Inc.	Radiological survey support
Canberra Industries, Inc.	Radiological survey support
Garden State Surveying, Engineering, and Planning, Inc.	Surveying and mapping
NAEVA Geophysics, Inc.	Geophysical investigation
TerraProbe, Inc.	Direct push services
Franklin Environmental Services, Inc.	Construction services
ThermoRetec	Radiological sample analysis
RECRA LabNet.....	Environmental sample analysis
Kestrel Environmental Technologies, Inc.	Data validation

PDI activities involved non-intrusive surveys followed by intrusive investigations. The preliminary, non-intrusive PDI activities (including surface gamma scans, surface In-Situ Object Counting System (ISOCS) readings, geophysical surveys and field surveying) were initiated in August 1999. The intrusive portion of the PDI program began in January 2000 and was completed in April 2000. [Table 8-2](#) presents a summary of PDI intrusive field activities. For logistical reasons, PDI environmental borings were performed at the outset of the Groundwater Remedial Investigation program during the latter part of March and beginning of April 2000.

PDI field activities were conducted in accordance with the PDIWP, and in compliance with procedures established in the following project documents: Contractor Quality Control Plan (CQCP), Site Safety and Health Plan (SSHP), General Environmental Protection Plan (EPP), Chemical Data Quality Management Plan (CDQMP), and the Materials Handling, Transportation and Disposal Plan (MHTDP), (Stone & Webster, 1999b, c, and d, 2000a, 2000b, respectively). Variances in methodology and sample locations between the PDIWP and the actual PDI execution are discussed below.

2.1 Variances from PDIWP

This section discusses deviations in methodologies and sample locations from the approved PDIWP.

2.1.1 Methodology Variances

Methodology variances from the PDIWP were as follows:

- The PDIWP called for the use of an ISOCS utilizing germanium gamma spectroscopy to quantify radionuclide activity in soil. Following approval of the PDIWP, regulatory concerns regarding the use of ISOCS for subsurface investigation were raised. The PDIWP was subsequently modified by replacing intrusive ISOCS sampling with conventional sample

collection using direct push methods to collect soil cores for laboratory analysis. Due to this change, Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled “Soil Probe Investigation” was developed and followed. Refer to the USACE letters dated December 8, 1999 from the Project Manager, Mr. Allen Roos, informing the U.S. Environmental Protection Agency (USEPA) Project Manager, Ms. Angela Carpenter, and the New Jersey Department of Environmental Protection (NJDEP) Case Manager, Ms. Donna Gaffigan, of the modification, as presented in [Appendix 8-A](#). The USEPA approved use of SOP-SW-MWD-509-0 on December 29, 1999 and NJDEP approved it on January 20, 2000.

- A Bicron[®] Model G1 one-inch by one-inch (1” x 1”) sodium iodide (NaI) detector was substituted for the originally proposed 3/8” x 3/8” NaI detector for downhole gamma logging. This substitution was needed to provide greater detector sensitivity through the soil probe casing. Due to the addition of this detector, SOP number SW-MWD-509-0 entitled “Soil Probe Investigation” was revised. These revisions are outlined in [Table 1-A](#) in [Appendix 8-A](#). The 3/8” x 3/8” NaI detector was used only when the manual direct push method was employed. Manual direct push methodology was required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- The CDQMP originally specified a frequency of 10% for field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. This corresponds to the USACE internal quality control standard. However, due to the significant number of samples to be collected as part of the PDI program (totaling approximately 2000 soil samples and in excess of 10,000 gamma count rate and photoionization detector (PID) readings), the USACE agreed to reduce the frequency to 5%, which is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and USEPA guidelines for MS/MSD analysis. USEPA Region II does not have a specific guideline for field duplicate samples. Refer to the USACE and USEPA/NJDEP correspondence in [Appendix 8-A](#).
- The PDIWP stipulates that geotechnical borings with associated laboratory testing may be required in order to provide design parameters in locations where excavation may impact adjacent structures. Since radiological clean-up criteria have yet to be finalized, final assessment of limits of radiological contamination cannot be made at this time. The geotechnical investigation program was suspended from the PDI. During the design process, existing geotechnical information will be evaluated for design and a determination will be made if supplemental data are needed.

2.1.2 Sample Location Variances

The PDIWP was developed with the intent that proposed sample locations would be deleted, added, or moved as additional information regarding site features and contamination distribution became available during the course of the PDI implementation. In accordance with this approach, sample locations as proposed in the PDIWP were deleted, added, or moved for the following reasons:

- Base mapping developed subsequent to completion of the PDIWP provided additional information regarding underground utility locations and other site features. Proposed sample

locations proximate to these utilities and site features were moved in order to minimize impacts.

- Review of surface gamma survey data collected as part of the PDI, coupled with additional review of data from previous investigations performed by BNI and ORNL, indicated that certain proposed intrusive locations should either be moved or could be deleted. To address potential areas of surface radiological contamination not previously identified as areas of concern, a protocol was established for determining the need for additional intrusive sampling locations. Refer to “Protocol For Addressing Gamma Scan Anomalies” in [Appendix 8-A](#).

Specific rationale for the deletion, addition, or movement of locations proposed in the PDIWP are summarized in [Appendix 8-A](#).

2.2 Geophysical Surveys

Between September 20, 1999 and March 2, 2000, NAEVA Geophysics, Inc. conducted geophysical investigations on the Maywood Site. The purpose of these investigations was to delineate surface traces of detectable underground utilities in the vicinity of proposed exploratory boring sites. Equipment selected for this investigation included: a Fisher TW-6 Pipe and Cable Locator; a Radiodetection RD432PDL-2 Utility Locator; a Subsite 75 Utility Locator, a 3M Dynatel 2250 Cable Locator, and a GSSI SIR-3 ground penetrating radar (GPR) system with a 300 MHz antenna. Details of the surveys are presented in the NAEVA report (NAEVA, 2000).

2.3 Sample Locations

In October 1999, Garden State Engineering, Surveying, and Planning, Inc. performed a ground survey of the Maywood Site properties. Results of the ground survey were combined with aerial mapping prepared by GEOD Corporation to produce new base mapping for the Maywood Site. This new base mapping replaced the mapping used to generate the PDIWP drawings.

Sample points for the surface gamma survey, surface ISOCS measurements, direct push (Geoprobe[®]) sampling, and environmental sampling were located in the field using a Global Positioning System (GPS). A Trimble 4800 Site Surveyor system with a 4700 base receiver, GPS antenna, radio antenna, and ancillary equipment were used to perform GPS surveys. Base stations were set up and calibrated at specified bench-mark locations established by the surveyor. Following base receiver set up, sampling points were located. Field markings (spray paint, flags, and stakes) were used to identify intrusive sampling locations for radiological and environmental direct push mobile rigs, as well as surface ISOCS locations.

Coordinates for intrusive sample locations were determined from new PDI sample location maps which reflected updated base mapping and modified sample locations; surface ISOCS locations were identified based on original PDIWP mapping. For the surface gamma survey, GPS was used to record locations of gamma scan measurements. Where GPS instrumentation could not be utilized due to signal disruption (e.g., tree coverage, building interference, non-availability of satellites, or poor satellite reception due to weather conditions), sample locations were based on identification of site features and scaling off base mapping.

2.4 Surface Gamma Surveys

Surface gamma surveys for all of the Phase II properties were conducted from August 1999 to March 2000. Surveys were conducted to obtain distribution of surface radiological contamination for health and safety reasons, as well as to verify existing data. Measurements were collected by suspending a 1" x 1" NaI gamma scintillation detector coupled to a Ludlum Model 12 ratemeter within a few inches of the ground surface. A health physics technician walked transects (approximately four to six feet wide) covering the properties while slowly swinging the detector in a serpentine motion. Transects were spaced to assure full areal coverage with some overlap. Gamma count measurements were taken approximately every 15 to 20 feet; measurement frequency was increased in areas exhibiting elevated gamma counts. Minimum detectable concentrations (MDCs) for this detector for the radionuclides of concern (ROC) are approximately 4.7 picoCurie per gram (pCi/g) for Radium-226 (Ra-226), 3.0 pCi/g for Thorium-232 (Th-232), and 121.0 pCi/g for Uranium-238 (U-238), correcting for volume and distance from the source (Multi-Agency Radiation Survey and Site Investigation Manual, MARSSIM, 1997). Gamma count data were stored with associated locations in the GPS recorder. In some instances where locations could not be recorded with a GPS (as stipulated above), measurements were manually recorded on the PDI maps.

2.5 Surface ISOCS Measurements

Surface ISOCS measurements were collected at selected locations where environmental, geotechnical, and radiological shallow boreholes were proposed in the PDIWP. Surface ISOCS measurements were collected to identify and quantify radionuclide activity in surface soil, beneath shielded areas (e.g., areas covered with gravel, asphalt, and concrete), and in areas proposed for environmental borings.

Gamma spectroscopy measurements of surface soil were collected using the Canberra high-purity germanium ISOCS and assuming uniform radioactivity distribution in soil. The high-purity germanium detector was positioned in a "downward-looking" direction perpendicular to the ground surface at a height of three feet. The detector was collimated using a lead shield subtending a 90-degree angle, which provided a surface soil viewing area approximately six feet in diameter. The back and side of the detector were shielded with two-inch thick lead O-rings. The detector collimator and shielding were used to ensure that radioactivity detected by the probe originated only from the six-foot diameter area beneath the detector, hence minimizing one possible source of error in the measurements.

2.6 Direct Push Soil Probes

Direct push soil probes (using truck-mounted model 5400 Geoprob[®] or track-mounted model 54DT Geoprob[®]) were used to collect soil samples for radiological and environmental parameter analysis. Two types of direct push soil probes were used: a single rod system (i.e., Macro-Core[®]) and a dual tube (or cased) system. The latter system utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Samples were collected in four-foot soil cores within polyvinyl chloride/polyethylene terephthalate (PVC/PET) liners, marked with the appropriate field identification number, sealed with rubber end caps, and placed

into a two-inch inner diameter PVC container (including PVC end caps) for transport and storage.

For sample locations that were inaccessible to the mounted direct push rigs, soil cores were collected using a manual direct push method. Two-foot cores approximately one inch in diameter were collected using an electric powered hand-held vibratory hammer.

Prior to commencing intrusive sampling, underground utilities in the vicinity of the proposed boring locations were identified by reviewing PDI geophysical survey data, and by contacting the appropriate authorized parties (i.e., New Jersey One-Call System, and the property owner). In addition, a safe working distance from overhead utilities was maintained.

Sampling equipment (the rig, direct push soil probe casing and tools) was decontaminated prior to use and following each borehole installation using pressure or manual washing. Each soil probe hole was backfilled for the full length using Benseal[®] bentonite in accordance with project requirements. For areas covered by asphalt, cold patch was placed at the surface.

2.6.1 Downhole Gamma Logging

Measurements were taken with a Bicron[®] Model G1 1" x 1" NaI gamma detector sealed in a waterproof stainless steel container. The instrument MDCs are approximately 3.6 pCi/g for Ra-226, 2.3 pCi/g for Th-232, and 92.0 pCi/g for U-238, which are approximately 75% of the surface MDCs listed in Section 2.4. This estimate assumes a geometry factor of 0.50, where a four pi geometry (i.e., a sphere) when scanning downhole is approximately half of a two pi geometry (i.e., a hemisphere) when scanning the ground surface. However, this reduction in the MDCs is modified by the 0.3-inch steel casing in the hole, which results in an approximate 33% reduction in the gammas seen by the detector as calculated by the computer code Microshield[™]. The correction factor is therefore calculated by dividing the geometry factor (0.50) by the steel casing reduction factor (0.66), yielding approximately 0.75. The NaI detector was connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector[™] multi-channel analyzer/amplifier/high voltage power supply. The system was controlled, and the data stored, via notebook computer. Ten-second integrated gross gamma measurements were recorded at each 6-inch depth increment in the cased soil probe holes and data entered onto the PDI Soil Probe Log Sheets (see [Appendix 8-B](#)). In areas where samples were collected using the manual direct push method, a Bicron[®] 3/8" x 3/8" NaI gamma detector coupled to a Ludlum Model 2221 scaler/ratemeter was used to take 30 to 60-second gross gamma measurements in uncased soil probe holes. The MDCs for this instrument are estimated to be approximately 1.9 pCi/g for Ra-226 and 2.3 pCi/g for Th-232, as provided by the vendor. There is no correction factor for these MDCs.

2.6.2 Direct Push Core Screening/Sample Collection

Sealed PVC containers collected from direct push mobile and manual rigs were transported to the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation added to the PDI Soil Probe Log Sheets (see [Appendix 8-B](#)) included soil column description and soil screening data. Field screening for radiological activity was performed on soil cores contained in the PVC/PET liner. A collimated Eberline

SPA-3 2" x 2" NaI detector (or Ludlum Model 44-10) coupled to a Ludlum Model 2221 scaler/ratemeter was used to measure gamma activity. The detector was positioned approximately 0.5 inch above the soil core, on a guide, to ensure that this distance was maintained over the entire length of each soil core. Continuous scanning of the soil core was performed at an approximate rate of three inches per second. The instrument MDC, taken from MARSSIM, is estimated to be 2.8 pCi/g for Ra-226, 1.8 pCi/g for Th-232, and 80 pCi/g for U-238 (MARSSIM, 1997). Although the MARSSIM MDC values are based upon an open area, it was assumed that the slower scan time compensated for the different geometry. An indelible marker was used to mark the liner where elevated readings were identified during scanning. Total integrated gross gamma counts were accumulated over a 30-second interval and recorded.

Soil cores were also screened for total volatile organic vapors using a PID. A series of small perforations were made along the PVC/PET liner at 12-inch increments to expose soil to the PID. Perforations were sealed with tape after PID screening. Screening results were recorded on the PDI Soil Probe Logs.

Prior to obtaining samples, each core was photographed using a digital camera. A brief soil field classification description of each core was entered onto the PDI Soil Probe Log Sheet.

Soil samples were selected from each direct push location for analysis of the ROC: Th-232, Ra-226, and U-238. Samples were selected based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample was taken at the highest reading location (suspected FUSRAP waste, if present, as defined in the Federal Facilities Agreement dated November, 1991; DOE and USEPA, 1991); a second soil sample was collected where the readings approached a constant value (suspected transition zone, if present); and a third soil sample was collected within the zone of constant readings (below suspected transition zone). When soil cores exhibited uniform count rates (i.e., elevated gamma measurements were not identified), three samples per soil probe location were collected.

Selected samples were obtained from each core sufficient to fill a 300-milliliter sample container. Samples were labeled and capped at either end with plastic caps. Caps were color-coded for 'top' and 'bottom' of the original hole. Each extracted section of the soil core was replaced with a wooden spacer to indicate what portion of the soil core was sampled. The spacer was labeled with the sample identification number of the soil removed for testing. After screening and sample extraction, remaining portions of each soil core were placed back into the appropriate PVC container, with the wooden spacer in its appropriate location, and stored on-site for future reference. The section of core tube containing the sample was then transferred to the MISS on-site laboratory for sample preparation and analysis.

Evaluation of all gamma log data led to the archiving of selected samples. That is, a number of the direct push soil probes exhibited 'constant' count rates over the depth interval. In these cases, rather than having all samples analyzed at this time, the deepest prepared sample was not counted but archived. By doing this, as laboratory results confirm that radiological contamination does not exist at that soil probe location, unnecessary analytical work is

prevented. Samples that were archived are noted on the PDI Soil Logs in [Appendix 8-B](#) and on [Table 8-4](#).

As described above, a collimated Eberline SPA-3 or Ludlum Model 44-10 2" x 2" NaI detector was used to measure gamma activity for the soil cores, while a Bicron[®] Model G1 1" x 1" NaI gamma detector was used for the downhole measurements. The 2" x 2" NaI detector (Eberline SPA-3 or Ludlum Model 44-10) provided confirmation of downhole measurements and greater sensitivity for sample selection than the 1" x 1" NaI gamma detector.

2.6.3 Sample Preparation

Soil samples were screened to remove small debris and oven-dried to obtain moisture content and to facilitate grinding. Grinding assured sample homogenization. Samples were then transferred to a 300-milliliter commercially supplied metal can. Lids were secured on cans, after which they were shelved for 21 days. The 21-day period was required to allow radon and its daughter products to in-grow and establish secular equilibrium between Ra-226, Radon-222 (Rn-222), and the gamma-emitting daughters.

2.6.4 Laboratory Data

Analysis for ROC on selected samples was performed at the MISS on-site field laboratory using a Canberra high-purity germanium detector. All testing in the MISS on-site field laboratory was completed in accordance with the procedures outlined in the CDQMP. MISS on-site field laboratory data have been entered onto the PDI Soil Probe Log sheets (see [Appendix 8-B](#)).

The Project Chemist evaluated 10% of the MISS on-site field laboratory radiological data packages; the evaluation is included in the PDI Quality Control Summary Report (QCSR; Stone & Webster, 2000c). The laboratory qualified the reported data when the germanium detector measurement system fell outside of one of the control limits during quality control check runs. Data qualification procedures are described in the PDI QCSR.

Ten percent of the samples analyzed by the MISS on-site field laboratory were sent to a USACE-approved off-site laboratory (ThermoRetec) for confirmatory analysis of the ROC. Following analysis, all soil samples were returned to the Maywood Site for storage and future reference. Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the off-site confirmatory radiological data. Radiological data were evaluated using the USACE's Radiological Data Quality Evaluation Guidance, as presented in the CDQMP. The data validation reports for the radiological confirmatory sample results are provided in the PDI QCSR.

2.7 Environmental Sampling

A limited number of soil samples were collected for environmental analyses in order to identify potential chemical contamination commingled with the radioactive waste. This information would aid in assessing waste classification (i.e., whether hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), is commingled with radioactive waste) as well as provide data for worker health and safety. Samples for environmental analysis were

collected using direct push Macro-Core[®] methodology. Sampling depths were based on the anticipated depth of radiological contamination. Soils exhibiting the highest PID readings or visual contamination were collected and sent for laboratory analysis by a USACE and NJDEP certified laboratory (RECRA LabNet). Samples were analyzed for RCRA disposal characteristics (ignitability, reactivity, corrosivity, and toxicity characteristic leaching procedure TCLP), the Target Compound List (TCL) and the Target Analyte List (TAL) with chromium speciation.

During performance of environmental borings, environmental boring log sheets were completed for each boring. Copies of the completed log sheets are included in [Appendix 8-C](#).

Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the environmental data. Environmental data were evaluated using the USACE's Data Quality Evaluation Guidance, as presented in the CDQMP. In addition, the USEPA Region II SOP No. HW-24, Revision I, June 1999, was also applied. The data validation reports for the environmental sample results are provided in the PDI QCSR.

2.8 Geotechnical Sampling

Radiological cleanup criteria have yet to be finalized, therefore final assessment of the extent of radiological contamination cannot be made at this time. The geotechnical investigation program was therefore suspended from the PDI. Following approximate determination of limits of excavation during the design phase, existing geotechnical information will be evaluated for remedial design purposes. If it is decided that additional information is required, then the geotechnical program will be reinstated, as necessary.

2.9 Quality Assurance/Quality Control

Field and laboratory activities were completed in accordance with the CQCP and the CDQMP. Data reflecting adherence to the Quality Assurance / Quality Control (QA/QC) program was documented and presented in the PDI QCSR.

2.10 Health and Safety

All PDI investigation activities were conducted in compliance with the SSHP and associated protocols and directives. Field crews received daily briefings at 'Plan of the Day' meetings prior to any work activities. These meetings reviewed daily health and safety issues such as potential inclement weather, as well as reviews of general site health and safety directives.

3.0 CLUSTER DESCRIPTION AND PDI RESULTS

3.1 Cluster No. 8 Description

Cluster No. 8 consists of one property in the Borough of Maywood, Property No. 08A – 23 West Howcroft Road. This property is approximately 2.5 acres in area, and occupies Block 124, Lot 17. There is a 50,000 square foot building that is occupied by the Maywood Furniture Corporation & DeSaussure Equipment Company, Inc. The building consists of a front office area and a manufacturing area at the rear of the building (BNI, 1994). The company is engaged in the manufacture and sale of furniture products, specifically tables. Hours of operation are from Monday to Saturday, 7:30 a.m. to 4:00 p.m. (Stone & Webster, 1999e). The manufacturing process includes cutting, covering, gluing, painting, and machining of all components of the tables. The front portion of the building is used for clerical and sales personnel and also contains a large lunchroom area that is accessed from the manufacturing area (BNI, 1994). According to the property owner, during construction (1961), the footprint of the building was excavated to the ‘hard pan’ (approximately 5-6 feet) and granite-containing fill was brought in from New York. The building was expanded in 1972 with a 35-foot addition added to the west side of the building (Stone & Webster, 1999e).

There is a wooded area (palustrine, forested, broad-leaved deciduous) to the north of the building, encompassing approximately 0.425 acres. The area is a delineated wetland (CH2M Hill, 1994).

Property No. 08A is bounded by Cluster No. 9 to the north and west; Maywood Avenue (residential area) to the east; and by a drainage swale, West Howcroft Road, and Cluster No. 8 to the south.

Refer to [Figure 8-3](#) for more specific details of site features.

3.2 Radiological Data

3.2.1 Surface Gamma Survey

A surface gamma survey was performed at Cluster No. 8. Data, recorded using GPS, was entered into the Groundwater Modeling System (GMS) software package and contoured to a two-dimensional grid using the “Natural Neighbor” contouring protocol. “Natural Neighbor” interpolation is based on the Thiessen polygon network of the scatter point set. Data are interpolated based on distance as well as topological relationships (Boss International, Inc., 2000).

Results of the gamma scan survey for Cluster No. 8 are presented graphically on [Figure 8-4](#) and [Figure 8-A1](#) (Appendix 8-A). [Figure 8-4](#) presents surface gamma scan data in context of the Maywood Site: the upper limit of the contour range is the maximum gamma count measurement detected at the Maywood Site, and the lower contour range represents 1.5 times the background gamma count rate for Cluster No. 8 (background is approximately 2,000 counts per minute for Cluster No. 8). [Figure 8-A1](#) provides a more detailed, cluster-specific, presentation of the

gamma scan data, with the contoured ranges corresponding to the actual minimum and maximum measured gross gamma counts recorded at Cluster No. 8.

3.2.2 Surface ISOCS Measurements

Surface ISOCS measurements were taken at nine locations on Cluster No. 8; locations are shown on [Figure 8-3](#). The results of surface ISOCS measurements are tabulated on [Table 8-3](#).

3.2.3 Direct Push Soil Probes

Twenty-five (25) direct push soil probes were performed at Cluster No. 8 for radiological purposes. Soil probe locations are shown on [Figure 8-3](#).

3.2.3.1 Downhole Gamma Logging

Results from downhole gamma logging measurements taken at soil probe locations are presented on the PDI Soil Probe Logs included in [Appendix 8-B](#).

3.2.3.2 Direct Push Core Screening/Sample Collection

Results of soil core screening activities performed at the MISS radiological screening laboratory are recorded on PDI Soil Probe Logs included in [Appendix 8-B](#).

3.2.3.3 MISS On-Site Field Laboratory Data and ThermoRetec Confirmatory Data

Eighty-four (84) soil samples were collected for laboratory analysis from the 25 soil probe locations at Cluster No. 8. Seventy-three (73) of the 84 samples were sent for analysis (including eight duplicates); 11 were archived. Laboratory data consisting of soil concentrations of the ROC are presented on the soil probe logs in [Appendix 8-B](#), and summarized on [Table 8-4](#). Archived samples are also recorded on the logs and the table.

Fourteen of the soil samples analyzed by the MISS on-site field laboratory were sent to ThermoRetec for confirmatory analysis. Results of the confirmatory analyses performed by ThermoRetec are shown in [Table 8-4](#).

As part of the data quality objective process, a comparison study was performed between the MISS on-site field laboratory and the ThermoRetec laboratory data. The results of the comparison can be found under separate cover (Stone & Webster, 2000d).

3.3 Environmental Data

Three environmental borings were drilled at Cluster No. 8, and three soil samples were collected for environmental analysis. A summary of the environmental analytical data is presented on [Table 8-5](#). [Figure 8-3](#) shows the locations of the borings. In addition, the environmental boring log sheets are included in [Appendix 8-C](#).

4.0 REFERENCES

Bechtel National, Inc. Remedial Investigation Report for the Maywood Site, December 1992.

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Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Radiological Data Comparison Study*, FUSRAP Maywood Superfund Site. Boston, MA; December 2000d.

U.S. Department of Energy and U.S. Environmental Protection Agency. Federal Facility Agreement for the Maywood Interim Storage Site; November, 1991.

Table 8-1: Properties Comprising Each Cluster

Cluster No.	Property No.	Properties (occupant)	Township/Borough	Property Block & Lot
1	01A	72 Sidney St. (Vacant)	Lodi	Block 164, Lots 1 and 5
2	02A	100 Hancock Street (AT&T)	Lodi	Block 205.03, Lot 2.04
	02B	80 Hancock Street (Vacant)	Lodi	Block 205.03, Lot 2.03
	02C	80 Industrial Road (American Jewel Windows)	Lodi	Block 205.02, Lot 4.02
	02D	8 Mill St. (NJVIS)	Lodi	Block 205.02, Lot 1.05
3	03A	170 Gregg Street (Bergen Cable)	Lodi	Block 205, Lot 1.02
4	04A	160/174 Essex Street (Bank of New York)	Lodi	Block 186.01, Lot 1 and Block 174, Lot 1.02
	04B	I-80 Westbound Right-of-Way (NJDOT)	Lodi	Not Applicable
5	05A	99 Essex Street (Joseph Muscarelle, Inc.)	Maywood	Block 125, Lot 1
	05B	113 Essex Street (Bank of New York)	Maywood	Block 125, Lot 2
	05C	200 NJ Route 17 South (Sears Appliance Repair)	Maywood	Block 125, Lot 3
6	06A	85-101 NJ Route 17 North (Architectural Windows)	Maywood	Block 124, Lot 4
	06B	137 NJ Route 17 North (Ramsey Auto Group)	Maywood	Block 124, Lot 3
	06C	167 NJ Route 17 North (Sunoco Station - Inactive)	Maywood	Block 124, Lot 2
	06D	239 NJ Route 17 North (Gulf Station)	Maywood	Block 124, Lot 1
	06E	29 Essex Street (Federal Express Corporation)	Maywood	Block 124, Lot 5
7	07A	111 Essex Street (Scanel Company, Inc.)	Maywood	Block 131, Lots 1,2,3,4
	07B	New York, Susquehanna & Western Railway - Lodi Branch	Maywood	Block 131, Lot 8
8	08A	23 West Howcroft Road (Maywood Furniture, Inc.)	Maywood	Block 124, Lot 17
9	09A	149-151 Maywood Avenue (Sears Logistical Services)	Maywood; Rochelle Park	Block 124, Lot 30; Block 17.02, Lot 1
10	10A	100 West Hunter Avenue (Stepan Company)	Maywood; Rochelle Park	Block 124, Lot 10; Block 18.02, Lot 2
11	11A	205 Maywood Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
	11B	61 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 50
	11C	50 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
12	12A	New York, Susquehanna & Western Railway	Maywood; Rochelle Park	Block 124, Lot 55 and Block 110, Lot 1
	12B	100 West Hunter Avenue (MISS)	Maywood; Rochelle Park	Block 124, Lot 46 and Block 20.01, Lot 1
	12C	New Jersey Route 17 (NJDOT)	Rochelle Park	Not Applicable

Table 8-2: Summary of PDI Intrusive Field Activities

Cluster No.	Property No.	Property Address	Occupant	Planned			Actual			Schedule (Year 2000)
				Probe Locations	Depth (ft)	Footage (ft)	Probe Locations	Depth (ft)	Footage (ft)	
1	01A	72 Sydney Street	Vacant	13	12	156	15	12	188	Jan. 11, 12, Mar. 31
2	02A	100 Hancock Street	AT&T	17	16	272	17	6 - 12	194	Jan. 27, Feb. 1, 2, Mar. 16
	02B	80 Hancock Street	Vacant	18	16	288	Pending Right of Entry Agreement			
	02C	80 Industrial Road	American Jewel Windows	23	16	368	20	12	272	Jan. 21, 24, 28, Feb. 1
	02D	8 Mill Street	NJVIS	38	16	608	44	12 - 16	593	Jan. 13, 14, 18, 19, 20, 21
3	03A	170 Gregg Street	Bergen Cable	10	8	80	10	8	62	Jan. 12, 13
4	04A	160/174 Essex Street	Bank of New York	25	12	300	23	4 - 12	427	Feb. 2, 3, 4
	04B	I-80 Right-of-Way	NJDOT	7	12	84	7	8 - 12	69	Feb. 2, 4, Mar. 31
5	05A	99 Essex Street	Joseph Muscarelle, Inc.	38	8	304	38	8	318	Feb. 23, 24, Mar. 17
	05B	113 Essex Street	Bank of New York	18	8	144	21	4 - 16	171	Feb. 8, 10, 16
	05C	200 NJ Route 17 South	Sears Appliance Repair	23	8	184	16	8 - 10	129	Feb. 15, 16, Mar. 2
6	06A	85-101 NJ Route 17 North	Architectural Windows	17	12	204	17	8 - 18	196	Feb. 9, 10, 16, Mar. 16
	06B	137 NJ Route 17 North	Ramsey Auto Group	15	12	190	13	10 - 12	145	Feb. 9, 16, 25
	06C	167 NJ Route 17 North	Sunoco Station - Inactive	27	12	324	19	3 - 14	239	Feb. 11, Mar. 8
	06D	239 NJ Route 17 North	Gulf Station	19	12	228	2	11 - 12	23	Feb. 16
	06E	29 Essex Street	Federal Express Corporation	7	12	84	9	7 - 12	95	Feb. 16, Mar. 31
7	07A	111 Essex Street	Scanel Company, Inc.	12	16	192	12	12 - 22	161	Feb. 21, 22, 23
	07B	NYS&W - Lodi Branch	NYS&W - Lodi Branch	16	16	256	11	6 - 16	115	Feb. 21, 22
8	08A	23 West Howcroft Street	Maywood Furniture, Inc.	26	16	416	25	7 - 16	321	Feb. 17, 21
9	09A	149-151 Maywood Avenue	Sears Logistical Services	131	16	2096	72	4 - 16	574	Mar. 2, 3, 6, 7, 8, 9, 15
10	10A	100 West Hunter Avenue	Stepan Company	106	24	2544	92	4 - 24	1076	Feb. 25, 28, 29, Mar. 1, 2, 6, 7, 9, 16, 30
11	11A	205 Maywood Avenue	Myron Manufacturing	5	8	40	5	8 - 12	44	Feb. 16
	11B	61 West Hunter Avenue	Myron Manufacturing	9	8	72	10	8 - 16	87	Feb. 15, 21
	11C	50 West Hunter Avenue	Myron Manufacturing	1	8	8	1	8	8	Feb. 15
12	12A	NYS&W	NYS&W	31	24	744	27	12 - 27	335	Feb. 18, 22, 24, Mar. 16, 30
	12B	100 West Hunter Avenue	MISS	120	24	2880	100	7 - 26	1769	Feb. 4, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24, 25, 29, Mar. 1, 7, 8, 9
	12C	NJ Route 17	NJDOT	0	0	0	0	0	0	<i>No investigations planned.</i>
TOTALS:				772		13,066	626		7,611	

Table 8-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
	pCi/g	%	pCi/g	pCi/g	%	pCi/g	pCi/g	%	pCi/g
8-SI001-SS-0-1	0.52	24.0	0.42	3.58	10.5	0.15	< 7.44	-----	7.44
8-SI002-SS-0-1	0.59	21.8	0.32	5.91	8.9	0.12	< 6.74	-----	6.74
8-SI003-SS-0-1 (1)	1.72	15.6	0.86	29.14	6.5	0.25	< 12.90	-----	12.90
8-SI003-SS-1-1 (1)	1.84	14.8	0.89	28.53	6.5	0.20	< 13.50	-----	13.50
8-SI004-SS-0-1	7.52	9.7	1.26	72.76	6.0	0.46	< 22.30	-----	22.30
8-SI005-SS-0-1	0.81	14.9	0.19	5.23	7.7	0.01	< 4.92	-----	4.92
8-SI006-SS-0-1	1.07	16.6	0.44	6.62	8.6	0.11	< 8.87	-----	8.87
8-SI007-SS-0-1	1.14	16.5	0.42	9.07	7.9	0.13	< 9.77	-----	9.77
8-SI008-SS-0-1	0.68	27.0	0.39	0.77	30.5	0.12	< 11.60	-----	11.60
8-SI009-SS-0-1	2.75	16.8	1.46	28.40	6.5	0.40	< 25.10	-----	25.10

* Reported data are taken from the Nuclide Identification Report

MDA : Minimum Detectable Activity

Error: 2 sigma (95% confidence interval)

< : Nuclide undetected or less than the MDA. The nuclide is assumed to be present at the MDA Value.

----- Not Applicable

(1) Sample (-0-1) and its duplicate (-1-1)

**Table 8-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results								
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
08A-001	0.50	08A05400		3.65	J 0.15	0.54	16.32	J 0.30	0.40	22.10	UJ ---	22.10
<i>ThermoRetec</i> ⁽²⁾		08A05400		2.85	0.30	0.31	14.11	0.69	0.46	4.29	J 3.96	4.97
08A-001	1.00	08A05401		0.33	U ---	0.33	0.64	0.05	0.20	4.77	U ---	4.77
08A-001	5.00	08A05402		ARCHIVED								
08A-002	2.50	08A05403		0.79	0.07	0.12	0.77	0.06	0.21	5.89	U ---	5.89
<i>ThermoRetec</i> ⁽²⁾		08A05403		0.80	0.12	0.16	1.01	0.12	0.21	1.68	UJ 1.73	2.10
08A-002	2.50	08A05404	X	0.71	0.07	0.22	0.76	0.06	0.22	3.61	1.73	5.59
<i>ThermoRetec</i> ⁽²⁾		08A05404		0.67	0.12	0.15	0.80	0.17	0.22	1.25	UJ 1.74	2.37
08A-002	4.50	08A05405		0.54	0.06	0.20	0.69	0.05	0.20	7.03	U ---	7.03
08A-002	7.50	08A05406		0.64	J 0.06	0.15	0.75	J 0.05	0.20	7.17	UJ ---	7.17
08A-003	0.50	08A05407		0.30	U ---	0.30	0.48	0.05	0.18	4.55	U ---	4.55
08A-003	5.00	08A05408		0.99	0.08	0.26	1.93	0.09	0.30	10.50	U ---	10.50
08A-003	8.50	08A05409		ARCHIVED								
08A-004	1.50	08A05410		27.95	0.58	1.47	112.90	1.40	1.11	57.40	U ---	57.40
<i>ThermoRetec</i> ⁽²⁾		08A05410		23.94	1.47	0.82	110.50	4.28	1.25	23.01	8.994	12.55
08A-004	2.50	08A05411		1.32	0.11	0.29	1.45	0.09	0.31	1.50	2.36	7.94
08A-004	4.50	08A05412		0.93	0.07	0.23	0.93	0.05	0.15	7.33	U ---	7.33
08A-004	4.50	08A05413	X	ARCHIVED								
08A-005	3.50	08A05414		19.94	0.51	1.77	134.05	1.68	1.21	49.00	U ---	49.00
08A-005	6.50	08A05415		2.34	0.15	0.64	16.22	0.33	0.49	27.30	U ---	27.30
08A-005	8.50	08A05416		0.51	0.06	0.18	0.75	0.06	0.19	5.14	U ---	5.14
08A-006	1.00	08A05417		2.55	0.11	0.43	12.14	0.23	0.31	12.00	U ---	12.00
08A-006	4.50	08A05418		0.61	0.07	0.23	0.80	0.06	0.23	7.84	U ---	7.84
08A-006	8.50	08A05419		ARCHIVED								
08A-007	0.50	08A05420		2.12	0.11	0.36	5.14	0.15	0.29	15.50	U ---	15.50
<i>ThermoRetec</i> ⁽²⁾		08A05420		1.60	0.21	0.23	5.17	0.32	0.33	5.55	J 2.63	3.55
08A-007	1.50	08A05421		0.82	0.09	0.26	0.71	0.07	0.26	7.07	U ---	7.07
08A-007	1.50	08A05422	X	0.82	0.09	0.25	0.82	0.06	0.26	6.62	U ---	6.62
08A-007	5.00	08A05423		ARCHIVED								
08A-008	4.50	08A05424		38.53	0.85	2.54	230.36	2.72	1.86	95.10	U ---	95.10
<i>ThermoRetec</i> ⁽²⁾		08A05424		31.26	2.04	1.34	202.80	7.76	2.02	45.14	15.75	20.99
08A-008	6.00	08A05425		0.88	0.06	0.20	1.26	0.07	0.26	8.27	U ---	8.27
08A-008	8.50	08A05426		ARCHIVED								

**Table 8-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results								
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
08A-009	0.50	08A05427		3.50	J 0.16	0.58	20.28	J 0.36	0.47	25.30	UJ ---	25.30
08A-009	1.00	08A05428		0.81	0.08	0.17	0.80	0.06	0.20	5.47	U ---	5.47
08A-009	4.50	08A05429		ARCHIVED								
08A-010	5.50	08A05430		43.62	J 0.99	3.26	401.27	J 4.56	2.60	59.66	J 38.88	128.00
<i>ThermoRetec</i> ⁽²⁾		08A05430		33.66	2.65	2.28	336.60	12.80	3.44	79.52	23.57	31.41
08A-010	6.50	08A05431		1.00	0.08	0.23	1.32	0.07	0.16	6.44	U ---	6.44
08A-010	8.50	08A05432		ARCHIVED								
08A-011	0.50	08A05433		3.38	0.17	0.69	16.06	0.32	0.45	17.31	5.34	17.00
08A-011	1.00	08A05434		1.20	J 0.09	0.30	1.26	J 0.07	0.23	11.50	UJ ---	11.50
<i>ThermoRetec</i> ⁽²⁾		08A05434		0.97	0.17	0.19	1.26	0.16	0.28	3.99	2.06	2.86
08A-011	1.00	08A05435	X	1.03	0.09	0.23	1.09	0.06	0.18	7.35	U ---	7.35
08A-011	6.00	08A05436		ARCHIVED								
08A-012	2.00	08A05437		4.05	J 0.15	0.54	24.77	J 0.38	0.43	22.70	UJ ---	22.70
08A-012	2.50	08A05438		1.50	0.13	0.35	1.60	0.11	0.36	10.90	U ---	10.90
08A-012	4.50	08A05439		0.81	J 0.07	0.22	0.96	J 0.05	0.17	8.10	UJ ---	8.10
08A-013	1.50	08A05440		0.45	0.07	0.23	0.57	0.05	0.20	0.97	J 1.33	4.49
08A-013	2.50	08A05441		1.20	J 0.08	0.25	0.94	J 0.07	0.30	10.20	UJ ---	10.20
08A-013	4.50	08A05442		ARCHIVED								
08A-014	1.50	08A05443		3.98	0.16	0.56	21.92	0.37	0.41	16.90	U ---	16.90
08A-014	5.50	08A05444		0.92	J 0.07	0.25	0.99	J 0.06	0.16	8.71	UJ ---	8.71
08A-014	5.50	08A05445	X	0.65	0.08	0.21	0.85	0.06	0.21	5.17	U ---	5.17
08A-014	7.00	08A05446		ARCHIVED								
08A-015	0.50	08A05447		9.57	J 0.32	1.28	82.18	J 1.08	0.93	48.90	UJ ---	48.90
<i>ThermoRetec</i> ⁽²⁾		08A05447		7.77	0.77	0.75	71.11	2.94	1.11	20.78	8.61	12.15
08A-015	2.50	08A05448		1.07	0.10	0.27	1.19	0.07	0.18	5.33	2.34	7.50
08A-015	4.50	08A05449		1.59	J 0.17	0.48	3.82	J 0.17	0.55	19.60	UJ ---	19.60
<i>ThermoRetec</i> ⁽²⁾		08A05449		1.43	0.31	0.32	3.91	J 0.34	0.51	8.51	J 3.89	4.94
08A-016	1.00	08A05450		2.76	0.14	0.50	10.48	0.23	0.34	13.80	U ---	13.80
<i>ThermoRetec</i> ⁽²⁾		08A05450		2.40	0.29	0.29	10.01	0.53	0.44	4.22	J 3.91	4.53
08A-016	2.00	08A05451		0.78	J 0.07	0.22	0.90	J 0.05	0.16	7.50	UJ ---	7.50
08A-016	4.50	08A05452		1.62	0.10	0.35	3.94	0.12	0.21	9.21	U ---	9.21
<i>ThermoRetec</i> ⁽²⁾		08A05452		1.35	0.18	0.19	4.02	0.31	0.29	5.31	2.87	3.14

**Table 8-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results								
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
08A-017	4.50	08A05453		1.23	J 0.09	0.25	0.98	J 0.07	0.28	9.46	UJ ---	9.46
08A-017	6.50	08A05454		0.29	0.06	0.22	0.49	0.04	0.14	4.42	U ---	4.42
08A-017	8.50	08A05455		0.58	J 0.07	0.20	0.73	J 0.05	0.21	7.40	UJ ---	7.40
08A-018	0.50	08A05456		2.23	0.11	0.38	7.69	0.18	0.27	11.00	U ---	11.00
08A-018	1.50	08A05457		0.61	J 0.07	0.20	0.66	J 0.06	0.22	7.67	UJ ---	7.67
08A-018	4.50	08A05458		0.60	0.07	0.20	0.68	0.05	0.20	5.20	U ---	5.20
08A-018	4.50	08A05459	X	0.87	J 0.08	0.25	1.00	J 0.07	0.25	8.20	UJ ---	8.20
08A-019	5.50	08A05460		0.69	0.06	0.17	0.86	0.05	0.12	4.92	U ---	4.92
08A-019	6.50	08A05461		0.68	J 0.05	0.14	0.74	J 0.04	0.15	6.57	UJ ---	6.57
08A-019	9.50	08A05462		0.57	J 0.07	0.22	0.71	J 0.06	0.24	8.18	UJ ---	8.18
08A-020	0.50	08A05463		1.47	0.11	0.43	4.38	0.16	0.42	10.70	U ---	10.70
08A-020	1.50	08A05464		0.88	J 0.11	0.32	1.46	J 0.09	0.38	12.40	UJ ---	12.40
08A-020	6.00	08A05465		0.71	0.06	0.24	1.12	0.07	0.21	5.89	U ---	5.89
08A-021	1.00	08A05466		4.42	J 0.15	0.52	14.93	J 0.27	0.37	19.70	UJ ---	19.70
08A-021	2.00	08A05467		1.25	0.19	0.60	3.94	0.19	0.57	14.50	U ---	14.50
08A-021	4.50	08A05468		1.04	J 0.07	0.22	1.47	J 0.07	0.18	8.41	UJ ---	8.41
<i>ThermoRetec</i> ⁽²⁾		08A05468		0.76	0.13	0.12	1.38	0.12	0.19	1.27	UJ 1.45	1.97
08A-021	4.50	08A05469	X	1.11	0.09	0.24	1.98	0.09	0.27	7.18	U ---	7.18
<i>ThermoRetec</i> ⁽²⁾		08A05469		1.10	0.18	0.20	2.48	0.21	0.26	2.85	J 2.30	2.96
08A-022	2.00	08A05470		0.43	J 0.05	0.16	0.44	J 0.05	0.20	6.11	UJ ---	6.11
08A-022	2.50	08A05471		0.37	0.06	0.18	0.58	0.05	0.16	4.46	U ---	4.46
08A-022	4.50	08A05472		0.45	J 0.06	0.15	0.59	J 0.05	0.19	6.69	UJ ---	6.69
08A-023	5.50	08A05473		0.69	0.06	0.21	0.86	0.06	0.20	5.23	U ---	5.23
08A-023	7.00	08A05474		0.61	J 0.05	0.15	0.69	J 0.05	0.18	6.60	UJ ---	6.60
08A-023	8.50	08A05475		0.48	0.06	0.16	0.25	U ---	0.25	4.25	U ---	4.25
08A-024	1.00	08A05476		0.71	J 0.07	0.19	0.66	J 0.05	0.17	8.04	UJ ---	8.04
08A-024	4.50	08A05477		0.54	0.06	0.17	0.69	0.05	0.19	4.45	U ---	4.45
08A-024	4.50	08A05478	X	0.60	0.05	0.17	0.57	0.05	0.18	4.69	U ---	4.69
08A-024	6.00	08A05479		0.64	J 0.06	0.16	0.91	J 0.05	0.16	7.24	UJ ---	7.24

**Table 8-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
<i>08A-025</i>	2.00	08A05480		1.17	J	0.08	0.23	0.87	J	0.06	0.27	8.53	UJ	---	8.53
<i>08A-025</i>	4.50	08A05481		0.83		0.09	0.23	0.72		0.06	0.24	6.00	U	---	6.00
<i>08A-025</i>	6.00	08A05482		0.55	J	0.06	0.20	0.56	J	0.05	0.19	6.41	UJ	---	6.41

Error: 2 sigma (95% confidence interval)

--- Not Applicable

U Undetected or Negative Concentration Less Than the MDA

J Estimated

MDA Minimum Detectable Activity

- (1) The sample marked with an "X" for duplicate is a duplicate of the sample listed directly above it. Duplicate samples are prepared by homogenizing soil above and below the centerpoint and then separating for analysis. The depth listed is the center point.
- (2) Approximately 10% of all radiological soil samples collected under the PDI Program were sent to ThermoRetec, an off-site laboratory, for confirmatory radiological analyses. Results from ThermoRetec are presented in this table in italicized font immediately below the MISS On-Site field laboratory result for that same sample.

Table 8-5: Summary of Environmental Analytical Data

Parameter	Sample ID	08A-020548	08A-020550	08A-020772
	Sample Location	08A-001	08A-002	08A-003
	Sample Depth (feet)	9 - 12	1 - 3	5 - 8
	Sample Date	03/30/00	03/30/00	03/30/00
	Units			
<i>Miscellaneous</i>				
Corrosivity by pH	SOIL pH	8.1	7.3	7.4
Cyanide, Reactive	mg/kg	0.50U	0.50U	0.50U
Cyanide, Total	mg/kg	0.55	2.3	0.54U
Sulfide, Reactive	mg/kg	24.0U	24.0U	24.0U
<i>PCBs</i>				
4,4'-DDD	ug/kg	4.0U	5.3U	3.8U
4,4'-DDE	ug/kg	4.0U	5.3U	3.8U
4,4'-DDT	ug/kg	4.0U	5.3U	3.8U
Aldrin	ug/kg	2.0U	3.2	1.9U
Alpha-BHC	ug/kg	2.0U	2.7U	1.9U
alpha-Chlordane	ug/kg	2.0U	2.7U	1.9U
Aroclor-1016	ug/kg	40U	53U	38U
Aroclor-1221	ug/kg	79U	110U	77U
Aroclor-1232	ug/kg	40U	53U	38U
Aroclor-1242	ug/kg	40U	53U	38U
Aroclor-1248	ug/kg	40U	53U	38U
Aroclor-1254	ug/kg	40U	53U	38U
Aroclor-1260	ug/kg	40U	53U	38U
Beta-BHC	ug/kg	2.0U	2.7U	1.9U
Delta-BHC	ug/kg	2.0U	2.7U	1.9U
Dieldrin	ug/kg	4.0U	5.3U	3.8U
Endosulfan I	ug/kg	2.0U	2.7U	1.9U
Endosulfan II	ug/kg	4.0U	5.3U	3.8U
Endosulfan sulfate	ug/kg	4.0U	5.3U	3.8U
Endrin	ug/kg	4.0U	5.3U	3.8U
Endrin aldehyde	ug/kg	4.0U	5.3U	3.8U
Endrin ketone	ug/kg	4.0U	5.3U	3.8U
gamma-BHC (Lindane)	ug/kg	2.0U	2.7U	1.9U
gamma-Chlordane	ug/kg	2.0U	2.7U	1.9U
Heptachlor	ug/kg	2.0U	2.7U	1.9U
Heptachlor epoxide	ug/kg	2.0U	2.7U	1.9U
Methoxychlor	ug/kg	20U	27U	19U
Toxaphene	ug/kg	200U	270U	190U

Table 8-5: Summary of Environmental Analytical Data

Parameter	Sample ID	08A-020548	08A-020550	08A-020772
	Sample Location	08A-001	08A-002	08A-003
	Sample Depth (feet)	9 - 12	1 - 3	5 - 8
	Sample Date	03/30/00	03/30/00	03/30/00
	Units			
Rare Earth Metals				
Cerium, Total	mg/kg	18.8	3500	30
Dysprosium, Total	mg/kg	1.4	26.5	1.8
Lanthanum, Total	mg/kg	8.9	1680	10
Neodymium, Total	mg/kg	10.3	1550	15.9
Yttrium, Total	mg/kg	5.2	57.2	8
Semivolatile Organics				
1,2,4-Trichlorobenzene	ug/kg	400U	530U	380U
1,2-Dichlorobenzene	ug/kg	400U	530U	380U
1,3-Dichlorobenzene	ug/kg	400U	530U	380U
1,4-Dichlorobenzene	ug/kg	400U	530U	380U
2,2'-oxybis(1-Chloropropane)	ug/kg	400U	530U	380U
2,4,5-Trichlorophenol	ug/kg	990U	1300U	960U
2,4,6-Trichlorophenol	ug/kg	400U	530U	380U
2,4-Dichlorophenol	ug/kg	400U	530U	380U
2,4-Dimethylphenol	ug/kg	400U	530U	380U
2,4-Dinitrophenol	ug/kg	990U	1300U	960U
2,4-Dinitrotoluene	ug/kg	400U	530U	380U
2,6-Dinitrotoluene	ug/kg	400U	530U	380U
2-Chloronaphthalene	ug/kg	400U	530U	380U
2-Chlorophenol	ug/kg	400U	530U	380U
2-Methylnaphthalene	ug/kg	400U	32J	380U
2-Methylphenol	ug/kg	400U	530U	380U
2-Nitroaniline	ug/kg	990U	1300U	960U
2-Nitrophenol	ug/kg	400U	530U	380U
3,3'-Dichlorobenzidine	ug/kg	400U	530U	380U
3-Nitroaniline	ug/kg	990U	1300U	960U
4,6-Dinitro-2-methylphenol	ug/kg	990U	1300U	960U
4-Bromophenyl-phenylether	ug/kg	400U	530U	380U
4-Chloro-3-methylphenol	ug/kg	400U	530U	380U
4-Chloroaniline	ug/kg	400U	530U	380U
4-Chlorophenyl-phenylether	ug/kg	400U	530U	380U
4-Methylphenol	ug/kg	400U	530U	380U
4-Nitroaniline	ug/kg	990U	1300U	960U
4-Nitrophenol	ug/kg	990U	1300U	960U
Acenaphthene	ug/kg	400U	530U	380U
Acenaphthylene	ug/kg	400U	530U	380U
Anthracene	ug/kg	400U	530U	380U
Benzo(a)anthracene	ug/kg	400U	87J	380U
Benzo(a)pyrene	ug/kg	400U	88J	380U
Benzo(b)fluoranthene	ug/kg	400U	110J	380U

Table 8-5: Summary of Environmental Analytical Data

Parameter	Sample ID	08A-020548	08A-020550	08A-020772
	Sample Location	08A-001	08A-002	08A-003
	Sample Depth (feet)	9 - 12	1 - 3	5 - 8
	Sample Date	03/30/00	03/30/00	03/30/00
Units				
<i>Semivolatiles (continued)</i>				
Benzo(g,h,i)perylene	ug/kg	400U	76J	380U
Benzo(k)fluoranthene	ug/kg	400U	81J	380U
bis(2-Chloroethoxy)methane	ug/kg	400U	530U	380U
bis(2-Chloroethyl)ether	ug/kg	400U	530U	380U
bis(2-Ethylhexyl)phthalate	ug/kg	31BJ	140BJ	59BJ
Butylbenzylphthalate	ug/kg	400U	530U	380U
Carbazole	ug/kg	400U	530U	380U
Chrysene	ug/kg	400U	200J	380U
Di-n-butylphthalate	ug/kg	21J	41J	26J
Di-n-octyl phthalate	ug/kg	400U	530U	380U
Dibenz(a,h)anthracene	ug/kg	400U	530U	380U
Dibenzofuran	ug/kg	400U	530U	380U
Diethylphthalate	ug/kg	400U	530U	380U
Dimethylphthalate	ug/kg	400U	530U	380U
Fluoranthene	ug/kg	400U	170J	380U
Fluorene	ug/kg	400U	530U	380U
Hexachlorobenzene	ug/kg	400U	530U	380U
Hexachlorobutadiene	ug/kg	400U	530U	380U
Hexachlorocyclopentadiene	ug/kg	400U	530U	380U
Hexachloroethane	ug/kg	400U	530U	380U
Indeno(1,2,3-cd)pyrene	ug/kg	400U	66J	380U
Isophorone	ug/kg	400U	530U	380U
N-Nitroso-di-n-propylamine	ug/kg	400U	530U	380U
N-Nitrosodiphenylamine (1)	ug/kg	400U	530U	380U
Naphthalene	ug/kg	400U	530U	380U
Nitrobenzene	ug/kg	400U	530U	380U
Pentachlorophenol	ug/kg	990U	1300U	960U
Phenanthrene	ug/kg	400U	190J	380U
Phenol	ug/kg	400U	59J	380U
Pyrene	ug/kg	400U	150J	380U
<i>Total Metals</i>				
Aluminum, Total	mg/kg	2030	7000	3520
Antimony, Total	mg/kg	0.16U	2.4U	0.18U
Arsenic, Total	mg/kg	1.7	32.7	3.3
Barium, Total	mg/kg	44.5	110	101
Beryllium, Total	mg/kg	0.17	1.2	0.29
Boron, Total	mg/kg	2.2	6.2	2.3
Cadmium, Total	mg/kg	0.03U	0.40U	0.03U
Calcium, Total	mg/kg	5800	55900	1860
Chromium VI	mg/kg	0.48U	63.8U	0.46U
Chromium, Total	mg/kg	4.5	262	9.4

Table 8-5: Summary of Environmental Analytical Data

Parameter	Sample ID	08A-020548	08A-020550	08A-020772
	Sample Location	08A-001	08A-002	08A-003
	Sample Depth (feet)	9 - 12	1 - 3	5 - 8
	Sample Date	03/30/00	03/30/00	03/30/00
Units				
Total Metals (continued)				
Cobalt, Total	mg/kg	2.2	2.5	2.9
Copper, Total	mg/kg	4.3	118	4.7
Iron, Total	mg/kg	6610	5280	8180
Lead, Total	mg/kg	2.4	224	3.7
Lithium, Total	mg/kg	3.4	548	5.1
Magnesium, Total	mg/kg	1260	1440	1210
Manganese, Total	mg/kg	118	86.3	68.6
Mercury, Total	mg/kg	0.02U	0.18	0.02U
Nickel, Total	mg/kg	4.4	11.6	6.2
Potassium, Total	mg/kg	345	808	377
Selenium, Total	mg/kg	0.40U	5.8U	0.44U
Silver, Total	mg/kg	0.08U	0.56	0.09U
Sodium, Total	mg/kg	78.1	2490	67.5
Thallium, Total	mg/kg	0.41	4.9U	0.37U
Vanadium, Total	mg/kg	7.5	15.4	13.5
Zinc, Total	mg/kg	12.8	73	23.6
Volatile Organics				
1,1,1-Trichloroethane	ug/kg	810U	1200U	720U
1,1,2,2-Tetrachloroethane	ug/kg	810U	1200U	720U
1,1,2-Trichloroethane	ug/kg	810U	1200U	720U
1,1-Dichloroethane	ug/kg	810U	1200U	720U
1,1-Dichloroethene	ug/kg	810U	1200U	720U
1,2-Dichloroethane	ug/kg	810U	1200U	720U
1,2-Dichloroethene (total)	ug/kg	810U	1200U	720U
1,2-Dichloropropane	ug/kg	810U	1200U	720U
2-Butanone	ug/kg	1600U	2400U	1400U
2-Hexanone	ug/kg	1600U	2400U	1400U
4-Methyl-2-pentanone	ug/kg	1600U	2400U	1400U
Acetone	ug/kg	660J	2400U	1400U
Benzene	ug/kg	810U	1200U	720U
Bromodichloromethane	ug/kg	810U	1200U	720U
Bromoform	ug/kg	810U	1200U	720U
Bromomethane	ug/kg	1600U	2400U	1400U
Carbon Disulfide	ug/kg	810U	1200U	720U
Carbon Tetrachloride	ug/kg	810U	1200U	720U
Chlorobenzene	ug/kg	810U	1200U	720U
Chloroethane	ug/kg	1600U	2400U	1400U
Chloroform	ug/kg	810U	1200U	720U

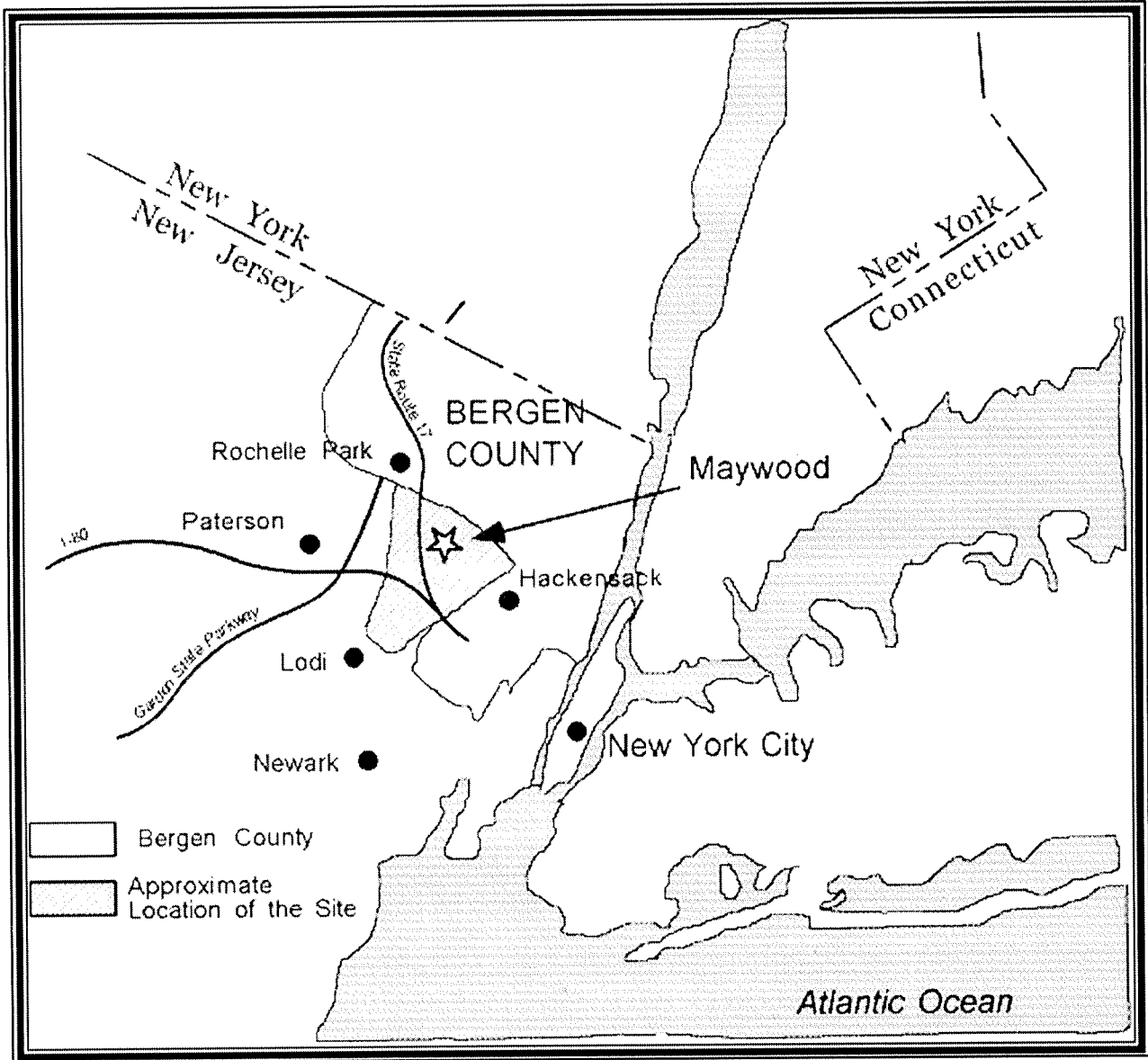
Table 8-5: Summary of Environmental Analytical Data

Parameter	Sample ID	08A-020548	08A-020550	08A-020772
	Sample Location	08A-001	08A-002	08A-003
	Sample Depth (feet)	9 - 12	1 - 3	5 - 8
	Sample Date	03/30/00	03/30/00	03/30/00
	Units			
<i>Volatile Organics (continued)</i>				
Chloromethane	ug/kg	1600U	2400U	1400U
cis-1,3-Dichloropropene	ug/kg	810U	1200U	720U
Dibromochloromethane	ug/kg	810U	1200U	720U
Ethylbenzene	ug/kg	810U	1200U	720U
Methylene Chloride	ug/kg	810U	1200U	720U
Styrene	ug/kg	810U	1200U	720U
Tetrachloroethene	ug/kg	810U	1200U	720U
Toluene	ug/kg	810U	1200U	720U
Trans-1,3-Dichloropropene	ug/kg	810U	1200U	720U
Trichloroethene	ug/kg	810U	1200U	720U
Vinyl Chloride	ug/kg	1600U	2400U	1400U
Xylene (total)	ug/kg	810U	1200U	720U
<i>TCLP Metals</i>				
Arsenic	ug/L	22.9U	52.9U	22.9U
Barium	ug/L	1090J	120J	435J
Cadmium	ug/L	4.1U	4.1U	4.1U
Chromium	ug/L	3.4	7.4	3.4U
Lead	ug/L	26.6U	26.6U	26.6U
Mercury	ug/L	0.1U	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U	49.7U
Silver	ug/L	3.7U	3.7U	3.7U
<i>TCLP Pesticides</i>				
Alpha-Chlordane	ug/L	0.5U	0.5U	0.5UJ
Endrin	ug/L	1U	1U	1UJ
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U	0.5UJ
Gamma-Chlordane	ug/L	0.5U	0.5U	0.5UJ
Heptachlor	ug/L	0.5U	0.5U	0.5UJ
Heptachlor epoxide	ug/L	0.5U	0.5U	0.5UJ
Methoxychlor	ug/L	5U	5U	5UJ
Toxaphene	ug/L	50U	50U	50UJ
2,4,5-TP (Silvex)	ug/L	5U	5U	5U
2,4-D	ug/L	10U	10U	10U

Table 8-5: Summary of Environmental Analytical Data

Parameter	Sample ID	08A-020548	08A-020550	08A-020772
	Sample Location	08A-001	08A-002	08A-003
	Sample Depth (feet)	9 - 12	1 - 3	5 - 8
	Sample Date	03/30/00	03/30/00	03/30/00
	Units			
<i>TCLP Volatiles</i>				
1,1-Dichloroethene	mg/L	0.025U	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U	0.05U
Benzene	mg/L	0.028U	0.025U	0.025U
Carbon tetrachloride	mg/L	0.025U	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>				
1,4-Dichlorobenzene	mg/L	0.05U	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U	0.05U

B (inorganics) Value Between Method Detection Limit and Reporting Limit
 B (organics) Found in Associated Blank
 U Undetected Values
 J Estimated Value
 BJ Found in Blank; is an Estimated Value



NOT TO SCALE

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT

US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM



STONE & WEBSTER, INC.

Prepared by:

**MALCOLM
PIRNE**

File Name:

MPI-CH8

**LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY**

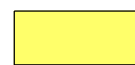
PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

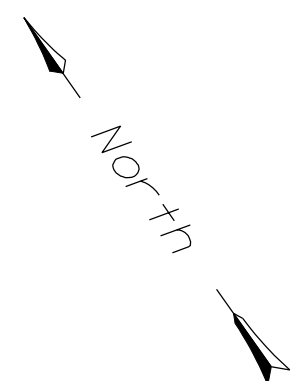
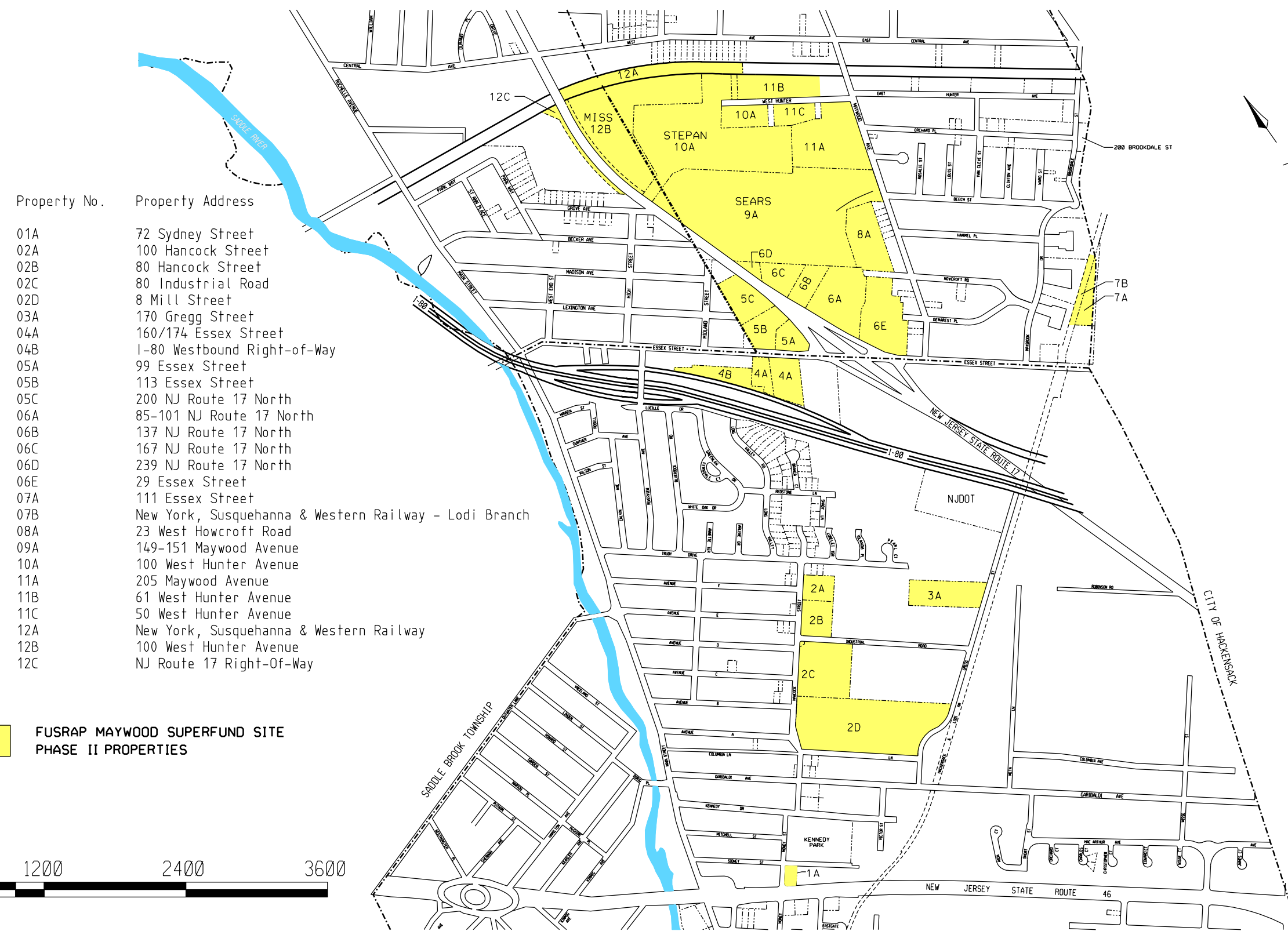
Contract Number:
DACW41-98-R-0034
Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 8-1

Cluster No.	Property No.	Property Address
1	01A	72 Sydney Street
2	02A	100 Hancock Street
	02B	80 Hancock Street
	02C	80 Industrial Road
	02D	8 Mill Street
3	03A	170 Gregg Street
4	04A	160/174 Essex Street
	04B	1-80 Westbound Right-of-Way
5	05A	99 Essex Street
	05B	113 Essex Street
	05C	200 NJ Route 17 North
6	06A	85-101 NJ Route 17 North
	06B	137 NJ Route 17 North
	06C	167 NJ Route 17 North
	06D	239 NJ Route 17 North
7	06E	29 Essex Street
	07A	111 Essex Street
8	07B	New York, Susquehanna & Western Railway - Lodi Branch
	08A	23 West Howcroft Road
9	09A	149-151 Maywood Avenue
10	10A	100 West Hunter Avenue
11	11A	205 Maywood Avenue
	11B	61 West Hunter Avenue
	11C	50 West Hunter Avenue
12	12A	New York, Susquehanna & Western Railway
	12B	100 West Hunter Avenue
	12C	NJ Route 17 Right-Of-Way


 FUSRAP MAYWOOD SUPERFUND SITE
PHASE II PROPERTIES



U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT



US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

 **STONE & WEBSTER, INC.**

Prepared by:
**MALCOLM
PIRNIE**

File Name:
\\MAYWOOD\TASK0318\CLUSTER REPORT\REV 1\FIGURE8-2.DGN

LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY

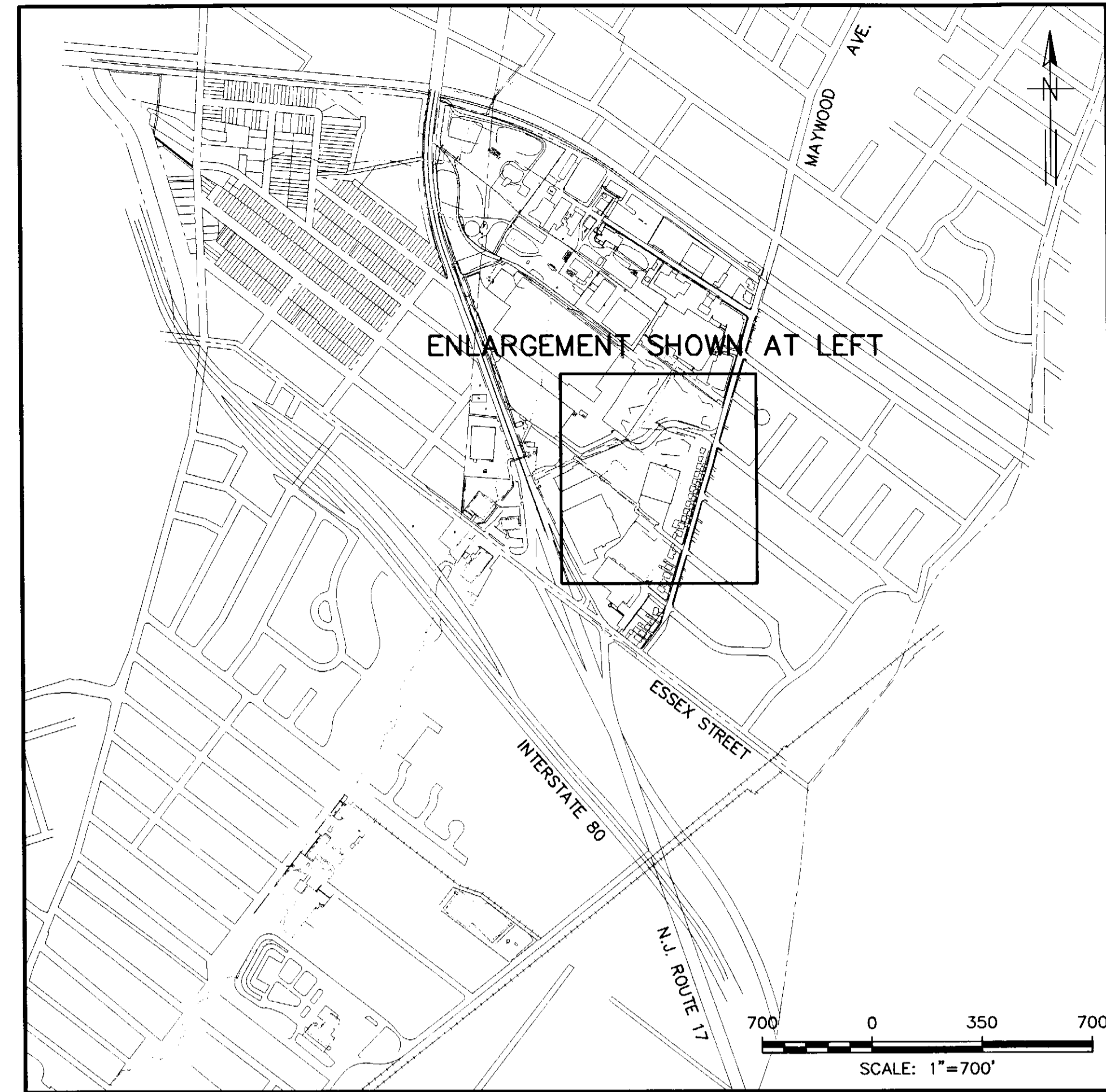
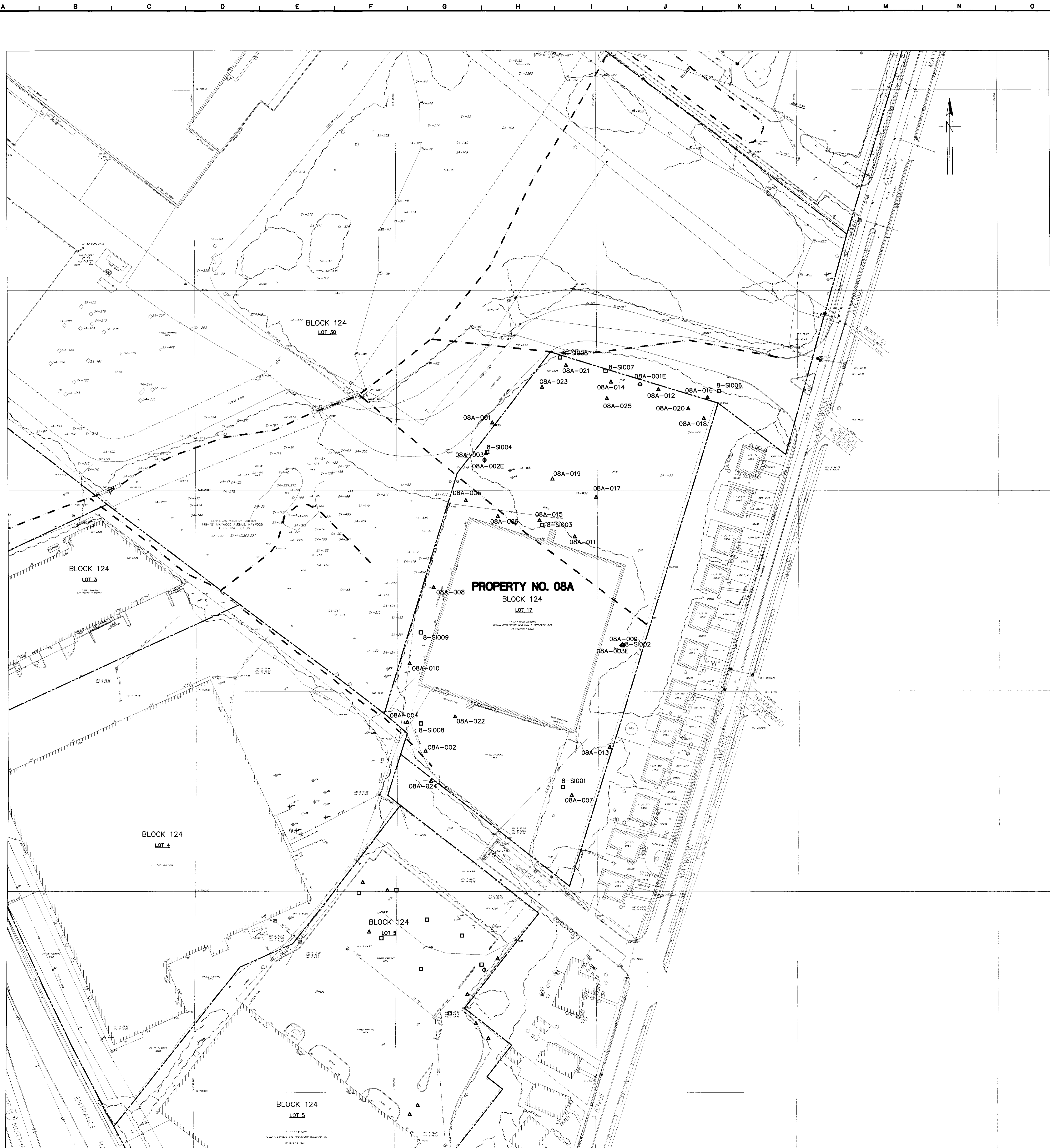
PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

Contract Number:
DACW41-99-D-9001

Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 8-2



KEY MAP

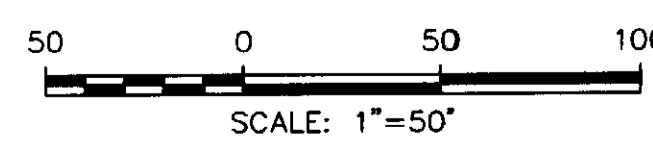
- LEGEND**
- — — — — PROPERTY BOUNDARY
 - ▨ EXISTING BUILDING
 - - - - - EXISTING 1' CONTOUR
 - - - - - APPROXIMATE LOCATION OF HISTORIC LODI BROOK CHANNEL

SAMPLE SYMBOL	SAMPLE TYPE	NUMBER OF SAMPLING LOCATIONS
▲	DIRECT PUSH SOIL PROBE LOCATIONS (RADIOLOGICAL)	25
□	SURFACE ISOCS LOCATIONS	9
⊕	DIRECT PUSH SOIL PROBE LOCATION (ENVIRONMENTAL)	3

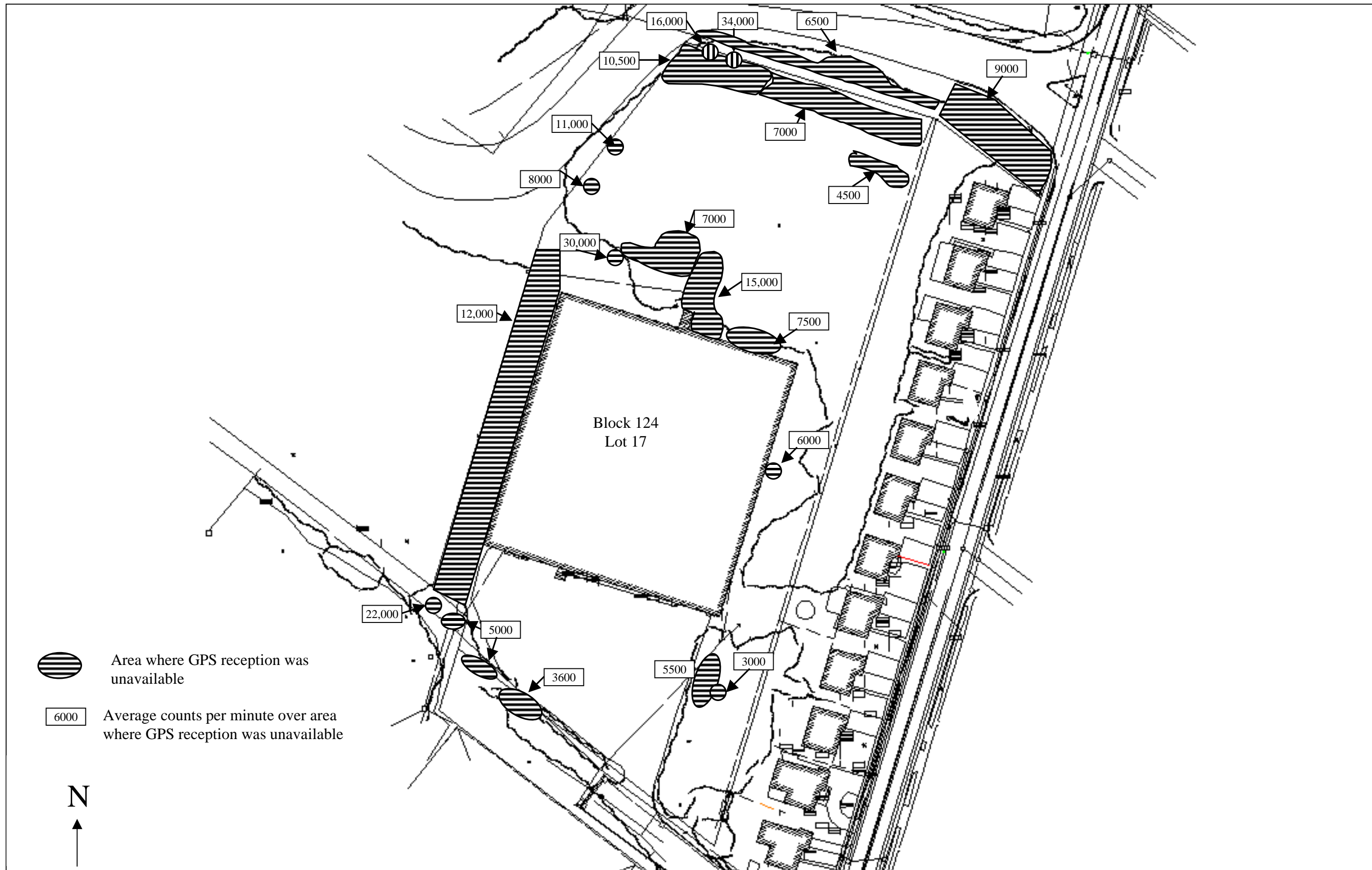
NOTES:

1. THIS SURVEY SHOWS CONDITIONS AS OF OCTOBER 1999 BASED ON AERIAL MAPPING PREPARED BY GEOD CORP. AND GROUND SURVEY BY GARDEN STATE ENGINEERING SURVEYING AND PLANNING.
2. VERTICAL DATUM IS REFERENCED TO NGVD 1929.
3. HORIZONTAL DATUM IS REFERENCED TO NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 1927.
4. THE LOCATION OF THE HISTORIC LODI BROOK SHOWN ON THIS SHEET WAS APPROXIMATED BASED UPON REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS FROM APRIL 6, 1940.

CLUSTER NO. 8 23 WEST HOWCROFT ROAD (08A)



U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS NEW YORK DISTRICT FUSRAP FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM	Prepared by: STONE & WEBSTER, INC. Date:	CLUSTER NO. 8 SAMPLE LOCATION MAP PRE-DESIGN INVESTIGATION REPORT FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, LOT 4 AND ROCHELLE PARK, NEW JERSEY Figure Number 8-3
	Drawn by: CS Date: 7/21/00 File Name: 8MPI-C8	



1.5 X Background = 1.5 X 2000 = 3000 counts per minute

Property Cluster No. 8: 23 W.Howcroft Rd. (Maywood Furniture, Inc.)
 Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 8-4

APPENDIX 8-A

Variations from the PDI Work Plan

**Letters Informing EPA and NJDEP of Use of Geoprobes⁰
In Lieu of Downhole ISOCS**



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Angela Carpenter
Remedial Project Manager
Federal Facilities Section
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Dear Ms. Carpenter:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in your December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Donna Gaffigan, NJDEP



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

December 8, 1999

REPLY TO
ATTENTION OF

Programs and Project Management Division

Ms. Donna Gaffigan
Case Manager
Bureau of Case Management
New Jersey Department of Environmental Protection
401 E State St
Trenton, NJ 08625-0600

Dear Ms. Gaffigan:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in USEPA's December 1, 1999, letter under separate cover.

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depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

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We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Angela Carpenter, EPA

Revisions to Standard Operating Procedure No. SW-MWD-509-0



**STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION**

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE: 1 of 8 plus Attachment 1
	DATE: February 2000

APPROVED:

Prepared by:
Project Chemist
Reviewed by:
PDI Task Manager
Richard Skyness 2/29/00
Project Engineer
[Signature] 2/29/00
Project Manager

1.0 PURPOSE

This Stone & Webster Standard Operating Procedure (SOP), **Soil Probe Investigation** shall be employed when collecting subsurface soil samples using the direct push soil probe method at the FUSRAP Maywood Superfund Site (hereafter referred to as the Maywood Site) properties with known or suspected soil and/or groundwater contamination.

2.0 SCOPE

This procedure details the materials, equipment, and methods common to soil probe investigation activities. Consult the site-specific project plans and work plans for proposed soil probe locations. Always consult site-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Task Manager prior to implementation and shall be documented in project field logbooks.**

3.0 REFERENCES

- Stone & Webster Maywood SOP 102 - Downhole Gamma Radiation Logging
- Stone & Webster Maywood SOP 307 - Surface and Shallow Subsurface Soil Sampling
- Stone & Webster Maywood SOP 308 - Soil Borings and Sampling
- Stone & Webster Maywood SOP 401 - Photoionization Detector (PID)
- Stone & Webster Maywood SOP 504 - Labeling, Packaging, and Shipping Environmental Samples
- Stone & Webster Maywood SOP 505 - Cuttings and Fluids Management
- Stone & Webster Maywood SOP 506 - Decontamination
- Stone & Webster Maywood SOP 507 - Field Notebook Content and Control
- U.S.E.P.A., A Compendium of Superfund Field Operation Methods, Document EPA/540/P-87/001, December, 1987.

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	2 of 8

DEFINITIONS

Stone & Webster Team – personnel of the Stone & Webster Team that includes for this SOP: Stone & Webster, Malcolm Pirnie, Franklin Environmental Services, Inc., Safety & Ecology Corporation (SEC), and Garden State Surveying, Engineering and Planning, Inc. The Stone & Webster Team shall perform soil probe investigation activities, except those activities specified as performed by the Subcontractor.

Subcontractor – personnel of the direct push soil probe firm.

Direct Push Soil Probe – generic name for advancing media sampling piping/tubes with only direct mechanical force. They are typically hollow steel rods advanced using a percussive force (powered hammer) and driven directly into unconsolidated soil. There are two types of direct push soil probes. One is a single rod system (i.e., macrocore) and the other is a dual tube or cased system. The latter, which will be the method of choice for most Maywood Site investigations, utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Drive rods used with the cased system are usually made from a high-grade steel alloy and are retracted after sampling.

4.0 RESPONSIBILITIES

5.1 Project Manager - Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 Project Environmental Engineer - Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for direct push soil probe activities.

5.3 Project Superintendent - Designated by the Project Manager to supervise investigative activities by Stone & Webster Team and Subcontractor personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in monitoring soil probe investigation activities in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each workday. The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil probe investigation activities and deviations from this SOP.

5.4 Site Personnel (including the data logger) - Required to read and sign the Maywood Site Safety and Health Plan (SSHP), have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil probe investigation activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

5.5 Site Safety & Health Officer - Responsible for ensuring that all site workers (Stone & Webster and Subcontractor) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.6 Task Manager – Responsible to plan, implement, and closeout field work requiring direct push technology.

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	3 of 8

5.7 Subcontractor - Required to read and sign the SSHP, have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. Subcontractors shall report directly to the Task Manager or his designee.

6.0 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS FOR SOIL PROBE INVESTIGATION

The following is a list of equipment and material that is commonly used on all projects when the direct push probe technique is performed in the unconsolidated soils. Refer also to related SOP equipment and material requirements to ensure completeness.

Items required by Subcontractor:

- Direct push probe equipment - of appropriate size and direct push probe and sampling capabilities; vehicle mounted; direct push probe sampling tools used to advance boring (i.e., direct push small diameter rods; and augers, if required) equipment, labor, and supplies to maintain optimal efficiency
- Environmentally-safe lubricants
- Backfill material for probe holes, as required
- Soil sample collection and logging supplies – **See Stone & Webster Maywood SOP 308, Soil Borings and Sampling**
- Decontamination supplies - **See Stone & Webster Maywood SOP 506, Decontamination**

Items carried by Stone & Webster Team on-site personnel

- **SSHP To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Clipboard
- Pencils
- Six-foot-ruler
- Pocket knife
- Camera (optional), check with Project Manager if required
- Volatile organic compound vapor meter equipped with photoionization detector (PID) and other air surveillance monitoring equipment, as required by the SSHP
- Radiation meter
- Site boring logs
- Blank soil probe logs
- Weighted measuring tape
- Water level measuring device - **See Stone & Webster Maywood SOP 410, Groundwater Level Measurement**, Interface probe, if needed
- Paper towels
- Chain of Custody forms

7.0 DIRECT PUSH PROBE ACTIVITIES

7.1 General Considerations

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	4 of 8

Prior to selecting the direct push probe method for a specific property, the objectives of the field investigation must be established. These property-specific objectives shall include one or more of the following Maywood Pre-Design Investigation (PDI) program objectives:

- Soil classification/evaluation - the direct push soil probe technique will be able to accommodate the collection of soils for characterization purposes.
- Characterization of hydrogeologic conditions - the direct push soil probe technique shall allow for the characterization of each stratigraphic zone, and water level measurements.
- Evaluation of soil contamination - the direct push soil probe technique shall provide the appropriate sample collection methods, must not introduce contaminants into the probe hole or otherwise alter the existing soil or groundwater chemistry, and should not result in subsurface cross contamination during or after installation of direct push probe.

7.2 Direct Push Probe Activities

Prior to commencing direct push soil probe fieldwork, several activities should be performed. These activities, which include both pre-mobilization office tasks and pre-installation field tasks, are discussed below. Once the pre-installation activities are completed, direct push soil probe installation may commence.

7.2.1 Pre-Mobilization Tasks

1. The Stone & Webster Team and Subcontractor shall acquire as much geologic and hydrogeologic information about the site as possible. This information may include possible soil and groundwater contamination present, groundwater table depths and fluctuations, surficial and bedrock geology, approximate thickness of the unconsolidated zone, depth to top of weathered rock, depth to competent rock, and site access.
2. Soil probe locations shall be marked in the field by the Stone & Webster Team with either paint or flags/stakes during pre-mobilization tasks, and surveyed using a global positioning system (GPS). The Stone & Webster Team shall check and verify that the soil probe location corresponds to the location on the project plans. The Stone & Webster Team and Subcontractor shall check to see if visible structures will prevent the completion of proposed soil probes at specific locations.
3. The Stone & Webster Team shall communicate with the Subcontractor regarding the requirements of the direct push soil probe program and required geologic and environmental information. Inform the Subcontractor of the environmental sampling program that the project shall follow. This information includes sampling frequency, sampling depths, type of sample required (soil or groundwater), the length of casing, direct push soil probe method (i.e., macrocore, dual tube, etc.), number and type of soil samplers required, and special sampling techniques. Ensure that probe hole backfill is selected in accordance with the project specifications.
4. The Subcontractor shall ensure that all utilities in the vicinity of the proposed boring(s) have been cleared by the appropriate authorized parties (e.g., New Jersey One-Call System at 1-800-272-1000, owner, etc.) or, if utilities exist, are visibly marked on the ground surface in the area of the proposed boring. In addition, keep a safe working distance (pursuant to OSHA) from overhead utilities. **NOTE: The party responsible for having utilities cleared shall be identified. If the responsible party is not clearly identified then the Task Manager shall establish the responsible party. Ensure that utilities have been cleared prior to installation of soil probe.**

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	5 of 8

7.2.2 Pre-Installation Field Tasks

Sampling equipment shall be decontaminated prior to use, using pressure or manual washing of the rig, direct push soil probe, and tools, as required to prevent introducing off-site contamination. The direct push soil probe related equipment shall be decontaminated on site prior to direct push soil probe activities. Refer to **Stone & Webster Maywood SOP 506, Decontamination** for specific instructions.

7.3 General Direct Push Soil Probe Method Procedures

The following sections outline general direct push soil probe procedures used in unconsolidated soil materials.

1. Assuming a vertical soil probe, the Subcontractor shall set the direct push rig over the proposed soil probe location. Level the direct push rig and ensure that the direct push rods used to advance the soil probe are in a vertical position directly above the hole.
2. The inspecting Stone & Webster Team shall obtain and record measurements of tools to be used for direct push probe operations. Down-hole measurements taken by the Subcontractors shall be to the nearest 0.1 foot.
3. The Subcontractor shall begin sampling or advancement of soil probe to the desired depth utilizing the direct push method described below. Samples shall be taken using the steps described in Section 8.1.1.
4. When the direct push advancement tools are lowered into the probe hole, the Stone & Webster Team shall keep track of tool lengths to check Subcontractor's stated depth of soil probe.
5. The Stone & Webster Team shall make certain that the Subcontractor is performing depth measurements with a ruler and known tool lengths and not visually judging ("eyeballing") casing and tool projections above the ground. The Stone & Webster Team shall maintain a mental note of depth to bottom of soil probe by keeping track of the linear feet of tools in and above the ground. By mentally subtracting the "stick-up" above the ground, the Stone & Webster Team can maintain a constant approximate check on the soil probe depth and Subcontractor's indicated depths.
6. The breathing zone shall be screened by a designee of the Stone & Webster Team Site Safety and Health Officer for total volatile organic vapors using an organic vapor analyzer as outlined in the SSHP. A lower explosive limit meter (LEL) shall be employed if required in SSHP. Record the measured readings at the depth and time of reading on the boring log.
7. During direct push probe activities, both the Stone & Webster Team and Subcontractor shall record production, mechanical and/or sampling difficulties and the sequence of activities. Also record rig mobilization time, rig set-up time, and probe commencement and completion times. This information should be recorded in a field log book. The Stone & Webster Team shall also record pertinent details on the soil probe log (See Attachment A for blank soil probe log).
8. Refusal of direct push probe advancement tools (i.e., casing refusal) is defined as when the probe hole cannot be advanced using regular advancement methods. Generally, refusal can be identified by the following characteristics:
 - Advancement of probe hole is not noticeable or is very slow
 - A change in the frequency/pitch of the direct push probe equipment
 - The direct push probe downpressure may be significantly higher than under "normal" conditions. The direct push rig may be lifted off the ground surface.
9. If refusal is encountered in the soil probe, refer to **Stone & Webster Maywood SOP 308, Soil Borings and Sampling** for specific instructions. If the probe hole cannot be advanced, relocate the probe hole within approximately 5 feet distant from the original location and start with the

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	6 of 8

work in Section Paragraph 7.2.1. Measure the distance and direction from the original location, and record this information in the field logbook. The actual distance of movement necessary may be greater depending on the site conditions. If the required movement is greater than 5 feet, contact the Task Manager for direction.

10. Downhole gamma radiation logging will be performed, *where feasible* by the Stone & Webster Team as described in Section 8.1.1 below (**See Stone & Webster Maywood SOP 102, Downhole Gamma Radiation Logging**).
11. When the probe hole is completed and the area is cleaned up, all contaminated equipment, including down-hole tools, hand tools, and direct push rig shall be decontaminated by the Subcontractor (**See Stone & Webster Maywood SOP 506, Decontamination**) and as directed by the Radiation Safety Officer (RSO).
12. The Stone & Webster Team shall record the soil probe location on the project drawings.

8.0 METHOD-SPECIFIC SOIL SCREENING AND SAMPLING

In this section, the soil screening and sampling procedure for the direct push soil probe method is described.

8.1 Direct Push Probe Services

The direct push probe rig is a hydraulically powered percussion/direct push machine used for small diameter subsurface investigations. It can obtain continuous soil cores, discreet soil samples, groundwater samples and vapor samples along with installation of permanent sparge points.

8.1.1 Procedures for Screening and Sampling Direct Push Probe Soil Samples

Following is the procedure to be used at the Maywood Site for screening and sampling direct push probe soil cores.

1. Each 4-foot soil core sample will remain in the polyvinyl chloride/polyethylene terephthalate (PVC/PETG) liner and marked with the appropriate field identification number, sealed with rubber end caps for liners, and placed into a designated (2 inch ID) PVC container (including PVC end caps) supplied by the Subcontractor for storage. Pertinent sample data will also be marked on the PVC container.
2. Downhole gamma logging will be accomplished, *where feasible* by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.
3. Each soil probe hole will be backfilled for the full length, in accordance with project requirements.
4. The sealed PVC containers will be transported by the Stone & Webster Team to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. All Building 76 sample documentation, field screening, and sampling tasks shall be performed by the Stone & Webster Team. Sample documentation will include the preparation of a soil probe log containing the following pertinent field documentation: soil probe identification number and location; soil column description; soil screening data, and photo-documentation. **Stone & Webster Maywood SOP 507, Field Notebook Content and Control**, shall be followed. Sample documentation information shall be recorded electronically.
5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	7 of 8

soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integration taken at each marked location and recorded.

6. The soil cores will then be screened for total volatile organic vapors using a PID (see **Stone & Webster Maywood SOP 401, Photoionization Detector (PID)**). A series of small perforations will be made through the liner at 12-inch increments.
7. The soil cores will be described generally in accordance with the Unified Soil Classification system, based on visual observations through the liners and soil extracted from the small perforations. Prior to storage, these perforations will be sealed with tape. The soil descriptions developed will be marked with an "FC" note to define the description as a field classification.
8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.
9. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.
11. Extracted samples shall be prepared in accordance with the Safety and Ecology Corporation (SEC) on-site field laboratory soil preparation practice/SOP.
12. Analysis for ROC on extracted sections of the soil core will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector, or equivalent. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.
14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.
15. Sampling tools will be decontaminated before each boring, after collecting each soil sample, and after each boring.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term "blind duplicates"), thus eliminating potential bias in the test measurement.

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE 8 of 8

If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.

ATTACHMENT 1

PDI SOIL PROBE LOG SHEET				
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling		
Site Designator		XXX		
Activity Designator		AAA		PDI
Field Measurement/Sample Collection Designator		VV		SP
Station Number		N N N		
Media		m m		SB
Sample Type		n		
Sequential Sample Number		# # # # #		(see Below)
		Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location				
		Gamma Logging		Photoionization Detector (PID) Logging
		Down Hole	Core	
Date				Date
Time				Time
Logger				Logger
Detector Model #		SPA-3	PID Model #	Multi-RAE
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		
Comments: 1. MPI No. _____. 2. Direct-push location grouted with BenSeal.				
<div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 40%; text-align: center;"> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> Signature (Down Hole Gamma Logging) </div> <div style="width: 15%; text-align: center;"> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> Date </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 40%; text-align: center;"> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> Signature (Core Gamma Logging) </div> <div style="width: 15%; text-align: center;"> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> Date </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 40%; text-align: center;"> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> Signature (PID Logging) </div> <div style="width: 15%; text-align: center;"> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> Date </div> </div>				

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)															
					X	X	X	#	#	#	#	#	#							
0.0																				
0.5																				
1.0																				
1.5																				
2.0																				
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¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 G:\3674009\PDI Report\AppdxA\SOP509FINAL.doc

TABLE 1-A: REVISIONS TO SOP SW-MWD-509-0

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>Section 8.1.1 Procedures for Screening and Sampling Direct Push Soil Samples 2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a Bicon 3/8- inch x 3/8- inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. The detector shall be positioned below the bottom of the casing to allow gamma log readings in the uncased portion of the probe hole. The casing shall be extracted at 6-inch increments and a 30-second count reading shall be taken at each increment.</p>	<p>2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. The sodium iodide detector preamplifier is connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector™ multi-channel analyzer/amplifier/high voltage power supply. The system is controlled, and the data stored, via a notebook computer. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.</p>	<p>Cabrera Services, Inc. developed this procedure as a cost effective site characterization method. Better sensitivity of the 1-inch x 1-inch detector used by Cabrera Services, Inc. allows gross gamma measurements through the soil probe casings, thereby increasing soil probe production rates.</p>	<p>January 11, 2000, without waterproof container. Sealed solid casing installed following extraction of MacroCore or Dual Tube system. January 28, 2000, with waterproof container. Eliminated need of sealed solid casing.</p>
<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The acetate liner shall be marked off at 6-inch intervals. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Readings shall consist of 10-second integrations taken every six inches and recorded.</p>	<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the PVC/PET liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integrations taken at the marked locations and recorded.</p>	<p>Continuous scanning of the soil core provides complete coverage, longer counting time at the regions of interest, and minimizes redundancy of the downhole gamma measurements.</p>	<p>January 11, 2000</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>8. A minimum of three soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238 based on field radiological screening and gamma logging values. At a minimum, one soil sample will be taken at the highest reading location (suspected FUSRAP waste); a second soil sample shall be collected where the readings approach a constant value (suspected transition zone); and a third soil sample shall be collected within the zone of constant readings (below suspected transition zone). Additional samples may be taken based on the Task Manager's direction.</p>	<p>8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.</p>	<p>Suspected FUSRAP waste and suspected transition zones may not be present in each direct push location.</p>	<p>Selection of archived samples began February 21, 2000.</p>
<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored in Building 76 for future reference.</p>	<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.</p>	<p>Based on laboratory analysis there may be the need to collect additional samples from the stored soil cores.</p>	<p>January 11, 2000</p>
<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a USACE-certified off-site laboratory, for confirmatory ROC analysis. Soil samples shall be placed in labeled containers provided by the laboratory, then placed in coolers maintained at 4°C. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>Samples will be sealed in containers provided by the SEC on-site field laboratory.</p> <p>Preservation (i.e., 4°C) is not required for ROC analysis.</p>	<p>February 28, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>14. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.</p>	<p>14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.</p>	<p>Sample storage will be returned to the FUSRAP Maywood Superfund Site for future disposition.</p>	<p>January 11, 2000</p>
<p>9.0 QUALITY ASSURANCE/QUALITY CONTROL Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment rinsate blanks and duplicates. Equipment rinsate blanks must be collected each day that sampling occurs or each decontamination event, whichever is less, per matrix per parameter per field crew, per equipment type (assuming reusable sampling equipment is used). This QA/QC requirement may be modified based on conversations with USACE, USEPA, and NJDEP. Field duplicate samples must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement. Field duplicate samples must represent no less than 10 % of the total number of samples per matrix per parameter per area of study. Field duplicate gamma radiation readings shall also be recorded at a frequency of 10% of the total gamma radiation readings.</p> <p>Matrix spike/matrix duplicate (MS/MD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat</p>	<p>Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement.</p> <p>If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given</p>	<p>Swipe sample is a more representative QC check of loose surface alpha radioactivity than aqueous rinsate sample.</p> <p>Reduction from 10% to 5% duplicate samples based on large number of soil samples proposed for PDI. In addition, 5% is consistent with NJDEP Field Sampling Procedures Manual for field duplicates and EPA guidelines for MS/MSD analysis. Electronic mail sent to EPA and NJDEP regarding reduction in duplicate percentage on January 28, 2000.</p>	<p>Equipment blank revision implemented on January 11, 2000.</p> <p>Reduction from 10% to 5% duplicate samples implemented week of February 7, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
no less than 10% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.	method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.		

Revised PDI Work Plan Table 5-1

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

PROPERTY CLUSTER NUMBER ⁽⁸⁾	NUMBER OF SAMPLING LOCATIONS						NUMBER OF SAMPLES FOR ANALYSIS BY PARAMETER ⁽⁶⁾								
	RADIOLOGICAL SURVEY				GEOTECH	ENVIR	GEOTECHNICAL					CHEMICAL ANALYSES			
	SOIL PROBES ⁽¹⁾	SOIL PROBE DEPTHS (FT) (ESTIMATED)	SOIL PROBE RADIOLOGICAL ANALYSES ⁽²⁾	SURFACE SOIL RADIOLOGICAL ANALYSES ⁽³⁾	SOIL BORINGS ⁽⁴⁾	SOIL BORINGS ^(4,5)	SPECIFIC GRAVITY	ATTERBERG LIMITS	GRAIN SIZE	TRIAXIAL TESTS ⁽⁷⁾	CONSOLID. TESTS ⁽⁷⁾	WATER CONTENT	CHROMIUM SPECIATION	TCL/TAL	FULL RCRA CHAR.
1	13	12	39	5	3	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
2	96	16	288	50	22	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
3	10	8	30	5	2	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
4	32	12	96	15	4	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
5	79	8	237	40	8	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
6	85	16	255	40	12	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
7	28	16	84	15	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
8	26	16	78	15	6	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
9	131	16	393	65	17	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
10	106	24	318	55	16	6	TBD	TBD	TBD	TBD	TBD	TBD	6	6	6
11	16	8	48	10	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
12	151	24	453	75	17	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
TOTALS	773	N/A	2319	390	115	47	---	---	---	---	---	---	47	47	47

NOTES:

- 1 Soil probes installed using direct-push method, to the depth shown or refusal.
- 2 At a minimum, three separate soil samples (one soil sample from within the suspected FUSRAP waste, one in transition zone, and one below the transition zone) will be selected for analysis of the ROC by the on-site field laboratory. A total of 2319 subsurface soil samples (i.e., 3 X 773) will be selected for ROC analysis by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 3 Five surface soil samples will be randomly collected from up to 10% of the 773 soil probe locations for radiological analyses and comparative evaluation of surface ISOCs measurement. A total of 390 surface soil samples (i.e., 5 X 78) will be selected for ROC analyses by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 4 Depths and quantities to be determined in field based on radiological data, structure foundations depths, etc.
- 5 Advanced to depth of radiological contamination.
- 6 Sample Analyses Rationale:
 - 6a Chromium Speciation - Speciation of trivalent and hexavalent chromium for health and safety purposes.
 - 6b TCL/TAL - Detection of organic and inorganic constituents to assess the potential for the presence of commingled radiological and chemical contamination.

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

6c	RCRA Characteristics - To support transportation & disposal activities
6d	Geotechnical Parameters (Specific Gravity, Atterberg Limits, Grain Size, Water Content) - To characterize physical properties of soil for excavation and remediation.
7	Triaxial tests and consolidation tests will be performed on undisturbed tube samples to determine strength and consolidation parameters of fine-grained materials, where present. These parameters will be used to perform bearing capacity and settlement analyses where excavations are adjacent to structures.
8	Property Clusters are defined as follows: <i>PROPERTY CLUSTER NO. 1: 72 SIDNEY ST. (A.K.A 88 MONEY ST.)</i> <i>PROPERTY CLUSTER NO. 2: 100, 80 HANCOCK ST., 80 INDUSTRIAL RD., AND NJVIS</i> <i>PROPERTY CLUSTER NO. 3: 170 GREGG ST.</i> <i>PROPERTY CLUSTER NO. 4: 160/174 ESSEX ST., I-80 RIGHT-OF-WAY</i> <i>PROPERTY CLUSTER NO. 5: 99 ESSEX ST, 113 ESSEX ST., 200 ROUTE 17 SOUTH</i> <i>PROPERTY CLUSTER NO. 6: 29 ESSEX ST., 85-101 ROUTE 17 NORTH, 137 ROUTE 17 NORTH, 167 ROUTE 17 NORTH, 239 ROUTE 17 NORTH</i> <i>PROPERTY CLUSTER NO. 7: 111 ESSEX ST. - SCANEL/HACKENSACK AND LODI RAILROAD</i> <i>PROPERTY CLUSTER NO. 8: 23 WEST HOWCROFT RD.</i> <i>PROPERTY CLUSTER NO.9: 149-151 MAYWOOD AVE.</i> <i>PROPERTY CLUSTER NO.10: 100 W. HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.11: 205 MAYWOOD AVENUE AND 50 & 61 WEST HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.12: 100 W. HUNTER AVE., NY, SUSQUEHANNA AND WESTERN RAILROAD, AND NJ ROUTE 17</i>

Rationale of Intrusive Sample Location Relocations

PDI Soil Probe Variance Log

Cluster No.: 8

Property Address: Property No. 08A - 23 West Howcroft Road (Maywood Furniture, Inc.)

Sample Location Map: Figure 8-3

No. Revised Soil Probe Locations: 10

Rationale for Revisions

- Sample location 08A-001 was moved approximately 35 feet northwest closer to the property boundary to better define the area.
- Sample location 08A-003 was moved to the south about 20 feet to investigate an area of elevated gamma counts..
- Sample location 08A-004 was moved to the south about 20 feet to investigate an area of elevated gamma counts..
- Sample location 08A-006 was moved closer to the building to an area exhibiting an elevated gamma counts.
- Sample location 08A-007 was relocated 250 feet from west side of the building to the wooded area on the east side of the building which exhibited elevated gamma counts.
- Sample location 08A-008 was moved closer to the property boundary away from the building to avoid the radiologically unrepresentative landscaped area.
- Sample location 08A-009 was relocated 250 feet from the west side of the building to the grass area on the east side of the building to define an area which exhibited elevated gamma counts (see 08A-007).
- Sample location 08A-010 was moved closer to the property boundary away from the building and underground utility (sewer) due to physical restrictions.
- Sample Location 08A-011 was moved slightly south towards the building to investigate an area exhibiting an elevated gamma counts.
- Sample Location 08A-011 was moved slightly south towards the building to investigate an area exhibiting an elevated gamma counts.

Notes:

1. This list provides specific rationale for the relocation/deletion/addition of intrusive radiological sampling locations due to revised understanding of anticipated radiological contamination. This revised understanding was based on further review of previous data collected by others, and review of surface gamma survey and ISOCS data collected by the Team under this PDI program.

2. Base mapping used in the PDIWP (Stone & Webster, 1999a) has been revised by the Team. Accordingly, a number of intrusive sample locations needed to be relocated due to previously unforeseen physical restrictions (i.e., presence of underground utilities, unacceptable proximity to buildings/roadways, revisions to previously mapped property limits). This table is not intended to provide detailed rationale for points moved due to new mapping.

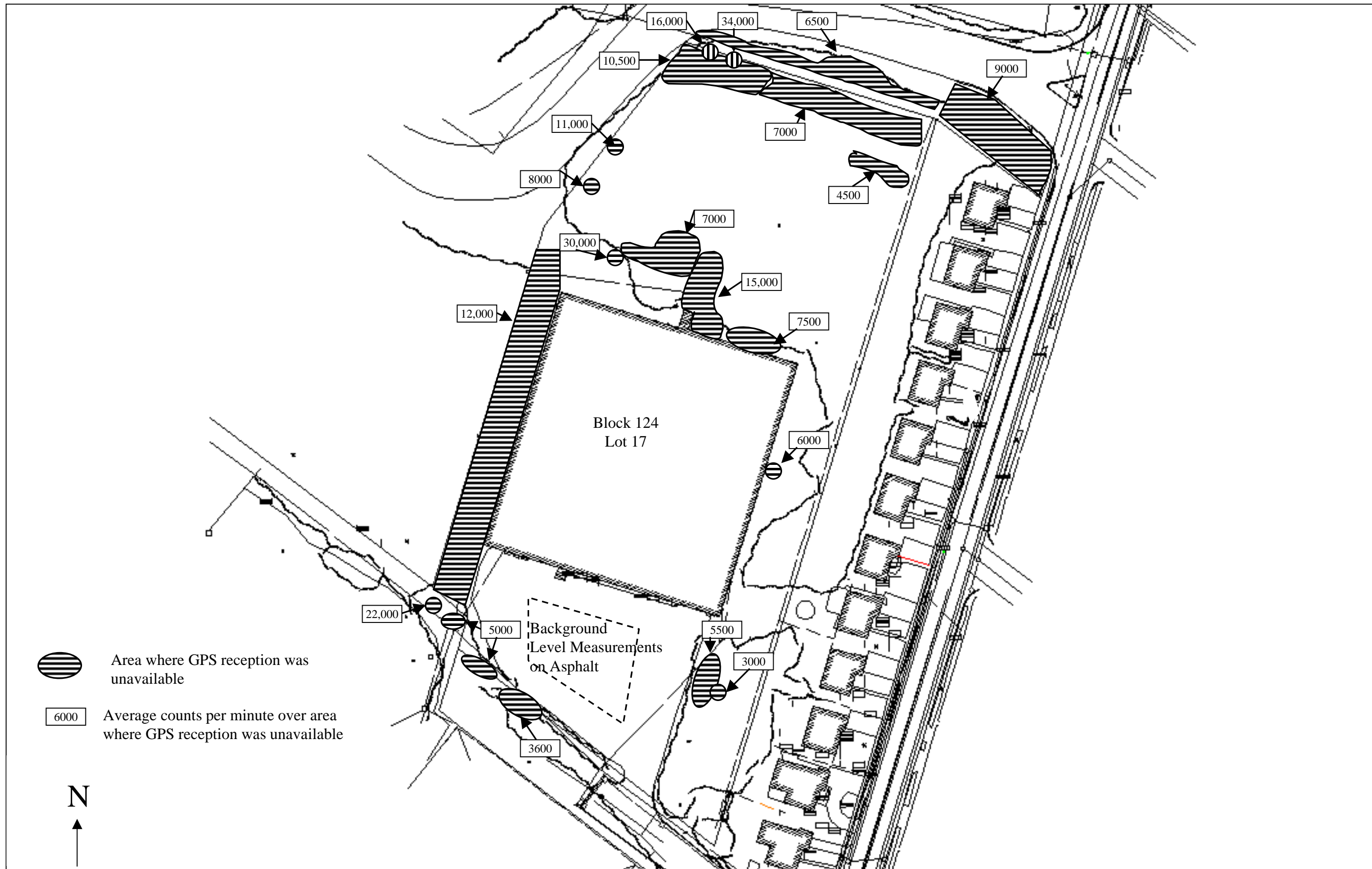
Outlier Protocol (Gamma Scan Anomalies)

Protocol for Addressing Gamma Scan Anomalies (Outliers)

Maywood FUSRAP Superfund Site

Pre-Design Investigation

1. Anomalous surface gamma scan measurements **greater than 2500 cpm for shielded areas (e.g. asphalt covered surfaces), or 3500 cpm for unshielded areas (e.g. bare soil) but, less than 6,000 cpm (1" x 1" NaI detector)** will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL. Note, these count rates are approximately one and one-half times background on shielded and unshielded surfaces.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization (i.e., eliminates the potential for elevated levels of radiological contamination at depth or provides adequate information on the existence of radiological contamination with depth) **will not be further investigated during the PDI.**
 - C. Anomalous areas that do not have previous data that are adequate for characterization **will only be investigated during the PDI if proposed soil probe locations can be moved to these locations without compromising the quality of the data from the proposed locations.** Additional soil probe locations **will not be added** to the program.
 - D. Anomalous areas where additional PDI investigations (based on 1.C) will be performed but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
2. Anomalous areas exhibiting a surface gamma count rate **greater than or equal to 6,000 cpm** (based on a 1" x 1" NaI detector) will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be as follows: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization **will not be further investigated during the PDI.**
 - C. Anomalous areas with previous data that are not adequate for characterization **will be investigated further during the PDI.** Proposed soil probe locations **will be moved** to these locations if possible, or additional soil probe locations **will be added** to the PDI program. These additional soil probes will be used to define the nature and extent of contamination within these previously unidentified areas; the quantity of additional borings is to be determined on a site-by-site basis.
 - D. Anomalous areas that require additional PDI investigations (based on 2.C) but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
3. All anomalous areas and their dispositions will be documented in the PDI.



Property Cluster No. 8: 23 W. Howcroft Rd. (Maywood Furniture, Inc.)
Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 8-A1

Reduction in Field Duplicate and MS/MSD Frequency

Navon, Daria

Subject: FW: Reduction in field duplicate and MS/MSD frequency request

----- Forwarded by David Doyle/Environmental/SWEC on 01/28/2000
02:54 PM -----

"Shonkwiler, Glen D NWK" <Glen.D.Shonkwiler@nwk02.usace.army.mil> on 01/28/2000
02:00:15 PM

To: "carpenter.angela@epamail.epa.gov" <carpenter.angela@epamail.epa.gov>, "dgaffica@dep.state.nj.us" <dgaffica@dep.state.nj.us>
cc: "Roos, Allen D NAN02" <Allen.D.Roos@nan02.usace.army.mil>, "Medary, Richard T NWK" <Richard.T.Medary@nwk02.usace.army.mil>, "Mellema, Doug W NWK" <Doug.W.Mellema@nwk02.usace.army.mil>, "Speckin, Paul D NWK" <Paul.D.Speckin@nwk02.usace.army.mil> (bcc: David Doyle/Environmental/SWEC)

Subject: Reduction in field duplicate and MS/MSD frequency request

Angela/Donna, with this email, USACE is notifying EPA and NJDEP of our intent to reduce the number of field duplicates and MS/MSD samples required in the Maywood Chemical Site CDQMP for the PDI sampling from 10% to 5%. The 10% frequency is a USACE-internal QC standard which USACE plans to reduce based on the large number of soil samples collected during the Pre-Design Investigation (PDI). The reduction in frequency would affect field duplicate samples collected for radionuclides of concern (ROC) and analysis by the on-site field laboratory; field duplicate gamma radiation readings (both downhole and core sample); photoionization detector (PID) or flame ionization (FID) readings; and MS/MSD samples analyzed by the off-site laboratory. It is anticipated that greater than 2000 soil samples will be analyzed by the on-site field laboratory and gamma radiation and PID readings will exceed 10,000 measurements.

Five percent is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and EPA guidelines for MS/MSD analysis. EPA Region II does not have a specific QA/QC guideline for field duplicate samples. The guideline is therefore on a case-by-case basis, in accordance with the site-specific project plans.

Please note that the 10 percent of the samples analyzed by the on-site field laboratory will still be sent to a certified off-site laboratory for confirmatory ROC analysis.

We will continue to adhere to the current 10 percent until EPA and NJ notifies USACE of its concurrence with this deviation from the CDQMP (for the PDI only). Your attention to this matter is greatly appreciated, since reduction of this QA/QC guideline will help to increase production during the Pre-Design Investigation without, in the opinion of USACE, impacting

quality and usability of the data.

Thanks,
Glen Shonkwiler
Remedial Investigations & Remedial Design Manager
Hazardous, Toxic, & Radioactive Waste Branch
U. S. Army Corps of Engineers
CENWK-EC-EA RM 610
601 E 12th St
Kansas City, MO 64106
(816) 983-3561
(816) 426-5550/5949 (fax)
glen.d.shonkwiler@usace.army.mil

APPENDIX 8-B

**PDI Soil Probe Log Sheets
(Radiological Data)**

PDI Soil Probe Log Sheet
LEGEND

List of Abbreviations:

--- = not applicable	lt = light
blk = black	MDA = minimum detectable activity
bn = brown	med = medium
cl = clay	n/r = no recovery
cnts = counts	pCi/g = picoCuries per gram
Conc. = concentration	ppm = parts per million
dk = dark	SAA = same as above
DUP = duplicate	sc = clayey sand
f = fine	sec = seconds
gm = silty gravel	sm = silty sand
gp = poorly-graded gravel	sp = poorly-graded sand
gw = well-graded gravel	sw = well-graded sand
gy = gray	tr = trace
J = estimated	U = unidentified or negative conc. less than MDA
lg = large	wht = white

List of General Comments:

- 4x4 truck-mounted model 5400 and track-mounted model 54DT Geoprobe[®] were used to collect samples. Manual direct push methodology required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- Holes were grouted with BenSeal[®]
- Gamma measurements were taken at center point
- Duplicate samples marked with an "X" for duplicate were prepared by homogenizing soil above and below the center point and then separating for analysis.
- The depth listed is the center point
- Error: 2 sigma (95% confidence interval)

Tube Types

1-inch diameter = Dual Tube (actual 1.3-inch diameter)

2-inch diameter = Macro-Core[®] (actual 1.7-inch diameter)

Sample Intervals

Dual Tube – 13 inches

Macro-Core[®] – 8 inches

Manual Direct Push – 24 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750835	2165369	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	02/17/2000	02/24/2000	02/25/2000	
Time	8:15	14:25	10:50	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

depth to groundwater at 14.7 feet

<i>Field Original Signed</i>	02/17/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/24/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/25/2000
Signature (PID Logging)	Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results											
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	0	8	A	0	0	5	4	0	0		3.65	J	0.15	0.54	16.32	J	0.30	0.40	22.10	UJ	---	22.10
1.0	0	8	A	0	0	5	4	0	1		0.33	U	---	0.33	0.64		0.05	0.20	4.77	U	---	4.77
1.5																						
2.0																						
2.5																						
3.0																						
3.5																						
4.0																						
4.5																						
5.0	0	8	A	0	0	5	4	0	2		ARCHIVED											
5.5																						
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750425	2165285	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/24/2000	02/25/2000	
Time	8:29	14:40	11:30	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter native at 4.0

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/25/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	750797	2165361

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/24/2000	02/25/2000	
Time	8:55	15:10	15:15	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	depth to groundwater at 6.4 feet
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	native at 5.0
12 to 16 feet = 1-inch diameter	

<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)	02/17/2000 <hr style="width: 80%; margin: 0 auto;"/> Date
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)	02/24/2000 <hr style="width: 80%; margin: 0 auto;"/> Date
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)	02/25/2000 <hr style="width: 80%; margin: 0 auto;"/> Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results											
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	0	8	A	0	0	5	4	0	7		0.30	U	---	0.30	0.48		0.05	0.18	4.55	U	---	4.55
1.0																						
1.5																						
2.0																						
2.5																						
3.0																						
3.5																						
4.0																						
4.5																						
5.0	0	8	A	0	0	5	4	0	8		0.99		0.08	0.26	1.93		0.09	0.30	10.50	U	---	10.50
5.5																						
6.0																						
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8.0																						
8.5	0	8	A	0	0	5	4	0	9		ARCHIVED											
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750461	2165262	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/25/2000	02/28/2000	
Time	8:51	7:45	9:00	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436C	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.0

4 to 8 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750738	2165335	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/25/2000	02/28/2000	9:35
Time	10:05	8:10	J. Dekoskie	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	depth to groundwater at 6.3 feet
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	native at 6.6

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750718	2165375	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/25/2000	02/28/2000	
Time	9:35	8:35	10:00	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750370	2165467	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/25/2000	02/28/2000	
Time	9:33	8:55	10:50	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/28/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	8	A	0	0	5	4	2	0		2.12	0.11	0.36	5.14	0.15	0.29	15.50	U	---	15.50
1.0																				
1.5	0	8	A	0	0	5	4	2	1		0.82	0.09	0.26	0.71	0.07	0.26	7.07	U	---	7.07
2.0	0	8	A	0	0	5	4	2	2	X	0.82	0.09	0.25	0.82	0.06	0.26	6.62	U	---	6.62
2.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750629	2165295	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/25/2000	02/28/2000	
Time	10:45	9:20	13:05	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter depth to groundwater at 7.8 feet
 4 to 8 feet = 1-inch diameter
 8 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750558	2165531	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/25/2000	02/28/2000	
Time	10:25	9:50	13:30	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.0

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/28/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.0	0.0-0.6: bn sm tr sc														
0.5	1111		1245	1263		0.6-0.7: green rock	0	8	A	0	0	5	4	2	7					
1.0	531		501		0.0	0.7-2.8: bn sm w/sc	0	8	A	0	0	5	4	2	8					
1.5	254		469																	
2.0	150	175			0.0															
2.5	156					2.8-4.0: no recovery														
3.0	196				n/r															
3.5	220																			
4.0	179				0.0	4.0-6.0: gy sm														
4.5			480				0	8	A	0	0	5	4	2	9					
5.0					0.0															
5.5			429																	
6.0			440		0.0	6.0-6.5: gy bn sm tr sc														
6.5						6.5-8.0: no recovery														
7.0					n/r															
7.5																				
8.0					0.0	8.0-9.8: lt bn sm tr sc														
8.5			438																	
9.0					0.0															
9.5			481			9.8-12.0: no recovery														
10.0					0.0															
10.5			411																	
11.0					n/r															
11.5																				
12.0					n/r															
12.5																				
13.0																				
13.5																				
14.0																				
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19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5																				
22.0						Recovery														
22.5						0-4 feet: 34 inches														
23.0						4-8 feet: 30 inches														
23.5						8-12 feet: 34 inches														
24.0																				

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results											
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	0	8	A	0	0	5	4	2	7		3.50	J	0.16	0.58	20.28	J	0.36	0.47	25.30	UJ	---	25.30
1.0	0	8	A	0	0	5	4	2	8		0.81		0.08	0.17	0.80		0.06	0.20	5.47	U	---	5.47
1.5																						
2.0																						
2.5																						
3.0																						
3.5																						
4.0																						
4.5	0	8	A	0	0	5	4	2	9		ARCHIVED											
5.0																						
5.5																						
6.0																						
6.5																						
7.0																						
7.5																						
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750534	2165265	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/25/2000	02/28/2000	
Time	11:25	10:40	14:15	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 5.5

4 to 8 feet = 1-inch diameter

8 to 16 feet = 1-inch diameter

<i>Field Original Signed</i> _____ Signature (Down Hole Gamma Logging)	02/17/2000 Date
<i>Field Original Signed</i> _____ Signature (Core Gamma Logging)	02/25/2000 Date
<i>Field Original Signed</i> _____ Signature (PID Logging)	02/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750693	2165471	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/25/2000	02/28/2000	
Time	11:01	11:00	14:50	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436C	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	depth to groundwater at 14.6 feet
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	native at 5.0
12 to 16 feet = 1-inch diameter	

<i>Field Original Signed</i>	02/17/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/25/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/28/2000
Signature (PID Logging)	Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results											
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	0	8	A	0	0	5	4	3	3		3.38	0.17	0.69	16.06	0.32	0.45	17.31	5.34	17.00			
1.0	0	8	A	0	0	5	4	3	4		1.20	J	0.09	0.30	1.26	J	0.07	0.23	11.50	UJ	---	11.50
1.5	0	8	A	0	0	5	4	3	5	X	1.03		0.09	0.23	1.09		0.06	0.18	7.35	U	---	7.35
2.0																						
2.5																						
3.0																						
3.5																						
4.0																						
4.5																						
5.0																						
5.5																						
6.0	0	8	A	0	0	5	4	3	6		ARCHIVED											
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750876	2165576	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/25/2000	02/28/2000	
Time	12:05	11:35	15:35	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter native at 4.0

<i>Field Original Signed</i>	02/17/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/25/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/28/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750429	2165514	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/25/2000	02/29/2000	8:00
Time	11:45	13:10	8:00	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:
 0 to 4 feet = 2-inch diameter native at 3.0
 4 to 8 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/29/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	014
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750886	2165518	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/25/2000	02/29/2000	8:30
Time	12:40	13:30	J. Dekoskie	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

<i>Field Original Signed</i>	02/17/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/25/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/29/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	015
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750713	2165427	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/28/2000	02/29/2000	9:00
Time	12:28	10:30	02/29/2000	9:00
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	depth to groundwater at 9.6 feet
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	native at 5.5
12 to 16 feet = 1-inch diameter	

<i>Field Original Signed</i>	02/17/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/28/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/29/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	016
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750867	2165637	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/28/2000	02/29/2000	9:28
Time	14:20	10:55		
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.0

4 to 8 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/29/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	017
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750742	2165498	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/28/2000	02/29/2000	9:45
Time	13:50	11:15	02/29/2000	9:45
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	depth to groundwater at 7.8 feet
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	native at 4.5
12 to 16 feet = 1-inch diameter	

<i>Field Original Signed</i>	02/17/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/28/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/29/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator		X X X	08A
Activity Designator		A A A	PDI
Field Measurement / Sample Collection Designator		V V	SP
Station Number		N N N	018
Media		m m	SB
Sample Type		n	0
Sequential Sample Number		# # # # #	(See Below)
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750840	2165632	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	02/17/2000	02/28/2000	Date 02/29/2000
Time	13:50	11:55	Time 12:40
Logger	E. Barbour	S. Ng	Logger J. Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	

Comments:
 0 to 4 feet = 2-inch diameter native at 4.0
 4 to 8 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/29/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	019
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750765	2165444	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/28/2000	02/29/2000	13:05
Time	14:25	13:10		
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436C	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	depth to groundwater at 9.0 feet
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	native at 4.0
12 to 16 feet = 1-inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/29/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	020
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750853	2165613	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/28/2000	02/29/2000	13:50
Time	14:40	14:00		
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 5.5

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

<i>Field Original Signed</i>	02/17/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/28/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/29/2000
Signature (PID Logging)	Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results											
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	0	8	A	0	0	5	4	6	3		1.47	0.11	0.43	4.38	0.16	0.42	10.70	U	---	10.70		
1.0																						
1.5	0	8	A	0	0	5	4	6	4		0.88	J	0.11	0.32	1.46	J	0.09	0.38	12.40	UJ	---	12.40
2.0																						
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4.0																						
4.5																						
5.0																						
5.5																						
6.0	0	8	A	0	0	5	4	6	5		0.71		0.06	0.24	1.12		0.07	0.21	5.89	U	---	5.89
6.5																						
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	021
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750906	2165462	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/17/2000	02/28/2000	02/29/2000	
Time	13:00	14:40	14:20	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/29/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	022
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750468	2165321	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	02/29/2000	03/01/2000	
Time	8:30	14:10	11:50	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 3.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/01/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	023
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750879	2165431	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	02/29/2000	03/01/2000	
Time	8:46	14:25	13:45	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 5.5

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/01/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	024
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750387	2165292	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	02/29/2000	03/01/2000	
Time	8:55	14:50	14:40	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.5

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/01/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	08A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	025
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750865	2165513	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	02/29/2000	03/01/2000	
Time	10:01	15:35	13:25	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/01/2000 Date

APPENDIX 8-C

Environmental Boring Log Sheets

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: GWRI Job Number: 085750503 Activity: Direct-Push Sampling	
Site Designator	XXX	08A	
Activity Designator	AAA	GWR	
Field Measurement/Sample Collection Designator	VV	DP	
Station Number	NNN	001	
Media	mm	SB	
Sample Type	n	0	
Sequential Sample Number	#####	(see Below)	
Location		Northing (NAD 1927) 750883-191	Easting (NAD 1927) 2165553.758
		Elevation (NGVD 1929)	
Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	
Date		3/30	Date
Time		0815	Time
Logger		G. MARKT	Logger
Detector Model #			PID Model #
Detector Serial #			PID Serial #
Scaler Model #			
Scaler Serial #			

Comments:

1. MPI No. ENV-08-8005
2. Direct-push location grouted with BenSeal.

0815-0830-SOIL SAMPLE 9'-12'
 0830-0945-H2O SAMPLE
 0945-1000-MOVE TO NEXT BORING--

<u>George H. Markt</u> Signature (Core Gamma Logging)	<u>3/30/00</u> Date
<u>George H. Markt</u> Signature (Logging)	<u>3/30/00</u> Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		0.0	↑	100% Recv. Top soil	0	8	A	0	2	0	5	5	0
0.5		20	↑	SC 2 GIEY 7/10B									
1.0		0.0											
1.5		0.0	0.0										
2.0		↓	↓	GM (Coal fragments)									
2.5		↓	↓	SC 2 GIEY 7/10B									
3.0		↓	↓										
3.5		↓	↓										
4.0		↑	↑	70% Recv									
4.5		↑	↑	GM (Coal fragments)									
5.0		0.0	0.0	SC 2 GIEY 5YR 6/1									
5.5		0.0	0.0										
6.0		↓	↓	SPSYR 4/4									
6.5		↓	↓										
7.0		↓	↓	SCSYR 4/4									
7.5		↓	↓										
8.0		↑	↑	80% Recv									
8.5		↑	↑										
9.0		0.0	0.0										
9.5		0.0	0.0										
10.0		↓	↓										
10.5		↓	↓										
11.0		↓	↓										
11.5		↓	↓										
12.0				END OF BORING									
12.5				@ 12'									
13.0													
13.5													
14.0													
14.5													
15.0													
15.5													
16.0													
16.5													
17.0													
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID
08A 020551

PROJECT: FUSRAP MAYWOOD	SITE: 08A	Page <u>1</u> of <u>1</u>
Project No: 085750503	Client: USACE	
Contractor: TERRA PROBE INC -		SAMPLE DEPTH: 8'-12'
Start Date/Time: 3/30 1015	Completion Date/Time:	Well Diameter:

Development Method/Equipment:

Logged by: S. MARKT	Water Level (ft bgs): 5.7'	Protection Level: D
Pre-development DTW (PVC) (ft): 5.7'	DTB (PVC) (ft): 12'	

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(ft) \times \pi \times (DTB-DTW)(ft) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.15 \text{ gal}$

(2-inch well = $0.164 \times (DTB-DTW)(ft)$) =

(2.5-inch well = $0.255 \times (DTB-DTW)(ft)$) =

Minimum Purge Volume (gal) (3 well volumes) = **0.45 gal**

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

Total Quantity Purged: **1 gal**

Disposition of Purge Water: **MISS**

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1045		5.7'	<u> </u>	10.3	6.72	2.47	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
DTW = depth to water gpm = gallons per minute

SCREEN 0'-4.5' (PVC SCREEN) flow rate \Rightarrow 3:40"/hr.
do = 2.83

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	08A
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	008
Media	mm	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)

	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
--	---------------------	--------------------	-----------------------



Location: 750488.369 2105358.541

	Gamma Logging			Photoionization Detector (PID) Logging
	Down Hole	Core		
Date		3/30	Date	3/30
Time		1000	Time	1000
Logger		G.MARKET	Logger	G.MARKET
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

- MPI No. ENV-08-8006
- Direct-push location grouted with BenSeal.

1000 - 1015 - SOIL SAMPLE 1' → 3'
 1015 - 1145 - H₂O SAMPLE
 1230 - 1300 - STEAM CLEAN

 _____ Signature (Core Gamma Logging)	<u>3/30/00</u> _____ Date
 _____ Signature (Logging)	<u>3/30/00</u> _____ Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	60% RECV. SW SYR4/4	0	8	#	0	2	0	5	4	8
0.5				trace coal									
1.0													
1.5		0.0	0.0										
2.0													
2.5													
3.0													
3.5		↓	↓	SC 2 GLEY 2,5/10Bq									
4.0				70% RECV.									
4.5													
5.0													
5.5													
6.0				SP SYR4/4									
6.5													
7.0													
7.5													
8.0				60% RECV									
8.5													
9.0													
9.5													
10.0													
10.5													
11.0													
11.5													
12.0				END OF BORING @ 12'0									
12.5													
13.0													
13.5													
14.0													
14.5													
15.0													
15.5													
16.0													
16.5													
17.0													
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

12.0
@ 1.0
↓

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID:
08A020549

PROJECT: FUSRAP MAYWOOD	SITE: 08A	Page 1 of 1
Project No: 085760503	Client: USACE	
Contractor: TERRA PROBE INC.	SAMPLE DEPTH: 8'-12'	
Start Date/Time: 3/30	Completion Date/Time:	Well Diameter:

Development Method/Equipment:

Logged by: G. MARKT	Water Level (ft bgs): 1.0'	Protection Level: D
Pre-development DTW (PVC) (ft): 1.0'	DTB (PVC) (ft): 12'	

Post-development DTW (PVC) (ft): **—**

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow ~~2.15~~ 0.250 \text{ gal}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) = **—**

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) = **—**

Minimum Purge Volume (gal) (3 well volumes) = **0.75 gal**

Development Purge/Discharge Rate (gpm): **—**

Maximum Drawdown During Purging (ft): **—**

Total Quantity Purged: **2.0 gal**

Disposition of Purge Water: **— MISS**

Hours of Development: **—**

Hours of Decon: **—**

Hours of Standby: **—**

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1 0845	-	1.0	-	10.3	6.53	1.22	79	
2				8.9	7.0	1.19	867	
				10.1				
				10.05	7.15	1.18	355	

Notes: = bgs = below ground surface D = well diameter
PVC = below top of PVC DTB = depth to bottom of well
DTW = depth to water gpm = gallons per minute
D (2-inch well) = 0.167 feet
D (2.5-inch well) = 0.208 feet

1 do = 2.40 2 do = 2.10 3 do = 1.23
SCREEN 8' → 12'
flow rate = 1.35"/min

08A 020772

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	08A
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)
Location	Northing (NAD 1927) 750556.996	Easting (NAD 1927) 2165524.762
		Elevation (NGVD 1929)
	Gamma Logging	
	Down Hole	Core
Date		3/30
Time		1315
Logger		G. MARKS
Detector Model #		
Detector Serial #		
Scaler Model #		
Scaler Serial #		
	Photoionization Detector (PID) Logging	
Date		3/30
Time		1315
Logger		G. MARKS
PID Model #		Multi-RAE
PID Serial #		CENAN 21811

Comments:

- MPI No. ENV-08-8004
- Direct-push location grouted with BenSeal.

1300 - 1315 - SOIL SAMPLE 5'-8'
 1315 - 1500 H₂O SAMPLE
 1500 - 1515 STEAM CLEAN

George H. Marks
 Signature (Core Gamma Logging)

3/30/00
 Date

George H. Marks
 Signature (Logging)

3/30/00
 Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↓	↓	50% RECV. SM5YR	0	8	A	0	2	0	7	7	2
0.5				2.5/1 (TOP SOIL)									
1.0		0.0	0.0	SM5YR 3/3 mixed									
1.5				w/white material									
2.0													
2.5				PLAT									
3.0													
3.5		↓	↓										
4.0		↓	↓	100% RECV. SP5YR									
4.5				4/1 SC. 2 GLAY									
5.0				5/100									
5.5		0.0	0.0	SP5YR 4/6									
6.0													
6.5		↓	↓										
7.0													
7.5		↓	↓										
8.0		↓	↓										
8.5				40% RECV. (2) SM									
9.0				5YR 4/4									
9.5		0.0	0.0										
10.0													
10.5													
11.0													
11.5		↓	↓										
12.0				END OF BORING									
12.5				@ 12'									
13.0													
13.5													
14.0													
14.5													
15.0													
15.5													
16.0													
16.5													
17.0													
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

H₂O @ 6.7

*depth uncertain due to poor recovery

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 08A020743

PROJECT: FUSRAP MAYWOOD	SITE: 08A	Page _____ of _____
Project No: 085750503	Client: USACE	
Contractor: TERRA PROBE INC-	SAMPLE DEPTH:	
Start Date/Time: 3/30	Completion Date/Time:	Well Diameter:
Development Method/Equipment:		
Logged by: G. MARKT	Water Level (ft bgs): 6.7	Protection Level: D

Pre-development DTW (PVC) (ft): 6.7 DTB (PVC) (ft): 12'

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.15 \text{ gal}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ —

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ —

Minimum Purge Volume (gal) (3 well volumes) = **0.45 gal**

Development Purge/Discharge Rate (gpm): —

Maximum Drawdown During Purging (ft): —

Total Quantity Purged: **1 gal**

Disposition of Purge Water: **→ MISS**

Hours of Development: —

Hours of Decon: —

Hours of Standby: —

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
			-	12.2	7.1	2.39	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

SCREEN — 4' → 8' (ORIGINAL SCREEN SET @ 6' → 10' NO WATER)
 RESET TO 4' → 8' FOR SAMPLING

$d_0 = 7.5$

Flow rate $\Rightarrow 2:10"/\text{hr}$

PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 9 – Revision 1

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

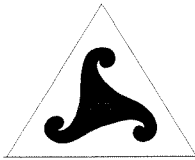
SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18

Submitted to:

Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
FUSRAP Project Office
26 Federal Plaza
New York, New York 10278

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Submitted by:



Stone & Webster, Inc.
100 West Hunter Ave.
Maywood, NJ 07607
May 2001

Reviewed/
Approved by:

Sam Rice Date: 5/31/01
Sam Rice, P.E.
Project Manager

Reviewed/
Approved by:

Kevin F. Donnelly Date: 5/31/01
Kevin F. Donnelly, P.E.
Project Environmental Engineer

Reviewed/
Approved by:

Alan F. Brown Date: 5-30-01
Alan F. Brown, P.E.
Task Manager

Reviewed/
Prepared by:

Edward A. Dudek Date: 5-31-01
Edward Dudek, P.E.
Task Leader

Reviewed/
Prepared by:

Michael Ciminera Date: 5-30-2001
Michael Ciminera
Field Operations Leader

**PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 9 – Revision 1**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18**

RECORD OF REVISIONS

Revision 0: Original Issue

Revision 1: The Final PDI Report (Revision 0) was submitted in July 2000. Revision 1 to the Final PDI Report incorporates the following significant changes: revision to text headers and footers; addition of results of confirmatory radiological analyses to [Table 9-4](#); and addition of Toxicity Characteristic Leaching Procedure (TCLP) data to [Table 9-5](#).

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ACRONYMS AND ABBREVIATIONS

AT&T	American Telephone & Telegraph
BNI	Bechtel National, Inc.
C	Degrees Centigrade
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
Conc.	Concentration
CQCP	Contractor Quality Control Plan
DOE	U.S. Department of Energy
EPP	Environmental Protection Plan
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	grams
GMS	Groundwater Modeling System
GPR	Ground Penetrating Radar
GPS	Global Positioning System
ID	Identification
ISOCS	In Situ Object Counting System
keV	kilo electron volts
kg	kilogram
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCW	Maywood Chemical Works
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
mg	milligram
MHTDP	Materials Handling, Transportation and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJVIS	New Jersey Vehicle Inspection Station
NYS&W	New York, Susquehanna & Western Railway
ORNL	Oak Ridge National Laboratories
pCi	picoCurie
PDI	Pre-Design Investigation
PDIWP	Pre-Design Investigation Work Plan
PID	Photoionization Detector
PVC/PET	Polyvinyl Chloride/Polyethylene Teraphthalate
QA	Quality Assurance
QC	Quality Control
QCSR	Quality Control Summary Report
Ra-226	Radium-226
Rn-222	Radon-222

RCRA	Resource Conservation and Recovery Act
RESRAD	Department of Energy Computer Code; RESidual RADioactivity
ROC	Radionuclides of Concern
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
St.	Street
Th-232	Thorium-232
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
ug	microgram
U-238	Uranium-238
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank

1.0 SITE BACKGROUND AND PHYSICAL SETTING

1.1 General Site Overview

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (hereafter referred to as the Maywood Site) is located in a highly developed area of Bergen County in northeastern New Jersey, in the Boroughs of Maywood and Lodi and the Township of Rochelle Park (Figure 9-1). Portions of the Maywood Site are radiologically impacted from process wastes and residues associated with the recovery and refining of thorium and thorium compounds from monazite ores by the Maywood Chemical Works (MCW) from 1916 to 1956 (Bechtel National, Inc., BNI, 1992).

Waste produced at MCW was a fine sand-like material containing residual thorium with lesser amounts of uranium and its daughter products including radium. Wastes and residues were disposed in low-lying areas west of processing facilities. In the early 1930s, a portion of these wastes and residues was separated from the main property by construction of New Jersey State Highway 17 (NJ Route 17). Additionally, the former channel of Lodi Brook runs through the majority of the properties making up the Maywood Site. Some of the contaminated materials are assumed to have eroded from the facility area and were transported downstream via Lodi Brook (Figure 9-2). In addition, from 1928 to 1944, local residents were known to use process waste in their lawns and gardens and as fill material (BNI, 1992). These are the major mechanisms for distribution of radiologically-contaminated materials on the Maywood Site.

The Maywood Site consists of 88 designated residential, commercial, municipal, and state or federal properties. All 64 Phase I properties (including all residential and municipal properties) have either been remediated by the U.S. Department of Energy (DOE) or U.S. Army Corps of Engineers (USACE) or are currently being addressed under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). The remaining 24 Phase II properties are being addressed by the Stone & Webster Team (i.e., Team).

1.2 Pre-Design Investigation Scope

On December 29, 1998, the USACE issued a Scope of Services for the design and remediation of the remaining 24 commercial and government properties. These properties potentially contain deposits of radioactive material in surface and subsurface soils resulting from operations of the former MCW. They have been designated as the Phase II properties.

A Pre-Design Investigation Work Plan (PDIWP, Stone & Webster, 1999a) was submitted in October 1999 for the Phase II properties. The purpose of the PDIWP was to address data gaps necessary to complete remedial design efforts. In determining additional data needs, it was assumed that remediation of radiologically-impacted soils would be conducted on “accessible soils” only. Accessible soils are defined as soils not under permanent structures such as buildings and roadways. Data acquisition was limited to accessible soils only.

A preliminary evaluation was performed to determine the human health risk from leaving subsurface radiologically-impacted soils proximate to these structures. The RESidual

RADioactivity (RESRAD) computer code was utilized to quantify the dose and risk under a number of assumed conditions. Based on the preliminary results, it was determined that any radioactive residues left adjacent to existing buildings, roadways, and railways would need a minimum of two feet of clean soil cover to be protective of human health. As such, it has been assumed that where radiologically-contaminated soils exist at depth adjacent to structures, at least the top two feet of radiologically-contaminated soil would be removed adjacent to the structure to a six foot horizontal setback, and then sloped at two horizontal to one vertical (2H:1V) to the required depth. However, it is recognized that site-specific calculations will need to be made during the remedial design phase in order to determine the actual depth of excavation adjacent to each structure, the horizontal setback, and the slope to final excavation depths (Stone & Webster, 1999a).

In preparing the PDIWP, the 24 Phase II properties were sub-divided into 12 clusters. The purpose of the clustering was to take a 'collective' view of a set of contiguous properties to efficiently secure needed pre-design investigation (PDI) information for those properties. [Table 9-1](#) lists the 12 clusters for the Phase II properties, from south to north. The reader is directed to the PDIWP for additional background information (Stone & Webster, 1999a).

The purpose of this PDI Report is to present data collected during the PDI for Cluster No. 9. The evaluation of PDI data, along with data collected by others during previous investigations, is documented separately.

2.0 PDI FIELD ACTIVITIES

PDI activities were performed by the following Team members:

Stone & Webster, Inc.	Team leader and engineering services
Malcolm Pirnie, Inc.	Engineering services
Science & Ecology Corporation.....	Health physics services
Cabrera Services, Inc.	Radiological survey support
Canberra Industries, Inc.	Radiological survey support
Garden State Surveying, Engineering, and Planning, Inc.	Surveying and mapping
NAEVA Geophysics, Inc.	Geophysical investigation
TerraProbe, Inc.	Direct push services
Franklin Environmental Services, Inc.	Construction services
ThermoRetec	Radiological sample analysis
RECRA LabNet.....	Environmental sample analysis
Kestrel Environmental Technologies, Inc.	Data validation

PDI activities involved non-intrusive surveys followed by intrusive investigations. The preliminary, non-intrusive PDI activities (including surface gamma scans, surface In-Situ Object Counting System (ISOCS) readings, geophysical surveys and field surveying) were initiated in August 1999. The intrusive portion of the PDI program began in January 2000 and was completed in April 2000. [Table 9-2](#) presents a summary of PDI intrusive field activities. For logistical reasons, PDI environmental borings were performed at the outset of the Groundwater Remedial Investigation program during the latter part of March and beginning of April 2000.

PDI field activities were conducted in accordance with the PDIWP, and in compliance with procedures established in the following project documents: Contractor Quality Control Plan (CQCP), Site Safety and Health Plan (SSHP), General Environmental Protection Plan (EPP), Chemical Data Quality Management Plan (CDQMP), and the Materials Handling, Transportation and Disposal Plan (MHTDP), (Stone & Webster, 1999b, c, and d, 2000a, 2000b, respectively). Variances in methodology and sample locations between the PDIWP and the actual PDI execution are discussed below.

2.1 Variances from PDIWP

This section discusses deviations in methodologies and sample locations from the approved PDIWP.

2.1.1 Methodology Variances

Methodology variances from the PDIWP were as follows:

- The PDIWP called for the use of an ISOCS utilizing germanium gamma spectroscopy to quantify radionuclide activity in soil. Following approval of the PDIWP, regulatory concerns regarding the use of ISOCS for subsurface investigation were raised. The PDIWP was subsequently modified by replacing intrusive ISOCS sampling with conventional sample collection using direct push methods to collect soil cores for laboratory analysis. Due to this

change, Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled “Soil Probe Investigation” was developed and followed. Refer to the USACE letters dated December 8, 1999 from the Project Manager, Mr. Allen Roos, informing the U.S. Environmental Protection Agency (USEPA) Project Manager, Ms. Angela Carpenter, and the New Jersey Department of Environmental Protection (NJDEP) Case Manager, Ms. Donna Gaffigan, of the modification, as presented in [Appendix 9-A](#). The USEPA approved use of SOP-SW-MWD-509-0 on December 29, 1999 and NJDEP approved it on January 20, 2000.

- A Bicon® Model G1 one-inch by one-inch (1” x 1”) sodium iodide (NaI) detector was substituted for the originally proposed 3/8” x 3/8” NaI detector for downhole gamma logging. This substitution was needed to provide greater detector sensitivity through the soil probe casing. Due to the addition of this detector, SOP number SW-MWD-509-0 entitled “Soil Probe Investigation” was revised. These revisions are outlined in [Table 1-A](#) in [Appendix 9-A](#). The 3/8” x 3/8” NaI detector was used only when the manual direct push method was employed. Manual direct push methodology was required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- The CDQMP originally specified a frequency of 10% for field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. This corresponds to the USACE internal quality control standard. However, due to the significant number of samples to be collected as part of the PDI program (totaling approximately 2000 soil samples and in excess of 10,000 gamma count rate and photoionization detector (PID) readings), the USACE agreed to reduce the frequency to 5%, which is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and USEPA guidelines for MS/MSD analysis. USEPA Region II does not have a specific guideline for field duplicate samples. Refer to the USACE and USEPA/NJDEP correspondence in [Appendix 9-A](#).
- The PDIWP stipulates that geotechnical borings with associated laboratory testing may be required in order to provide design parameters in locations where excavation may impact adjacent structures. Since radiological clean-up criteria have yet to be finalized, final assessment of limits of radiological contamination cannot be made at this time. The geotechnical investigation program was suspended from the PDI. During the design process, existing geotechnical information will be evaluated for design and a determination will be made if supplemental data are needed.

2.1.2 Sample Location Variances

The PDIWP was developed with the intent that proposed sample locations would be deleted, added, or moved as additional information regarding site features and contamination distribution became available during the course of the PDI implementation. In accordance with this approach, sample locations as proposed in the PDIWP were deleted, added, or moved for the following reasons:

- Base mapping developed subsequent to completion of the PDIWP provided additional information regarding underground utility locations and other site features. Proposed sample

locations proximate to these utilities and site features were moved in order to minimize impacts.

- Review of surface gamma survey data collected as part of the PDI, coupled with additional review of data from previous investigations performed by BNI and ORNL, indicated that certain proposed intrusive locations should either be moved or could be deleted. To address potential areas of surface radiological contamination not previously identified as areas of concern, a protocol was established for determining the need for additional intrusive sampling locations. Refer to “Protocol For Addressing Gamma Scan Anomalies” in [Appendix 9-A](#).

Specific rationale for the deletion, addition, or movement of locations proposed in the PDIWP are summarized in [Appendix 9-A](#).

2.2 Geophysical Surveys

Between September 20, 1999 and March 2, 2000, NAEVA Geophysics, Inc. conducted geophysical investigations on the Maywood Site. The purpose of these investigations was to delineate surface traces of detectable underground utilities in the vicinity of proposed exploratory boring sites. Equipment selected for this investigation included: a Fisher TW-6 Pipe and Cable Locator; a Radiodetection RD432PDL-2 Utility Locator; a Subsite 75 Utility Locator, a 3M Dynatel 2250 Cable Locator, and a GSSI SIR-3 ground penetrating radar (GPR) system with a 300 MHz antenna. Details of the surveys are presented in the NAEVA report (NAEVA, 2000a).

2.3 Sample Locations

In October 1999, Garden State Engineering, Surveying, and Planning, Inc. performed a ground survey of the Maywood Site properties. Results of the ground survey were combined with aerial mapping prepared by GEOD Corporation to produce new base mapping for the Maywood Site. This new base mapping replaced the mapping used to generate the PDIWP drawings.

Sample points for the surface gamma survey, surface ISOCS measurements, direct push (Geoprobe[®]) sampling, and environmental sampling were located in the field using a Global Positioning System (GPS). A Trimble 4800 Site Surveyor system with a 4700 base receiver, GPS antenna, radio antenna, and ancillary equipment were used to perform GPS surveys. Base stations were set up and calibrated at specified bench-mark locations established by the surveyor. Following base receiver set up, sampling points were located. Field markings (spray paint, flags, and stakes) were used to identify intrusive sampling locations for radiological and environmental direct push mobile rigs, as well as surface ISOCS locations.

Coordinates for intrusive sample locations were determined from new PDI sample location maps which reflected updated base mapping and modified sample locations; surface ISOCS locations were identified based on original PDIWP mapping. For the surface gamma survey, GPS was used to record locations of gamma scan measurements. Where GPS instrumentation could not be utilized due to signal disruption (e.g., tree coverage, building interference, non-availability of satellites, or poor satellite reception due to weather conditions), sample locations were based on identification of site features and scaling off base mapping.

2.4 Surface Gamma Surveys

Surface gamma surveys for all of the Phase II properties were conducted from August 1999 to March 2000. Surveys were conducted to obtain distribution of surface radiological contamination for health and safety reasons, as well as to verify existing data. Measurements were collected by suspending a 1" x 1" NaI gamma scintillation detector coupled to a Ludlum Model 12 ratemeter within a few inches of the ground surface. A health physics technician walked transects (approximately four to six feet wide) covering the properties while slowly swinging the detector in a serpentine motion. Transects were spaced to assure full areal coverage with some overlap. Gamma count measurements were taken approximately every 15 to 20 feet; measurement frequency was increased in areas exhibiting elevated gamma counts. Minimum detectable concentrations (MDCs) for this detector for the radionuclides of concern (ROC) are approximately 4.7 picoCurie per gram (pCi/g) for Radium-226 (Ra-226), 3.0 pCi/g for Thorium-232 (Th-232), and 121.0 pCi/g for Uranium-238 (U-238), correcting for volume and distance from the source (Multi-Agency Radiation Survey and Site Investigation Manual, MARSSIM, 1997). Gamma count data were stored with associated locations in the GPS recorder. In some instances where locations could not be recorded with a GPS (as stipulated above), measurements were manually recorded on the PDI maps.

2.5 Surface ISOCS Measurements

Surface ISOCS measurements were collected at selected locations where environmental, geotechnical, and radiological shallow boreholes were proposed in the PDIWP. Surface ISOCS measurements were collected to identify and quantify radionuclide activity in surface soil, beneath shielded areas (e.g., areas covered with gravel, asphalt, and concrete), and in areas proposed for environmental borings.

Gamma spectroscopy measurements of surface soil were collected using the Canberra high-purity germanium ISOCS and assuming uniform radioactivity distribution in soil. The high-purity germanium detector was positioned in a "downward-looking" direction perpendicular to the ground surface at a height of three feet. The detector was collimated using a lead shield subtending a 90-degree angle, which provided a surface soil viewing area approximately six feet in diameter. The back and side of the detector were shielded with two-inch thick lead O-rings. The detector collimator and shielding were used to ensure that radioactivity detected by the probe originated only from the six-foot diameter area beneath the detector, hence minimizing one possible source of error in the measurements.

2.6 Direct Push Soil Probes

Direct push soil probes (using truck-mounted model 5400 Geoprob[®] or track-mounted model 54DT Geoprob[®]) were used to collect soil samples for radiological and environmental parameter analysis. Two types of direct push soil probes were used: a single rod system (i.e., Macro-Core[®]) and a dual tube (or cased) system. The latter system utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Samples were collected in four-foot soil cores within polyvinyl chloride/polyethylene terephthalate (PVC/PET) liners, marked with the appropriate field identification number, sealed with rubber end caps, and placed

into a two-inch inner diameter PVC container (including PVC end caps) for transport and storage.

For sample locations that were inaccessible to the mounted direct push rigs, soil cores were collected using a manual direct push method. Two-foot cores approximately one inch in diameter were collected using an electric powered hand-held vibratory hammer.

Prior to commencing intrusive sampling, underground utilities in the vicinity of the proposed boring locations were identified by reviewing PDI geophysical survey data, and by contacting the appropriate authorized parties (i.e., New Jersey One-Call System, and the property owner). In addition, a safe working distance from overhead utilities was maintained.

Sampling equipment (the rig, direct push soil probe casing and tools) was decontaminated prior to use and following each borehole installation using pressure or manual washing. Each soil probe hole was backfilled for the full length using Benseal[®] bentonite in accordance with project requirements. For areas covered by asphalt, cold patch was placed at the surface.

2.6.1 Downhole Gamma Logging

Measurements were taken with a Bicron[®] Model G1 1" x 1" NaI gamma detector sealed in a waterproof stainless steel container. The instrument MDCs are approximately 3.6 pCi/g for Ra-226, 2.3 pCi/g for Th-232, and 92.0 pCi/g for U-238, which are approximately 75% of the surface MDCs listed in Section 2.4. This estimate assumes a geometry factor of 0.50, where a four pi geometry (i.e., a sphere) when scanning downhole is approximately half of a two pi geometry (i.e., a hemisphere) when scanning the ground surface. However, this reduction in the MDCs is modified by the 0.3-inch steel casing in the hole, which results in an approximate 33% reduction in the gammas seen by the detector as calculated by the computer code Microshield[™]. The correction factor is therefore calculated by dividing the geometry factor (0.50) by the steel casing reduction factor (0.66), yielding approximately 0.75. The NaI detector was connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector[™] multi-channel analyzer/amplifier/high voltage power supply. The system was controlled, and the data stored, via notebook computer. Ten-second integrated gross gamma measurements were recorded at each 6-inch depth increment in the cased soil probe holes and data entered onto the PDI Soil Probe Log Sheets (see [Appendix 9-B](#)). In areas where samples were collected using the manual direct push method, a Bicron[®] 3/8" x 3/8" NaI gamma detector coupled to a Ludlum Model 2221 scaler/ratemeter was used to take 30 to 60-second gross gamma measurements in uncased soil probe holes. The MDCs for this instrument are estimated to be approximately 1.9 pCi/g for Ra-226 and 2.3 pCi/g for Th-232, as provided by the vendor. There is no correction factor for these MDCs.

2.6.2 Direct Push Core Screening/Sample Collection

Sealed PVC containers collected from direct push mobile and manual rigs were transported to the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation added to the PDI Soil Probe Log Sheets (see [Appendix 9-B](#)) included soil column description and soil screening data. Field screening for radiological activity was performed on soil cores contained in the PVC/PET liner. A collimated Eberline

SPA-3 2" x 2" NaI detector (or Ludlum Model 44-10) coupled to a Ludlum Model 2221 scaler/ratemeter was used to measure gamma activity. The detector was positioned approximately 0.5 inch above the soil core, on a guide, to ensure that this distance was maintained over the entire length of each soil core. Continuous scanning of the soil core was performed at an approximate rate of three inches per second. The instrument MDC, taken from MARSSIM, is estimated to be 2.8 pCi/g for Ra-226, 1.8 pCi/g for Th-232, and 80 pCi/g for U-238 (MARSSIM, 1997). Although the MARSSIM MDC values are based upon an open area, it was assumed that the slower scan time compensated for the different geometry. An indelible marker was used to mark the liner where elevated readings were identified during scanning. Total integrated gross gamma counts were accumulated over a 30-second interval and recorded.

Soil cores were also screened for total volatile organic vapors using a PID. A series of small perforations were made along the PVC/PET liner at 12-inch increments to expose soil to the PID. Perforations were sealed with tape after PID screening. Screening results were recorded on the PDI Soil Probe Logs.

Prior to obtaining samples, each core was photographed using a digital camera. A brief soil field classification description of each core was entered onto the PDI Soil Probe Log Sheet.

Soil samples were selected from each direct push location for analysis of the ROC: Th-232, Ra-226, and U-238. Samples were selected based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample was taken at the highest reading location (suspected FUSRAP waste, if present, as defined in the Federal Facilities Agreement dated November, 1991; DOE and USEPA, 1991); a second soil sample was collected where the readings approached a constant value (suspected transition zone, if present); and a third soil sample was collected within the zone of constant readings (below suspected transition zone). When soil cores exhibited uniform count rates (i.e., elevated gamma measurements were not identified), three samples per soil probe location were collected.

Selected samples were obtained from each core sufficient to fill a 300-milliliter sample container. Samples were labeled and capped at either end with plastic caps. Caps were color-coded for 'top' and 'bottom' of the original hole. Each extracted section of the soil core was replaced with a wooden spacer to indicate what portion of the soil core was sampled. The spacer was labeled with the sample identification number of the soil removed for testing. After screening and sample extraction, remaining portions of each soil core were placed back into the appropriate PVC container, with the wooden spacer in its appropriate location, and stored on-site for future reference. The section of core tube containing the sample was then transferred to the MISS on-site laboratory for sample preparation and analysis.

Evaluation of all gamma log data led to the archiving of selected samples. That is, a number of the direct push soil probes exhibited 'constant' count rates over the depth interval. In these cases, rather than having all samples analyzed at this time, the deepest prepared sample was not counted but archived. By doing this, as laboratory results confirm that radiological contamination does not exist at that soil probe location, unnecessary analytical work is

prevented. Samples that were archived are noted on the PDI Soil Logs in [Appendix 9-B](#) and on [Table 9-4](#).

As described above, a collimated Eberline SPA-3 or Ludlum Model 44-10 2" x 2" NaI detector was used to measure gamma activity for the soil cores, while a Bicron[®] Model G1 1" x 1" NaI gamma detector was used for the downhole measurements. The 2" x 2" NaI detector (Eberline SPA-3 or Ludlum Model 44-10) provided confirmation of downhole measurements and greater sensitivity for sample selection than the 1" x 1" NaI gamma detector.

2.6.3 Sample Preparation

Soil samples were screened to remove small debris and oven-dried to obtain moisture content and to facilitate grinding. Grinding assured sample homogenization. Samples were then transferred to a 300-milliliter commercially supplied metal can. Lids were secured on cans, after which they were shelved for 21 days. The 21-day period was required to allow radon and its daughter products to in-grow and establish secular equilibrium between Ra-226, Radon-222 (Rn-222), and the gamma-emitting daughters.

2.6.4 Laboratory Data

Analysis for ROC on selected samples was performed at the MISS on-site field laboratory using a Canberra high-purity germanium detector. All testing in the MISS on-site field laboratory was completed in accordance with the procedures outlined in the CDQMP. MISS on-site field laboratory data have been entered onto the PDI Soil Probe Log sheets (see [Appendix 9-B](#)).

The Project Chemist evaluated 10% of the MISS on-site field laboratory radiological data packages; the evaluation is included in the PDI Quality Control Summary Report (QCSR; Stone & Webster, 2000c). The laboratory qualified the reported data when the germanium detector measurement system fell outside of one of the control limits during quality control check runs. Data qualification procedures are described in the PDI QCSR.

Ten percent of the samples analyzed by the MISS on-site field laboratory were sent to a USACE-approved off-site laboratory (ThermoRetec) for confirmatory analysis of the ROC. Following analysis, all soil samples were returned to the Maywood Site for storage and future reference. Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the off-site confirmatory radiological data. Radiological data were evaluated using the USACE's Radiological Data Quality Evaluation Guidance, as presented in the CDQMP. The data validation reports for the radiological confirmatory sample results are provided in the PDI QCSR.

2.7 Environmental Sampling

A limited number of soil samples were collected for environmental analyses in order to identify potential chemical contamination commingled with the radioactive waste. This information would aid in assessing waste classification (i.e., whether hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), is commingled with radioactive waste) as well as provide data for worker health and safety. Samples for environmental analysis were

collected using direct push Macro-Core® methodology. Sampling depths were based on the anticipated depth of radiological contamination. Soils exhibiting the highest PID readings or visual contamination were collected and sent for laboratory analysis by a USACE and NJDEP certified laboratory (RECRA LabNet). Samples were analyzed for RCRA disposal characteristics (ignitability, reactivity, corrosivity, and toxicity characteristic leaching procedure TCLP), the Target Compound List (TCL) and the Target Analyte List (TAL) with chromium speciation.

During performance of environmental borings, environmental boring log sheets were completed for each boring. Copies of the completed log sheets are included in [Appendix 9-C](#).

Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the environmental data. Environmental data were evaluated using the USACE's Data Quality Evaluation Guidance, as presented in the CDQMP. In addition, the USEPA Region II SOP No. HW-24, Revision I, June 1999, was also applied. The data validation reports for the environmental sample results are provided in the PDI QCSR.

2.8 Geotechnical Sampling

Radiological cleanup criteria have yet to be finalized, therefore final assessment of the extent of radiological contamination cannot be made at this time. The geotechnical investigation program was therefore suspended from the PDI. Following approximate determination of limits of excavation during the design phase, existing geotechnical information will be evaluated for remedial design purposes. If it is decided that additional information is required, then the geotechnical program will be reinstated, as necessary.

2.9 Quality Assurance/Quality Control

Field and laboratory activities were completed in accordance with the CQCP and the CDQMP. Data reflecting adherence to the Quality Assurance / Quality Control (QA/QC) program was documented and presented in the PDI QCSR.

2.10 Health and Safety

All PDI investigation activities were conducted in compliance with the SSHP and associated protocols and directives. Field crews received daily briefings at 'Plan of the Day' meetings prior to any work activities. These meetings reviewed daily health and safety issues such as potential inclement weather, as well as reviews of general site health and safety directives.

3.0 CLUSTER DESCRIPTION AND PDI RESULTS

3.1 Cluster No. 9 Description

Cluster No. 9 consists of one property (Property No. 09A – Sears Logistical Services) in the Borough of Maywood and the Township of Rochelle Park. This property is located at 149-151 Maywood Ave. and occupies Block 124, Lot 30 within the Borough of Maywood and Block 17.02, Lot 1 within the Township of Rochelle Park. The property comprises approximately 27 acres and is occupied by Sears Logistical Services (Sears).

There is a 6.5-acre two-story cinder block building on the property. The first floor contains a large warehouse area, loading dock, boiler room, dispatch office, customer pickup area, employee locker room, and offices. The second floor contains offices, work areas for telemarketers, conference and staff training areas, and office space (BNI, 1994). The facility is active 7 days a week, 24 hours a day with no slow cyclic periods in Sears' operations (Stone & Webster, 1999e). Sears uses 100 % of the dock space but only about 1/3 of the warehouse floor space. All deliveries for the region (both to stores and customers) come out of this facility, with most delivery trucks (about 50) leaving by 9 a.m. every morning. Fifty-foot trailer trucks trickle in around the clock to deliver inventory. The dock space is relatively inactive between 9:00 am and 3:00 p.m. (Stone & Webster, 1999e). The western side of the facility is used as a staging area for Sears trucking contractors. The eastern side of the facility is a distribution facility for outlet stores in the area. The land area along the southern property border fence was leased to a landscape contractor. The loading dock has a concrete pad, while the parking lot appears to be asphalt only. Sears is in the process of closing out a diesel and gasoline underground storage tank (UST) site located southeast of the building (Stone & Webster, 1999e).

Approximately 11 acres of the site are paved, and the remaining areas are vegetated. A 3-acre wetland is located on the east side of the warehouse. There are two active rail spurs behind the warehouse on the border with Cluster No. 10 (Stepan Company). The low-lying area between the Sears and Stepan properties along the rail spur is also classified as a wetland.

The Sears property is bounded by New Jersey Route 17 on the west; by Cluster No. 6 (Gulf and Sunoco Service Stations, Properties No. 06D and 06C, respectively) on the south; by Cluster No. 8 (Maywood Furniture Company) and Maywood Avenue on the east; and by Cluster No. 12 (MISS) and Cluster No. 10 (Stepan Company) on the north.

Refer to [Figure 9-3](#) for more specific details of site features.

3.2 Radiological Data

3.2.1 Surface Gamma Survey

A surface gamma survey was performed at Cluster No. 9. Data, recorded using GPS, was entered into the Groundwater Modeling System (GMS) software package and contoured to a two-dimensional grid using the "Natural Neighbor" contouring protocol. "Natural Neighbor" interpolation is based on the Thiessen polygon network of the scatter point set. Data are

interpolated based on distance as well as topological relationships (Boss International, Inc., 2000).

Results of the gamma scan survey for Cluster No. 9 are presented graphically on [Figure 9-4](#) and [Figure 9-A1](#) (Appendix 9-A). [Figure 9-4](#) presents surface gamma scan data in context of the Maywood Site: the upper limit of the contour range is the maximum gamma count measurement detected at the Maywood Site, and the lower contour range represents 1.5 times the background gamma count rate for Cluster No. 9 (background is approximately 2,000 counts per minute for Cluster No. 9). [Figure 9-A1](#) provides a more detailed, cluster-specific, presentation of the gamma scan data, with the contoured ranges corresponding to the actual minimum and maximum measured gross gamma counts recorded at Cluster No. 9.

3.2.2 Surface ISOCS Measurements

Surface ISOCS measurements were taken at 17 locations on Cluster No. 9; locations are shown on [Figure 9-3](#). The results of surface ISOCS measurements are tabulated on [Table 9-3](#).

3.2.3 Direct Push Soil Probes

Seventy-two (72) direct push soil probes were performed at Cluster No. 9 for radiological purposes. Soil probe locations are shown on [Figure 9-3](#).

3.2.3.1 Downhole Gamma Logging

Results from downhole gamma logging measurements taken at the soil probe locations are presented on the PDI Soil Probe Logs included in [Appendix 9-B](#).

3.2.3.2 Direct Push Core Screening/Sample Collection

Results of soil core screening activities performed at the MISS radiological screening laboratory are recorded on PDI Soil Probe Logs included in [Appendix 9-B](#).

3.2.3.3 MISS On-Site Field Laboratory Data and ThermoRetec Confirmatory Data

Two-hundred and twenty-one (221) soil samples were collected for laboratory analysis from the 72 soil probe locations at Cluster No. 9. One-hundred and sixty (160) of the 221 samples were sent for analysis (including 11 duplicates); 61 were archived on-site. Laboratory data consisting of soil concentrations of the ROC are presented on the soil probe logs in [Appendix 9-B](#), and summarized on [Table 9-4](#). Archived samples are also recorded on the logs and the table.

Eight of the soil samples analyzed by the MISS on-site field laboratory were sent to ThermoRetec for confirmatory analysis. Results of the confirmatory analyses performed by ThermoRetec are shown in [Table 9-4](#).

As part of the data quality objective process, a comparison study was performed between the MISS on-site field laboratory and the ThermoRetec laboratory data. The results of the comparison can be found under separate cover (Stone & Webster, 2000d).

3.3 Environmental Data

Five (5) environmental borings were drilled at Cluster No. 9, and five soil samples were collected for environmental analysis. A summary of the environmental analytical data is presented on [Table 9-5](#). [Figure 9-3](#) shows the locations of the borings. In addition, the environmental boring log sheets are included in [Appendix 9-C](#).

3.4 Geophysical Data

Subsurface utilities detected at this property included the electric and natural gas services that enter the building at its northeast corner, the electric lines to the light standards and signs, and an extensive fire water loop. A river water return line leaves Cluster No. 10 (Stepan Company) to the north and flows under the Sears Logistical Services building. At the southern edge of the building, the drain line turns to the southeast, runs across the employee parking lot, and exits the property. The storm drain catch basin that borders the outside edge of the main concrete loading dock apron empties into this drain line. The storm drain catch basin that borders the smaller northeastern loading dock apron flows north and empties into a drainage swale (NAEVA, 2000a).

A sanitary sewer main enters the property near its northwest corner, flows south to the NJ Route 17 fence line, then turns southeast and parallels the eastern side of the fence until it crosses onto Property No. 06D (Gulf Station). A sanitary sewer lateral exits the Sears building at its westernmost corner and empties into the sewer main at a manhole. A 30-inch transcontinental gas pipeline runs along the western side of the NJ Route 17 fence line between the fence and a stream channel (NAEVA, 2000a).

Due to the presence of railroad tracks and dense vegetation, the narrow strip of land at the north side of the building was not investigated. Likewise, vegetation and standing water prevented a reconnaissance investigation of the wetlands and wooded portions of the site. However, once detected, individual utilities were traced across these areas (NAEVA, 2000a).

Subsurface anomalies were detected throughout Cluster No. 9. A series of parallel east/west sampling grid lines were established over accessible portions of the entire property. These lines were spaced 10 feet apart, with reference points painted at 20-foot intervals along each line. Data were initially collected using both a Geonics[®] EM-61 electromagnetic metal detector and a Geonics[®] EM-31DL terrain conductivity meter. A Fisher TW-6 Pipe and Cable locator, or M-scope (a type of metal detector), and a Sensors & Software NOGGIN 250 ground penetrating radar (GPR) system were used for detailed follow-up of selected significant electromagnetic anomalies. Using this approach, several hundred potential targets were detected (NAEVA, 2000b).

4.0 REFERENCES

Bechtel National, Inc. Characterization Report for the Sears Property, DE-AC05-81OR20722; May, 1987.

Bechtel National, Inc. Remedial Investigation Report for the Maywood Site, December 1992.

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Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM); EPA-402-R-97-016; NUREG-1575; December, 1997.

NAEVA Geophysics, Inc. Results of Subsurface Investigation for the FUSRAP Maywood Superfund Site; 2000a.

NAEVA Geophysics, Inc. Results of Geophysical Investigation, Property Cluster No. 9: Drum Investigation, Sears Logistical Services Property; 2000b.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Work Plan*, FUSRAP Maywood Superfund Site. Boston, MA; October 1999a.

Stone & Webster Environmental Technology & Services. *Final Contractor Quality Control Plan*, FUSRAP Maywood Superfund Site. Boston, MA; October 1999b.

Stone & Webster Environmental Technology & Services. *Final Site Safety and Health Plan*, FUSRAP Maywood Superfund Site. Boston, MA, August 1999c.

Stone & Webster Environmental Technology & Services. *Final General Environmental Protection Plan*, FUSRAP Maywood Superfund Site. Boston, MA; November 1999d.

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Stone & Webster Environmental Technology & Services. *Chemical Data Quality Management Plan, Revision 1*, FUSRAP Maywood Superfund Site. Boston, MA; February 2000a.

Stone & Webster Environmental Technology & Services. *Materials Handling/Transportation and Disposal Plan*, FUSRAP Maywood Superfund Site. Boston, MA; January 2000b.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Quality Control Summary Report*, FUSRAP Maywood Superfund Site. Boston, MA; March 2000c.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Radiological Data Comparison Study*, FUSRAP Maywood Superfund Site. Boston, MA; December 2000d.

U.S. Department of Energy and U.S. Environmental Protection Agency. Federal Facility Agreement for the Maywood Interim Storage Site; November, 1991.

Table 9-1: Properties Comprising Each Cluster

Cluster No.	Property No.	Properties (occupant)	Township/Borough	Property Block & Lot
1	01A	72 Sidney St. (Vacant)	Lodi	Block 164, Lots 1 and 5
2	02A	100 Hancock Street (AT&T)	Lodi	Block 205.03, Lot 2.04
	02B	80 Hancock Street (Vacant)	Lodi	Block 205.03, Lot 2.03
	02C	80 Industrial Road (American Jewel Windows)	Lodi	Block 205.02, Lot 4.02
	02D	8 Mill St. (NJVIS)	Lodi	Block 205.02, Lot 1.05
3	03A	170 Gregg Street (Bergen Cable)	Lodi	Block 205, Lot 1.02
4	04A	160/174 Essex Street (Bank of New York)	Lodi	Block 186.01, Lot 1 and Block 174, Lot 1.02
	04B	I-80 Westbound Right-of-Way (NJDOT)	Lodi	Not Applicable
5	05A	99 Essex Street (Joseph Muscarelle, Inc.)	Maywood	Block 125, Lot 1
	05B	113 Essex Street (Bank of New York)	Maywood	Block 125, Lot 2
	05C	200 NJ Route 17 South (Sears Appliance Repair)	Maywood	Block 125, Lot 3
6	06A	85-101 NJ Route 17 North (Architectural Windows)	Maywood	Block 124, Lot 4
	06B	137 NJ Route 17 North (Ramsey Auto Group)	Maywood	Block 124, Lot 3
	06C	167 NJ Route 17 North (Sunoco Station - Inactive)	Maywood	Block 124, Lot 2
	06D	239 NJ Route 17 North (Gulf Station)	Maywood	Block 124, Lot 1
	06E	29 Essex Street (Federal Express Corporation)	Maywood	Block 124, Lot 5
7	07A	111 Essex Street (Scanel Company, Inc.)	Maywood	Block 131, Lots 1,2,3,4
	07B	New York, Susquehanna & Western Railway - Lodi Branch	Maywood	Block 131, Lot 8
8	08A	23 West Howcroft Road (Maywood Furniture, Inc.)	Maywood	Block 124, Lot 17
9	09A	149-151 Maywood Avenue (Sears Logistical Services)	Maywood; Rochelle Park	Block 124, Lot 30; Block 17.02, Lot 1
10	10A	100 West Hunter Avenue (Stepan Company)	Maywood; Rochelle Park	Block 124, Lot 10; Block 18.02, Lot 2
11	11A	205 Maywood Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
	11B	61 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 50
	11C	50 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
12	12A	New York, Susquehanna & Western Railway	Maywood; Rochelle Park	Block 124, Lot 55 and Block 110, Lot 1
	12B	100 West Hunter Avenue (MISS)	Maywood; Rochelle Park	Block 124, Lot 46 and Block 20.01, Lot 1
	12C	New Jersey Route 17 (NJDOT)	Rochelle Park	Not Applicable

Table 9-2: Summary of PDI Intrusive Field Activities

Cluster No.	Property No.	Property Address	Occupant	Planned			Actual			Schedule (Year 2000)
				Probe Locations	Depth (ft)	Footage (ft)	Probe Locations	Depth (ft)	Footage (ft)	
1	01A	72 Sydney Street	Vacant	13	12	156	15	12	188	Jan. 11, 12, Mar. 31
2	02A	100 Hancock Street	AT&T	17	16	272	17	6 - 12	194	Jan. 27, Feb. 1, 2, Mar. 16
	02B	80 Hancock Street	Vacant	18	16	288	Pending Right of Entry Agreement			
	02C	80 Industrial Road	American Jewel Windows	23	16	368	20	12	272	Jan. 21, 24, 28, Feb. 1
	02D	8 Mill Street	NJVIS	38	16	608	44	12 - 16	593	Jan. 13, 14, 18, 19, 20, 21
3	03A	170 Gregg Street	Bergen Cable	10	8	80	10	8	62	Jan. 12, 13
4	04A	160/174 Essex Street	Bank of New York	25	12	300	23	4 - 12	427	Feb. 2, 3, 4
	04B	I-80 Right-of-Way	NJDOT	7	12	84	7	8 - 12	69	Feb. 2, 4, Mar. 31
5	05A	99 Essex Street	Joseph Muscarelle, Inc.	38	8	304	38	8	318	Feb. 23, 24, Mar. 17
	05B	113 Essex Street	Bank of New York	18	8	144	21	4 - 16	171	Feb. 8, 10, 16
	05C	200 NJ Route 17 South	Sears Appliance Repair	23	8	184	16	8 - 10	129	Feb. 15, 16, Mar. 2
6	06A	85-101 NJ Route 17 North	Architectural Windows	17	12	204	17	8 - 18	196	Feb. 9, 10, 16, Mar. 16
	06B	137 NJ Route 17 North	Ramsey Auto Group	15	12	190	13	10 - 12	145	Feb. 9, 16, 25
	06C	167 NJ Route 17 North	Sunoco Station - Inactive	27	12	324	19	3 - 14	239	Feb. 11, Mar. 8
	06D	239 NJ Route 17 North	Gulf Station	19	12	228	2	11 - 12	23	Feb. 16
	06E	29 Essex Street	Federal Express Corporation	7	12	84	9	7 - 12	95	Feb. 16, Mar. 31
7	07A	111 Essex Street	Scanel Company, Inc.	12	16	192	12	12 - 22	161	Feb. 21, 22, 23
	07B	NYS&W - Lodi Branch	NYS&W - Lodi Branch	16	16	256	11	6 - 16	115	Feb. 21, 22
8	08A	23 West Howcroft Street	Maywood Furniture, Inc.	26	16	416	25	7 - 16	321	Feb. 17, 21
9	09A	149-151 Maywood Avenue	Sears Logistical Services	131	16	2096	72	4 - 16	574	Mar. 2, 3, 6, 7, 8, 9, 15
10	10A	100 West Hunter Avenue	Stepan Company	106	24	2544	92	4 - 24	1076	Feb. 25, 28, 29, Mar. 1, 2, 6, 7, 9, 16, 30
11	11A	205 Maywood Avenue	Myron Manufacturing	5	8	40	5	8 - 12	44	Feb. 16
	11B	61 West Hunter Avenue	Myron Manufacturing	9	8	72	10	8 - 16	87	Feb. 15, 21
	11C	50 West Hunter Avenue	Myron Manufacturing	1	8	8	1	8	8	Feb. 15
12	12A	NYS&W	NYS&W	31	24	744	27	12 - 27	335	Feb. 18, 22, 24, Mar. 16, 30
	12B	100 West Hunter Avenue	MISS	120	24	2880	100	7 - 26	1769	Feb. 4, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24, 25, 29, Mar. 1, 7, 8, 9
	12C	NJ Route 17	NJDOT	0	0	0	0	0	0	<i>No investigations planned.</i>
TOTALS:				772		13,066	626		7,611	

Table 9-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
9-SI001-SS-0-1	12.66	11.0	4.04	91.18	5.8	0.09	< 56.80	-----	56.80
9-SI002-SS-0-1	0.90	20.0	0.36	0.72	30.0	0.12	< 8.92	-----	8.92
9-SI003-SS-0-1	0.24	28.0	0.21	0.45	27.0	0.01	< 4.15	-----	4.15
9-SI004-SS-0-1 (1)	2.09	11.5	0.07	19.52	6.0	0.28	< 9.45	-----	9.45
9-SI004-SS-1-1 (1)	2.50	10.0	0.59	19.51	6.0	0.23	< 9.55	-----	9.55
9-SI005-SS-0-1	0.21	37.6	0.19	0.31	37.0	0.07	< 5.44	-----	5.44
9-SI006-SS-0-1	0.26	29.9	0.03	0.32	36.7	0.06	< 4.62	-----	4.62
9-SI007-SS-0-1	1.16	13.6	0.46	4.12	9.6	0.09	< 7.61	-----	7.61
9-SI008-SS-0-1 (1)	0.89	17.7	0.58	5.41	9.0	0.01	< 7.44	-----	7.44
9-SI008-SS-1-1 (1)	0.87	18.0	0.39	6.21	8.8	0.15	< 8.02	-----	8.02
9-SI009-SS-0-1	0.59	25.0	0.05	0.65	30.0	0.12	< 9.61	-----	9.61
9-SI010-SS-0-1	118.30	22.6	35.80	425.10	7.9	4.98	< 853.00	-----	853.00
9-SI011-SS-0-1	4.97	36.0	3.87	29.20	10.0	0.96	< 87.00	-----	87.00
9-SI012-SS-0-1	0.87	18.0	0.48	5.84	8.9	0.15	< 8.40	-----	8.40
9-SI013-SS-0-1	12.82	23.6	9.11	128.10	6.0	1.74	< 147.00	-----	147.00
9-SI014-SS-0-1	4.00	11.0	1.23	29.29	6.5	0.26	< 16.80	-----	16.80
9-SI015-SS-0-1	6.18	8.0	1.22	61.05	5.0	0.50	< 19.50	-----	19.50
9-SI016-SS-0-1	0.79	18.0	0.35	3.59	10.7	0.08	< 5.71	-----	5.71
9-SI017-SS-0-1 (1)	1.28	21.7	0.68	6.06	10.7	0.02	< 12.30	-----	12.30
9-SI017-SS-1-1 (1)	1.42	20.0	0.54	6.13	10.6	0.20	< 13.90	-----	13.90

* Reported data are taken from the Nuclide Identification Report.

MDA : Minimum Detectable Activity

Error: 2 sigma (95% confidence interval)

< : Nuclide undetected or less than the MDA. The nuclide is assumed to be present at the MDA Value.

----- Not Applicable

(1) Sample (-0-1) and its duplicate (-1-1)

Table 2-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
2D-SI002-SS-1-1 (1)	0.35	30.5	0.29	4.21	9.9	0.09	< 6.67	----	6.67
2D-SI003-SS-0-1	0.44	25.9	0.37	4.10	9.7	0.11	< 6.94	----	6.94
2D-SI004-SS-0-1	0.49	20.7	0.25	2.43	11.3	0.12	< 6.19	----	6.19
2D-SI005-SS-0-1	0.40	24.9	0.26	3.30	10.2	0.09	< 6.33	----	6.33
2D-SI006-SS-0-1	0.58	22.4	0.35	7.94	7.5	0.15	< 7.49	----	7.49
2D-SI007-SS-0-1	0.84	26.5	0.59	3.88	12.7	0.13	< 11.40	----	11.40
2D-SI008-SS-0-1	0.55	22.0	0.29	3.21	10.9	0.15	< 7.44	----	7.44
2D-SI009-SS-0-1	0.44	27.7	0.42	3.59	10.6	0.10	< 7.74	----	7.74
2D-SI010-SS-0-1	0.66	20.9	0.30	3.75	10.0	0.12	< 7.13	----	7.13
2D-SI011-SS-0-1	0.59	23.0	0.34	4.03	10.0	0.17	< 7.50	----	7.50
2D-SI012-SS-0-1	0.61	20.6	0.28	2.90	11.0	0.10	< 6.67	----	6.67
2D-SI013-SS-0-1 (1)	0.61	21.0	0.32	4.06	10.0	0.12	< 7.13	----	7.13
2D-SI013-SS-1-1 (1)	0.69	19.7	0.33	4.06	10.1	0.01	< 7.13	----	7.13
2D-SI014-SS-0-1	0.48	24.0	0.37	2.85	11.0	0.07	< 6.80	----	6.80
2D-SI015-SS-0-1	0.45	24.0	0.24	2.77	11.6	0.01	< 7.25	----	7.25
2D-SI016-SS-0-1	0.48	22.0	0.22	1.71	14.0	0.11	< 5.63	----	5.63
2D-SI017-SS-0-1	0.43	25.0	0.29	2.44	12.0	0.11	< 6.10	----	6.10
2D-SI018-SS-0-1	0.67	20.0	0.40	4.46	9.9	0.14	< 7.74	----	7.74
2D-SI019-SS-0-1	0.41	23.8	0.22	0.66	23.5	0.01	< 4.62	----	4.62
2D-SI020-SS-0-1	0.64	23.0	0.42	6.47	8.7	0.19	< 8.92	----	8.92
2D-SI021-SS-0-1	0.08	19.7	0.49	7.17	8.5	0.14	< 8.66	----	8.66
2D-SI022-SS-0-1 (1)	0.47	20.7	0.16	0.36	32.6	0.12	< 5.44	----	5.44
2D-SI022-SS-1-1 (1)	0.47	22.0	0.25	0.28	38.0	0.01	< 5.40	----	5.40
2D-SI023-SS-0-1	0.53	22.0	0.41	2.68	11.6	0.08	< 6.53	----	6.53
2D-SI024-SS-0-1	0.68	18.5	0.26	1.01	18.7	0.01	< 4.92	----	4.92

* Reported data are taken from the Nuclide Identification Report

MDA : Minimum Detectable Activity

Error: 2 sigma (95% confidence interval)

< : Nuclide unidentified or less than the MDA. The nuclide is assumed to be present at the MDA Value.

---- Not Applicable

(1) Sample (-0-1) and its duplicate (-1-1)

**Table 9-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
09A-001	1.00	09A05800		49.86	0.82	1.60	142.25	1.64	1.21	61.30	U	---	61.30
09A-001	2.50	09A05801		1.05	0.10	0.26	1.12	0.07	0.28	6.35	U	---	6.35
09A-001	5.50	09A05802		ARCHIVED									
09A-002	0.50	09A05803		0.86	0.06	0.24	1.48	0.07	0.26	8.27	U	---	8.27
09A-002	1.00	09A05804		0.69	0.08	0.23	0.87	0.06	0.21	5.22	U	---	5.22
09A-002	3.50	09A05805		ARCHIVED									
09A-003	1.00	09A05806		0.84	0.06	0.23	2.29	0.08	0.24	7.97	U	---	7.97
09A-003	1.50	09A05807		0.56	0.07	0.21	1.02	0.06	0.20	5.05	U	---	5.05
09A-003	4.50	09A05808		ARCHIVED									
09A-004	2.50	09A05809		5.40	0.17	0.51	20.67	0.34	0.41	22.20	U	---	22.20
<i>ThermoRetec</i> ⁽²⁾		09A05809		4.02	0.39	0.32	18.92	0.87	0.48	3.77	U	4.26	5.21
09A-004	5.00	09A05810		0.73	0.07	0.25	1.38	0.07	0.23	6.13	U	---	6.13
<i>ThermoRetec</i> ⁽²⁾		09A05810		0.75	0.14	0.15	1.63	0.16	0.23	2.32		2.00	2.30
09A-004	5.00	09A05811	X	1.03	0.09	0.22	1.74	0.08	0.29	9.32	U	---	9.32
09A-004	6.50	09A05812		ARCHIVED									
09A-005	2.00	09A05813		1.00	0.10	0.28	1.39	0.08	0.29	10.20	U	---	10.20
09A-005	3.00	09A05814		18.74	0.45	1.10	56.87	0.82	0.79	31.70	U	---	31.70
09A-005	4.50	09A05815		ARCHIVED									
09A-006	1.50	09A05816		9.41	0.26	0.76	38.51	0.56	0.60	31.70	U	---	31.70
09A-006	2.50	09A05817		0.78	0.07	0.27	1.42	0.08	0.24	6.39	U	---	6.39
09A-006	4.50	09A05818		1.01	0.08	0.21	1.23	0.06	0.18	8.82	U	---	8.82
09A-007	1.00	09A05819		0.95	0.09	0.23	2.31	0.09	0.28	6.74	U	---	6.74
09A-007	1.50	09A05820		0.63	0.07	0.15	0.93	0.05	0.18	5.06	U	---	5.06
09A-007	3.50	09A05821		ARCHIVED									
09A-008	1.50	09A05822		1.93	0.10	0.42	9.81	0.20	0.30	15.60	U	---	15.60
09A-008	2.50	09A05823		0.68	0.07	0.14	0.84	0.05	0.18	4.87	U	---	4.87
09A-008	2.50	09A05824	X	0.58	0.07	0.19	0.81	0.05	0.18	4.94	U	---	4.94
09A-008	4.50	09A05825		0.44	0.06	0.22	0.66	0.05	0.20	6.51	U	---	6.51
09A-009	1.50	09A05826		22.84	0.43	1.00	59.07	0.77	0.77	38.50	U	---	38.50
09A-009	2.50	09A05827		0.69	0.07	0.15	0.97	0.06	0.20	4.97	U	---	4.97
09A-009	4.50	09A05828		0.84	0.08	0.25	1.30	0.07	0.25	7.86	U	---	7.86
09A-010	0.50	09A05829		5.69	0.18	0.60	25.96	0.40	0.43	17.10	U	---	17.10
<i>ThermoRetec</i> ⁽²⁾		09A05829		5.04	0.45	0.40	26.62	1.18	0.64	2.76	U	3.87	6.53
09A-010	1.50	09A05830		0.63	0.06	0.18	0.82	0.05	0.15	7.25	U	---	7.25
09A-010	5.50	09A05831		ARCHIVED									

**Table 9-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
09A-011	1.00	09A05832		3.59	0.15	0.47	11.79	0.24	0.32	13.50	U	---	13.50
09A-011	2.50	09A05833		0.77	0.07	0.22	1.08	0.07	0.24	8.11	U	---	8.11
09A-011	4.50	09A05834		ARCHIVED									
09A-012	0.50	09A05835		1.82	0.09	0.28	4.60	0.12	0.20	8.45	U	---	8.45
09A-012	1.50	09A05836		0.65	0.07	0.20	0.83	0.06	0.20	6.90	U	---	6.90
09A-012	5.50	09A05837		ARCHIVED									
09A-013	1.00	09A05838		0.73	0.07	0.19	0.91	0.06	0.21	5.20	U	---	5.20
09A-013	1.00	09A05839	X	0.71	0.07	0.23	0.96	0.06	0.24	7.84	U	---	7.84
09A-013	2.50	09A05840		0.63	0.08	0.24	1.00	0.07	0.23	5.81	U	---	5.81
09A-013	5.00	09A05841		ARCHIVED									
09A-014	2.50	09A05842		1.67	0.08	0.30	4.49	0.12	0.23	11.30	U	---	11.30
09A-014	3.50	09A05843		0.75	0.07	0.21	1.02	0.06	0.19	5.83	U	---	5.83
09A-014	5.50	09A05844		ARCHIVED									
09A-015	2.50	09A05845		2.00	0.09	0.33	6.91	0.15	0.25	13.60	U	---	13.60
09A-015	3.50	09A05846		0.65	0.05	0.14	0.68	0.04	0.11	4.68	U	---	4.68
09A-015	5.50	09A05847		ARCHIVED									
09A-016	2.50	09A05848		9.91	0.29	0.88	49.16	0.70	0.67	38.20	U	---	38.20
09A-016	6.00	09A05849		0.85	0.07	0.24	1.18	0.06	0.18	8.62	U	---	8.62
09A-016	7.00	09A05850		ARCHIVED									
09A-017	1.00	09A05851		59.64	1.11	2.70	478.82	5.08	2.40	85.80	U	---	85.80
09A-017	5.00	09A05852		0.45	0.07	0.20	0.52	0.06	0.19	4.95	U	---	4.95
09A-017	7.50	09A05853		ARCHIVED									
09A-018	1.50	09A05854		76.24	1.20	1.94	154.62	1.83	1.41	70.40	U	---	70.40
09A-018	5.00	09A05855		0.69	0.08	0.21	0.67	0.05	0.20	5.40	U	---	5.40
09A-018	6.50	09A05856		ARCHIVED									
09A-019	1.50	09A05857		2.17	0.10	0.38	6.54	0.15	0.28	0.99	J	3.36	11.30
09A-019	4.50	09A05858		0.71	0.08	0.23	0.89	0.07	0.21	5.95	U	---	5.95
09A-019	9.00	09A05859		ARCHIVED									
09A-020	3.50	09A05860		0.61	0.06	0.20	1.46	0.07	0.22	5.50	U	---	5.50
09A-020	4.50	09A05861		0.68	0.07	0.19	0.84	0.06	0.19	7.04	U	---	7.04
09A-020	4.50	09A05862	X	0.69	0.07	0.19	0.74	0.05	0.19	4.84	U	---	4.84
09A-020	6.50	09A05863		ARCHIVED									

**Table 9-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results										
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g				
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA		
09A-021	1.00	09A05864		2.13	0.12	0.45	8.01	0.19	0.30	12.30	U	---	12.30	
09A-021	1.50	09A05865		1.90	0.24	0.64	6.16	0.24	0.69	19.80	U	---	19.80	
09A-021	4.50	09A05866		ARCHIVED										
09A-022	NO HOLE - REFUSAL													
09A-023	0.50	09A05867		1.18	0.11	0.33	2.41	0.11	0.36	12.10	U	---	12.10	
09A-023	2.50	09A05868		1.21	0.10	0.25	0.93	0.07	0.27	7.02	U	---	7.02	
09A-023	5.50	09A05869		ARCHIVED										
09A-024	1.50	09A05870		0.42	J	0.15	0.55	2.45	0.15	0.50	16.00	U	---	16.00
09A-024	4.50	09A05871		0.28	U	---	0.28	0.27	0.05	0.18	6.17	U	---	6.17
09A-024	6.00	09A05872		ARCHIVED										
09A-025	1.50	09A05873		8.52	0.25	0.82	43.12	0.62	0.60	12.71	J	6.61	21.60	
09A-025	5.50	09A05874		1.00	0.09	0.24	1.28	0.07	0.27	9.06	U	---	9.06	
09A-025	6.50	09A05875		ARCHIVED										
09A-026	2.50	09A05876		2.43	0.11	0.35	7.08	0.17	0.28	10.70	U	---	10.70	
09A-026	5.00	09A05877		0.59	0.07	0.21	0.79	0.06	0.21	7.69	U	---	7.69	
09A-026	6.00	09A05878		ARCHIVED										
09A-027	3.50	09A05879		1.05	0.07	0.23	2.03	0.07	0.15	6.07	U	---	6.07	
09A-027	5.50	09A05880		0.99	0.06	0.22	1.00	0.06	0.16	8.30	U	---	8.30	
09A-027	6.50	09A05881		ARCHIVED										
09A-028	NO HOLE - REFUSAL													
09A-029	1.00	09A05882		15.14	0.37	1.07	69.08	0.90	0.73	29.00	U	---	29.00	
09A-029	6.50	09A05883		1.19	0.10	0.21	0.87	0.07	0.25	5.70	U	---	5.70	
09A-029	6.50	09A05884	X	1.22	0.08	0.21	0.91	0.07	0.28	9.21	U	---	9.21	
09A-029	8.50	09A05885		ARCHIVED										
09A-030	5.50	09A05886		7.65	0.21	0.56	14.96	0.28	0.39	-0.38	U	4.24	14.20	
ThermoRetec ⁽²⁾		09A05886		6.64	0.50	0.33	15.02	0.76	0.53	4.59	J	3.83	5.08	
09A-030	9.00	09A05887		0.80	0.07	0.22	0.80	0.05	0.16	7.52	U	---	7.52	
09A-030	10.00	09A05888		ARCHIVED										
09A-031	5.00	09A05889		1.20	0.07	0.28	3.07	0.09	0.18	7.01	U	---	7.01	
09A-031	6.00	09A05890		0.89	0.06	0.18	0.97	0.05	0.16	7.96	U	---	7.96	
09A-031	7.00	09A05891		ARCHIVED										

**Table 9-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
09A-032	1.00	09A05892		7.36	0.23	0.63	25.48	0.43	0.53	28.90	U	---	28.90
09A-032	2.00	09A05893		1.42	0.10	0.24	1.13	0.06	0.18	6.82	U	---	6.82
09A-032	4.50	09A05894		ARCHIVED									
09A-033	2.00	09A05895		2.55	0.12	0.46	9.93	0.21	0.33	16.30	U	---	16.30
<i>ThermoRetec</i> ⁽²⁾		09A05895		2.26	0.25	0.23	9.01	0.49	0.39	3.33	U	3.44	3.89
09A-033	3.00	09A05896		0.84	0.06	0.18	1.14	0.07	0.25	6.05	U	---	6.05
09A-033	4.50	09A05897		ARCHIVED									
09A-034	1.00	09A05898		6.02	0.23	0.73	25.74	0.46	0.57	31.60	U	---	31.60
09A-034	2.00	09A05899		1.11	0.08	0.25	0.96	0.06	0.19	9.16	U	---	9.16
09A-034	4.50	09A05900		ARCHIVED									
09A-035	2.00	09A05901		0.62	0.07	0.20	0.80	0.06	0.20	4.91	U	---	4.91
09A-035	3.00	09A05902		0.80	0.09	0.25	1.30	0.07	0.26	8.64	U	---	8.64
09A-035	4.50	09A05903		0.85	0.08	0.20	1.33	0.08	0.24	8.76	U	---	8.76
09A-036	2.00	09A05904		1.11	0.14	0.38	1.95	0.12	0.41	1.97	J	3.25	11.00
<i>ThermoRetec</i> ⁽²⁾		09A05904		1.21	0.21	0.23	2.16	0.20	0.33	11.06		3.48	4.22
09A-036	2.00	09A05905	X	1.49	0.14	0.43	2.59	0.13	0.29	14.08		3.46	10.30
09A-036	4.50	09A05906		1.04	0.08	0.21	0.96	0.06	0.19	8.94	U	---	8.94
09A-036	5.50	09A05907		ARCHIVED									
09A-037	0.50	09A05908		1.17	0.08	0.25	2.54	0.10	0.30	7.56	U	---	7.56
09A-037	1.50	09A05909		1.08	0.10	0.29	1.08	0.07	0.27	6.85	U	---	6.85
09A-037	7.00	09A05910		ARCHIVED									
09A-038	1.00	09A05911		1.28	0.08	0.30	4.06	0.12	0.33	11.60	U	---	11.60
09A-038	2.00	09A05912		1.10	0.08	0.20	1.35	0.07	0.20	9.34	U	---	9.34
09A-038	4.50	09A05913		ARCHIVED									
09A-039	2.50	09A05914		0.82	0.06	0.20	1.47	0.06	0.21	7.64	U	---	7.64
09A-039	4.50	09A05915		ARCHIVED									
09A-039	5.50	09A05916		0.52	0.07	0.20	0.63	0.06	0.20	4.66	U	---	4.66
09A-040	2.00	09A05917		7.00	0.25	0.80	31.00	0.51	0.50	23.90	U	---	23.90
09A-040	5.00	09A05918		0.76	0.07	0.20	0.77	0.05	0.19	4.93	U	---	4.93
09A-040	6.50	09A05919		7.82	0.25	0.80	33.34	0.54	0.66	34.30	U	---	34.30
09A-041	1.00	09A05920		1.07	0.10	0.21	1.01	0.08	0.29	7.31	U	---	7.31
09A-041	2.50	09A05921		0.53	0.07	0.19	0.66	0.05	0.20	4.68	U	---	4.68
09A-041	4.50	09A05922		ARCHIVED									

**Table 9-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
09A-042	1.00	09A05923		0.78	0.07	0.20	1.01	0.05	0.16	8.33	U	---	8.33
09A-042	2.00	09A05924		0.84	0.10	0.32	1.49	0.08	0.28	6.93	U	---	6.93
09A-042	5.00	09A05925		ARCHIVED									
09A-043	2.00	09A05926		0.79	0.08	0.24	1.40	0.07	0.23	5.55	U	---	5.55
09A-043	4.50	09A05927		0.76	0.08	0.29	1.03	0.07	0.29	9.36	U	---	9.36
09A-043	5.50	09A05928		ARCHIVED									
09A-044	1.50	09A05929		3.11	0.14	0.40	3.02	0.12	0.32	12.46	J	4.12	13.10
09A-044	1.50	09A05930	X	2.82	0.13	0.42	2.88	0.12	0.29	15.00	U	---	15.00
09A-044	4.50	09A05931		0.91	0.08	0.16	0.93	0.06	0.23	5.68	U	---	5.68
09A-044	5.50	09A05932		ARCHIVED									
09A-045	1.00	09A05933		1.60	0.10	0.29	1.64	0.07	0.21	10.30	U	---	10.30
09A-045	2.00	09A05934		0.66	0.07	0.14	0.76	0.06	0.22	5.13	U	---	5.13
09A-045	4.50	09A05935		ARCHIVED									
09A-046	0.50	09A05936		7.78	0.27	0.95	52.80	0.75	0.71	38.90	U	---	38.90
09A-046	1.50	09A05937		0.66	0.07	0.20	1.08	0.06	0.20	5.08	U	---	5.08
09A-046	3.00	09A05938		ARCHIVED									
09A-047	1.50	09A05939		1.11	0.07	0.23	1.06	0.05	0.18	8.93	U	---	8.93
09A-047	2.50	09A05940		0.84	0.06	0.16	0.83	0.05	0.13	5.61	U	---	5.61
09A-047	4.50	09A05941		ARCHIVED									
09A-048	4.50	09A05942		10.63	0.28	0.94	53.71	0.72	0.72	38.30	U	---	38.30
09A-048	6.00	09A05943		0.77	0.08	0.19	0.92	0.06	0.20	5.23	U	---	5.23
09A-048	7.50	09A05944		0.74	0.08	0.20	0.86	0.06	0.24	8.55	U	---	8.55
09A-049	1.00	09A05945		1.04	0.09	0.27	1.60	0.08	0.28	6.43	U	---	6.43
09A-049	2.00	09A05946		1.11	0.08	0.26	1.35	0.07	0.20	9.61	U	---	9.61
09A-049	4.50	09A05947		ARCHIVED									
09A-050	0.50	09A05948		1.68	0.11	0.41	4.87	0.15	0.42	14.40	U	---	14.40
<i>ThermoRetec⁽²⁾</i>		09A05948		1.34	0.21	0.25	3.96	0.36	0.35	1.39	U	2.54	3.40
09A-050	1.00	09A05949		0.79	0.08	0.21	1.05	0.07	0.24	6.43	U	---	6.43
09A-050	4.50	09A05950		ARCHIVED									
09A-051	0.50	09A05951		1.43	0.13	0.47	3.68	0.14	0.43	10.90	U	---	10.90
09A-051	1.00	09A05952		0.97	0.14	0.38	1.24	0.11	0.46	14.90	U	---	14.90
09A-051	4.50	09A05953		0.58	0.05	0.14	0.77	0.04	0.11	4.68	U	---	4.68
09A-051	4.50	09A05954	X	0.56	0.07	0.20	0.71	0.05	0.21	7.02	U	---	7.02

**Table 9-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
09A-052	0.50	09A05955		1.36	0.09	0.35	5.30	0.14	0.22	9.03	U	---	9.03
09A-052	1.50	09A05956		2.08	0.15	0.50	4.49	0.18	0.56	19.00	U	---	19.00
09A-052	5.00	09A05957		ARCHIVED									
09A-053	0.50	09A05958		1.81	0.10	0.30	2.51	0.11	0.34	8.56	U	---	8.56
09A-053	1.50	09A05959		0.57	0.07	0.22	0.90	0.06	0.23	7.80	U	---	7.80
09A-053	3.00	09A05960		ARCHIVED									
09A-054	2.00	09A05961		0.65	0.07	0.19	0.83	0.06	0.22	5.39	U	---	5.39
09A-054	4.50	09A05962		0.59	0.06	0.22	0.86	0.05	0.20	6.80	U	---	6.80
09A-054	5.50	09A05963		ARCHIVED									
09A-055	1.00	09A05964		0.83	0.09	0.21	1.03	0.08	0.27	6.39	U	---	6.39
09A-055	2.50	09A05965		0.72	0.08	0.24	1.13	0.07	0.25	8.19	U	---	8.19
09A-055	4.50	09A05966		ARCHIVED									
09A-056	0.50	09A05967		ARCHIVED									
09A-056	1.00	09A05968		0.88	0.06	0.19	1.35	0.06	0.15	5.78	U	---	5.78
09A-056	2.50	09A05969		ARCHIVED									
09A-057	0.50	09A05970		2.47	0.15	0.57	7.31	0.21	0.43	21.60	U	---	21.60
09A-057	1.00	09A05971		0.64	0.07	0.21	0.81	0.06	0.20	5.03	U	---	5.03
09A-057	2.50	09A05972		ARCHIVED									
09A-058	1.50	09A05973		1.37	0.11	0.25	0.92	0.08	0.32	7.18	U	---	7.18
09A-058	1.50	09A05974	X	1.46	0.09	0.26	1.20	0.06	0.16	6.40	U	---	6.40
09A-058	2.50	09A05975		0.50	0.06	0.20	0.74	0.06	0.17	4.87	U	---	4.87
09A-058	4.50	09A05976		ARCHIVED									
09A-059	1.50	09A05977		0.71	0.06	0.21	1.24	0.07	0.21	5.47	U	---	5.47
09A-059	2.00	09A05978		4.16	0.19	0.59	14.29	0.30	0.48	24.10	U	---	24.10
09A-059	4.50	09A05979		ARCHIVED									
09A-060	0.50	09A05980		1.99	0.15	0.41	5.88	0.20	0.56	13.60	U	---	13.60
09A-060	1.00	09A05981		2.62	0.18	0.48	1.97	0.14	0.54	17.40	U	---	17.40
09A-060	5.00	09A05982		ARCHIVED									
09A-061	0.50	09A05983		2.60	0.15	0.51	9.34	0.24	0.35	13.90	U	---	13.90
09A-061	1.00	09A05984		1.53	0.14	0.45	1.39	0.11	0.42	14.30	U	---	14.30
09A-061	2.50	09A05985		ARCHIVED									

**Table 9-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
09A-062	1.00	09A05986		1.32	0.08	0.26	3.83	0.12	0.33	11.70	U	---	11.70
<i>ThermoRetec⁽²⁾</i>		09A05986		<i>1.20</i>	<i>0.16</i>	<i>0.18</i>	<i>3.45</i>	<i>0.23</i>	<i>0.26</i>	<i>0.98</i>	<i>U</i>	<i>1.52</i>	<i>2.63</i>
09A-062	2.00	09A05987		0.80	0.12	0.37	0.76	0.09	0.32	8.26	U	---	8.26
09A-062	4.50	09A05988		ARCHIVED									
09A-063	1.50	09A05989		1.62	0.09	0.30	5.14	0.14	0.24	9.76	U	---	9.76
09A-063	2.50	09A05990		1.38	0.12	0.31	2.70	0.12	0.40	13.00	U	---	13.00
09A-063	4.50	09A05991		ARCHIVED									
09A-064	2.00	09A05992		0.80	0.07	0.23	1.29	0.06	0.18	8.70	U	---	8.70
09A-064	4.50	09A05993		0.73	0.07	0.17	0.97	0.06	0.22	4.98	U	---	4.98
09A-064	6.50	09A05994		ARCHIVED									
09A-065	1.50	09A05995		0.97	0.08	0.23	1.49	0.07	0.19	8.63	U	---	8.63
09A-065	2.00	09A05996		0.76	0.08	0.18	0.96	0.06	0.23	5.66	U	---	5.66
09A-065	3.00	09A05997		ARCHIVED									
09A-066	0.50	09A05998		1.86	0.09	0.33	4.77	0.12	0.25	11.60	U	---	11.60
09A-066	1.50	09A05999		0.57	0.07	0.20	0.69	0.05	0.20	2.90	J	1.36	4.39
09A-066	2.50	09A06000		0.77	0.07	0.23	1.17	0.06	0.15	7.88	U	---	7.88
09A-066	2.50	09A06001	X	0.68	0.07	0.20	0.87	0.06	0.21	5.32	U	---	5.32
09A-067	2.00	09A06002		0.95	0.06	0.20	1.10	0.06	0.18	8.02	U	---	8.02
09A-067	2.50	09A06003		0.75	0.07	0.16	0.80	0.06	0.21	5.37	U	---	5.37
09A-067	5.00	09A06004		0.74	0.07	0.26	1.09	0.07	0.25	8.12	U	---	8.12
09A-068	2.00	09A06005		0.62	0.06	0.17	1.07	0.06	0.21	5.51	U	---	5.51
09A-068	4.50	09A06006		0.96	0.07	0.20	1.34	0.06	0.17	8.58	U	---	8.58
09A-069	1.00	09A06007		33.85	0.69	2.03	216.96	2.48	1.53	77.90	U	---	77.90
09A-069	8.50	09A06008		3.52	0.14	0.45	13.76	0.26	0.33	13.80	U	---	13.80
09A-069	12.50	09A06009		0.73	0.06	0.18	0.96	0.06	0.22	6.93	U	---	6.93
09A-069	13.50	09A06010		ARCHIVED									
09A-070	1.00	09A06011		0.92	0.07	0.26	2.15	0.09	0.27	6.29	U	---	6.29
09A-070	1.50	09A06012		0.76	0.08	0.24	1.15	0.07	0.22	3.01	J	---	4.73
09A-070	2.50	09A06013		ARCHIVED									
09A-071	1.00	09A06014		2.57	0.12	0.41	7.82	0.20	0.30	12.40	U	---	12.40
09A-071	2.00	09A06015		0.92	0.10	0.38	1.27	0.10	0.35	11.90	U	---	11.90
09A-071	2.00	09A06016	X	0.79	0.11	0.30	0.82	0.10	0.37	0.18	J	2.37	8.21
09A-071	4.50	09A06017		ARCHIVED									

**Table 9-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
09A-072	5.00	09A06018		8.76	0.26	0.90	49.12	0.70	0.70	37.30	U	---	37.30
09A-072	6.00	09A06019		0.92	0.08	0.19	0.88	0.06	0.21	7.78	U	---	7.78
09A-072	7.00	09A06020		ARCHIVED									

Error: 2 sigma (95% confidence interval)

--- Not Applicable

U Undetected or Negative Concentration Less Than the MDA

J Estimated

MDA Minimum Detectable Activity

- (1) The sample marked with an "X" for duplicate is a duplicate of the sample listed directly above it. Duplicate samples are prepared by homogenizing soil above and below the centerpoint and then separating for analysis. The depth listed is the center point.
- (2) Approximately 10% of all radiological soil samples collected under the PDI Program were sent to ThermoRetec, an off-site laboratory, for confirmatory radiological analyses. Results from ThermoRetec are presented in this table in italicized font immediately below the MISS On-Site field laboratory result for that same sample.

Table 9-5: Summary of Environmental Analytical Data

Parameter	Sample ID	09A-020552	09A-020554	09A-020556
	Sample Location	09A-001	09A-002	09A-003
	Sample Depth (feet)	5-8	6-9	6-9
	Sample Date	03/28/00	03/28/00	03/28/00
	Units			
Miscellaneous				
Chromium VI	mg/kg	0.46U	0.48U	0.45U
Corrosivity by pH	Soil pH	7.2	7.8	8.9
Cyanide, Reactive	mg/kg	0.50U	0.50U	0.50U
Cyanide, Total	mg/kg	0.58U	0.34U	0.50U
Sulfide, Reactive	mg/kg	24.0U	24.0U	24.0U
PCBs				
4,4'-DDD	ug/kg	3.8U	3.9U	3.7U
4,4'-DDE	ug/kg	3.8U	3.9U	3.7U
4,4'-DDT	ug/kg	3.8U	3.9U	3.7U
Aldrin	ug/kg	1.9U	2.0U	1.9U
Alpha-BHC	ug/kg	1.9U	2.0U	1.9U
alpha-Chlordane	ug/kg	1.9U	2.0U	1.9U
Aroclor-1016	ug/kg	39U	40U	38U
Aroclor-1221	ug/kg	77U	79U	75U
Aroclor-1232	ug/kg	39U	40U	38U
Aroclor-1242	ug/kg	39U	40U	38U
Aroclor-1248	ug/kg	39U	40U	38U
Aroclor-1254	ug/kg	39U	40U	38U
Aroclor-1260	ug/kg	39U	40U	38U
Beta-BHC	ug/kg	1.9U	2.0U	1.9U
Delta-BHC	ug/kg	1.9U	2.0U	1.9U
Dieldrin	ug/kg	3.8U	3.9U	3.7U
Endosulfan I	ug/kg	1.9U	2.0U	1.9U
Endosulfan II	ug/kg	3.8U	3.9U	3.7U
Endosulfan sulfate	ug/kg	3.8U	3.9U	3.7U
Endrin	ug/kg	3.8U	3.9U	3.7U
Endrin aldehyde	ug/kg	3.8U	3.9U	3.7U
Endrin ketone	ug/kg	3.8U	3.9U	3.7U
gamma-BHC (Lindane)	ug/kg	1.9U	2.0U	1.9U
gamma-Chlordane	ug/kg	1.9U	2.0U	1.9U
Heptachlor	ug/kg	1.9U	2.0U	1.9U
Heptachlor epoxide	ug/kg	1.9U	2.0U	1.9U
Methoxychlor	ug/kg	19U	20U	19U
Toxaphene	ug/kg	190U	200U	190U

Table 9-5: Summary of Environmental Analytical Data

Parameter	Sample ID	09A-020552	09A-020554	09A-020556
	Sample Location	09A-001	09A-002	09A-003
	Sample Depth (feet)	5-8	6-9	6-9
	Sample Date	03/28/00	03/28/00	03/28/00
Units				
<i>Rare Earth Metals</i>				
Cerium, Total	mg/kg	22.1	21.5	10.8
Dysprosium, Total	mg/kg	1.6	1.2	0.83
Lanthanum, Total	mg/kg	11	11	6.2
Neodymium, Total	mg/kg	13	12.2	8.6
Yttrium, Total	mg/kg	7.5	5.9	4.3
<i>Semivolatile Organics</i>				
1,2,4-Trichlorobenzene	ug/kg	380U	400U	370U
1,2-Dichlorobenzene	ug/kg	380U	400U	370U
1,3-Dichlorobenzene	ug/kg	380U	400U	370U
1,4-Dichlorobenzene	ug/kg	380U	400U	370U
2,2'-oxybis(1-Chloropropane)	ug/kg	380U	400U	370U
2,4,5-Trichlorophenol	ug/kg	960U	1000U	930U
2,4,6-Trichlorophenol	ug/kg	380U	400U	370U
2,4-Dichlorophenol	ug/kg	380U	400U	370U
2,4-Dimethylphenol	ug/kg	380U	400U	370U
2,4-Dinitrophenol	ug/kg	960U	1000U	930U
2,4-Dinitrotoluene	ug/kg	380U	400U	370U
2,6-Dinitrotoluene	ug/kg	380U	400U	370U
2-Chloronaphthalene	ug/kg	380U	400U	370U
2-Chlorophenol	ug/kg	380U	400U	370U
2-Methylnaphthalene	ug/kg	380U	400U	370U
2-Methylphenol	ug/kg	380U	400U	370U
2-Nitroaniline	ug/kg	960U	1000U	930U
2-Nitrophenol	ug/kg	380U	400U	370U
3,3'-Dichlorobenzidine	ug/kg	380U	400U	370U
3-Nitroaniline	ug/kg	960U	1000U	930U
4,6-Dinitro-2-methylphenol	ug/kg	960U	1000U	930U
4-Bromophenyl-phenylether	ug/kg	380U	400U	370U
4-Chloro-3-methylphenol	ug/kg	380U	400U	370U
4-Chloroaniline	ug/kg	380U	400U	370U
4-Chlorophenyl-phenylether	ug/kg	380U	400U	370U
4-Methylphenol	ug/kg	380U	400U	370U
4-Nitroaniline	ug/kg	960U	1000U	930U
4-Nitrophenol	ug/kg	960U	1000U	930U
Acenaphthene	ug/kg	380U	400U	370U
Acenaphthylene	ug/kg	380U	400U	370U
Anthracene	ug/kg	380U	400U	370U
Benzo(a)anthracene	ug/kg	380U	400U	370U
Benzo(a)pyrene	ug/kg	380U	400U	370U
Benzo(b)fluoranthene	ug/kg	380U	400U	370U

Table 9-5: Summary of Environmental Analytical Data

Parameter	Sample ID	09A-020552	09A-020554	09A-020556
	Sample Location	09A-001	09A-002	09A-003
	Sample Depth (feet)	5-8	6-9	6-9
	Sample Date	03/28/00	03/28/00	03/28/00
Units				
<i>Semivolatile Organics (continued)</i>				
Benzo(g,h,i)perylene	ug/kg	380U	400U	370U
Benzo(k)fluoranthene	ug/kg	380U	400U	370U
bis(2-Chloroethoxy)methane	ug/kg	380U	400U	370U
bis(2-Chloroethyl)ether	ug/kg	380U	400U	370U
bis(2-Ethylhexyl)phthalate	ug/kg	380U	400U	370U
Butylbenzylphthalate	ug/kg	380U	400U	370U
Carbazole	ug/kg	380U	400U	370U
Chrysene	ug/kg	380U	400U	370U
Di-n-butylphthalate	ug/kg	380U	400U	370U
Di-n-octyl phthalate	ug/kg	380U	400U	370U
Dibenz(a,h)anthracene	ug/kg	380U	400U	370U
Dibenzofuran	ug/kg	380U	400U	370U
Diethylphthalate	ug/kg	380U	400U	370U
Dimethylphthalate	ug/kg	380U	400U	370U
Fluoranthene	ug/kg	380U	400U	370U
Fluorene	ug/kg	380U	400U	370U
Hexachlorobenzene	ug/kg	380U	400U	370U
Hexachlorobutadiene	ug/kg	380U	400U	370U
Hexachlorocyclopentadiene	ug/kg	380U	400U	370U
Hexachloroethane	ug/kg	380U	400U	370U
Indeno(1,2,3-cd)pyrene	ug/kg	380U	400U	370U
Isophorone	ug/kg	380U	400U	370U
N-Nitroso-di-n-propylamine	ug/kg	380U	400U	370U
N-Nitrosodiphenylamine (1)	ug/kg	380U	400U	370U
Naphthalene	ug/kg	380U	400U	370U
Nitrobenzene	ug/kg	380U	400U	370U
Pentachlorophenol	ug/kg	960U	1000U	930U
Phenanthrene	ug/kg	380U	400U	370U
Phenol	ug/kg	380U	400U	370U
Pyrene	ug/kg	380U	400U	370U
<i>Total Metals</i>				
Aluminum, Total	mg/kg	4470	2420	2080
Antimony, Total	mg/kg	0.19U	0.17U	0.20U
Arsenic, Total	mg/kg	5	3.8	0.96
Barium, Total	mg/kg	117	88.1	53.6
Beryllium, Total	mg/kg	0.3	0.2	0.27
Boron, Total	mg/kg	1.6	1.3	2.9
Cadmium, Total	mg/kg	0.03U	0.03U	0.03U
Calcium, Total	mg/kg	1840	2370	10800
Chromium, Total	mg/kg	13.7	6.4	6.5

Table 9-5: Summary of Environmental Analytical Data

Parameter	Sample ID	09A-020552	09A-020554	09A-020556
	Sample Location	09A-001	09A-002	09A-003
	Sample Depth (feet)	5-8	6-9	6-9
	Sample Date	03/28/00	03/28/00	03/28/00
Units				
Total Metals (continued)				
Cobalt, Total	mg/kg	3.4	2.9	3
Copper, Total	mg/kg	5.1	5.6	4.6
Iron, Total	mg/kg	9460	8870	7400
Lead, Total	mg/kg	4.2	3.3	3.8
Lithium, Total	mg/kg	5.1	4.3	4
Magnesium, Total	mg/kg	1280	1410	1860
Manganese, Total	mg/kg	96.3	104	177
Mercury, Total	mg/kg	0.02U	0.02U	0.02U
Nickel, Total	mg/kg	6.7	6.2	5.9
Potassium, Total	mg/kg	448	363	650
Selenium, Total	mg/kg	0.47U	0.42U	0.49U
Silver, Total	mg/kg	0.1U	0.09U	0.1U
Sodium, Total	mg/kg	142	65.7	114
Thallium, Total	mg/kg	0.40U	0.35U	0.41U
Vanadium, Total	mg/kg	14.9	13.1	7.7
Zinc, Total	mg/kg	17.1	15.7	14.9
Volatile Organics				
1,1,1-Trichloroethane	ug/kg	620U	570U	590U
1,1,2,2-Tetrachloroethane	ug/kg	620U	570U	590U
1,1,2-Trichloroethane	ug/kg	620U	570U	590U
1,1-Dichloroethane	ug/kg	620U	570U	590U
1,1-Dichloroethene	ug/kg	620U	570U	590U
1,2-Dichloroethane	ug/kg	620U	570U	590U
1,2-Dichloroethene (total)	ug/kg	620U	570U	590U
1,2-Dichloropropane	ug/kg	620U	570U	590U
2-Butanone	ug/kg	1200U	1100U	1200U
2-Hexanone	ug/kg	1200U	1100U	1200U
4-Methyl-2-pentanone	ug/kg	1200U	1100U	1200U
Acetone	ug/kg	1200U	1100U	1200U
Benzene	ug/kg	620U	570U	590U
Bromodichloromethane	ug/kg	620U	570U	590U
Bromoform	ug/kg	620U	570U	590U
Bromomethane	ug/kg	1200U	1100U	1200U
Carbon Disulfide	ug/kg	620U	570U	590U
Carbon Tetrachloride	ug/kg	620U	570U	590U
Chlorobenzene	ug/kg	620U	570U	590U
Chloroethane	ug/kg	1200U	1100U	1200U
Chloroform	ug/kg	620U	570U	590U

Table 9-5: Summary of Environmental Analytical Data

Parameter	Sample ID	09A-020552	09A-020554	09A-020556
	Sample Location	09A-001	09A-002	09A-003
	Sample Depth (feet)	5-8	6-9	6-9
	Sample Date	03/28/00	03/28/00	03/28/00
Units				
<i>Volatile Organics (continued)</i>				
Chloromethane	ug/kg	1200U	1100U	1200U
cis-1,3-Dichloropropene	ug/kg	620U	570U	590U
Dibromochloromethane	ug/kg	620U	570U	590U
Ethylbenzene	ug/kg	620U	570U	590U
Methylene Chloride	ug/kg	620U	570U	590U
Styrene	ug/kg	620U	570U	590U
Tetrachloroethene	ug/kg	620U	570U	590U
Toluene	ug/kg	620U	570U	590U
Trans-1,3-Dichloropropene	ug/kg	620U	570U	590U
Trichloroethene	ug/kg	620U	570U	590U
Vinyl Chloride	ug/kg	1200U	1100U	1200U
Xylene (total)	ug/kg	620U	570U	590U
<i>TCLP Metals</i>				
Arsenic	ug/L	22.9U	34.7U	22.9U
Barium	ug/L	928	926	1230
Cadmium	ug/L	4.1U	4.1U	4.1U
Chromium	ug/L	3.4U	3.4U	3.4U
Lead	ug/L	26.6U	26.6U	26.6U
Mercury	ug/L	0.1U	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U	49.7U
Silver	ug/L	3.7U	3.7U	3.7U
<i>TCLP Pesticides</i>				
Alpha-Chlordane	ug/L	0.5U	0.5U	0.5U
Endrin	ug/L	1U	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5U	0.5U	0.5U
Heptachlor	ug/L	0.5U	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5U	0.5U	0.5U
Methoxychlor	ug/L	5U	5U	5U
Toxaphene	ug/L	50U	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U	5U
2,4-D	ug/L	10U	10U	10U

Table 9-5: Summary of Environmental Analytical Data

Parameter	Sample ID	09A-020552	09A-020554	09A-020556
	Sample Location	09A-001	09A-002	09A-003
	Sample Depth (feet)	5-8	6-9	6-9
	Sample Date	03/28/00	03/28/00	03/28/00
	Units			
<i>TCLP Volatiles</i>				
1,1-Dichloroethene	mg/L	0.025U	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U	0.05U
Benzene	mg/L	0.04	0.025U	0.025U
Carbon tetrachloride	mg/L	0.025U	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>				
1,4-Dichlorobenzene	mg/L	0.05U	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U	0.05U

Table 9-5: Summary of Environmental Analytical Data

Parameter	Sample ID	09A-020558	09A-020560
	Sample Location	09A-004	09A-005
	Sample Depth (feet)	6-9	6-9
	Sample Date	03/31/00	03/31/00
Units			
<i>Miscellaneous</i>			
Chromium VI	mg/kg	0.46U	0.48U
Corrosivity by pH	Soil pH	7.0	7.7
Cyanide, Reactive	mg/kg	0.50U	0.50U
Cyanide, Total	mg/kg	0.56U	0.59U
Sulfide, Reactive	mg/kg	24.0U	24.0U
<i>PCBs</i>			
4,4'-DDD	ug/kg	3.8U	4U
4,4'-DDE	ug/kg	3.8U	4U
4,4'-DDT	ug/kg	3.8U	4U
Aldrin	ug/kg	1.9U	2U
Alpha-BHC	ug/kg	1.9U	2U
alpha-Chlordane	ug/kg	1.9U	2U
Aroclor-1016	ug/kg	39U	40U
Aroclor-1221	ug/kg	77U	80U
Aroclor-1232	ug/kg	39U	40U
Aroclor-1242	ug/kg	39U	40U
Aroclor-1248	ug/kg	39U	40U
Aroclor-1254	ug/kg	39U	40U
Aroclor-1260	ug/kg	39U	40U
Beta-BHC	ug/kg	1.9U	2U
Delta-BHC	ug/kg	1.9U	2U
Dieldrin	ug/kg	3.8U	4U
Endosulfan I	ug/kg	1.9U	2U
Endosulfan II	ug/kg	3.8U	4U
Endosulfan sulfate	ug/kg	3.8U	4U
Endrin	ug/kg	3.8U	4U
Endrin aldehyde	ug/kg	3.8U	4U
Endrin ketone	ug/kg	3.8U	4U
gamma-BHC (Lindane)	ug/kg	1.9U	2U
gamma-Chlordane	ug/kg	1.9U	2U
Heptachlor	ug/kg	1.9U	2U
Heptachlor epoxide	ug/kg	1.9U	2U
Methoxychlor	ug/kg	19U	20U
Toxaphene	ug/kg	190U	200U

Table 9-5: Summary of Environmental Analytical Data

Parameter	Sample ID	09A-020558	09A-020560
	Sample Location Sample Depth (feet) Sample Date	09A-004 6-9 03/31/00	09A-005 6-9 03/31/00
Units			
<i>Rare Earth Metals</i>			
Cerium, Total	mg/kg	31.9	17.6
Dysprosium, Total	mg/kg	2.6	1.4
Lanthanum, Total	mg/kg	11.7	6.9
Neodymium, Total	mg/kg	18.9	10.2
Yttrium, Total	mg/kg	11.4	5.5
<i>Semivolatile Organics</i>			
1,2,4-Trichlorobenzene	ug/kg	390U	400U
1,2-Dichlorobenzene	ug/kg	390U	400U
1,3-Dichlorobenzene	ug/kg	390U	400U
1,4-Dichlorobenzene	ug/kg	390U	400U
2,2'-oxybis(1-Chloropropane)	ug/kg	390U	400U
2,4,5-Trichlorophenol	ug/kg	960U	1000U
2,4,6-Trichlorophenol	ug/kg	390U	400U
2,4-Dichlorophenol	ug/kg	390U	400U
2,4-Dimethylphenol	ug/kg	390U	400U
2,4-Dinitrophenol	ug/kg	960U	1000U
2,4-Dinitrotoluene	ug/kg	390U	400U
2,6-Dinitrotoluene	ug/kg	390U	400U
2-Chloronaphthalene	ug/kg	390U	400U
2-Chlorophenol	ug/kg	390U	400U
2-Methylnaphthalene	ug/kg	390U	400U
2-Methylphenol	ug/kg	390U	400U
2-Nitroaniline	ug/kg	960U	1000U
2-Nitrophenol	ug/kg	390U	400U
3,3'-Dichlorobenzidine	ug/kg	390U	400U
3-Nitroaniline	ug/kg	960U	1000U
4,6-Dinitro-2-methylphenol	ug/kg	960U	1000U
4-Bromophenyl-phenylether	ug/kg	390U	400U
4-Chloro-3-methylphenol	ug/kg	390U	400U
4-Chloroaniline	ug/kg	390U	400U
4-Chlorophenyl-phenylether	ug/kg	390U	400U
4-Methylphenol	ug/kg	390U	400U
4-Nitroaniline	ug/kg	960U	1000U
4-Nitrophenol	ug/kg	960U	1000U
Acenaphthene	ug/kg	390U	400U
Acenaphthylene	ug/kg	390U	400U
Anthracene	ug/kg	390U	400U
Benzo(a)anthracene	ug/kg	390U	400U
Benzo(a)pyrene	ug/kg	390U	400U
Benzo(b)fluoranthene	ug/kg	390U	400U

Table 9-5: Summary of Environmental Analytical Data

Parameter	Sample ID	09A-020558	09A-020560
	Sample Location Sample Depth (feet) Sample Date	09A-004 6-9 03/31/00	09A-005 6-9 03/31/00
Units			
<i>Semivolatile Organics (continued)</i>			
Benzo(g,h,i)perylene	ug/kg	390U	400U
Benzo(k)fluoranthene	ug/kg	390U	400U
bis(2-Chloroethoxy)methane	ug/kg	390U	400U
bis(2-Chloroethyl)ether	ug/kg	390U	400U
bis(2-Ethylhexyl)phthalate	ug/kg	61BJ	60JB
Butylbenzylphthalate	ug/kg	390U	400U
Carbazole	ug/kg	390U	400U
Chrysene	ug/kg	390U	400U
Di-n-butylphthalate	ug/kg	24BJ	34J
Di-n-octyl phthalate	ug/kg	390U	400U
Dibenz(a,h)anthracene	ug/kg	390U	400U
Dibenzofuran	ug/kg	390U	400U
Diethylphthalate	ug/kg	390U	400U
Dimethylphthalate	ug/kg	390U	400U
Fluoranthene	ug/kg	390U	400U
Fluorene	ug/kg	390U	400U
Hexachlorobenzene	ug/kg	390U	400U
Hexachlorobutadiene	ug/kg	390U	400U
Hexachlorocyclopentadiene	ug/kg	390U	400U
Hexachloroethane	ug/kg	390U	400U
Indeno(1,2,3-cd)pyrene	ug/kg	390U	400U
Isophorone	ug/kg	390U	400U
N-Nitroso-di-n-propylamine	ug/kg	390U	400U
N-Nitrosodiphenylamine (1)	ug/kg	390U	400U
Naphthalene	ug/kg	390U	400U
Nitrobenzene	ug/kg	390U	400U
Pentachlorophenol	ug/kg	960U	1000U
Phenanthrene	ug/kg	390U	400U
Phenol	ug/kg	390U	400U
Pyrene	ug/kg	390U	400U
<i>Total Metals</i>			
Aluminum, Total	mg/kg	3800	3140
Antimony, Total	mg/kg	0.19U	0.21U
Arsenic, Total	mg/kg	1.8	1.7
Barium, Total	mg/kg	49.6	53.1
Beryllium, Total	mg/kg	0.63	0.29
Boron, Total	mg/kg	4.6	3.1
Cadmium, Total	mg/kg	0.03U	0.03U
Calcium, Total	mg/kg	1550	1620
Chromium, Total	mg/kg	111	6.6

Table 9-5: Summary of Environmental Analytical Data

Parameter	Sample ID	09A-020558	09A-020560
	Sample Location Sample Depth (feet) Sample Date	09A-004 6-9 03/31/00	09A-005 6-9 03/31/00
Units			
Total Metals (continued)			
Cobalt, Total	mg/kg	5.8	3.1
Copper, Total	mg/kg	5.1	4.7
Iron, Total	mg/kg	12900	8830
Lead, Total	mg/kg	7.1	4.1
Lithium, Total	mg/kg	4.6	4.7
Magnesium, Total	mg/kg	1330	1330
Manganese, Total	mg/kg	240	144
Mercury, Total	mg/kg	0.02U	0.02U
Nickel, Total	mg/kg	12	6.5
Potassium, Total	mg/kg	812	616
Selenium, Total	mg/kg	0.45U	0.51U
Silver, Total	mg/kg	0.38U	0.1U
Sodium, Total	mg/kg	113	87.9
Thallium, Total	mg/kg	0.09U	0.43U
Vanadium, Total	mg/kg	12.5	10.3
Zinc, Total	mg/kg	19.9	18
Volatile Organics			
1,1,1-Trichloroethane	ug/kg	650U	1100U
1,1,2,2-Tetrachloroethane	ug/kg	650U	1100U
1,1,2-Trichloroethane	ug/kg	650U	1100U
1,1-Dichloroethane	ug/kg	650U	1100U
1,1-Dichloroethene	ug/kg	650U	1100U
1,2-Dichloroethane	ug/kg	650U	1100U
1,2-Dichloroethene (total)	ug/kg	650U	1100U
1,2-Dichloropropane	ug/kg	650U	1100U
2-Butanone	ug/kg	1300U	2200U
2-Hexanone	ug/kg	1300U	2200U
4-Methyl-2-pentanone	ug/kg	1300U	2200U
Acetone	ug/kg	1300U	2200U
Benzene	ug/kg	650U	1100U
Bromodichloromethane	ug/kg	650U	1100U
Bromoform	ug/kg	650U	1100U
Bromomethane	ug/kg	1300U	2200U
Carbon Disulfide	ug/kg	650U	1100U
Carbon Tetrachloride	ug/kg	650U	1100U
Chlorobenzene	ug/kg	650U	1100U
Chloroethane	ug/kg	1300U	2200U
Chloroform	ug/kg	650U	1100U

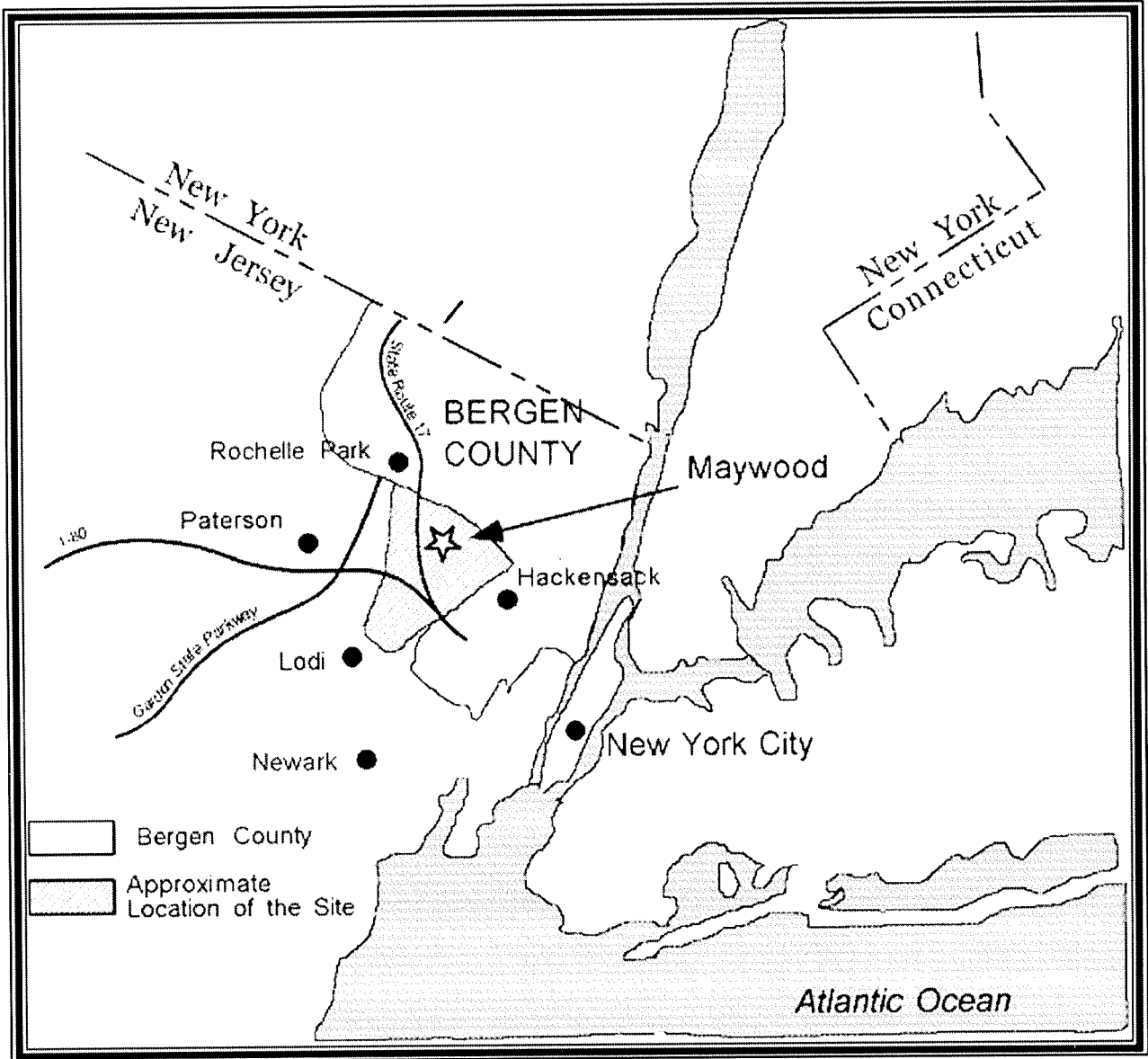
Table 9-5: Summary of Environmental Analytical Data

Parameter	Sample ID	09A-020558	09A-020560
	Sample Location	09A-004	09A-005
	Sample Depth (feet)	6-9	6-9
	Sample Date	03/31/00	03/31/00
Units			
<i>Volatile Organics (continued)</i>			
Chloromethane	ug/kg	1300U	2200U
cis-1,3-Dichloropropene	ug/kg	650U	1100U
Dibromochloromethane	ug/kg	650U	1100U
Ethylbenzene	ug/kg	650U	1100U
Methylene Chloride	ug/kg	650U	1100U
Styrene	ug/kg	650U	1100U
Tetrachloroethene	ug/kg	650U	1100U
Toluene	ug/kg	650U	1100U
Trans-1,3-Dichloropropene	ug/kg	650U	1100U
Trichloroethene	ug/kg	650U	1100U
Vinyl Chloride	ug/kg	1300U	2200U
Xylene (total)	ug/kg	650U	1100U
<i>TCLP Metals</i>			
Arsenic	ug/L	22.9U	1.7U
Barium	ug/L	528J	769J
Cadmium	ug/L	4.1U	4.1U
Chromium	ug/L	14.1	3.4U
Lead	ug/L	26.6U	26.6U
Mercury	ug/L	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U
Silver	ug/L	3.7U	3.7U
<i>TCLP Pesticides</i>			
Alpha-Chlordane	ug/L	0.5U	0.5U
Endrin	ug/L	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5U	0.5U
Heptachlor	ug/L	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5U	0.5U
Methoxychlor	ug/L	5U	5U
Toxaphene	ug/L	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U
2,4-D	ug/L	10U	10U

Table 9-5: Summary of Environmental Analytical Data

Parameter	Sample ID	09A-020558	09A-020560
	Sample Location	09A-004	09A-005
	Sample Depth (feet)	6-9	6-9
	Sample Date	03/31/00	03/31/00
Units			
<i>TCLP Volatiles</i>			
1,1-Dichloroethene	mg/L	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U
Benzene	mg/L	0.025U	0.025U
Carbon tetrachloride	mg/L	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>			
1,4-Dichlorobenzene	mg/L	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U

B (inorganics) Value Between Method Detection Limit and Reporting Limit
 B (organics) Found in Associated Blank
 U Undetected Values
 J Estimated Value
 BJ Found in Blank; is an Estimated Value



NOT TO SCALE

<p>U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS NEW YORK DISTRICT</p>	<p>STONE & WEBSTER, INC.</p>
<p>US ARMY CORPS OF ENGINEERS FUSRAP FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM</p>	<p>Prepared by: MALCOLM PIRNE</p> <p>File Name: MPI-CH9</p>

**LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY**

PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

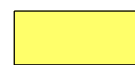
Contract Number:
DACW41-98-R-0034

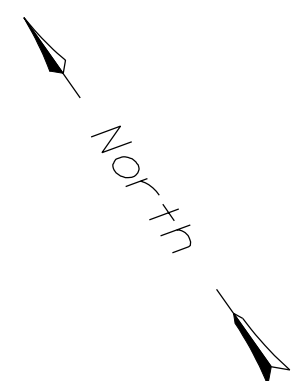
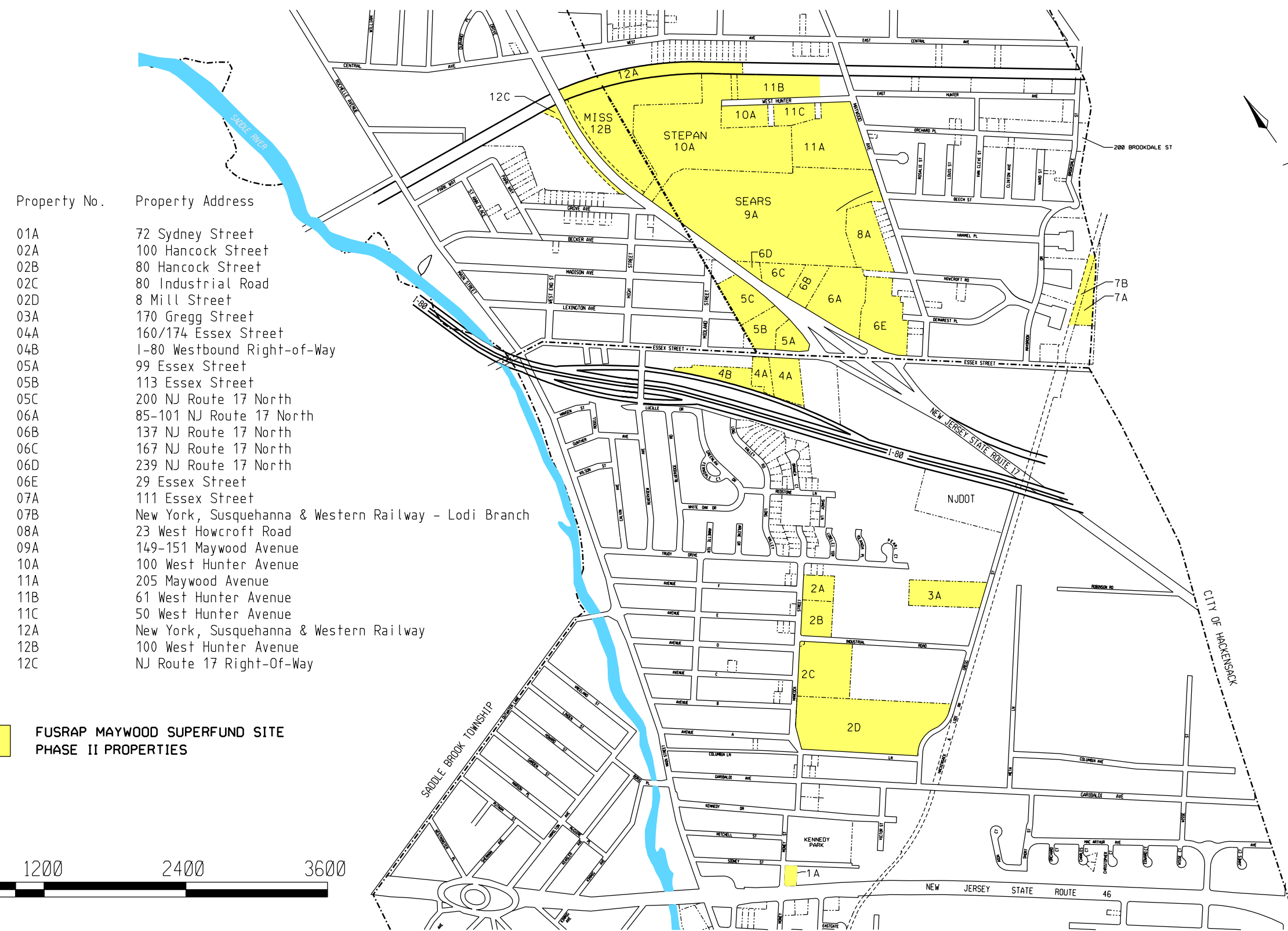
Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 9-1

Cluster No.	Property No.	Property Address
1	01A	72 Sydney Street
2	02A	100 Hancock Street
	02B	80 Hancock Street
	02C	80 Industrial Road
	02D	8 Mill Street
3	03A	170 Gregg Street
4	04A	160/174 Essex Street
	04B	1-80 Westbound Right-of-Way
5	05A	99 Essex Street
	05B	113 Essex Street
	05C	200 NJ Route 17 North
6	06A	85-101 NJ Route 17 North
	06B	137 NJ Route 17 North
	06C	167 NJ Route 17 North
	06D	239 NJ Route 17 North
7	06E	29 Essex Street
	07A	111 Essex Street
8	07B	New York, Susquehanna & Western Railway - Lodi Branch
	08A	23 West Howcroft Road
9	09A	149-151 Maywood Avenue
10	10A	100 West Hunter Avenue
11	11A	205 Maywood Avenue
	11B	61 West Hunter Avenue
	11C	50 West Hunter Avenue
12	12A	New York, Susquehanna & Western Railway
	12B	100 West Hunter Avenue
	12C	NJ Route 17 Right-Of-Way


 FUSRAP MAYWOOD SUPERFUND SITE
PHASE II PROPERTIES



U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT



US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

 **STONE & WEBSTER, INC.**

Prepared by:
**MALCOLM
PIRNIE**

File Name:
\\MAYWOOD\TASK0318\CLUSTER REPORT\REV 1\FIGURE9-2.DGN

LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY

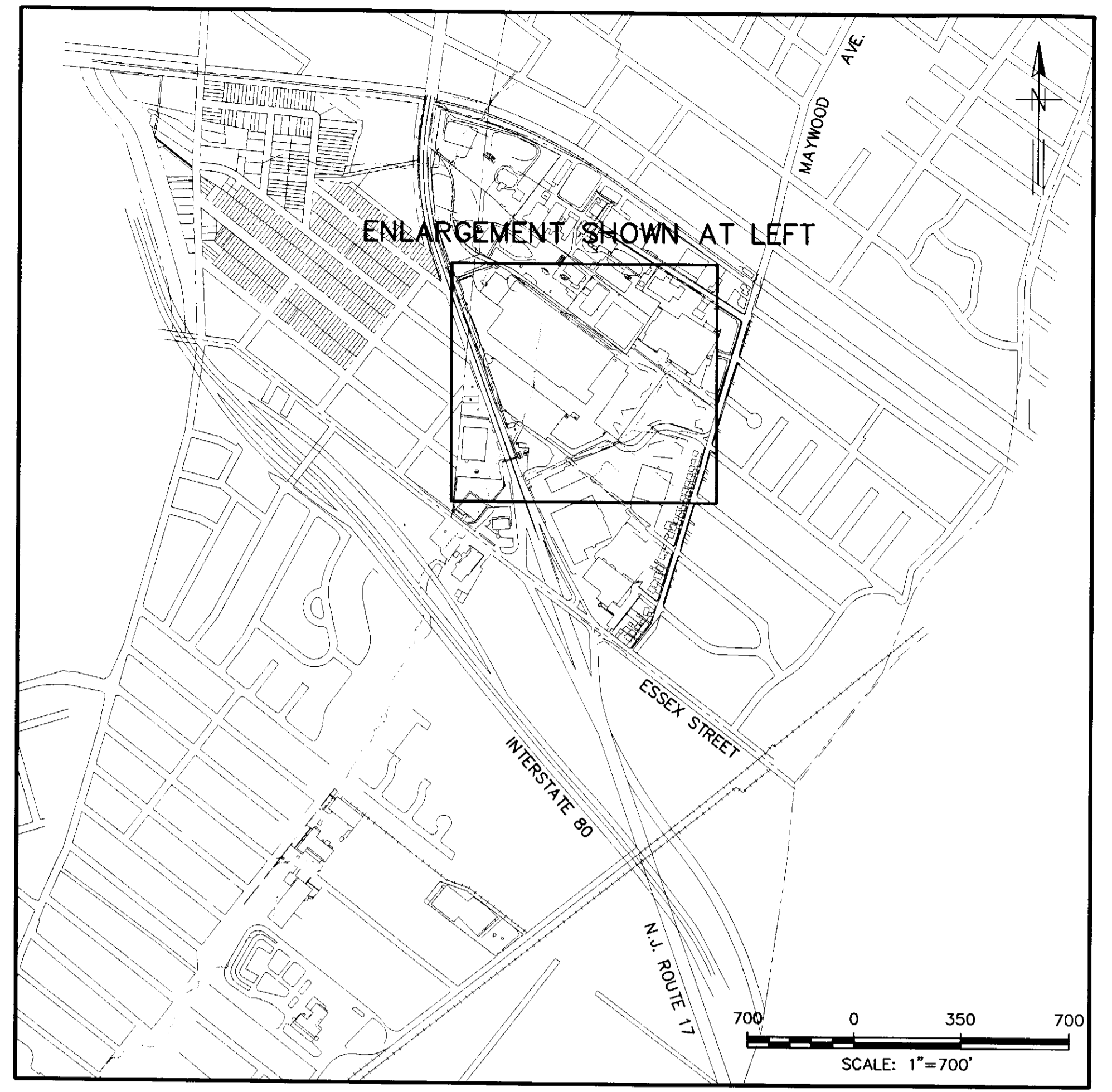
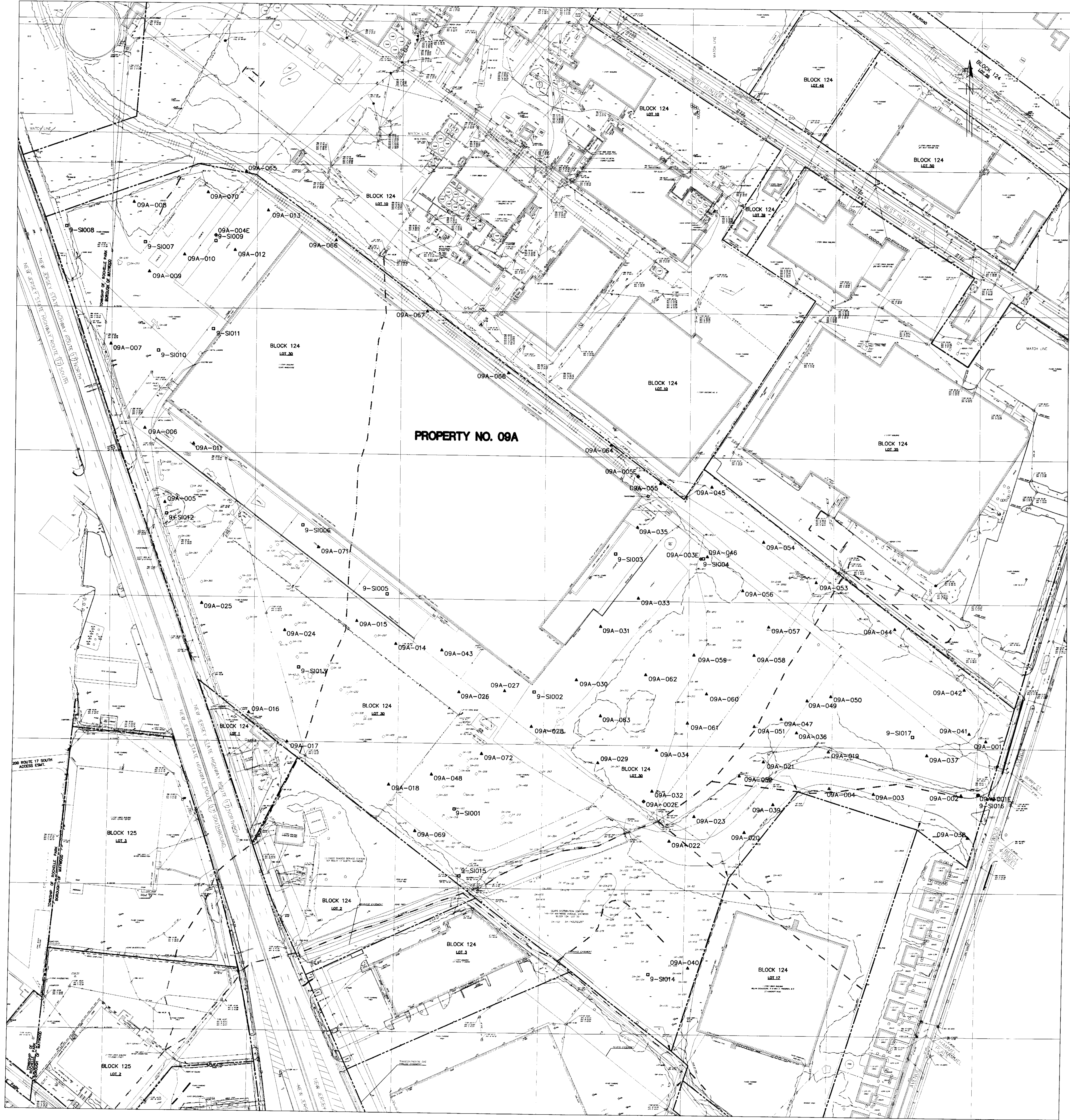
PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

Contract Number:
DACW41-99-D-9001

Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 9-2



KEY MAP

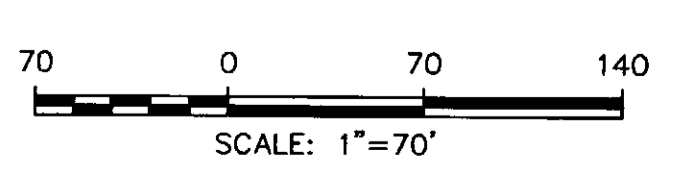
LEGEND

- PROPERTY BOUNDARY
- EXISTING BUILDING
- EXISTING 1' CONTOUR
- APPROXIMATE LOCATION OF HISTORIC LODI BROOK CHANNEL

SAMPLE SYMBOL	SAMPLE TYPE	NUMBER OF SAMPLING LOCATIONS
▲	DIRECT PUSH SOIL PROBE LOCATIONS (RADIOLOGICAL)	72
□	SURFACE ISDCS LOCATIONS	17
⊕	DIRECT PUSH SOIL PROBE LOCATION (ENVIRONMENTAL)	5

- NOTES:**
- THIS SURVEY SHOWS CONDITIONS AS OF OCTOBER 1999 BASED ON AERIAL MAPPING PREPARED BY GEOD CORP. AND GROUND SURVEY BY GARDEN STATE ENGINEERING SURVEYING AND PLANNING.
 - VERTICAL DATUM IS REFERENCED TO NGVD 1929.
 - HORIZONTAL DATUM IS REFERENCED TO NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 1927.
 - THE LOCATION OF THE HISTORIC LODI BROOK SHOWN ON THIS SHEET WAS APPROXIMATED BASED UPON REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS FROM APRIL 6, 1940.

CLUSTER NO. 9 149-151 MAYWOOD AVENUE (09A)



		Prepared by: _____ Reviewed by: _____ Date: _____
		Drawn by: _____ Date: 7-21-00 File Name: MPEI-C9



Lower Contour Limit = 1.5 X Background = 1.5 X 2000 = 3000 counts per minute

Upper Contour Limit = Highest measurement across entire Maywood Site: approx. 500,000 counts per minute

Property Cluster No. 9: 149-151 Maywood Ave. (Sears Logistical Services)

Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 9-4

APPENDIX 9-A

Variations from the PDI Work Plan

**Letters Informing EPA and NJDEP of Use of Geoprobes⁰
In Lieu of Downhole ISOCS**



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Angela Carpenter
Remedial Project Manager
Federal Facilities Section
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Dear Ms. Carpenter:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in your December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Donna Gaffigan, NJDEP



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

December 8, 1999

REPLY TO
ATTENTION OF

Programs and Project Management Division

Ms. Donna Gaffigan
Case Manager
Bureau of Case Management
New Jersey Department of Environmental Protection
401 E State St
Trenton, NJ 08625-0600

Dear Ms. Gaffigan:

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- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Angela Carpenter, EPA

Revisions to Standard Operating Procedure No. SW-MWD-509-0



**STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION**

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE: 1 of 8 plus Attachment 1
	DATE: February 2000

APPROVED:
Prepared by:
Project Chemist
Reviewed by:
PDI Task Manager
Richard Skyness 2/29/00
Project Engineer
[Signature] 2/29/00
Project Manager

1.0 PURPOSE

This Stone & Webster Standard Operating Procedure (SOP), **Soil Probe Investigation** shall be employed when collecting subsurface soil samples using the direct push soil probe method at the FUSRAP Maywood Superfund Site (hereafter referred to as the Maywood Site) properties with known or suspected soil and/or groundwater contamination.

2.0 SCOPE

This procedure details the materials, equipment, and methods common to soil probe investigation activities. Consult the site-specific project plans and work plans for proposed soil probe locations. Always consult site-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Task Manager prior to implementation and shall be documented in project field logbooks.**

3.0 REFERENCES

Stone & Webster Maywood SOP 102 - Downhole Gamma Radiation Logging
Stone & Webster Maywood SOP 307 - Surface and Shallow Subsurface Soil Sampling
Stone & Webster Maywood SOP 308 - Soil Borings and Sampling
Stone & Webster Maywood SOP 401 - Photoionization Detector (PID)
Stone & Webster Maywood SOP 504 - Labeling, Packaging, and Shipping Environmental Samples
Stone & Webster Maywood SOP 505 - Cuttings and Fluids Management
Stone & Webster Maywood SOP 506 - Decontamination
Stone & Webster Maywood SOP 507 - Field Notebook Content and Control
U.S.E.P.A., A Compendium of Superfund Field Operation Methods, Document EPA/540/P-87/001, December, 1987.

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DEFINITIONS

Stone & Webster Team – personnel of the Stone & Webster Team that includes for this SOP: Stone & Webster, Malcolm Pirnie, Franklin Environmental Services, Inc., Safety & Ecology Corporation (SEC), and Garden State Surveying, Engineering and Planning, Inc. The Stone & Webster Team shall perform soil probe investigation activities, except those activities specified as performed by the Subcontractor.

Subcontractor – personnel of the direct push soil probe firm.

Direct Push Soil Probe – generic name for advancing media sampling piping/tubes with only direct mechanical force. They are typically hollow steel rods advanced using a percussive force (powered hammer) and driven directly into unconsolidated soil. There are two types of direct push soil probes. One is a single rod system (i.e., macrocore) and the other is a dual tube or cased system. The latter, which will be the method of choice for most Maywood Site investigations, utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Drive rods used with the cased system are usually made from a high-grade steel alloy and are retracted after sampling.

4.0 RESPONSIBILITIES

5.1 Project Manager - Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 Project Environmental Engineer - Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for direct push soil probe activities.

5.3 Project Superintendent - Designated by the Project Manager to supervise investigative activities by Stone & Webster Team and Subcontractor personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in monitoring soil probe investigation activities in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each workday. The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil probe investigation activities and deviations from this SOP.

5.4 Site Personnel (including the data logger) - Required to read and sign the Maywood Site Safety and Health Plan (SSHP), have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil probe investigation activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

5.5 Site Safety & Health Officer - Responsible for ensuring that all site workers (Stone & Webster and Subcontractor) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.6 Task Manager – Responsible to plan, implement, and closeout field work requiring direct push technology.

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5.7 Subcontractor - Required to read and sign the SSHP, have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. Subcontractors shall report directly to the Task Manager or his designee.

6.0 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS FOR SOIL PROBE INVESTIGATION

The following is a list of equipment and material that is commonly used on all projects when the direct push probe technique is performed in the unconsolidated soils. Refer also to related SOP equipment and material requirements to ensure completeness.

Items required by Subcontractor:

- Direct push probe equipment - of appropriate size and direct push probe and sampling capabilities; vehicle mounted; direct push probe sampling tools used to advance boring (i.e., direct push small diameter rods; and augers, if required) equipment, labor, and supplies to maintain optimal efficiency
- Environmentally-safe lubricants
- Backfill material for probe holes, as required
- Soil sample collection and logging supplies – **See Stone & Webster Maywood SOP 308, Soil Borings and Sampling**
- Decontamination supplies - **See Stone & Webster Maywood SOP 506, Decontamination**

Items carried by Stone & Webster Team on-site personnel

- **SSHP To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Clipboard
- Pencils
- Six-foot-ruler
- Pocket knife
- Camera (optional), check with Project Manager if required
- Volatile organic compound vapor meter equipped with photoionization detector (PID) and other air surveillance monitoring equipment, as required by the SSHP
- Radiation meter
- Site boring logs
- Blank soil probe logs
- Weighted measuring tape
- Water level measuring device - **See Stone & Webster Maywood SOP 410, Groundwater Level Measurement**, Interface probe, if needed
- Paper towels
- Chain of Custody forms

7.0 DIRECT PUSH PROBE ACTIVITIES

7.1 General Considerations

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Prior to selecting the direct push probe method for a specific property, the objectives of the field investigation must be established. These property-specific objectives shall include one or more of the following Maywood Pre-Design Investigation (PDI) program objectives:

- Soil classification/evaluation - the direct push soil probe technique will be able to accommodate the collection of soils for characterization purposes.
- Characterization of hydrogeologic conditions - the direct push soil probe technique shall allow for the characterization of each stratigraphic zone, and water level measurements.
- Evaluation of soil contamination - the direct push soil probe technique shall provide the appropriate sample collection methods, must not introduce contaminants into the probe hole or otherwise alter the existing soil or groundwater chemistry, and should not result in subsurface cross contamination during or after installation of direct push probe.

7.2 Direct Push Probe Activities

Prior to commencing direct push soil probe fieldwork, several activities should be performed. These activities, which include both pre-mobilization office tasks and pre-installation field tasks, are discussed below. Once the pre-installation activities are completed, direct push soil probe installation may commence.

7.2.1 Pre-Mobilization Tasks

1. The Stone & Webster Team and Subcontractor shall acquire as much geologic and hydrogeologic information about the site as possible. This information may include possible soil and groundwater contamination present, groundwater table depths and fluctuations, surficial and bedrock geology, approximate thickness of the unconsolidated zone, depth to top of weathered rock, depth to competent rock, and site access.
2. Soil probe locations shall be marked in the field by the Stone & Webster Team with either paint or flags/stakes during pre-mobilization tasks, and surveyed using a global positioning system (GPS). The Stone & Webster Team shall check and verify that the soil probe location corresponds to the location on the project plans. The Stone & Webster Team and Subcontractor shall check to see if visible structures will prevent the completion of proposed soil probes at specific locations.
3. The Stone & Webster Team shall communicate with the Subcontractor regarding the requirements of the direct push soil probe program and required geologic and environmental information. Inform the Subcontractor of the environmental sampling program that the project shall follow. This information includes sampling frequency, sampling depths, type of sample required (soil or groundwater), the length of casing, direct push soil probe method (i.e., macrocore, dual tube, etc.), number and type of soil samplers required, and special sampling techniques. Ensure that probe hole backfill is selected in accordance with the project specifications.
4. The Subcontractor shall ensure that all utilities in the vicinity of the proposed boring(s) have been cleared by the appropriate authorized parties (e.g., New Jersey One-Call System at 1-800-272-1000, owner, etc.) or, if utilities exist, are visibly marked on the ground surface in the area of the proposed boring. In addition, keep a safe working distance (pursuant to OSHA) from overhead utilities. **NOTE: The party responsible for having utilities cleared shall be identified. If the responsible party is not clearly identified then the Task Manager shall establish the responsible party. Ensure that utilities have been cleared prior to installation of soil probe.**

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7.2.2 Pre-Installation Field Tasks

Sampling equipment shall be decontaminated prior to use, using pressure or manual washing of the rig, direct push soil probe, and tools, as required to prevent introducing off-site contamination. The direct push soil probe related equipment shall be decontaminated on site prior to direct push soil probe activities. Refer to **Stone & Webster Maywood SOP 506, Decontamination** for specific instructions.

7.3 General Direct Push Soil Probe Method Procedures

The following sections outline general direct push soil probe procedures used in unconsolidated soil materials.

1. Assuming a vertical soil probe, the Subcontractor shall set the direct push rig over the proposed soil probe location. Level the direct push rig and ensure that the direct push rods used to advance the soil probe are in a vertical position directly above the hole.
2. The inspecting Stone & Webster Team shall obtain and record measurements of tools to be used for direct push probe operations. Down-hole measurements taken by the Subcontractors shall be to the nearest 0.1 foot.
3. The Subcontractor shall begin sampling or advancement of soil probe to the desired depth utilizing the direct push method described below. Samples shall be taken using the steps described in Section 8.1.1.
4. When the direct push advancement tools are lowered into the probe hole, the Stone & Webster Team shall keep track of tool lengths to check Subcontractor's stated depth of soil probe.
5. The Stone & Webster Team shall make certain that the Subcontractor is performing depth measurements with a ruler and known tool lengths and not visually judging ("eyeballing") casing and tool projections above the ground. The Stone & Webster Team shall maintain a mental note of depth to bottom of soil probe by keeping track of the linear feet of tools in and above the ground. By mentally subtracting the "stick-up" above the ground, the Stone & Webster Team can maintain a constant approximate check on the soil probe depth and Subcontractor's indicated depths.
6. The breathing zone shall be screened by a designee of the Stone & Webster Team Site Safety and Health Officer for total volatile organic vapors using an organic vapor analyzer as outlined in the SSHP. A lower explosive limit meter (LEL) shall be employed if required in SSHP. Record the measured readings at the depth and time of reading on the boring log.
7. During direct push probe activities, both the Stone & Webster Team and Subcontractor shall record production, mechanical and/or sampling difficulties and the sequence of activities. Also record rig mobilization time, rig set-up time, and probe commencement and completion times. This information should be recorded in a field log book. The Stone & Webster Team shall also record pertinent details on the soil probe log (See Attachment A for blank soil probe log).
8. Refusal of direct push probe advancement tools (i.e., casing refusal) is defined as when the probe hole cannot be advanced using regular advancement methods. Generally, refusal can be identified by the following characteristics:
 - Advancement of probe hole is not noticeable or is very slow
 - A change in the frequency/pitch of the direct push probe equipment
 - The direct push probe downpressure may be significantly higher than under "normal" conditions. The direct push rig may be lifted off the ground surface.
9. If refusal is encountered in the soil probe, refer to **Stone & Webster Maywood SOP 308, Soil Borings and Sampling** for specific instructions. If the probe hole cannot be advanced, relocate the probe hole within approximately 5 feet distant from the original location and start with the

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work in Section Paragraph 7.2.1. Measure the distance and direction from the original location, and record this information in the field logbook. The actual distance of movement necessary may be greater depending on the site conditions. If the required movement is greater than 5 feet, contact the Task Manager for direction.

10. Downhole gamma radiation logging will be performed, *where feasible* by the Stone & Webster Team as described in Section 8.1.1 below (**See Stone & Webster Maywood SOP 102, Downhole Gamma Radiation Logging**).
11. When the probe hole is completed and the area is cleaned up, all contaminated equipment, including down-hole tools, hand tools, and direct push rig shall be decontaminated by the Subcontractor (**See Stone & Webster Maywood SOP 506, Decontamination**) and as directed by the Radiation Safety Officer (RSO).
12. The Stone & Webster Team shall record the soil probe location on the project drawings.

8.0 METHOD-SPECIFIC SOIL SCREENING AND SAMPLING

In this section, the soil screening and sampling procedure for the direct push soil probe method is described.

8.1 Direct Push Probe Services

The direct push probe rig is a hydraulically powered percussion/direct push machine used for small diameter subsurface investigations. It can obtain continuous soil cores, discreet soil samples, groundwater samples and vapor samples along with installation of permanent sparge points.

8.1.1 Procedures for Screening and Sampling Direct Push Probe Soil Samples

Following is the procedure to be used at the Maywood Site for screening and sampling direct push probe soil cores.

1. Each 4-foot soil core sample will remain in the polyvinyl chloride/polyethylene terephthalate (PVC/PETG) liner and marked with the appropriate field identification number, sealed with rubber end caps for liners, and placed into a designated (2 inch ID) PVC container (including PVC end caps) supplied by the Subcontractor for storage. Pertinent sample data will also be marked on the PVC container.
2. Downhole gamma logging will be accomplished, *where feasible* by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.
3. Each soil probe hole will be backfilled for the full length, in accordance with project requirements.
4. The sealed PVC containers will be transported by the Stone & Webster Team to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. All Building 76 sample documentation, field screening, and sampling tasks shall be performed by the Stone & Webster Team. Sample documentation will include the preparation of a soil probe log containing the following pertinent field documentation: soil probe identification number and location; soil column description; soil screening data, and photo-documentation. **Stone & Webster Maywood SOP 507, Field Notebook Content and Control**, shall be followed. Sample documentation information shall be recorded electronically.
5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each

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soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integration taken at each marked location and recorded.

6. The soil cores will then be screened for total volatile organic vapors using a PID (see **Stone & Webster Maywood SOP 401, Photoionization Detector (PID)**). A series of small perforations will be made through the liner at 12-inch increments.
7. The soil cores will be described generally in accordance with the Unified Soil Classification system, based on visual observations through the liners and soil extracted from the small perforations. Prior to storage, these perforations will be sealed with tape. The soil descriptions developed will be marked with an "FC" note to define the description as a field classification.
8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.
9. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.
11. Extracted samples shall be prepared in accordance with the Safety and Ecology Corporation (SEC) on-site field laboratory soil preparation practice/SOP.
12. Analysis for ROC on extracted sections of the soil core will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector, or equivalent. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.
14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.
15. Sampling tools will be decontaminated before each boring, after collecting each soil sample, and after each boring.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term "blind duplicates"), thus eliminating potential bias in the test measurement.

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If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.

ATTACHMENT 1

PDI SOIL PROBE LOG SHEET				
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator			XXX	
Activity Designator			AAA PDI	
Field Measurement/Sample Collection Designator			VV SP	
Station Number			N N N	
Media			m m SB	
Sample Type			n	
Sequential Sample Number			# # # # # (see Below)	
		Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location				
		Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core		
Date			Date	
Time			Time	
Logger			Logger	
Detector Model #	SPA-3		PID Model #	Multi-RAE
Detector Serial #	CENAN 33401		PID Serial #	CENAN 21811
Scaler Model #	2224			
Scaler Serial #	132842			
Comments: 1. MPI No. _____. 2. Direct-push location grouted with BenSeal.				
<div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%; text-align: center;"> _____ Signature (Down Hole Gamma Logging) </div> <div style="width: 45%; text-align: center;"> _____ Date </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%; text-align: center;"> _____ Signature (Core Gamma Logging) </div> <div style="width: 45%; text-align: center;"> _____ Date </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%; text-align: center;"> _____ Signature (PID Logging) </div> <div style="width: 45%; text-align: center;"> _____ Date </div> </div>				

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)															
					X	X	X	#	#	#	#	#	#							
0.0																				
0.5																				
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¹ Location of Core Gamma Reading Based on Initial Continuous Scan
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TABLE 1-A: REVISIONS TO SOP SW-MWD-509-0

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>Section 8.1.1 Procedures for Screening and Sampling Direct Push Soil Samples 2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a Bicon 3/8- inch x 3/8- inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. The detector shall be positioned below the bottom of the casing to allow gamma log readings in the uncased portion of the probe hole. The casing shall be extracted at 6-inch increments and a 30-second count reading shall be taken at each increment.</p>	<p>2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. The sodium iodide detector preamplifier is connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector™ multi-channel analyzer/amplifier/high voltage power supply. The system is controlled, and the data stored, via a notebook computer. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.</p>	<p>Cabrera Services, Inc. developed this procedure as a cost effective site characterization method. Better sensitivity of the 1-inch x 1-inch detector used by Cabrera Services, Inc. allows gross gamma measurements through the soil probe casings, thereby increasing soil probe production rates.</p>	<p>January 11, 2000, without waterproof container. Sealed solid casing installed following extraction of MacroCore or Dual Tube system. January 28, 2000, with waterproof container. Eliminated need of sealed solid casing.</p>
<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The acetate liner shall be marked off at 6-inch intervals. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Readings shall consist of 10-second integrations taken every six inches and recorded.</p>	<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the PVC/PET liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integrations taken at the marked locations and recorded.</p>	<p>Continuous scanning of the soil core provides complete coverage, longer counting time at the regions of interest, and minimizes redundancy of the downhole gamma measurements.</p>	<p>January 11, 2000</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>8. A minimum of three soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238 based on field radiological screening and gamma logging values. At a minimum, one soil sample will be taken at the highest reading location (suspected FUSRAP waste); a second soil sample shall be collected where the readings approach a constant value (suspected transition zone); and a third soil sample shall be collected within the zone of constant readings (below suspected transition zone). Additional samples may be taken based on the Task Manager's direction.</p>	<p>8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.</p>	<p>Suspected FUSRAP waste and suspected transition zones may not be present in each direct push location.</p>	<p>Selection of archived samples began February 21, 2000.</p>
<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored in Building 76 for future reference.</p>	<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.</p>	<p>Based on laboratory analysis there may be the need to collect additional samples from the stored soil cores.</p>	<p>January 11, 2000</p>
<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a USACE-certified off-site laboratory, for confirmatory ROC analysis. Soil samples shall be placed in labeled containers provided by the laboratory, then placed in coolers maintained at 4°C. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>Samples will be sealed in containers provided by the SEC on-site field laboratory.</p> <p>Preservation (i.e., 4°C) is not required for ROC analysis.</p>	<p>February 28, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>14. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.</p>	<p>14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.</p>	<p>Sample storage will be returned to the FUSRAP Maywood Superfund Site for future disposition.</p>	<p>January 11, 2000</p>
<p>9.0 QUALITY ASSURANCE/QUALITY CONTROL Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment rinsate blanks and duplicates. Equipment rinsate blanks must be collected each day that sampling occurs or each decontamination event, whichever is less, per matrix per parameter per field crew, per equipment type (assuming reusable sampling equipment is used). This QA/QC requirement may be modified based on conversations with USACE, USEPA, and NJDEP. Field duplicate samples must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement. Field duplicate samples must represent no less than 10 % of the total number of samples per matrix per parameter per area of study. Field duplicate gamma radiation readings shall also be recorded at a frequency of 10% of the total gamma radiation readings.</p> <p>Matrix spike/matrix duplicate (MS/MD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat</p>	<p>Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement.</p> <p>If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given</p>	<p>Swipe sample is a more representative QC check of loose surface alpha radioactivity than aqueous rinsate sample.</p> <p>Reduction from 10% to 5% duplicate samples based on large number of soil samples proposed for PDI. In addition, 5% is consistent with NJDEP Field Sampling Procedures Manual for field duplicates and EPA guidelines for MS/MSD analysis. Electronic mail sent to EPA and NJDEP regarding reduction in duplicate percentage on January 28, 2000.</p>	<p>Equipment blank revision implemented on January 11, 2000.</p> <p>Reduction from 10% to 5% duplicate samples implemented week of February 7, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
no less than 10% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.	method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.		

Revised PDI Work Plan Table 5-1

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

PROPERTY CLUSTER NUMBER ⁽⁸⁾	NUMBER OF SAMPLING LOCATIONS						NUMBER OF SAMPLES FOR ANALYSIS BY PARAMETER ⁽⁶⁾								
	RADIOLOGICAL SURVEY				GEOTECH	ENVIR	GEOTECHNICAL					CHEMICAL ANALYSES			
	SOIL PROBES ⁽¹⁾	SOIL PROBE DEPTHS (FT) (ESTIMATED)	SOIL PROBE RADIOLOGICAL ANALYSES ⁽²⁾	SURFACE SOIL RADIOLOGICAL ANALYSES ⁽³⁾	SOIL BORINGS ⁽⁴⁾	SOIL BORINGS ^(4,5)	SPECIFIC GRAVITY	ATTERBERG LIMITS	GRAIN SIZE	TRIAXIAL TESTS ⁽⁷⁾	CONSOLID. TESTS ⁽⁷⁾	WATER CONTENT	CHROMIUM SPECIATION	TCL/TAL	FULL RCRA CHAR.
1	13	12	39	5	3	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
2	96	16	288	50	22	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
3	10	8	30	5	2	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
4	32	12	96	15	4	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
5	79	8	237	40	8	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
6	85	16	255	40	12	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
7	28	16	84	15	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
8	26	16	78	15	6	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
9	131	16	393	65	17	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
10	106	24	318	55	16	6	TBD	TBD	TBD	TBD	TBD	TBD	6	6	6
11	16	8	48	10	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
12	151	24	453	75	17	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
TOTALS	773	N/A	2319	390	115	47	---	---	---	---	---	---	47	47	47

NOTES:

- 1 Soil probes installed using direct-push method, to the depth shown or refusal.
- 2 At a minimum, three separate soil samples (one soil sample from within the suspected FUSRAP waste, one in transition zone, and one below the transition zone) will be selected for analysis of the ROC by the on-site field laboratory. A total of 2319 subsurface soil samples (i.e., 3 X 773) will be selected for ROC analysis by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 3 Five surface soil samples will be randomly collected from up to 10% of the 773 soil probe locations for radiological analyses and comparative evaluation of surface ISOCs measurement. A total of 390 surface soil samples (i.e., 5 X 78) will be selected for ROC analyses by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 4 Depths and quantities to be determined in field based on radiological data, structure foundations depths, etc.
- 5 Advanced to depth of radiological contamination.
- 6 Sample Analyses Rationale:
 - 6a Chromium Speciation - Speciation of trivalent and hexavalent chromium for health and safety purposes.
 - 6b TCL/TAL - Detection of organic and inorganic constituents to assess the potential for the presence of commingled radiological and chemical contamination.

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

6c	RCRA Characteristics - To support transportation & disposal activities
6d	Geotechnical Parameters (Specific Gravity, Atterberg Limits, Grain Size, Water Content) - To characterize physical properties of soil for excavation and remediation.
7	Triaxial tests and consolidation tests will be performed on undisturbed tube samples to determine strength and consolidation parameters of fine-grained materials, where present. These parameters will be used to perform bearing capacity and settlement analyses where excavations are adjacent to structures.
8	Property Clusters are defined as follows: <i>PROPERTY CLUSTER NO. 1: 72 SIDNEY ST. (A.K.A 88 MONEY ST.)</i> <i>PROPERTY CLUSTER NO. 2: 100, 80 HANCOCK ST., 80 INDUSTRIAL RD., AND NJVIS</i> <i>PROPERTY CLUSTER NO. 3: 170 GREGG ST.</i> <i>PROPERTY CLUSTER NO. 4: 160/174 ESSEX ST., I-80 RIGHT-OF-WAY</i> <i>PROPERTY CLUSTER NO. 5: 99 ESSEX ST, 113 ESSEX ST., 200 ROUTE 17 SOUTH</i> <i>PROPERTY CLUSTER NO. 6: 29 ESSEX ST., 85-101 ROUTE 17 NORTH, 137 ROUTE 17 NORTH, 167 ROUTE 17 NORTH, 239 ROUTE 17 NORTH</i> <i>PROPERTY CLUSTER NO. 7: 111 ESSEX ST. - SCANEL/HACKENSACK AND LODI RAILROAD</i> <i>PROPERTY CLUSTER NO. 8: 23 WEST HOWCROFT RD.</i> <i>PROPERTY CLUSTER NO.9: 149-151 MAYWOOD AVE.</i> <i>PROPERTY CLUSTER NO.10: 100 W. HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.11: 205 MAYWOOD AVENUE AND 50 & 61 WEST HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.12: 100 W. HUNTER AVE., NY, SUSQUEHANNA AND WESTERN RAILROAD, AND NJ ROUTE 17</i>

Rationale of Intrusive Sample Location Relocations

PDI Soil Probe Variance Log

Cluster No.: 9

Property Address: Property No. 09A –149-151 Maywood Ave. (Sears Logistical Services)

Sample Location Map: Figure 9-3

Number of Revised Soil Probe Locations: 48

Rationale for Revisions

- Location 09A-047 was moved slightly due to a magnetic anomaly detected by NAEVA.
- Location 09A-050 was moved slightly due to a magnetic anomaly detected by NAEVA.
- Location 09A-051 was moved slightly due to a magnetic anomaly detected by NAEVA.
- Location 09A-056 was moved slightly due to a magnetic anomaly detected by NAEVA.
- Location 09A-057 was moved slightly due to a magnetic anomaly detected by NAEVA.
- Location 09A-064 was moved north approximately 400 feet to an area requiring additional coverage.
- Location 09A-068 was moved north approximately 400 feet to an area requiring additional coverage.
- Locations 9001, 9002, 9005, 9008, 9011, 9014, 9015, 9041, 9047, 9049, 9050, 9051, 9052, 9055, 9056, 9057, 9058, 9060, 9061, 9064, 9066, 9067, 9084, 9085, 9086, 9088, 9089, 9090, 9091, 9094, 9095, 9097, 9098, 9099, 9100, 9101, 9104, 9105, 9106, 9107, and 9108, originally proposed in the PDIWP were deleted because they were unnecessary.

Notes:

1. This list provides specific rationale for the relocation/deletion/addition of intrusive radiological sampling locations due to revised understanding of anticipated radiological contamination. This revised understanding was based on further review of previous data collected by others, and review of surface gamma survey and ISOCS data collected by the Team under this PDI program.
2. Base mapping used in the PDIWP (Stone & Webster, 1999a) has been revised by the Team. Accordingly, a number of intrusive sample locations needed to be relocated due to previously unforeseen physical restrictions (i.e., presence of underground utilities, unacceptable proximity to buildings/roadways, revisions to previously mapped property limits). This table is not intended to provide detailed rationale for points moved due to new mapping.

Notes:

1. This list provides specific rationale for the relocation/deletion/addition of intrusive radiological sampling locations due to revised understanding of anticipated radiological contamination. This revised understanding was based on further review of previous data collected by others, and review of surface gamma survey and ISOCS data collected by the Team under this PDI program.
2. Base mapping used in the PDIWP (Stone & Webster, 1999a) has been revised by the Team. Accordingly, a number of intrusive sample locations needed to be relocated due to previously unforeseen physical restrictions (i.e., presence of underground utilities, unacceptable proximity to buildings/roadways, revisions to previously mapped property limits). This table is not intended to provide detailed rationale for points moved due to new mapping.

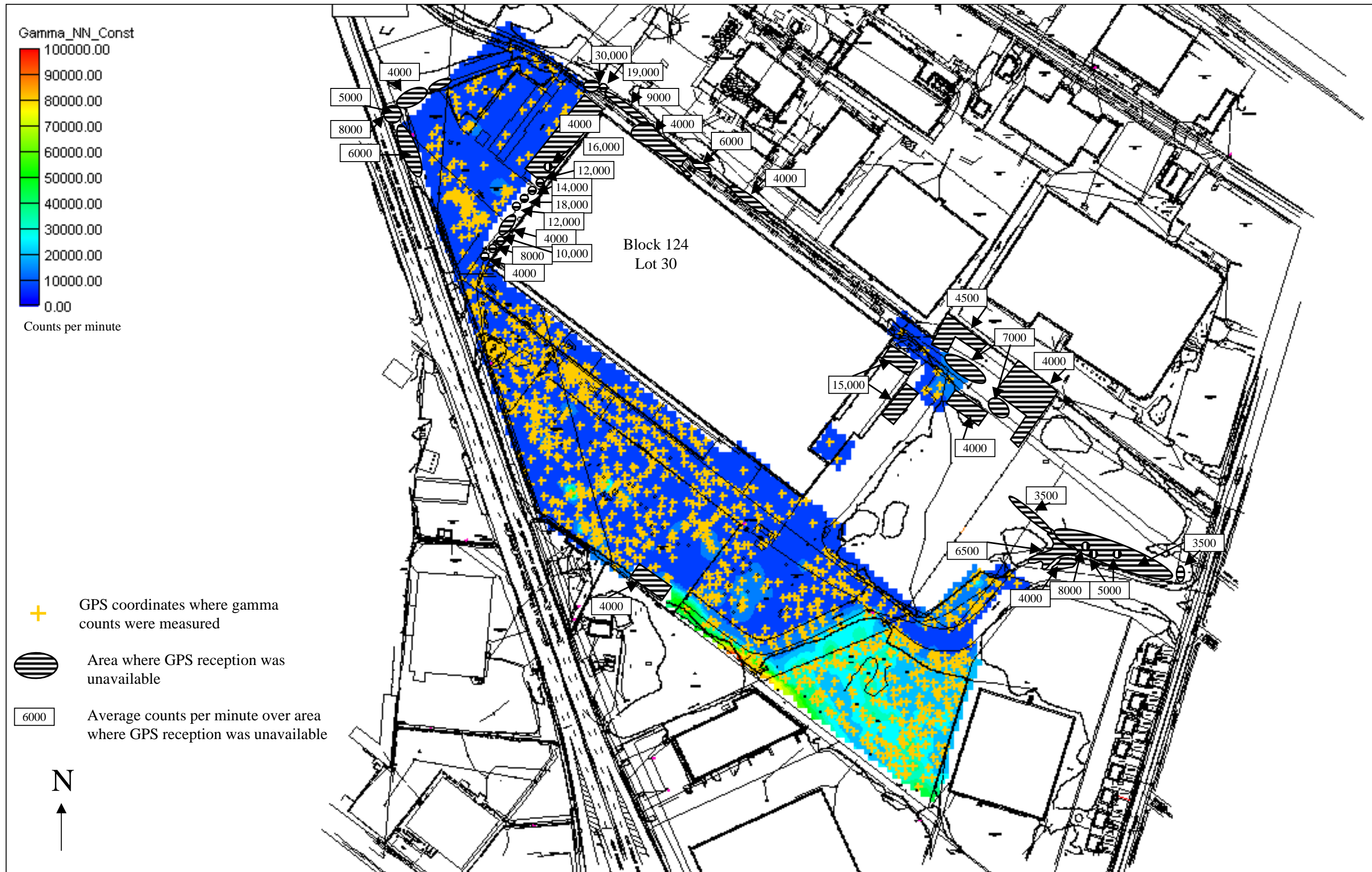
Outlier Protocol (Gamma Scan Anomalies)

Protocol for Addressing Gamma Scan Anomalies (Outliers)

Maywood FUSRAP Superfund Site

Pre-Design Investigation

1. Anomalous surface gamma scan measurements **greater than 2500 cpm for shielded areas (e.g. asphalt covered surfaces), or 3500 cpm for unshielded areas (e.g. bare soil) but, less than 6,000 cpm (1" x 1" NaI detector)** will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL. Note, these count rates are approximately one and one-half times background on shielded and unshielded surfaces.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization (i.e., eliminates the potential for elevated levels of radiological contamination at depth or provides adequate information on the existence of radiological contamination with depth) **will not be further investigated during the PDI.**
 - C. Anomalous areas that do not have previous data that are adequate for characterization **will only be investigated during the PDI if proposed soil probe locations can be moved to these locations without compromising the quality of the data from the proposed locations.** Additional soil probe locations **will not be added** to the program.
 - D. Anomalous areas where additional PDI investigations (based on 1.C) will be performed but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
2. Anomalous areas exhibiting a surface gamma count rate **greater than or equal to 6,000 cpm** (based on a 1" x 1" NaI detector) will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be as follows: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization **will not be further investigated during the PDI.**
 - C. Anomalous areas with previous data that are not adequate for characterization **will be investigated further during the PDI.** Proposed soil probe locations **will be moved** to these locations if possible, or additional soil probe locations **will be added** to the PDI program. These additional soil probes will be used to define the nature and extent of contamination within these previously unidentified areas; the quantity of additional borings is to be determined on a site-by-site basis.
 - D. Anomalous areas that require additional PDI investigations (based on 2.C) but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
3. All anomalous areas and their dispositions will be documented in the PDI.



Property Cluster No. 9: 149-151 Maywood Ave. (Sears Logistical Services)

Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 9-A1

Reduction in Field Duplicate and MS/MSD Frequency

Navon, Daria

Subject: FW: Reduction in field duplicate and MS/MSD frequency request

----- Forwarded by David Doyle/Environmental/SWEC on 01/28/2000
02:54 PM -----

"Shonkwiler, Glen D NWK" <Glen.D.Shonkwiler@nwk02.usace.army.mil> on 01/28/2000
02:00:15 PM

To: "carpenter.angela@epamail.epa.gov" <carpenter.angela@epamail.epa.gov>, "dgaffica@dep.state.nj.us" <dgaffica@dep.state.nj.us>
cc: "Roos, Allen D NAN02" <Allen.D.Roos@nan02.usace.army.mil>, "Medary, Richard T NWK" <Richard.T.Medary@nwk02.usace.army.mil>, "Mellema, Doug W NWK" <Doug.W.Mellema@nwk02.usace.army.mil>, "Speckin, Paul D NWK" <Paul.D.Speckin@nwk02.usace.army.mil> (bcc: David Doyle/Environmental/SWEC)

Subject: Reduction in field duplicate and MS/MSD frequency request

Angela/Donna, with this email, USACE is notifying EPA and NJDEP of our intent to reduce the number of field duplicates and MS/MSD samples required in the Maywood Chemical Site CDQMP for the PDI sampling from 10% to 5%. The 10% frequency is a USACE-internal QC standard which USACE plans to reduce based on the large number of soil samples collected during the Pre-Design Investigation (PDI). The reduction in frequency would affect field duplicate samples collected for radionuclides of concern (ROC) and analysis by the on-site field laboratory; field duplicate gamma radiation readings (both downhole and core sample); photoionization detector (PID) or flame ionization (FID) readings; and MS/MSD samples analyzed by the off-site laboratory. It is anticipated that greater than 2000 soil samples will be analyzed by the on-site field laboratory and gamma radiation and PID readings will exceed 10,000 measurements.

Five percent is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and EPA guidelines for MS/MSD analysis. EPA Region II does not have a specific QA/QC guideline for field duplicate samples. The guideline is therefore on a case-by-case basis, in accordance with the site-specific project plans.

Please note that the 10 percent of the samples analyzed by the on-site field laboratory will still be sent to a certified off-site laboratory for confirmatory ROC analysis.

We will continue to adhere to the current 10 percent until EPA and NJ notifies USACE of its concurrence with this deviation from the CDQMP (for the PDI only). Your attention to this matter is greatly appreciated, since reduction of this QA/QC guideline will help to increase production during the Pre-Design Investigation without, in the opinion of USACE, impacting

quality and usability of the data.

Thanks,
Glen Shonkwiler
Remedial Investigations & Remedial Design Manager
Hazardous, Toxic, & Radioactive Waste Branch
U. S. Army Corps of Engineers
CENWK-EC-EA RM 610
601 E 12th St
Kansas City, MO 64106
(816) 983-3561
(816) 426-5550/5949 (fax)
glen.d.shonkwiler@usace.army.mil

APPENDIX 9-B

**PDI Soil Probe Log Sheets
(Radiological Data)**

PDI Soil Probe Log Sheet
LEGEND

List of Abbreviations:

--- = not applicable	lt = light
blk = black	MDA = minimum detectable activity
bn = brown	med = medium
cl = clay	n/r = no recovery
cnts = counts	pCi/g = picoCuries per gram
Conc. = concentration	ppm = parts per million
dk = dark	SAA = same as above
DUP = duplicate	sc = clayey sand
f = fine	sec = seconds
gm = silty gravel	sm = silty sand
gp = poorly-graded gravel	sp = poorly-graded sand
gw = well-graded gravel	sw = well-graded sand
gy = gray	tr = trace
J = estimated	U = unidentified or negative conc. less than MDA
lg = large	wht = white

List of General Comments:

- 4x4 truck-mounted model 5400 and track-mounted model 54DT Geoprobe[®] were used to collect samples. Manual direct push methodology required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- Holes were grouted with BenSeal[®]
- Gamma measurements were taken at center point
- Duplicate samples marked with an "X" for duplicate were prepared by homogenizing soil above and below the center point and then separating for analysis.
- The depth listed is the center point
- Error: 2 sigma (95% confidence interval)

Tube Types

1-inch diameter = Dual Tube (actual 1.3-inch diameter)

2-inch diameter = Macro-Core[®] (actual 1.7-inch diameter)

Sample Intervals

Dual Tube – 13 inches

Macro-Core[®] – 8 inches

Manual Direct Push – 24 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751013	2165764	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/13/2000	03/14/2000	
Time	8:04	13:35	7:35	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

Native Soil @ 4 feet
 Depth to groundwater at 10.2 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/14/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0	0	9	A	0	0	5	8	0	0		49.86	0.82	1.60	142.25	1.64	1.21	61.30	U	---	61.30
1.5																				
2.0																				
2.5	0	9	A	0	0	5	8	0	1		1.05	0.10	0.26	1.12	0.07	0.28	6.35	U	---	6.35
3.0																				
3.5																				
4.0																				
4.5																				
5.0																				
5.5	0	9	A	0	0	5	8	0	2		ARCHIVED									
6.0																				
6.5																				
7.0																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750919	2165723	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/13/2000	03/14/2000	
Time		13:50	8:10	
Logger	C. Hales	S. NG	J. Lincoln	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 1.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/13/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0					0.0	0.0-0.8: dk bn sm some gp														
0.5	314		504			0.8-1.3: dk bn sm	0	9	A	0	0	5	8	0	3					
1.0	785		438		0.0	1.3-2.3: red/bn sm some gp	0	9	A	0	0	5	8	0	4					
1.5	896		441																	
2.0	404				0.0	2.3-4.0: no recovery														
2.5	243																			
3.0	211				n/r															
3.5	205		432				0	9	A	0	0	5	8	0	5					
4.0	210	205			0.0	4.0-5.1: dk bn sm														
4.5	189		421																	
5.0	185				0.0	5.1-7.7: red/bn sm														
5.5	155																			
6.0	207				0.0															
6.5	204																			
7.0	182				0.0															
7.5	225					7.7-8.0: no recovery														
8.0					n/r															
8.5																				
9.0																				
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20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0						Recovery														
23.5						0-4 feet: 27 inches														
24.0						4-8 feet: 45 inches														

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	9	A	0	0	5	8	0	3		0.86	0.06	0.24	1.48	0.07	0.26	8.27	U	---	8.27
1.0	0	9	A	0	0	5	8	0	4		0.69	0.08	0.23	0.87	0.06	0.21	5.22	U	---	5.22
1.5																				
2.0																				
2.5																				
3.0																				
3.5	0	9	A	0	0	5	8	0	5		ARCHIVED									
4.0																				
4.5																				
5.0																				
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6.0																				
6.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750920	2165574	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/13/2000	03/14/2000	
Time	8:46	14:00	8:32	
Logger	C. Hales	S. NG	J. Lincoln	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter

Native Soil @ 2.0 feet
 Depth to groundwater at 5.8 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/14/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0					0.0	0.0-0.5: dk bn gp some sand														
0.5	207					0.5-1.5: bn sw														
1.0	247		608	571	0.0		0	9	A	0	0	5	8	0	6					
1.5	406	377	464			1.5-2.4: gy sp	0	9	A	0	0	5	8	0	7					
2.0	217		471		0.0															
2.5	253					2.4-4.0: no recovery														
3.0	227				n/r															
3.5	227																			
4.0					0.0	4.0-4.5: bn sp														
4.5			470			4.5-5.5: gy sp	0	9	A	0	0	5	8	0	8					
5.0					0.0															
5.5			469			5.5-8.0: red sp														
6.0					0.0															
6.5			462																	
7.0					0.0															
7.5			444																	
8.0																				
8.5																				
9.0																				
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19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0						Recovery														
23.5						0-4 feet: 28 inches														
24.0						4-8 feet: 48 inches														

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5																			
1.0	0	9	A	0	0	5	8	0	6		0.84	0.06	0.23	2.29	0.08	0.24	7.97 U	---	7.97
1.5	0	9	A	0	0	5	8	0	7		0.56	0.07	0.21	1.02	0.06	0.20	5.05 U	---	5.05
2.0																			
2.5																			
3.0																			
3.5																			
4.0																			
4.5	0	9	A	0	0	5	8	0	8		ARCHIVED								
5.0																			
5.5																			
6.0																			
6.5																			
7.0																			
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	09A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	004	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750929	2165497	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/02/2000	03/13/2000	Date 03/14/2000
Time		14:15	Time 8:40
Logger	C. Hales	S. NG	Logger J. Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet= 2-inch diameter 12 to 16 feet=2-inch diameter Native Soil @ 5.0 feet			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/02/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/13/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/14/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751413	2164342	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/13/2000	03/14/2000	
Time	10:23	14:30	9:10	
Logger	C. Hales	S. NG	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 3.0 feet

<i>Field Original Signed</i>	03/02/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/13/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/14/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751541	2164308	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/13/2000	03/14/2000	
Time	10:41	14:45	9:22	
Logger	C. Hales	S. NG	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 1.6 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/14/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5																			
1.0																			
1.5	0	9	A	0	0	5	8	1	6		TBD								
2.0																			
2.5	0	9	A	0	0	5	8	1	7		0.78	0.07	0.27	1.42	0.08	0.24	6.39 U	---	6.39
3.0																			
3.5																			
4.0																			
4.5	0	9	A	0	0	5	8	1	8		ARCHIVED								
5.0																			
5.5																			
6.0																			
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24.0																			

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751686	2164248	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/13/2000	03/14/2000	
Time	10:53	14:55	9:33	
Logger	C. Hales	S. NG	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter

Native Soil @ 3.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/14/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0	0	9	A	0	0	5	8	1	9		0.95	0.09	0.23	2.31	0.09	0.28	6.74	U	---	6.74
1.5	0	9	A	0	0	5	8	2	0		0.63	0.07	0.15	0.93	0.05	0.18	5.06	U	---	5.06
2.0																				
2.5																				
3.0																				
3.5	0	9	A	0	0	5	8	2	1		ARCHIVED									
4.0																				
4.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751933	2164287	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/13/2000	03/14/2000	
Time	11:12	15:05	9:43	
Logger	C. Hales	S. NG	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 1.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/14/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751813	2164313	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/13/2000	03/14/2000	
Time	12:06	13:20	10:30	
Logger	C. Hales	S. NG	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet= 2-inch diameter

Native Soil @ 3.5 feet

<i>Field Original Signed</i>	03/02/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/13/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/14/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751842	2164373	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/13/2000	03/14/2000	
Time	13:15	17:00	10:48	
Logger	C. Hales	S. NG	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 0.7 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/14/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	9	A	0	0	5	8	2	9		5.69	0.18	0.60	25.96	0.40	0.43	17.10	U	---	17.10
1.0																				
1.5	0	9	A	0	0	5	8	3	0		0.63	0.06	0.18	0.82	0.05	0.15	7.25	U	---	7.25
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5																				
5.0																				
5.5	0	9	A	0	0	5	8	3	1		ARCHIVED									
6.0																				
6.5																				
7.0																				
7.5																				
8.0																				
8.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751515	2164391	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/13/2000	03/14/2000	
Time	13:50	17:40	11:00	
Logger	B. Bowers	S. NG	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter
 12 to 16 feet = 2-inch diameter

Native Soil @ 3.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/14/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5																			
1.0	0	9	A	0	0	5	8	3	2	3.59	0.15	0.47	11.79	0.24	0.32	13.50	U	---	13.50
1.5																			
2.0																			
2.5	0	9	A	0	0	5	8	3	3	0.77	0.07	0.22	1.08	0.07	0.24	8.11	U	---	8.11
3.0																			
3.5																			
4.0																			
4.5	0	9	A	0	0	5	8	3	4	ARCHIVED									
5.0																			
5.5																			
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24.0																			

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	09A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	012	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751851	2164461	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/02/2000	03/13/2000	Date 03/14/2000
Time	13:38	17:50	Time 7:45
Logger	C. Hales	S. NG	Logger J. Lincoln
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter Native Soil @ 2.5 feet			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/02/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/13/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/14/2000 Date	

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	9	A	0	0	5	8	3	5		1.82	0.09	0.28	4.60	0.12	0.20	8.45	U	---	8.45
1.0																				
1.5	0	9	A	0	0	5	8	3	6		0.65	0.07	0.20	0.83	0.06	0.20	6.90	U	---	6.90
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5																				
5.0																				
5.5	0	9	A	0	0	5	8	3	7		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751920	2164519	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/14/2000	03/14/2000	
Time	14:00	7:35	11:18	
Logger	C. Hales	S. NG	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 2.4 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/14/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5																			
1.0	0	9	A	0	0	5	8	3	8		0.73	0.07	0.19	0.91	0.06	0.21	5.20	U	---
1.5	0	9	A	0	0	5	8	3	9	X	0.71	0.07	0.23	0.96	0.06	0.24	7.84	U	---
2.0																			
2.5	0	9	A	0	0	5	8	4	0		0.63	0.08	0.24	1.00	0.07	0.23	5.81	U	---
3.0																			
3.5																			
4.0																			
4.5																			
5.0	0	9	A	0	0	5	8	4	1		ARCHIVED								
5.5																			
6.0																			
6.5																			
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24.0																			

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	09A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	014	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751171	2164745	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/02/2000	03/14/2000	Date 03/14/2000
Time	14:25	8:05	Time 11:33
Logger	B. Bowers	S. NG	Logger J. Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet = 2-inch diameter Native Soil @ 3.0 feet			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/02/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/14/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/14/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	09A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	015	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751210	2164676	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/03/2000	03/14/2000	Date 03/14/2000
Time	10:50	8:20	Time 12:50
Logger	C. Hales	S. NG	Logger J. Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet = 2-inch diameter 12 to 16 feet = 2-inch diameter Native Soil @ 3.0 feet			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/02/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/14/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/14/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	016
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751050	2164492	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/14/2000	03/14/2000	
Time	14:45	8:35	13:08	
Logger	B. Bowers	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 2.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/14/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	017
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751000	2164559	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/14/2000	Date	03/14/2000
Time	14:52	8:50	Time	13:45
Logger	C. Hales	S. NG	Logger	J. Dekoskie
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet= 2-inch diameter

Native Soil @ 5.0 feet

<i>Field Original Signed</i>	03/02/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/14/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/14/2000
Signature (PID Logging)	Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5																			
1.0	0	9	A	0	0	5	8	5	1		59.64	1.11	2.70	478.82	5.08	2.40	85.80 U	---	85.80
1.5																			
2.0																			
2.5																			
3.0																			
3.5																			
4.0																			
4.5																			
5.0	0	9	A	0	0	5	8	5	2		0.45	0.07	0.20	0.52	0.06	0.19	4.95 U	---	4.95
5.5																			
6.0																			
6.5																			
7.0																			
7.5	0	9	A	0	0	5	8	5	3		ARCHIVED								
8.0																			
8.5																			
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	018
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750928	2164736	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/14/2000	03/14/2000	14:05
Time	15:12	9:05	14:05	
Logger	C. Hales	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	Multi Rae	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 4.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/14/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5																			
1.0																			
1.5	0	9	A	0	0	5	8	5	4		76.24	1.20	1.94	154.62	1.83	1.41	70.40 U	---	70.40
2.0																			
2.5																			
3.0																			
3.5																			
4.0																			
4.5																			
5.0	0	9	A	0	0	5	8	5	5		0.69	0.08	0.21	0.67	0.05	0.20	5.40 U	---	5.40
5.5																			
6.0																			
6.5	0	9	A	0	0	5	8	5	6		ARCHIVED								
7.0																			
7.5																			
8.0																			
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	019
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750992	2165494	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/03/2000	03/14/2000	03/14/2000	
Time	8:24	11:00	14:55	
Logger	C. Hales	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet = 2-inch diameter 12 to 16 feet = 2-inch diameter Native Soil @ 4.0 feet	The high down hole gamma reading location was not recovered in the core.
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<i>Field Original Signed</i>	03/03/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/14/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/14/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	020
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750851	2165350	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/03/2000	03/14/2000	03/15/2000	
Time	8:25	11:00	7:55	
Logger	B. Bowers	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter
 12 to 16 feet = 2-inch diameter

Native Soil @ 7.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/15/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator		X X X	09A
Activity Designator		A A A	PDI
Field Measurement / Sample Collection Designator		V V	SP
Station Number		N N N	021
Media		m m	SB
Sample Type		n	0
Sequential Sample Number		# # # # #	(See Below)
Location		Northing (NAD 1927)	Easting (NAD 1927)
		750974	2165382
		Gamma Logging	
		Down Hole	Core
		Photoionization Detector (PID) Logging	
		Date	Date
		03/03/2000	03/14/2000
		9:05	11:35
		C. Hales	S. NG
		G-1	SPA-3
		C436E	CENAN 33401
		N/A	2224
		N/A	132842
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet = 2-inch diameter 12 to 16 feet = 2-inch diameter Native Soil @ 4.5 feet			
		<i>Field Original Signed</i> _____ Signature (Down Hole Gamma Logging)	03/03/2000 _____ Date
		<i>Field Original Signed</i> _____ Signature (Core Gamma Logging)	03/14/2000 _____ Date
		<i>Field Original Signed</i> _____ Signature (PID Logging)	03/15/2000 _____ Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0	0	9	A	0	0	5	8	6	4		2.13	0.12	0.45	8.01	0.19	0.30	12.30	U	---	12.30
1.5	0	9	A	0	0	5	8	6	5		1.90	0.24	0.64	6.16	0.24	0.69	19.80	U	---	19.80
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5	0	9	A	0	0	5	8	6	6		ARCHIVED									
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5.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	022
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750835	2165222	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/03/2000	03/14/2000		
Time		11:50		
Logger	B. Bowers	S. NG		
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments: Refusal at 1 foot. No hole. No Recovery

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	023
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750878	2165264	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/03/2000	03/14/2000	03/15/2000	
Time	9:10	11:52	9:00	
Logger	B. Bowers	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet= 2-inch diameter
 12 to 16 feet= 2-inch diameter

Native Soil @ 2.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/15/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	9	A	0	0	5	8	6	7		1.18	0.11	0.33	2.41	0.11	0.36	12.10	U	---	12.10
1.0																				
1.5																				
2.0																				
2.5	0	9	A	0	0	5	8	6	8		1.21	0.10	0.25	0.93	0.07	0.27	7.02	U	---	7.02
3.0																				
3.5																				
4.0																				
4.5																				
5.0																				
5.5	0	9	A	0	0	5	8	6	9		ARCHIVED									
6.0																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	024
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751193	2164552	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/03/2000	03/14/2000	03/15/2000	
Time	9:30	13:35	9:25	
Logger	C. Hales	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet= 2-inch diameter

Native Soil @ 2.0 feet

<u>Field Original Signed</u> _____ Signature (Down Hole Gamma Logging)	<u>03/03/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (Core Gamma Logging)	<u>03/14/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (PID Logging)	<u>03/15/2000</u> _____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	09A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	025	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751238	2164408	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/03/2000	03/14/2000	Date 03/15/2000
Time	10:10	13:35	Time 10:40
Logger	B. Bowers	S. NG	Logger J. Dekoskie
Detector Model #	G-1	SPA-3	PID Model # Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet= 2-inch diameter Native Soil @ 5.0 feet			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/03/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/14/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/15/2000 Date	

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0																				
1.5	0	9	A	0	0	5	8	7	3		8.52	0.25	0.82	43.12	0.62	0.60	12.71	J	6.61	21.60
2.0																				
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3.5																				
4.0																				
4.5																				
5.0																				
5.5	0	9	A	0	0	5	8	7	4		1.00	0.09	0.24	1.28	0.07	0.27	9.06	U	---	9.06
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6.5	0	9	A	0	0	5	8	7	5		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	09A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	026	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751089	2164854	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/03/2000	03/14/2000	Date 03/15/2000
Time	11:10	14:10	Time 11:05
Logger	B. Bowers	S. NG	Logger J. Dekoskie
Detector Model #	G-1	SPA-3	PID Model # Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet= 2-inch diameter 12 to 16 feet= 2-inch diameter Native Soil @ 4.0 feet			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/03/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/14/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/15/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	027
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751092	2164933	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/03/2000	03/14/2000	03/15/2000	
Time	11:25	18:45	11:40	
Logger	C. Hales	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter
 12 to 16 feet = 2-inch diameter

Native Soil @ 5.5 feet

<i>Field Original Signed</i>	03/03/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/14/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/15/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	028
Media	m m	SB
Sample Type	n	A
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751031	2164980	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date				
Time				
Logger				
Detector Model #				
Detector Serial #				
Scaler Model #				
Scaler Serial #				

Comments: Refusal at 1.0 foot - No sample

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/14/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/15/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	09A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	029	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750970	2165094	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/03/2000	03/15/2000	Date 03/15/2000
Time	12:00	8:00	Time 13:12
Logger	B. Bowers	S. NG	Logger J. Dekoskie
Detector Model #	G-1	SPA-3	PID Model # Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet= 2-inch diameter 12 to 16 feet= 2-inch diameter Native Soil @ 6.5 feet			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/03/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/15/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/15/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	030
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751113	2165055	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/03/2000	03/15/2000	03/15/2000	
Time	12:30	8:20	14:05	
Logger	C. Hales	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet= 2-inch diameter

Native Soil @ 5.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/15/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	031
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751206	2165096	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/03/2000	03/15/2000	03/15/2000	
Time	12:47	8:55	15:20	
Logger	C. Hales	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 2.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/15/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	09A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	032	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750921	2165191	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/03/2000	03/15/2000	Date 03/16/2000
Time	13:00	9:10	Time 8:15
Logger	B. Bowers	S. NG	Logger J. Dekoskie
Detector Model #	G-1	SPA-3	PID Model # Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet= 2-inch diameter Native Soil @ 2.0 feet			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/03/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/15/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/16/2000 Date	

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5																			
1.0	0	9	A	0	0	5	8	9	2	7.36	0.23	0.63	25.48	0.43	0.53	28.90	U	---	28.90
1.5																			
2.0	0	9	A	0	0	5	8	9	3	1.42	0.10	0.24	1.13	0.06	0.18	6.82	U	---	6.82
2.5																			
3.0																			
3.5																			
4.0																			
4.5	0	9	A	0	0	5	8	9	4	ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	033
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751255	2165163	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/03/2000	03/15/2000	03/16/2000	8:45
Time	13:06	9:30	J. Dekoskie	Multi Rae
Logger	C. Hales	S. NG	PID Model #	CENAN 21811
Detector Model #	G-1	SPA-3	PID Serial #	
Detector Serial #	C436E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 4.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/03/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	034
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750992	2165197	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/03/2000	03/15/2000	03/16/2000	9:05
Time	13:25	10:30	J. Dekoskie	Multi Rae
Logger	B. Bowers	S. NG	PID Model #	CENAN 21811
Detector Model #	G-1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet= 2-inch diameter

Native Soil @ 2.0 feet

<i>Field Original Signed</i>	03/03/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/15/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/16/2000
Signature (PID Logging)	Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0	0	9	A	0	0	5	8	9	8		6.02	0.23	0.73	25.74	0.46	0.57	31.60	U	---	31.60
1.5																				
2.0	0	9	A	0	0	5	8	9	9		1.11	0.08	0.25	0.96	0.06	0.19	9.16	U	---	9.16
2.5																				
3.0																				
3.5																				
4.0																				
4.5	0	9	A	0	0	5	9	0	0		ARCHIVED									
5.0																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	09A		
Activity Designator	A A A	PDI		
Field Measurement / Sample Collection Designator	V V	SP		
Station Number	N N N	035		
Media	m m	SB		
Sample Type	n	0		
Sequential Sample Number	# # # # #	(See Below)		
Location	Northing (NAD 1927)	Easting (NAD 1927)		
	751378	2165160		
	Gamma Logging	Photoionization Detector (PID) Logging		
	Down Hole	Core		
Date	03/03/2000	03/15/2000		
Time	13:47	10:50		
Logger	C. Hales	S. NG		
Detector Model #	G-1	SPA-3		
Detector Serial #	C436E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet= 2-inch diameter
 12 to 16 feet= 2-inch diameter

Native Soil @ 6.0 feet

<i>Field Original Signed</i>	03/03/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/15/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/16/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	036
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751025	2165438	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/15/2000	03/16/2000	
Time	8:40	11:10	10:30	
Logger	J. Marsden	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 1.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Tel: (201) 226-6600 FAX: (201) 226-6660			
Site Designator	X X X	09A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	037	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750988	2165664	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/06/2000	03/15/2000	Date 03/16/2000
Time	8:35	11:30	Time 11:37
Logger	E. Barbour	S. NG	Logger J. Dekoskie
Detector Model #	G-1	SPA-3	PID Model # Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: <p style="margin-left: 40px;">0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet = 2-inch diameter</p> <p style="margin-left: 40px;">Native Soil @ 1.0 feet</p>			
<u>Field Original Signed</u> Signature (Down Hole Gamma Logging)		<u>03/06/2000</u> Date	
<u>Field Original Signed</u> Signature (Core Gamma Logging)		<u>03/15/2000</u> Date	
<u>Field Original Signed</u> Signature (PID Logging)		<u>03/16/2000</u> Date	

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	9	A	0	0	5	9	0	8		1.17	0.08	0.25	2.54	0.10	0.30	7.56	U	---	7.56
1.0																				
1.5	0	9	A	0	0	5	9	0	9		1.08	0.10	0.29	1.08	0.07	0.27	6.85	U	---	6.85
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7.0	0	9	A	0	0	5	9	1	0		ARCHIVED									
7.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	038
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750846	2165735	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/15/2000	03/16/2000	
Time	9:10	11:55	14:15	
Logger	E. Barbour	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 1.6 feet

<i>Field Original Signed</i>	03/06/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/15/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/16/2000
Signature (PID Logging)	Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0	0	9	A	0	0	5	9	1	1		1.28	0.08	0.30	4.06	0.12	0.33	11.60	U	---	11.60
1.5																				
2.0	0	9	A	0	0	5	9	1	2		1.10	0.08	0.20	1.35	0.07	0.20	9.34	U	---	9.34
2.5																				
3.0																				
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4.0																				
4.5	0	9	A	0	0	5	9	1	3		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	039
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750900	2165399	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/15/2000	03/16/2000	
Time	9:10	13:30	14:40	
Logger	J. Marsden	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter
 12 to 16 feet = 2-inch diameter

Native Soil @ 5.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	040
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750615	2165258	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/15/2000	03/16/2000	
Time	9:55	13:50	15:15	
Logger	J. Marsden	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 2-inch diameter
- 8 to 12 feet = 2-inch diameter
- 12 to 16 feet = 2-inch diameter

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	03/06/2000	Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	03/15/2000	Date
<i>Field Original Signed</i> Signature (PID Logging)	03/16/2000	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	041
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	751026	2165735

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	03/06/2000	03/15/2000	03/16/2000	
Time	10:00	14:40	15:38	
Logger	E. Barbour	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 0 feet

_____ *Field Original Signed* 03/06/2000
 Signature (Down Hole Gamma Logging) Date

_____ *Field Original Signed* 03/15/2000
 Signature (Core Gamma Logging) Date

_____ *Field Original Signed* 03/16/2000
 Signature (PID Logging) Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5																			
1.0	0	9	A	0	0	5	9	2	0		1.07	0.10	0.21	1.01	0.08	0.29	7.31 U	---	7.31
1.5																			
2.0																			
2.5	0	9	A	0	0	5	9	2	1		0.53	0.07	0.19	0.66	0.05	0.20	4.68 U	---	4.68
3.0																			
3.5																			
4.0																			
4.5	0	9	A	0	0	5	9	2	2		ARCHIVED								
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	042
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751102	2165725	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/15/2000	03/16/2000	
Time	10:25	15:00	15:53	
Logger	E. Barbour	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 2.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/16/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0	0	9	A	0	0	5	9	2	3		0.78	0.07	0.20	1.01	0.05	0.16	8.33	U	---	8.33
1.5																				
2.0	0	9	A	0	0	5	9	2	4		0.84	0.10	0.32	1.49	0.08	0.28	6.93	U	---	6.93
2.5																				
3.0																				
3.5																				
4.0																				
4.5																				
5.0	0	9	A	0	0	5	9	2	5		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	043
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751161	2164824	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/15/2000	03/17/2000	
Time	10:45	15:15	8:00	
Logger	J. Marsden	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 6.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	044
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751206	2165607	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/15/2000	03/17/2000	
Time	11:00	15:30	8:20	
Logger	E. Barbour	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 4.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	045
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751449	2165288	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/16/2000	03/17/2000	
Time	11:05	7:35	8:42	
Logger	J. Marsden	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 4.0 feet

<i>Field Original Signed</i>	03/06/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/16/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/17/2000
Signature (PID Logging)	Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0	0	9	A	0	0	5	9	3	3		1.60	0.10	0.29	1.64	0.07	0.21	10.30	U	---	10.30
1.5																				
2.0	0	9	A	0	0	5	9	3	4		0.66	0.07	0.14	0.76	0.06	0.22	5.13	U	---	5.13
2.5																				
3.0																				
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4.0																				
4.5	0	9	A	0	0	5	9	3	5		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	046
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751328	2165281	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/16/2000	03/17/2000	
Time	11:45	8:40	8:58	
Logger	J. Marsden	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 2.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/17/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5	0	9	A	0	0	5	9	3	6		7.78	0.27	0.95	52.80	0.75	0.71	38.90 U	---	38.90
1.0																			
1.5	0	9	A	0	0	5	9	3	7		0.66	0.07	0.20	1.08	0.06	0.20	5.08 U	---	5.08
2.0																			
2.5																			
3.0	0	9	A	0	0	5	9	3	8		ARCHIVED								
3.5																			
4.0																			
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	047
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751048	2165411	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/16/2000	03/17/2000	
Time	12:25	11:50	9:20	
Logger	E. Barbour	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 2.0 feet

<i>Field Original Signed</i>	03/06/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/16/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/17/2000
Signature (PID Logging)	Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5																			
1.0																			
1.5	0	9	A	0	0	5	9	3	9		1.11	0.07	0.23	1.06	0.05	0.18	8.93 U	---	8.93
2.0																			
2.5	0	9	A	0	0	5	9	4	0		0.84	0.06	0.16	0.83	0.05	0.13	5.61 U	---	5.61
3.0																			
3.5																			
4.0																			
4.5	0	9	A	0	0	5	9	4	1		ARCHIVED								
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	048
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750946	2164809	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/16/2000	03/17/2000	
Time	13:00	13:15	9:45	
Logger	E. Barbour	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter
 12 to 16 feet = 2-inch diameter

Native Soil @ 5.4 feet

<i>Field Original Signed</i>	03/06/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/16/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/17/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	049
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751080	2165455	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/16/2000	03/17/2000	
Time	13:35	13:40	10:05	
Logger	E. Barbour	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 1.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/17/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5																			
1.0	0	9	A	0	0	5	9	4	5		1.04	0.09	0.27	1.60	0.08	0.28	6.43 U	---	6.43
1.5																			
2.0	0	9	A	0	0	5	9	4	6		1.11	0.08	0.26	1.35	0.07	0.20	9.61 U	---	9.61
2.5																			
3.0																			
3.5																			
4.0																			
4.5	0	9	A	0	0	5	9	4	7		ARCHIVED								
5.0																			
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	050
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751088	2165497	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/16/2000	03/17/2000	
Time	13:55	13:55	10:27	
Logger	E. Barbour	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 1.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/17/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226			Thorium-232			Uranium-238			
	X	X	X	#	#	#	#	#	#	DUP	pCi/g			pCi/g			pCi/g			
Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA												
0.0																				
0.5	0	9	A	0	0	5	9	4	8		1.68	0.11	0.41	4.87	0.15	0.42	14.40	U	---	14.40
1.0	0	9	A	0	0	5	9	4	9		0.79	0.08	0.21	1.05	0.07	0.24	6.43	U	---	6.43
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2.0																				
2.5																				
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4.5	0	9	A	0	0	5	9	5	0		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	051
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751035	2165364	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/16/2000	03/17/2000	
Time	14:10	14:15	10:43	
Logger	E. Barbour	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 1.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/17/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	9	A	0	0	5	9	5	1		1.43	0.13	0.47	3.68	0.14	0.43	10.90	U	---	10.90
1.0	0	9	A	0	0	5	9	5	2		0.97	0.14	0.38	1.24	0.11	0.46	14.90	U	---	14.90
1.5																				
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5	0	9	A	0	0	5	9	5	3		0.58	0.05	0.14	0.77	0.04	0.11	4.68	U	---	4.68
5.0	0	9	A	0	0	5	9	5	4	X	0.56	0.07	0.2	0.71	0.05	0.21	7.02	U	---	7.02
5.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	052
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750949	2165340	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/16/2000	03/17/2000	
Time	14:30	14:35	11:02	
Logger	E. Barbour	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 1.5 feet

<i>Field Original Signed</i>	03/06/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/16/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/17/2000
Signature (PID Logging)	Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	9	A	0	0	5	9	5	5		1.36	0.09	0.35	5.30	0.14	0.22	9.03	U	---	9.03
1.0																				
1.5	0	9	A	0	0	5	9	5	6		2.08	0.15	0.50	4.49	0.18	0.56	19.00	U	---	19.00
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5																				
5.0	0	9	A	0	0	5	9	5	7		ARCHIVED									
5.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	053
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751286	2165470	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/07/2000	03/17/2000	Date	03/17/2000
Time	8:25	7:40	Time	11:18
Logger	E. Barbour	S. NG	Logger	J. Dekoskie
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 2.0 feet

<i>Field Original Signed</i>	03/07/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/17/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/17/2000
Signature (PID Logging)	Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5	0	9	A	0	0	5	9	5	8		1.81	0.10	0.3	2.51	0.11	0.34	8.56 U	---	8.56
1.0																			
1.5	0	9	A	0	0	5	9	5	9		0.57	0.07	0.22	0.90	0.06	0.23	7.80 U	---	7.80
2.0																			
2.5																			
3.0	0	9	A	0	0	5	9	6	0		ARCHIVED								
3.5																			
4.0																			
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5.0																			
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	054
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751355	2165378	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/07/2000	03/17/2000	03/17/2000	11:35
Time	8:45	9:35	J. Dekoskie	Multi Rae
Logger	E. Barbour	S. NG	PID Model #	CENAN 21811
Detector Model #	G-1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 2.0 feet

<i>Field Original Signed</i>	03/07/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/17/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/17/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	055
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751455	2165199	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/07/2000	03/17/2000	03/17/2000	13:30
Time	9:10	9:45	J. Dekoskie	Multi Rae
Logger	E. Barbour	S. NG	PID Model #	CENAN 21811
Detector Model #	G-1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 0.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/17/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5																			
1.0	0	9	A	0	0	5	9	6	4		0.83	0.09	0.21	1.03	0.08	0.27	6.39 U	---	6.39
1.5																			
2.0																			
2.5	0	9	A	0	0	5	9	6	5		0.72	0.08	0.24	1.13	0.07	0.25	8.19 U	---	8.19
3.0																			
3.5																			
4.0																			
4.5	0	9	A	0	0	5	9	6	6		ARCHIVED								
5.0																			
5.5																			
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling		
Site Designator	X X X	09A		
Activity Designator	A A A	PDI		
Field Measurement / Sample Collection Designator	V V	SP		
Station Number	N N N	056		
Media	m m	SB		
Sample Type	n	0		
Sequential Sample Number	# # # # #	(See Below)		
Location	Northing (NAD 1927)	Easting (NAD 1927)		
	751270	2165342		
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date	03/07/2000	03/17/2000	Date	03/20/2000
Time	9:55	10:05	Time	8:25
Logger	E. Barbour	S. NG	Logger	J. Dekoskie
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet = 2-inch diameter Native Soil @ 1.0 feet				
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)			<hr style="width: 80%; margin: 0 auto;"/> 03/07/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)			<hr style="width: 80%; margin: 0 auto;"/> 03/17/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)			<hr style="width: 80%; margin: 0 auto;"/> 03/20/2000 Date	

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	9	A	0	0	5	9	6	7		ARCHIVED									
1.0	0	9	A	0	0	5	9	6	8		0.88	0.06	0.19	1.35	0.06	0.15	5.78	U	---	5.78
1.5																				
2.0																				
2.5	0	9	A	0	0	5	9	6	9		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	09A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	057	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751208	2165388	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/07/2000	03/17/2000	Date 03/20/2000
Time	10:15	10:45	Time 9:00
Logger	E. Barbour	S. NG	Logger J. Dekoskie
Detector Model #	G-1	SPA-3	PID Model # Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter Native Soil @ 1.0 feet			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/07/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/17/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/20/2000 Date	

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)														
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP					
0.0					0.8	0.0-0.9: dk bn sm tr organics, clay															
0.5	482		605				0	9	A	0	0	5	9	7	0						
1.0	573		474		1.1	0.9-2.8: bn sw tr sm	0	9	A	0	0	5	9	7	1						
1.5	334																				
2.0	261				0.0																
2.5	173		413	457			0	9	A	0	0	5	9	7	2						
3.0	169				n/r	2.8-4.0: no recovery															
3.5	178	176																			
4.0	162				1.6	4.0-5.7: bn sw															
4.5	151		449																		
5.0	177				0.0																
5.5	183		474			5.7-8.0: red sm w/gp															
6.0	202				0.0																
6.5	216																				
7.0					n/r																
7.5																					
8.0					n/r																
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21.0																					
21.5																					
22.0																					
22.5																					
23.0						Recovery															
23.5						0-4 feet: 35 inches															
24.0						4-8 feet: 36 inches															

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	9	A	0	0	5	9	7	0		2.47	0.15	0.57	7.31	0.21	0.43	21.60	U	---	21.60
1.0	0	9	A	0	0	5	9	7	1		0.64	0.07	0.21	0.81	0.06	0.20	5.03	U	---	5.03
1.5																				
2.0																				
2.5	0	9	A	0	0	5	9	7	2		ARCHIVED									
3.0																				
3.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	058
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751158	2165362	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/07/2000	03/17/2000	03/20/2000	
Time	10:35	11:00	9:18	
Logger	E. Barbour	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/20/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)														
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP					
0.0						0.0-1.5: blk sc															
0.5	299		426	466	0.5																
1.0	248				0.5																
1.5	217		481	443		1.5-2.4: bn sm	0	9	A	0	0	5	9	7	3						
2.0	289				0.0	2.4-2.7: bn sm tr gp	0	9	A	0	0	5	9	7	4	X					
2.5	251		438			2.7-4.0: no recovery	0	9	A	0	0	5	9	7	5						
3.0	205				n/r																
3.5	213																				
4.0	205	184			3.7	4.0-4.3: blk sc															
4.5	211		441			4.3-5.5: bn/gy sm w/sc	0	9	A	0	0	5	9	7	6						
5.0	207				0.0																
5.5	203					5.5-7.1: red sm tr gp															
6.0	211		470		0.0																
6.5	205																				
7.0	198																				
7.5	207																				
8.0																					
8.5																					
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19.5																					
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20.5																					
21.0																					
21.5																					
22.0																					
22.5																					
23.0						Recovery															
23.5						0-4 feet: 33 inches															
24.0						4-8 feet: 37 inches															

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	059
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751157	2165259	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/07/2000	03/17/2000	03/20/2000	
Time	10:55	11:20	9:35	
Logger	E. Barbour	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter
 12 to 16 feet = 2-inch diameter

Native Soil @ 2.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/20/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	09A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	060	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751090	2165281	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/07/2000	03/17/2000	Date 03/20/2000
Time	13:00	13:25	Time 10:18
Logger	E. Barbour	S. NG	Logger J. Dekoskie
Detector Model #	G-1	SPA-3	PID Model # Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet = 2-inch diameter Native Soil @ 1.0 feet			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/07/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/17/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/20/2000 Date	

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	9	A	0	0	5	9	8	0		1.99	0.15	0.41	5.88	0.20	0.56	13.60	U	---	13.60
1.0	0	9	A	0	0	5	9	8	1		2.62	0.18	0.48	1.97	0.14	0.54	17.40	U	---	17.40
1.5																				
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5																				
5.0	0	9	A	0	0	5	9	8	2		ARCHIVED									
5.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	09A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	061	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751039	2165249	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/07/2000	03/17/2000	Date 03/20/2000
Time	13:35	13:35	Time 10:53
Logger	E. Barbour	S. NG	Logger J. Dekoskie
Detector Model #	G-1	SPA-3	PID Model # Multi Rae
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet= 2-inch diameter Native Soil @ 1.5 feet			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/07/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/17/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/20/2000 Date	

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0					0.0	0.0-1.5: dk bn/blk sc tr silt														
0.5	498		641	745			0	9	A	0	0	5	9	8	3					
1.0	574		462		0.0		0	9	A	0	0	5	9	8	4					
1.5	340					1.5-2.8: lt bn sm														
2.0	280				0.0															
2.5	183		480			2.8-4.0: no recovery	0	9	A	0	0	5	9	8	5					
3.0	189				n/r															
3.5	182																			
4.0	186	191			0.9	4.0-4.5: blk sm w/organics														
4.5	189		470			4.5-5.5: lt bn sm														
5.0	176				0.2															
5.5	187					5.5-7.0: bn sw														
6.0	203				0.0															
6.5	195																			
7.0	220				0.0	7.0-7.6: red sm w/gp														
7.5	189		490			7.6-8.0: no recovery														
8.0					0.2	8.0-9.8: red bn sm w/gp														
8.5			472																	
9.0					0.0															
9.5			481																	
10.0					n/r	9.8-12.0: no recovery														
10.5																				
11.0					n/r															
11.5																				
12.0																				
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21.5																				
22.0																				
22.5						Recovery														
23.0						0-4 feet: 33 inches														
23.5						4-8 feet: 43 inches														
24.0						8-12 feet: 22 inches														

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	9	A	0	0	5	9	8	3		2.60	0.15	0.51	9.34	0.24	0.35	13.90	U	---	13.90
1.0	0	9	A	0	0	5	9	8	4		1.53	0.14	0.45	1.39	0.11	0.42	14.30	U	---	14.30
1.5																				
2.0																				
2.5	0	9	A	0	0	5	9	8	5		ARCHIVED									
3.0																				
3.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	062
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751122	2165176	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/07/2000	03/17/2000	03/20/2000	
Time	14:00	13:50	11:22	
Logger	E. Barbour	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	Multi Rae	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 2.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/20/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0	0	9	A	0	0	5	9	8	6		1.32	0.08	0.26	3.83	0.12	0.33	11.70	U	---	11.70
1.5																				
2.0	0	9	A	0	0	5	9	8	7		0.80	0.12	0.37	0.76	0.09	0.32	8.26	U	---	8.26
2.5																				
3.0																				
3.5																				
4.0																				
4.5	0	9	A	0	0	5	9	8	8		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	09A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	063	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751051	2165097	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/07/2000	03/17/2000	Date 03/20/2000
Time		14:10	Time 12:30
Logger	J. Marsden	S. NG	Logger J. Dekoskie
Detector Model #	G-1	SPA-3	PID Model # Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet= 2-inch diameter 12 to 16 feet= 2-inch diameter Native Soil @ 4.0 feet			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/07/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/17/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/20/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	064
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751520	2165113	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/08/2000	03/17/2000	03/20/2000	
Time	8:15	14:25	13:00	
Logger	J. Marsden	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet= N/A
 12 to 16 feet= N/A

Native Soil @ 1.0 feet

<i>Field Original Signed</i>	03/08/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/17/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/20/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	065
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751987	2164480	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/08/2000	03/17/2000	03/20/2000	
Time	9:12	15:05	14:23	
Logger	J. Marsden	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 1.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/20/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0																				
1.5	0	9	A	0	0	5	9	9	5		0.97	0.08	0.23	1.49	0.07	0.19	8.63	U	---	8.63
2.0	0	9	A	0	0	5	9	9	6		0.76	0.08	0.18	0.96	0.06	0.23	5.66	U	---	5.66
2.5																				
3.0	0	9	A	0	0	5	9	9	7		ARCHIVED									
3.5																				
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4.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	066
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751870	2164636	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/08/2000	03/17/2000	03/20/2000	
Time	10:15	15:30	14:48	
Logger	J. Marsden	S. NG	J. Dekoskie	
Detector Model #	G-1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

Native Soil @ 1.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/20/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	0	9	A	0	0	5	9	9	8		1.86	0.09	0.33	4.77	0.12	0.25	11.60	U	---	11.60
1.0																				
1.5	0	9	A	0	0	5	9	9	9		0.57	0.07	0.20	0.69	0.05	0.20	2.90	J	1.36	4.39
2.0																				
2.5	0	9	A	0	0	6	0	0	0		0.77	0.07	0.23	1.17	0.06	0.15	7.88	U	---	7.88
3.0	0	9	A	0	0	6	0	0	1	X	0.68	0.07	0.20	0.87	0.06	0.21	5.32	U	---	5.32
3.5																				
4.0																				
4.5																				
5.0																				
5.5																				
6.0																				
6.5																				
7.0																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	067
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751749	2164795	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/08/2000	03/20/2000	03/21/2000	
Time	10:50	10:00	7:40	
Logger	J. Marsden	S. NG	J. Dekoskie	
Detector Model #	G-1	44-10	PID Model #	Multi Rae
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native Soil @ 1.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	068
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751644	2164936	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/08/2000	03/20/2000	03/21/2000	
Time	11:10	10:35	8:02	
Logger	J. Marsden	S. NG	J. Dekoskie	
Detector Model #	G-1	44-10	PID Model #	Multi Rae
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Only two samples were taken due to limited soil recovery.

Native Soil @ 1.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	069
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750848	2164783	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/09/2000	03/20/2000	03/21/2000	
Time	12:50	11:00	8:15	
Logger	J. Marsden	S. NG	J. Dekoskie	
Detector Model #	G-1	44-10	PID Model #	Multi Rae
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter
 12 to 16 feet = 2-inch diameter

Native Soil @ 3.0 feet

Four samples were taken due to two core gamma reading peaks.

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	070
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	751950	2164413

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date		03/20/2000	03/21/2000	
Time		11:40	9:32	
Logger		S. NG	J. Dekoskie	
Detector Model #		44-10	Multi-RAE	
Detector Serial #		21779	CENAN 21811	
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:
 0 to 4 feet = 2-inch diameter native @ 1.0'

Field Original Signed
 Signature (Down Hole Gamma Logging) 02/09/2000
 Date

Field Original Signed
 Signature (Core Gamma Logging) 02/11/2000
 Date

Field Original Signed
 Signature (PID Logging) 02/11/2000
 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0	0	9	A	0	0	6	0	1	1		0.92	0.07	0.26	2.15	0.09	0.27	6.29	U	---	6.29
1.5	0	9	A	0	0	6	0	1	2		0.76	0.08	0.24	1.15	0.07	0.22	3.01	J	---	4.73
2.0																				
2.5	0	9	A	0	0	6	0	1	3		ARCHIVED									
3.0																				
3.5																				
4.0																				
4.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	071
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751337	2164609	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		03/20/2000	03/21/2000	
Time		12:00	9:45	
Logger		S. NG	J. Dekoskie	
Detector Model #		44-10	PID Model #	Multi-RAE
Detector Serial #		21779	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2.0'

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/11/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0	0	9	A	0	0	6	0	1	4		2.57	0.12	0.41	7.82	0.20	0.30	12.40	U	---	12.40
1.5																				
2.0	0	9	A	0	0	6	0	1	5		0.92	0.10	0.38	1.27	0.10	0.35	11.90	U	---	11.90
2.5	0	9	A	0	0	6	0	1	6	X	0.79	0.11	0.30	0.82	0.10	0.37	0.18	J	2.37	8.21
3.0																				
3.5																				
4.0																				
4.5	0	9	A	0	0	6	0	1	7		ARCHIVED									
5.0																				
5.5																				
6.0																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	09A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	072
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	750983	2164895	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		03/20/2000	03/21/2000	
Time		12:15	10:02	
Logger		S. NG	J. Dekoskie	
Detector Model #		44-10	PID Model #	Multi-RAE
Detector Serial #		21779	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 5.5'

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/11/2000 Date

APPENDIX 9-C

Environmental Boring Log Sheets

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: GWRI Job Number: 085750503 Activity: Direct-Push Sampling
---	---

Site Designator	XXX	09a
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	mm	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)
Location	Northing (NAD 1927) _____ Easting (NAD 1927) _____ Elevation (NGVD 1929) _____	



Gamma Logging		Photoionization Detector (PID) Logging	
Date	Down Hole	Date	Core
		3/28	
		0915	
		G MARKT	

Comments:

- MPI No. ENV-09-9021
- Direct-push location grouted with BenSeal.

0915-0930 - SOIL SAMPLE 5'-8'

0930-0945 - H₂O SAMPLE

 _____ Signature (Core Gamma Logging)	3/28/00 _____ Date
 _____ Signature (Logging)	3/28/00 _____ Date

H₂O
@ 1.1'

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	80% RECV SC	0	9	a	0	2	0	5	5	2
0.5				SYR 2.5/1									
1.0													
1.5		0.0	0.0										
2.0													
2.5		↓	↓										
3.0													
3.5		↓	↓	SM SYR 4/4 (2m) SC									
4.0		↑	↑										
4.5				100% RECV SC									
5.0				SYR 4/2									
5.5		0.0	0.0										
6.0													
6.5		↓	↓										
7.0				SM SYR 4/4									
7.5		↓	↓										
8.0													
8.5				END OF BORING @ 8' (BEDROCK)									
9.0													
9.5													
10.0													
10.5													
11.0													
11.5													
12.0													
12.5													
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23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
 STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 09a 020553
 Page 1 of 1

PROJECT: FUS RAP MAYWOOD	SITE: 09a
Project No: 08575053	Client: USACE
Contractor: TERRA PROBE INC	SAMPLE DEPTH:
Start Date/Time: 3/28 0930	Completion Date/Time: 0945
Development Method/Equipment:	
Logged by: G. NIHRKI	Water Level (ft bgs): 1.1'
Pre-development DTW (PVC) (ft): 1.1'	DTB (PVC) (ft): 8'
Protection Level: D	

Post-development DTW (PVC) (ft):
 Standing Well Volume (gal) = $D^2(ft)/4 \times \pi \times (DTB-DTW)(ft) \times 7.48 \text{ gal/ft}^3$
 (2-inch well = $0.164 \times (DTB-DTW)(ft)$) =
 (2.5-inch well = $0.255 \times (DTB-DTW)(ft)$) =
 Minimum Purge Volume (gal) (3 well volumes) =
 Development Purge/Discharge Rate (gpm):
 Maximum Drawdown During Purging (ft):
 Total Quantity Purged:
 Disposition of Purge Water:
 Hours of Development:
 Hours of Decon:
 Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1 0930 2		1.1	-	10.0	6.19	2.02	999+	
				9.7	6.44	1.99	116	

Notes: = bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

SCREEN @ 4' - 8'
 1 do = 2.16
 2 do = 3.1

GWRI SOIL PROBE LOG SHEET

Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: GWRI
Job Number: 085750503
Activity: Direct-Push Sampling

Site Designator	XXX	09a
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	008
Media	m m	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)

Location	Northing (NAD 1927) <i>750903.574</i>	Easting (NAD 1927) <i>2105176.644</i>	Elevation (NGVD 1929)
----------	--	--	-----------------------

Gamma Logging		Photoionization Detector (PID) Logging	
Date	<i>3/28</i>	Date	<i>3/28</i>
Time	<i>10:45</i>	Time	
Logger	<i>G. MARKT</i>	Logger	<i>G. MARKT</i>
Detector Model #		PID Model #	Multi-RAE
Detector Serial #		PID Serial #	CENAN 21811
Scaler Model #			
Scaler Serial #			

Comments:

- MPI No. *ENV-09-9026*
- Direct-push location grouted with BenSeal.

1045 - 1100 - SOIL SAMPLE 6' - 9'
1100 - 1200 - H2O SAMPLE
1200 - 1215 - STEAM CLEAN

<u><i>George H. Markt</i></u> Signature (Core Gamma Logging)	<u><i>3/28/00</i></u> Date
<u><i>George H. Markt</i></u> Signature (Logging)	<u><i>3/28/00</i></u> Date

H₂O
@ 2'00"
▽

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0				100% RECV. SC	0	9	a	0	2	0	5	5	4
0.5				5YR 3/1 coal frag.									
1.0				occasional cobble stones									
1.5													
2.0													
2.5													
3.0				SM 5YR 2.5/1									
3.5													
4.0				95% RECV.									
4.5				2.6 LEY 5/10g									
5.0													
5.5													
6.0													
6.5				1" black layer (organic)									
7.0				SC 5YR 4/4									
7.5													
8.0				100% RECV. ORGANICS									
8.5				marsh deposit, SP 5YR									
9.0				4/2									
9.5				SC 5YR 4/2, weathered									
10.0				bedrock									
10.5				REFUSAL @ 10.5									
11.0													
11.5													
12.0													
12.5													
13.0													
13.5													
14.0													
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22.0													
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23.0													
23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
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WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
09a 020555

PROJECT: FUSRAP MAYWOOD	SITE: 09a	Page 1 of 1
Project No: 08575053	Client: USACE	
Contractor: TERRA PROBE INC.	SAMPLE DEPTH:	
Start Date/Time: 3/28	Completion Date/Time:	Well Diameter:

Development Method/Equipment:

Logged by: G. MARKT Water Level (ft bgs): 2.0 Protection Level: D

Pre-development DTW (PVC) (ft): 2.0 DTB (PVC) (ft): 10.5

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) =

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) =

Minimum Purge Volume (gal) (3 well volumes) =

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

Total Quantity Purged:

Disposition of Purge Water:

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
		2.0		6.6	6.57	1.4	84	
		2.0		9.5	6.57	1.4	604	
				9.5	6.65	1.43	133	
							748	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
DTW = depth to water gpm = gallons per minute

SCREEN @ 6'-10'

do 3.2

do 3.7

do 11.53

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	09a
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	003
Media	m m	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)
Location	Northing (NAD 1927) 751324.718	Easting (NAD 1927) 2165270.058
		Elevation (NGVD 1929)





Gamma Logging		Photoionization Detector (PID) Logging	
Date	Down Hole	Date	Core
		3/28	
		1300	
		G. MARKT	

Comments:

- MPI No. ENV-09-9028
- Direct-push location grouted with BenSeal.

1300 - 1315 - SOIL SAMPLE 6' - 9'

1315 - 1330 - H₂O SAMPLE

 _____ Signature (Core Gamma Logging)	 _____ Date
 _____ Signature (Logging)	 _____ Date

H₂O
@ 1.4
▽

Depth (Feet)	Down Hole Gamma Reading (c/10 ³ sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	40% RECV. SW SYR 4/3	0	9	9	0	2	0	5	5	6
0.5													
1.0													
1.5	0.0		0.0										
2.0													
2.5													
3.0													
3.5													
4.0				80% RECV.									
4.5				GC SYR 4/3									
5.0				conglomerate rock									
5.5	0.0		0.0										
6.0													
6.5													
7.0													
7.5													
8.0				60% RECV. SW SYR 4/3									
8.5													
9.0													
9.5	0.0		0.0										
10.0													
10.5													
11.0													
11.5													
12.0				END OF BORING									
12.5				@ 12'									
13.0													
13.5													
14.0													
14.5													
15.0													
15.5													
16.0													
16.5													
17.0													
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 09a 020557
 Page 1 of 1

PROJECT: <u>FUDRAP MAYWOOD</u>	SITE: <u>09a</u>
Project No: <u>08575053</u>	Client: <u>USACE</u>
Contractor: <u>TERRA PROBE INC.</u>	SAMPLE DEPTH:
Start Date/Time: <u>3/28 1330</u>	Completion Date/Time: <u>1330</u>
Well Diameter:	

Development Method/Equipment:

Logged by: _____ Water Level (ft bgs): 1.4' Protection Level: D

Pre-development DTW (PVC) (ft): 1.4' DTB (PVC) (ft): 12'

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) =

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) =

Minimum Purge Volume (gal) (3 well volumes) =

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

al Quantity Purged:

Disposition of Purge Water:

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
<u>1330</u>	<u>-</u>	<u>1.4</u>	<u>-</u>	<u>11.1</u>	<u>6.75</u>	<u>1.88</u>	<u>999+</u>	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

Do = 5.94
SCREEN @ 6'-10'

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	09A
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	00A
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)

	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	751876.356	2164427.431	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		3/31	Date	3/31
Time		0745	Time	0745
Logger		G. MARKT	Logger	G. MARKT
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				



Comments:

- MPI No. ENV-09-9024
- Direct-push location grouted with BenSeal.

0745-0815 - SOIL SAMPLE 6' → 9'

0815-1145 - H₂O SAMPLE

KEVIN (S&W) REMAINED @ THIS LOCATION UNTIL QW SAMPLE WAS COLLECTED, WHILE THE GEOPROBE CREW MOVED TO 09A-005

 _____ Signature (Core Gamma Logging)	3/31/00 _____ Date
 _____ Signature (Logging)	3/31/00 _____ Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑		75% RECV.	0	4	A	0	7	0	5	5	8
0.5		↑		GC 54R 4/4									
1.0													
1.5		0.0											
2.0													
2.5													
3.0													
3.5		↓											
4.0		↓		80% RECV									
4.5		↓											
5.0													
5.5													
6.0		0.0											
6.5													
7.0													
7.5													
8.0		↓		100% RECV.									
8.5		↓											
9.0		↓		REFUSAL @ 9'									
9.5													
10.0													
10.5													
11.0													
11.5													
12.0													
12.5													
13.0													
13.5													
14.0													
14.5													
15.0													
15.5													
16.0													
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20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

H₂O @ 3.0



¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
TONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 094-080559

Page 1 of 1

PROJECT: FUSRAP MAYWOOD

SITE: 094

Project No: 085750503

Client: USACE

Contractor: TERRA PROBE INC.

SAMPLE DEPTH: 4'-9'

Start Date/Time: 3/31

Completion Date/Time:

Well Diameter:

Development Method/Equipment:

Logged by: G. MARKT

Water Level (ft bgs): 3.0'

Protection Level: D

Pre-development DTW (PVC) (ft): 3.0 DTB (PVC) (ft): 9'

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 = 0.1 \text{ gal.}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) = \text{---}$

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) = \text{---}$

Minimum Purge Volume (gal) (3 well volumes) = 0.3 gal

Development Purge/Discharge Rate (gpm): ---

Maximum Drawdown During Purging (ft): ---

tal Quantity Purged: ---

Disposition of Purge Water: STREET @ MISS

Hours of Development: ---

Hours of Decon: ---

Hours of Standby: ---

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
	-	3.0'	-	11.5	5.73	1.04	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

10 = 3.2

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Site Designator	XXX	09A
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
----------	---------------------	--------------------	-----------------------

	Gamma Logging			Photoionization Detector (PID) Logging	
	Down Hole	Core			
Date		3/31	Date	3/31	
Time		1100	Time	1100	
Logger		G. MARKT	Logger	G. MARKT	
Detector Model #			PID Model #	Multi-RAE	
Detector Serial #			PID Serial #	CENAN 21811	
Scaler Model #					
Scaler Serial #					



Comments:

- MPI No. ENV-09-005
- Direct-push location grouted with BenSeal.

1100 - 1115 - SOIL SAMPLE 6' → 9'

1115 - 1200 - H₂O SAMPLE

1300 - 1330 - STEAM CLEAN

	3/31/00
Signature (Core Gamma Logging)	Date
	3/31/00
Signature (Logging)	Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑		80% RECV (GW) RR. BALAST	0	9	A	0	7	0	5	6	0
0.5		↑		GC 5YR 4/4									
1.0		0.0											
1.5				↓									
2.0				SC 5YR 5/4									
2.5													
3.0													
3.5		↓											
4.0		↑		SP 5YR 3/2 (40% RECV)									
4.5		0.0											
5.0													
5.5		↓											
6.0		↓		GA 5YR 4/4									
6.5		↑											
7.0		0.0											
7.5													
8.0		↓											
8.5		↓											
9.0				REFUSAL @ 9.0'									
9.5													
10.0													
10.5													
11.0													
11.5													
12.0													
12.5													
13.0													
13.5													
14.0													
14.5													
15.0													
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18.5													
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19.5													
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21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
TONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 09A - 020561

Page 1 of 1

PROJECT: FUSRAP MAYWOOD SITE: 09A

Project No: 085750503 Client: USACE

Contractor: TERRA PROBE INC - SAMPLE DEPTH: 4'-8'

Start Date/Time: 3/31 1115 Completion Date/Time: _____ Well Diameter: _____

Development Method/Equipment: _____

Logged by: G. MARKT Water Level (ft bgs): 0.0' Protection Level: D

Pre-development DTW (PVC) (ft): 0.0' DTB (PVC) (ft): 9'

Post-development DTW (PVC) (ft): _____

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.10$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ _____

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ _____

Minimum Purge Volume (gal) (3 well volumes) = 0.3 gal

Development Purge/Discharge Rate (gpm): _____

Maximum Drawdown During Purging (ft): _____

tal Quantity Purged: 0.5 gal

Disposition of Purge Water: \Rightarrow MISS

Hours of Development: _____

Hours of Decon: _____

Hours of Standby: _____

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1115	-	0.0	-	11.0	6.62	.712	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

do = 2.3
flow rate 3:10"/min

PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 10 – Revision 1

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

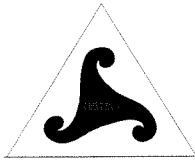
SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18

Submitted to:

Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
FUSRAP Project Office
26 Federal Plaza
New York, New York 10278

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Submitted by:



Stone & Webster, Inc.
100 West Hunter Ave.
Maywood, NJ 07607
May 2001

Reviewed/
Approved by:

Sam Rice Date: 5/31/01
Sam Rice, P.E.
Project Manager

Reviewed/
Approved by:

Kevin F. Donnelly Date: 5/31/01
Kevin F. Donnelly, P.E.
Project Environmental Engineer

Reviewed/
Approved by:

Alan F. Brown Date: 5-30-01
Alan F. Brown, P.E.
Task Manager

Reviewed/
Prepared by:

Edward Dudek Date: 5-31-01
Edward Dudek, P.E.
Task Leader

Reviewed/
Prepared by:

Michael Ciminera Date: 5-30-2001
Michael Ciminera
Field Operations Leader

**PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 10 – Revision 1**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18**

RECORD OF REVISIONS

Revision 0: Original Issue

Revision 1: The Final PDI Report (Revision 0) was submitted in July 2000. Revision 1 to the Final PDI Report incorporates the following significant changes: revision to text headers and footers; addition of results of confirmatory radiological analyses to [Table 10-4](#); and addition of Toxicity Characteristic Leaching Procedure (TCLP) data to [Table 10-5](#).

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- Appendix 10-A: Variances from the PDI Work Plan**
- Appendix 10-B: PDI Soil Probe Log Sheets**
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- 10-1 Properties Comprising Each Cluster**
- 10-2 Summary of PDI Field Activities**
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FIGURES

- 10-1 Location of Maywood Site, Bergen County, New Jersey**
- 10-2 FUSRAP Maywood Superfund Site**
- 10-3 Cluster No. 10 Sample Location Map**
- 10-4 Cluster No. 10 Surface Gamma Survey Results**

ACRONYMS AND ABBREVIATIONS

AT&T	American Telephone & Telegraph
BNI	Bechtel National, Inc.
C	Degrees Centigrade
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
Conc.	Concentration
CQCP	Contractor Quality Control Plan
DOE	U.S. Department of Energy
EPP	Environmental Protection Plan
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	grams
GMS	Groundwater Modeling System
GPR	Ground Penetrating Radar
GPS	Global Positioning System
ID	Identification
ISOCS	In Situ Object Counting System
keV	kilo electron volts
kg	kilogram
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCW	Maywood Chemical Works
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
mg	milligram
MHTDP	Materials Handling, Transportation and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJVIS	New Jersey Vehicle Inspection Station
NYS&W	New York, Susquehanna & Western Railway
ORNL	Oak Ridge National Laboratories
pCi	picoCurie
PDI	Pre-Design Investigation
PDIWP	Pre-Design Investigation Work Plan
PID	Photoionization Detector
PVC/PET	Polyvinyl Chloride/Polyethylene Teraphthalate
QA	Quality Assurance
QC	Quality Control
QCSR	Quality Control Summary Report
Ra-226	Radium-226
Rn-222	Radon-222

RCRA	Resource Conservation and Recovery Act
RESRAD	Department of Energy Computer Code; RESidual RADioactivity
ROC	Radionuclides of Concern
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
St.	Street
Th-232	Thorium-232
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
ug	microgram
U-238	Uranium-238
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank

1.0 SITE BACKGROUND AND PHYSICAL SETTING

1.1 General Site Overview

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (hereafter referred to as the Maywood Site) is located in a highly developed area of Bergen County in northeastern New Jersey, in the Boroughs of Maywood and Lodi and the Township of Rochelle Park (Figure 10-1). Portions of the Maywood Site are radiologically impacted from process wastes and residues associated with the recovery and refining of thorium and thorium compounds from monazite ores by the Maywood Chemical Works (MCW) from 1916 to 1956 (Bechtel National, Inc., BNI, 1992).

Waste produced at MCW was a fine sand-like material containing residual thorium with lesser amounts of uranium and its daughter products including radium. Wastes and residues were disposed in low-lying areas west of processing facilities. In the early 1930s, a portion of these wastes and residues was separated from the main property by construction of New Jersey State Highway 17 (NJ Route 17). Additionally, the former channel of Lodi Brook runs through the majority of the properties making up the Maywood Site. Some of the contaminated materials are assumed to have eroded from the facility area and were transported downstream via Lodi Brook (Figure 10-2). In addition, from 1928 to 1944, local residents were known to use process waste in their lawns and gardens and as fill material (BNI, 1992). These are the major mechanisms for distribution of radiologically-contaminated materials on the Maywood Site.

The Maywood Site consists of 88 designated residential, commercial, municipal, and state or federal properties. All 64 Phase I properties (including all residential and municipal properties) have either been remediated by the U.S. Department of Energy (DOE) or U.S. Army Corps of Engineers (USACE) or are currently being addressed under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). The remaining 24 Phase II properties are being addressed by the Stone & Webster Team (i.e., Team).

1.2 Pre-Design Investigation Scope

On December 29, 1998, the USACE issued a Scope of Services for the design and remediation of the remaining 24 commercial and government properties. These properties potentially contain deposits of radioactive material in surface and subsurface soils resulting from operations of the former MCW. They have been designated as the Phase II properties.

A Pre-Design Investigation Work Plan (PDIWP, Stone & Webster, 1999a) was submitted in October 1999 for the Phase II properties. The purpose of the PDIWP was to address data gaps necessary to complete remedial design efforts. In determining additional data needs, it was assumed that remediation of radiologically-impacted soils would be conducted on “accessible soils” only. Accessible soils are defined as soils not under permanent structures such as buildings and roadways. Data acquisition was limited to accessible soils only.

A preliminary evaluation was performed to determine the human health risk from leaving subsurface radiologically-impacted soils proximate to these structures. The RESidual RADioactivity (RESRAD) computer code was utilized to quantify the dose and risk under a

number of assumed conditions. Based on the preliminary results, it was determined that any radioactive residues left adjacent to existing buildings, roadways, and railways would need a minimum of two feet of clean soil cover to be protective of human health. As such, it has been assumed that where radiologically-contaminated soils exist at depth adjacent to structures, at least the top two feet of radiologically-contaminated soil would be removed adjacent to the structure to a six foot horizontal setback, and then sloped at two horizontal to one vertical (2H:1V) to the required depth. However, it is recognized that site-specific calculations will need to be made during the remedial design phase in order to determine the actual depth of excavation adjacent to each structure, the horizontal setback, and the slope to final excavation depths (Stone & Webster, 1999a).

In preparing the PDIWP, the 24 Phase II properties were sub-divided into 12 clusters. The purpose of the clustering was to take a 'collective' view of a set of contiguous properties to efficiently secure needed pre-design investigation (PDI) information for those properties. [Table 10-1](#) lists the 12 clusters for the Phase II properties, from south to north. The reader is directed to the PDIWP for additional background information (Stone & Webster, 1999a).

The purpose of this PDI Report is to present data collected during the PDI for Cluster No. 10. The evaluation of PDI data, along with data collected by others during previous investigations, is documented separately.

2.0 PDI FIELD ACTIVITIES

PDI activities were performed by the following Team members:

Stone & Webster, Inc.	Team leader and engineering services
Malcolm Pirnie, Inc.	Engineering services
Science & Ecology Corporation.....	Health physics services
Cabrera Services, Inc.	Radiological survey support
Canberra Industries, Inc.	Radiological survey support
Garden State Surveying, Engineering, and Planning, Inc.	Surveying and mapping
NAEVA Geophysics, Inc.	Geophysical investigation
TerraProbe, Inc.	Direct push services
Franklin Environmental Services, Inc.....	Construction services
ThermoRetec	Radiological sample analysis
RECRA LabNet.....	Environmental sample analysis
Kestrel Environmental Technologies, Inc.....	Data validation

PDI activities involved non-intrusive surveys followed by intrusive investigations. The preliminary, non-intrusive PDI activities (including surface gamma scans, surface In-Situ Object Counting System (ISOCS) readings, geophysical surveys and field surveying) were initiated in August 1999. The intrusive portion of the PDI program began in January 2000 and was completed in April 2000. [Table 10-2](#) presents a summary of PDI intrusive field activities. For logistical reasons, PDI environmental borings were performed at the outset of the Groundwater Remedial Investigation program during the latter part of March and beginning of April 2000.

PDI field activities were conducted in accordance with the PDIWP, and in compliance with procedures established in the following project documents: Contractor Quality Control Plan (CQCP), Site Safety and Health Plan (SSHP), General Environmental Protection Plan (EPP), Chemical Data Quality Management Plan (CDQMP), and the Materials Handling, Transportation and Disposal Plan (MHTDP), (Stone & Webster, 1999b, c, and d, 2000a, 2000b, respectively). Variances in methodology and sample locations between the PDIWP and the actual PDI execution are discussed below.

2.1 Variances from PDIWP

This section discusses deviations in methodologies and sample locations from the approved PDIWP.

2.1.1 Methodology Variances

Methodology variances from the PDIWP were as follows:

- The PDIWP called for the use of an ISOCS utilizing germanium gamma spectroscopy to quantify radionuclide activity in soil. Following approval of the PDIWP, regulatory concerns regarding the use of ISOCS for subsurface investigation were raised. The PDIWP was subsequently modified by replacing intrusive ISOCS sampling with conventional sample

collection using direct push methods to collect soil cores for laboratory analysis. Due to this change, Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled “Soil Probe Investigation” was developed and followed. Refer to the USACE letters dated December 8, 1999 from the Project Manager, Mr. Allen Roos, informing the U.S. Environmental Protection Agency (USEPA) Project Manager, Ms. Angela Carpenter, and the New Jersey Department of Environmental Protection (NJDEP) Case Manager, Ms. Donna Gaffigan, of the modification, as presented in [Appendix 10-A](#). The USEPA approved use of SOP-SW-MWD-509-0 on December 29, 1999 and NJDEP approved it on January 20, 2000.

- A Bicon® Model G1 one-inch by one-inch (1” x 1”) sodium iodide (NaI) detector was substituted for the originally proposed 3/8” x 3/8” NaI detector for downhole gamma logging. This substitution was needed to provide greater detector sensitivity through the soil probe casing. Due to the addition of this detector, SOP number SW-MWD-509-0 entitled “Soil Probe Investigation” was revised. These revisions are outlined in [Table 1-A](#) in [Appendix 10-A](#). The 3/8” x 3/8” NaI detector was used only when the manual direct push method was employed. Manual direct push methodology was required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- The CDQMP originally specified a frequency of 10% for field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. This corresponds to the USACE internal quality control standard. However, due to the significant number of samples to be collected as part of the PDI program (totaling approximately 2000 soil samples and in excess of 10,000 gamma count rate and photoionization detector (PID) readings), the USACE agreed to reduce the frequency to 5%, which is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and USEPA guidelines for MS/MSD analysis. USEPA Region II does not have a specific guideline for field duplicate samples. Refer to the USACE and USEPA/NJDEP correspondence in [Appendix 10-A](#).
- The PDIWP stipulates that geotechnical borings with associated laboratory testing may be required in order to provide design parameters in locations where excavation may impact adjacent structures. Since radiological clean-up criteria have yet to be finalized, final assessment of limits of radiological contamination cannot be made at this time. The geotechnical investigation program was suspended from the PDI. During the design process, existing geotechnical information will be evaluated for design and a determination will be made if supplemental data are needed.

2.1.2 Sample Location Variances

The PDIWP was developed with the intent that proposed sample locations would be deleted, added, or moved as additional information regarding site features and contamination distribution became available during the course of the PDI implementation. In accordance with this approach, sample locations as proposed in the PDIWP were deleted, added, or moved for the following reasons:

- Base mapping developed subsequent to completion of the PDIWP provided additional information regarding underground utility locations and other site features. Proposed sample

locations proximate to these utilities and site features were moved in order to minimize impacts.

- Review of surface gamma survey data collected as part of the PDI, coupled with additional review of data from previous investigations performed by BNI and ORNL, indicated that certain proposed intrusive locations should either be moved or could be deleted. To address potential areas of surface radiological contamination not previously identified as areas of concern, a protocol was established for determining the need for additional intrusive sampling locations. Refer to “Protocol For Addressing Gamma Scan Anomalies” in [Appendix 10-A](#).

Specific rationale for the deletion, addition, or movement of locations proposed in the PDIWP are summarized in [Appendix 10-A](#).

2.2 Geophysical Surveys

Between September 20, 1999 and March 2, 2000, NAEVA Geophysics, Inc. conducted geophysical investigations on the Maywood Site. The purpose of these investigations was to delineate surface traces of detectable underground utilities in the vicinity of proposed exploratory boring sites. Equipment selected for this investigation included: a Fisher TW-6 Pipe and Cable Locator; a Radiodetection RD432PDL-2 Utility Locator; a Subsite 75 Utility Locator, a 3M Dynatel 2250 Cable Locator, and a GSSI SIR-3 ground penetrating radar (GPR) system with a 300 MHz antenna. Details of the surveys are presented in the NAEVA report (NAEVA, 2000a).

2.3 Sample Locations

In October 1999, Garden State Engineering, Surveying, and Planning, Inc. performed a ground survey of the Maywood Site properties. Results of the ground survey were combined with aerial mapping prepared by GEOD Corporation to produce new base mapping for the Maywood Site. This new base mapping replaced the mapping used to generate the PDIWP drawings.

Sample points for the surface gamma survey, surface ISOCS measurements, direct push (Geoprobe[®]) sampling, and environmental sampling were located in the field using a Global Positioning System (GPS). A Trimble 4800 Site Surveyor system with a 4700 base receiver, GPS antenna, radio antenna, and ancillary equipment were used to perform GPS surveys. Base stations were set up and calibrated at specified bench-mark locations established by the surveyor. Following base receiver set up, sampling points were located. Field markings (spray paint, flags, and stakes) were used to identify intrusive sampling locations for radiological and environmental direct push mobile rigs, as well as surface ISOCS locations.

Coordinates for intrusive sample locations were determined from new PDI sample location maps which reflected updated base mapping and modified sample locations; surface ISOCS locations were identified based on original PDIWP mapping. For the surface gamma survey, GPS was used to record locations of gamma scan measurements. Where GPS instrumentation could not be utilized due to signal disruption (e.g., tree coverage, building interference, non-availability of satellites, or poor satellite reception due to weather conditions), sample locations were based on identification of site features and scaling off base mapping.

2.4 Surface Gamma Surveys

Surface gamma surveys for all of the Phase II properties were conducted from August 1999 to March 2000. Surveys were conducted to obtain distribution of surface radiological contamination for health and safety reasons, as well as to verify existing data. Measurements were collected by suspending a 1" x 1" NaI gamma scintillation detector coupled to a Ludlum Model 12 ratemeter within a few inches of the ground surface. A health physics technician walked transects (approximately four to six feet wide) covering the properties while slowly swinging the detector in a serpentine motion. Transects were spaced to assure full areal coverage with some overlap. Gamma count measurements were taken approximately every 15 to 20 feet; measurement frequency was increased in areas exhibiting elevated gamma counts. Minimum detectable concentrations (MDCs) for this detector for the radionuclides of concern (ROC) are approximately 4.7 picoCurie per gram (pCi/g) for Radium-226 (Ra-226), 3.0 pCi/g for Thorium-232 (Th-232), and 121.0 pCi/g for Uranium-238 (U-238), correcting for volume and distance from the source (Multi-Agency Radiation Survey and Site Investigation Manual, MARSSIM, 1997). Gamma count data were stored with associated locations in the GPS recorder. In some instances where locations could not be recorded with a GPS (as stipulated above), measurements were manually recorded on the PDI maps.

2.5 Surface ISOCS Measurements

Surface ISOCS measurements were collected at selected locations where environmental, geotechnical, and radiological shallow boreholes were proposed in the PDIWP. Surface ISOCS measurements were collected to identify and quantify radionuclide activity in surface soil, beneath shielded areas (e.g., areas covered with gravel, asphalt, and concrete), and in areas proposed for environmental borings.

Gamma spectroscopy measurements of surface soil were collected using the Canberra high-purity germanium ISOCS and assuming uniform radioactivity distribution in soil. The high-purity germanium detector was positioned in a "downward-looking" direction perpendicular to the ground surface at a height of three feet. The detector was collimated using a lead shield subtending a 90-degree angle, which provided a surface soil viewing area approximately six feet in diameter. The back and side of the detector were shielded with two-inch thick lead O-rings. The detector collimator and shielding were used to ensure that radioactivity detected by the probe originated only from the six-foot diameter area beneath the detector, hence minimizing one possible source of error in the measurements.

2.6 Direct Push Soil Probes

Direct push soil probes (using truck-mounted model 5400 Geoprob[®] or track-mounted model 54DT Geoprob[®]) were used to collect soil samples for radiological and environmental parameter analysis. Two types of direct push soil probes were used: a single rod system (i.e., Macro-Core[®]) and a dual tube (or cased) system. The latter system utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Samples were collected in four-foot soil cores within polyvinyl chloride/polyethylene terephthalate (PVC/PET) liners, marked with the appropriate field identification number, sealed with rubber end caps, and placed

into a two-inch inner diameter PVC container (including PVC end caps) for transport and storage.

For sample locations that were inaccessible to the mounted direct push rigs, soil cores were collected using a manual direct push method. Two-foot cores approximately one inch in diameter were collected using an electric powered hand-held vibratory hammer.

Prior to commencing intrusive sampling, underground utilities in the vicinity of the proposed boring locations were identified by reviewing PDI geophysical survey data, and by contacting the appropriate authorized parties (i.e., New Jersey One-Call System, and the property owner). In addition, a safe working distance from overhead utilities was maintained.

Sampling equipment (the rig, direct push soil probe casing and tools) was decontaminated prior to use and following each borehole installation using pressure or manual washing. Each soil probe hole was backfilled for the full length using Benseal[®] bentonite in accordance with project requirements. For areas covered by asphalt, cold patch was placed at the surface.

2.6.1 Downhole Gamma Logging

Measurements were taken with a Bicron[®] Model G1 1" x 1" NaI gamma detector sealed in a waterproof stainless steel container. The instrument MDCs are approximately 3.6 pCi/g for Ra-226, 2.3 pCi/g for Th-232, and 92.0 pCi/g for U-238, which are approximately 75% of the surface MDCs listed in Section 2.4. This estimate assumes a geometry factor of 0.50, where a four pi geometry (i.e., a sphere) when scanning downhole is approximately half of a two pi geometry (i.e., a hemisphere) when scanning the ground surface. However, this reduction in the MDCs is modified by the 0.3-inch steel casing in the hole, which results in an approximate 33% reduction in the gammas seen by the detector as calculated by the computer code Microshield[™]. The correction factor is therefore calculated by dividing the geometry factor (0.50) by the steel casing reduction factor (0.66), yielding approximately 0.75. The NaI detector was connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector[™] multi-channel analyzer/amplifier/high voltage power supply. The system was controlled, and the data stored, via notebook computer. Ten-second integrated gross gamma measurements were recorded at each 6-inch depth increment in the cased soil probe holes and data entered onto the PDI Soil Probe Log Sheets (see [Appendix 10-B](#)). In areas where samples were collected using the manual direct push method, a Bicron[®] 3/8" x 3/8" NaI gamma detector coupled to a Ludlum Model 2221 scaler/ratemeter was used to take 30 to 60-second gross gamma measurements in uncased soil probe holes. The MDCs for this instrument are estimated to be approximately 1.9 pCi/g for Ra-226 and 2.3 pCi/g for Th-232, as provided by the vendor. There is no correction factor for these MDCs.

2.6.2 Direct Push Core Screening/Sample Collection

Sealed PVC containers collected from direct push mobile and manual rigs were transported to the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation added to the PDI Soil Probe Log Sheets (see [Appendix 10-B](#)) included soil column description and soil screening data. Field screening for radiological activity was performed on soil cores contained in the PVC/PET liner. A collimated Eberline

SPA-3 2" x 2" NaI detector (or Ludlum Model 44-10) coupled to a Ludlum Model 2221 scaler/ratemeter was used to measure gamma activity. The detector was positioned approximately 0.5 inch above the soil core, on a guide, to ensure that this distance was maintained over the entire length of each soil core. Continuous scanning of the soil core was performed at an approximate rate of three inches per second. The instrument MDC, taken from MARSSIM, is estimated to be 2.8 pCi/g for Ra-226, 1.8 pCi/g for Th-232, and 80 pCi/g for U-238 (MARSSIM, 1997). Although the MARSSIM MDC values are based upon an open area, it was assumed that the slower scan time compensated for the different geometry. An indelible marker was used to mark the liner where elevated readings were identified during scanning. Total integrated gross gamma counts were accumulated over a 30-second interval and recorded.

Soil cores were also screened for total volatile organic vapors using a PID. A series of small perforations were made along the PVC/PET liner at 12-inch increments to expose soil to the PID. Perforations were sealed with tape after PID screening. Screening results were recorded on the PDI Soil Probe Logs.

Prior to obtaining samples, each core was photographed using a digital camera. A brief soil field classification description of each core was entered onto the PDI Soil Probe Log Sheet.

Soil samples were selected from each direct push location for analysis of the ROC: Th-232, Ra-226, and U-238. Samples were selected based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample was taken at the highest reading location (suspected FUSRAP waste, if present, as defined in the Federal Facilities Agreement dated November, 1991; DOE and USEPA, 1991); a second soil sample was collected where the readings approached a constant value (suspected transition zone, if present); and a third soil sample was collected within the zone of constant readings (below suspected transition zone). When soil cores exhibited uniform count rates (i.e., elevated gamma measurements were not identified), three samples per soil probe location were collected.

Selected samples were obtained from each core sufficient to fill a 300-milliliter sample container. Samples were labeled and capped at either end with plastic caps. Caps were color-coded for 'top' and 'bottom' of the original hole. Each extracted section of the soil core was replaced with a wooden spacer to indicate what portion of the soil core was sampled. The spacer was labeled with the sample identification number of the soil removed for testing. After screening and sample extraction, remaining portions of each soil core were placed back into the appropriate PVC container, with the wooden spacer in its appropriate location, and stored on-site for future reference. The section of core tube containing the sample was then transferred to the MISS on-site laboratory for sample preparation and analysis.

Evaluation of all gamma log data led to the archiving of selected samples. That is, a number of the direct push soil probes exhibited 'constant' count rates over the depth interval. In these cases, rather than having all samples analyzed at this time, the deepest prepared sample was not counted but archived. By doing this, as laboratory results confirm that radiological contamination does not exist at that soil probe location, unnecessary analytical work is

prevented. Samples that were archived are noted on the PDI Soil Logs in [Appendix 10-B](#) and on [Table 10-4](#).

As described above, a collimated Eberline SPA-3 or Ludlum Model 44-10 2" x 2" NaI detector was used to measure gamma activity for the soil cores, while a Bicron[®] Model G1 1" x 1" NaI gamma detector was used for the downhole measurements. The 2" x 2" NaI detector (Eberline SPA-3 or Ludlum Model 44-10) provided confirmation of downhole measurements and greater sensitivity for sample selection than the 1" x 1" NaI gamma detector.

2.6.3 Sample Preparation

Soil samples were screened to remove small debris and oven-dried to obtain moisture content and to facilitate grinding. Grinding assured sample homogenization. Samples were then transferred to a 300-milliliter commercially supplied metal can. Lids were secured on cans, after which they were shelved for 21 days. The 21-day period was required to allow radon and its daughter products to in-grow and establish secular equilibrium between Ra-226, Radon-222 (Rn-222), and the gamma-emitting daughters.

2.6.4 Laboratory Data

Analysis for ROC on selected samples was performed at the MISS on-site field laboratory using a Canberra high-purity germanium detector. All testing in the MISS on-site field laboratory was completed in accordance with the procedures outlined in the CDQMP. MISS on-site field laboratory data have been entered onto the PDI Soil Probe Log sheets (see [Appendix 10-B](#)).

The Project Chemist evaluated 10% of the MISS on-site field laboratory radiological data packages; the evaluation is included in the PDI Quality Control Summary Report (QCSR; Stone & Webster, 2000c). The laboratory qualified the reported data when the germanium detector measurement system fell outside of one of the control limits during quality control check runs. Data qualification procedures are described in the PDI QCSR.

Ten percent of the samples analyzed by the MISS on-site field laboratory were sent to a USACE-approved off-site laboratory (ThermoRetec) for confirmatory analysis of the ROC. Following analysis, all soil samples were returned to the Maywood Site for storage and future reference. Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the off-site confirmatory radiological data. Radiological data were evaluated using the USACE's Radiological Data Quality Evaluation Guidance, as presented in the CDQMP. The data validation reports for the radiological confirmatory sample results are provided in the PDI QCSR.

2.7 Environmental Sampling

A limited number of soil samples were collected for environmental analyses in order to identify potential chemical contamination commingled with the radioactive waste. This information would aid in assessing waste classification (i.e., whether hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), is commingled with radioactive waste) as well as provide data for worker health and safety. Samples for environmental analysis were

collected using direct push Macro-Core[®] methodology. Sampling depths were based on the anticipated depth of radiological contamination. Soils exhibiting the highest PID readings or visual contamination were collected and sent for laboratory analysis by a USACE and NJDEP certified laboratory (RECRA LabNet). Samples were analyzed for RCRA disposal characteristics (ignitability, reactivity, corrosivity, and toxicity characteristic leaching procedure TCLP), the Target Compound List (TCL) and the Target Analyte List (TAL) with chromium speciation.

During performance of environmental borings, environmental boring log sheets were completed for each boring. Copies of the completed log sheets are included in [Appendix 10-C](#).

Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the environmental data. Environmental data were evaluated using the USACE's Data Quality Evaluation Guidance, as presented in the CDQMP. In addition, the USEPA Region II SOP No. HW-24, Revision I, June 1999, was also applied. The data validation reports for the environmental sample results are provided in the PDI QCSR.

2.8 Geotechnical Sampling

Radiological cleanup criteria have yet to be finalized, therefore final assessment of the extent of radiological contamination cannot be made at this time. The geotechnical investigation program was therefore suspended from the PDI. Following approximate determination of limits of excavation during the design phase, existing geotechnical information will be evaluated for remedial design purposes. If it is decided that additional information is required, then the geotechnical program will be reinstated, as necessary.

2.9 Quality Assurance/Quality Control

Field and laboratory activities were completed in accordance with the CQCP and the CDQMP. Data reflecting adherence to the Quality Assurance / Quality Control (QA/QC) program was documented and presented in the PDI QCSR.

2.10 Health and Safety

All PDI investigation activities were conducted in compliance with the SSHP and associated protocols and directives. Field crews received daily briefings at 'Plan of the Day' meetings prior to any work activities. These meetings reviewed daily health and safety issues such as potential inclement weather, as well as reviews of general site health and safety directives.

3.0 CLUSTER DESCRIPTION AND PDI RESULTS

3.1 Cluster No. 10 Description

Cluster No. 10 consists of Property No. 10A located at 100 West Hunter Avenue. The property is owned by the Stepan Company and comprises approximately 19 acres. It is located primarily in Block 124, Lot 10 in the Borough of Maywood, except for a small area in the southwest corner which is in Block 17.02, Lot 1 in the Township of Rochelle Park. The property is bordered by the New York, Susquehanna & Western Railway (NYS&W) right-of-way (Property No. 12A) to the north and northeast; several businesses along West Hunter Avenue to the east (including Property Nos. 11A, 11B, and 11C); the Sears Logistical Services property to the south (Property No. 09A); and the MISS property (Property No. 12B) and NJ Route 17 (Property No. 12C) to the west.

The property consists of a series of filled areas upon which the operating facility was constructed. The difference in elevation between the highest point (at the north side of the property) and the lowest point (at the south side) is approximately 25 feet. The property is developed with operable buildings, above-ground tank farms, other structures, foundations of former structures, or asphalt paving (CH2M Hill, 1994). Currently, there are 12 numbered buildings on the property comprising office, support, production, warehouse and distribution facilities and four above-ground tank farms (containing from 4 to 12 tanks each). A chain-link fence encloses the property (excluding the main office and parking area). Additionally, a railroad spur transects an undeveloped open area adjacent to the MISS; the spur continues across the MISS.

There are eight existing and former underground storage tanks (USTs) located on the property (four tanks are currently active, one tank is abandoned in place, and three tanks were removed). The approximate locations, status, and contents of the existing and former tanks are presented in the Stepan Remedial Investigation (CH2M HILL, 1994).

Chemical production on the property includes esters, lubricants, amides, food ingredients and specialty products (Stepan, 2000). The facility employs a staff of 80 to 100 and operates 24 hours per day, seven days per week. The company usually shuts down for two weeks at the end of July; however, during the year 2000, the company will shut down for only one week in July.

Three Nuclear Regulatory Commission (NRC) licensed low-level radiological burial sites are located on the property but are not included in the PDI scope of work. Burial Pit 1 (approximately 100 feet by 50 feet) is located under the parking lot north of West Hunter Avenue; Burial Pit 2 (approximately 200 feet by 100 feet) is located along the east-central portion of the Stepan property adjacent to the office building on West Hunter Avenue; and Burial Pit 3 is under Building 8, a large secure building in the southeast corner of the Stepan property. The areal extent of Burial Pit 3 could not be accurately determined, as it is located beneath the building. A supplemental geophysical survey was performed by the Team in February/March 2000 to investigate the accessible burial pits (NAEVA, 2000b). This investigation confirmed the existence of metal objects within the limits of Burial Pits 1 and 2. Burial Pit 3 was not investigated due to its inaccessibility.

Refer to [Figure 10-3](#) for more specific details of site features.

3.2 Radiological Data

3.2.1 Surface Gamma Survey

A surface gamma survey was performed at Cluster No. 10. Data, recorded using GPS, was entered into the Groundwater Modeling System (GMS) software package and contoured to a two-dimensional grid using the “Natural Neighbor” contouring protocol. “Natural Neighbor” interpolation is based on the Thiessen polygon network of the scatter point set. Data are interpolated based on distance as well as topological relationships (Boss International, Inc., 2000).

Results of the gamma scan survey for Cluster No. 10 are presented graphically on [Figure 10-4](#) and [Figure 10-A1](#) (Appendix 10-A). [Figure 10-4](#) presents surface gamma scan data in context of the Maywood Site: the upper limit of the contour range is the maximum gamma count measurement detected at the Maywood Site, and the lower contour range represents 1.5 times the background gamma count rate for Cluster No. 10 (background is approximately 1,800 counts per minute for Cluster No. 10). [Figure 10-A1](#) provides a more detailed, cluster-specific, presentation of the gamma scan data, with contoured ranges corresponding to actual minimum and maximum measured gross gamma counts recorded at Cluster No. 10.

3.2.2 Surface ISOCS Measurements

Surface ISOCS measurements were taken at 45 locations on Cluster No. 10; locations are shown on [Figure 10-3](#). Results of surface ISOCS measurements are tabulated on [Table 10-3](#).

3.2.3 Direct Push Soil Probes

Ninety-two (92) direct push soil probes were performed at Cluster No. 10 for radiological purposes. Direct push soil probe locations are shown on [Figure 10-3](#).

3.2.3.1 Downhole Gamma Logging

Results from downhole gamma logging measurements taken at direct push soil probe locations are presented on the PDI Soil Probe Logs included in [Appendix 10-B](#).

3.2.3.2 Direct Push Core Screening/Sample Collection

Results of soil core screening activities performed at the MISS on-site field laboratory are recorded on PDI Soil Probe Logs included in [Appendix 10-B](#).

3.2.3.3 MISS On-Site Field Laboratory Data and ThermoRetec Confirmatory Data

Two-hundred and seventy-seven (277) soil samples were collected for laboratory analysis from the 92 soil probe locations at Cluster No. 10. Two-hundred and one (201) of the 277 samples were sent for analysis (including 13 duplicates); 76 were archived. Laboratory data consisting of

soil concentrations of the ROC are presented on the soil probe logs in [Appendix 10-B](#), and summarized on [Table 10-4](#). Archived samples are also recorded on the logs and the table.

Fourteen of the soil samples analyzed by the MISS on-site field laboratory were sent to ThermoRetec for confirmatory analysis. Results of the confirmatory analyses performed by ThermoRetec are shown in [Table 10-4](#).

As part of the data quality objective process, a comparison study was performed between the MISS on-site field laboratory and the ThermoRetec laboratory data. The results of the comparison can be found under separate cover (Stone & Webster, 2000d).

3.3 Environmental Data

Eight environmental borings were drilled at Cluster No. 10, and eight soil samples were collected for environmental analysis. A summary of the environmental analytical data is presented on [Table 10-5](#). [Figure 10-3](#) shows the location of the borings. In addition, the environmental boring log sheets are included in [Appendix 10-C](#).

4.0 REFERENCES

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Table 10-1: Properties Comprising Each Cluster

Cluster No.	Property No.	Properties (occupant)	Township/Borough	Property Block & Lot
1	01A	72 Sidney St. (Vacant)	Lodi	Block 164, Lots 1 and 5
2	02A	100 Hancock Street (AT&T)	Lodi	Block 205.03, Lot 2.04
	02B	80 Hancock Street (CGI, Inc.)	Lodi	Block 205.03, Lot 2.03
	02C	80 Industrial Road (American Jewel Windows)	Lodi	Block 205.02, Lot 4.02
	02D	8 Mill St. (NJVIS)	Lodi	Block 205.02, Lot 1.05
3	03A	170 Gregg Street (Bergen Cable)	Lodi	Block 205, Lot 1.02
4	04A	160/174 Essex Street (Bank of New York)	Lodi	Block 186.01, Lot 1 and Block 174, Lot 1.02
	04B	I-80 Westbound Right-of-Way (NJDOT)	Lodi	Not Applicable
5	05A	99 Essex Street (Joseph Muscarelle, Inc.)	Maywood	Block 125, Lot 1
	05B	113 Essex Street (Bank of New York)	Maywood	Block 125, Lot 2
	05C	200 NJ Route 17 South (Sears Appliance Repair)	Maywood	Block 125, Lot 3
6	06A	85-101 NJ Route 17 North (Architectural Windows)	Maywood	Block 124, Lot 4
	06B	137 NJ Route 17 North (Ramsey Auto Group)	Maywood	Block 124, Lot 3
	06C	167 NJ Route 17 North (Sunoco Station - Inactive)	Maywood	Block 124, Lot 2
	06D	239 NJ Route 17 North (Gulf Station)	Maywood	Block 124, Lot 1
	06E	29 Essex Street (Federal Express Corporation)	Maywood	Block 124, Lot 5
7	07A	111 Essex Street (Scanel Company, Inc.)	Maywood	Block 131, Lots 1,2,3,4
	07B	New York, Susquehanna & Western Railway - Lodi Branch	Maywood	Block 131, Lot 8
8	08A	23 West Howcroft Road (Maywood Furniture, Inc.)	Maywood	Block 124, Lot 17
9	09A	149-151 Maywood Avenue (Sears Logistical Services)	Maywood; Rochelle Park	Block 124, Lot 30; Block 17.02, Lot 1
10	10A	100 West Hunter Avenue (Stepan Company)	Maywood; Rochelle Park	Block 124, Lot 10; Block 18.02, Lot 2
11	11A	205 Maywood Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
	11B	61 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 50
	11C	50 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
12	12A	New York, Susquehanna & Western Railway	Maywood; Rochelle Park	Block 124, Lot 55 and Block 110, Lot 1
	12B	100 West Hunter Avenue (MISS)	Maywood; Rochelle Park	Block 124, Lot 46 and Block 20.01, Lot 1
	12C	New Jersey Route 17 (NJDOT)	Rochelle Park	Not Applicable

Table 10-2: Summary of PDI Intrusive Field Activities

Cluster No.	Property No.	Property Address	Occupant	Planned			Actual			Schedule (Year 2000)
				Probe Locations	Depth (ft)	Footage (ft)	Probe Locations	Depth (ft)	Footage (ft)	
1	01A	72 Sydney Street	Vacant	13	12	156	15	12	188	Jan. 11, 12, Mar. 31
2	02A	100 Hancock Street	AT&T	17	16	272	17	6 - 12	194	Jan. 27, Feb. 1, 2, Mar. 16
	02B	80 Hancock Street	Vacant	18	16	288	Pending Right of Entry Agreement			
	02C	80 Industrial Road	American Jewel Windows	23	16	368	20	12	272	Jan. 21, 24, 28, Feb. 1
	02D	8 Mill Street	NJVIS	38	16	608	44	12 - 16	593	Jan. 13, 14, 18, 19, 20, 21
3	03A	170 Gregg Street	Bergen Cable	10	8	80	10	8	62	Jan. 12, 13
4	04A	160/174 Essex Street	Bank of New York	25	12	300	23	4 - 12	427	Feb. 2, 3, 4
	04B	I-80 Right-of-Way	NJDOT	7	12	84	7	8 - 12	69	Feb. 2, 4, Mar. 31
5	05A	99 Essex Street	Joseph Muscarelle, Inc.	38	8	304	38	8	318	Feb. 23, 24, Mar. 17
	05B	113 Essex Street	Bank of New York	18	8	144	21	4 - 16	171	Feb. 8, 10, 16
	05C	200 NJ Route 17 South	Sears Appliance Repair	23	8	184	16	8 - 10	129	Feb. 15, 16, Mar. 2
6	06A	85-101 NJ Route 17 North	Architectural Windows	17	12	204	17	8 - 18	196	Feb. 9, 10, 16, Mar. 16
	06B	137 NJ Route 17 North	Ramsey Auto Group	15	12	190	13	10 - 12	145	Feb. 9, 16, 25
	06C	167 NJ Route 17 North	Sunoco Station - Inactive	27	12	324	19	3 - 14	239	Feb. 11, Mar. 8
	06D	239 NJ Route 17 North	Gulf Station	19	12	228	2	11 - 12	23	Feb. 16
	06E	29 Essex Street	Federal Express Corporation	7	12	84	9	7 - 12	95	Feb. 16, Mar. 31
7	07A	111 Essex Street	Scanel Company, Inc.	12	16	192	12	12 - 22	161	Feb. 21, 22, 23
	07B	NYS&W - Lodi Branch	NYS&W - Lodi Branch	16	16	256	11	6 - 16	115	Feb. 21, 22
8	08A	23 West Howcroft Street	Maywood Furniture, Inc.	26	16	416	25	7 - 16	321	Feb. 17, 21
9	09A	149-151 Maywood Avenue	Sears Logistical Services	131	16	2096	72	4 - 16	574	Mar. 2, 3, 6, 7, 8, 9, 15
10	10A	100 West Hunter Avenue	Stepan Company	106	24	2544	92	4 - 24	1076	Feb. 25, 28, 29, Mar. 1, 2, 6, 7, 9, 16, 30
11	11A	205 Maywood Avenue	Myron Manufacturing	5	8	40	5	8 - 12	44	Feb. 16
	11B	61 West Hunter Avenue	Myron Manufacturing	9	8	72	10	8 - 16	87	Feb. 15, 21
	11C	50 West Hunter Avenue	Myron Manufacturing	1	8	8	1	8	8	Feb. 15
12	12A	NYS&W	NYS&W	31	24	744	27	12 - 27	335	Feb. 18, 22, 24, Mar. 16, 30
	12B	100 West Hunter Avenue	MISS	120	24	2880	100	7 - 26	1769	Feb. 4, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24, 25, 29, Mar. 1, 7, 8, 9
	12C	NJ Route 17	NJDOT	0	0	0	0	0	0	<i>No investigations planned.</i>
TOTALS:				772		13,066	626		7,611	

Table 10-3: Surface ISOCS Measurements*A46

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
10-SI001-SS-0-1	0.72	25.6	0.34	1.04	23.4	0.16	< 9.69	-----	9.69
10-SI002-SS-0-1	0.84	18.0	0.41	7.38	8.0	0.10	< 6.67	-----	6.67
10-SI003-SS-0-1	0.43	25.0	0.29	1.53	14.8	0.07	< 5.29	-----	5.29
10-SI004-SS-0-1 (1)	4.07	15.9	2.46	181.20	5.8	0.67	< 28.30	-----	28.30
10-SI004-SS-1-1 (1)	3.77	14.9	2.37	183.20	5.8	0.69	< 29.00	-----	29.00
10-SI005-SS-0-1	0.61	21.0	N/R	1.86	13.7	N/R	<6.46	-----	6.46
10-SI006-SS-0-1	0.85	16.9	0.29	2.61	11.8	0.11	< 7.56	-----	7.56
10-SI007-SS-0-1	0.71	19.0	0.29	2.27	15.5	0.10	< 6.67	-----	6.67
10-SI008-SS-0-1	0.52	22.0	0.30	3.05	11.0	0.09	< 6.46	-----	6.46
10-SI009-SS-0-1	0.59	21.8	0.30	2.97	11.0	0.01	< 6.10	-----	6.10
10-SI010-SS-0-1	0.58	20.6	0.26	2.26	12.5	0.01	< 6.02	-----	6.02
10-SI011-SS-0-1	0.61	19.0	0.23	2.29	12.0	0.01	< 6.53	-----	6.53
10-SI012-SS-0-1	0.53	21.5	0.24	1.65	14.5	0.12	< 6.17	-----	6.17
10-SI013-SS-0-1	0.96	15.3	0.47	7.69	7.5	0.15	< 7.78	-----	7.78
10-SI014-SS-0-1	1.99	11.0	0.57	12.97	6.6	0.18	< 8.22	-----	8.22
10-SI015-SS-0-1	1.89	12.0	0.76	23.96	5.9	0.27	< 10.50	-----	10.50
10-SI016-SS-0-1	1.71	13.0	0.65	24.12	5.8	0.26	< 9.99	-----	9.99
10-SI017-SS-0-1	0.90	16.0	0.43	7.60	7.5	0.01	< 6.33	-----	6.33
10-SI018-SS-0-1	0.72	17.5	0.29	4.35	9.0	0.21	< 6.44	-----	6.44
10-SI019-SS-0-1	0.69	19.0	0.41	2.53	12.0	0.01	< 7.85	-----	7.85
10-SI020-SS-0-1	2.33	12.7	0.54	22.10	6.7	0.24	< 11.30	-----	11.30
10-SI021-SS-0-1 (1)	5.69	9.9	0.99	42.49	6.0	0.19	< 15.00	-----	15.00
10-SI021-SS-1-1 (1)	5.72	9.8	1.20	42.97	6.0	0.24	< 13.70	-----	13.70
10-SI022-SS-0-1	0.89	17.0	0.34	2.47	12.0	0.10	< 7.11	-----	7.11
10-SI023-SS-0-1	4.54	10.9	1.27	47.66	6.0	0.38	< 19.6	-----	19.60
10-SI024-SS-0-1	0.89	16.8	0.30	3.98	10.0	0.01	< 7.13	-----	7.13
10-SI025-SS-0-1	0.81	18.8	0.42	6.13	8.8	0.15	< 7.19	-----	7.19

Table 10-3: Surface ISOCS Measurements*A46

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity	Error	MDA	Activity	Error	MDA	Activity	Error	MDA
	pCi/g	%	pCi/g	pCi/g	%	pCi/g	pCi/g	%	pCi/g
10-SI026-SS-0-1	0.62	20.6	0.34	3.59	10.6	0.10	< 6.25	-----	6.25
10-SI027-SS-0-1	5.59	10.9	1.35	24.84	6.8	0.30	< 23.10	-----	23.10
10-SI028-SS-0-1 (1)	6.00	11.0	1.80	33.88	63.0	0.47	< 26.30	-----	26.30
10-SI028-SS-1-1 (1)	5.98	10.9	1.69	32.73	6.0	0.32	< 26.90	-----	26.90
10-SI029-SS-0-1	0.31	27.0	0.20	0.35	34.0	0.14	< 4.82	-----	4.82
10-SI030-SS-0-1 (1)	1.18	14.6	0.38	2.15	12.9	0.17	< 6.53	-----	6.53
10-SI030-SS-1-1 (1)	1.29	14.0	0.31	2.54	11.9	0.07	< 7.13	-----	7.13
10-SI031-SS-0-1	5.34	12.0	1.85	49.33	5.9	0.55	< 28.80	-----	28.80
10-SI032-SS-0-1	0.83	25.8	0.45	1.43	23.0	0.10	< 9.69	-----	9.69
10-SI033-SS-0-1	0.39	26.8	0.23	0.52	27.5	0.01	< 6.12	-----	6.12
10-SI034-SS-0-1	17.57	16.7	5.64	100.20	6.7	0.91	< 112.00	-----	112.00
10-SI035-SS-0-1	1.90	19.8	1.37	8.21	10.0	0.30	< 23.40	-----	23.40
10-SI036-SS-0-1	6.14	16.0	2.77	40.39	7.0	0.57	< 45.80	-----	45.80
10-SI037-SS-0-1	2.18	19.7	1.20	23.18	6.9	0.33	< 21.70	-----	21.70
10-SI038-SS-0-1	0.96	20.0	0.46	1.17	24.0	0.02	< 10.90	-----	10.90
10-SI039-SS-0-1	0.46	37.9	0.33	1.02	25.8	0.10	< 8.02	-----	8.02
10-SI040-SS-0-1	3.85	29.5	1.30	13.02	13.0	0.04	< 48.00	-----	48.00
10-SI041-SS-0-1	0.36	23.9	0.03	0.25	44.0	0.01	< 4.98	-----	4.98
10-SI042-SS-0-1	0.63	26.0	0.35	0.70	31.5	0.02	< 9.69	-----	9.69
10-SI043-SS-0-1	0.41	39.0	0.34	0.75	30.0	0.10	< 8.62	-----	8.62
10-SI044-SS-0-1 (1)	1.36	14.9	0.53	5.55	9.0	0.14	< 8.92	-----	8.92
10-SI044-SS-1-1 (1)	1.35	15.0	0.48	5.69	9.0	0.15	< 7.96	-----	7.96
10-SI045-SS-0-1	0.57	20.0	0.26	1.07	17.9	0.08	< 4.19	-----	4.19

* Reported data are taken from the Nuclide Identification Report

MDA : Minimum Detectable Activity

Error: 2 sigma (95% confidence interval)

< : Nuclide undetected or less than the MDA. The nuclide is assumed to be present at the MDA Value.

----- Not Applicable

N/R: Value not reported by laboratory

(1) Sample (-0-1) and its duplicate (-1-1)

**Table 10-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
10A-001	1.00	10A08001		2.88	0.14	0.46	8.61	0.20	0.52	17.30	U	---	17.30
10A-001	2.00	10A08002		1.07	0.08	0.24	1.70	0.09	0.28	7.11	U	---	7.11
10A-001	4.50	10A08003		ARCHIVED									
10A-002	1.50	10A08004		3.32	0.14	0.50	14.96	0.27	0.37	20.00	U	---	20.00
		<i>ThermoRetec</i> ⁽²⁾		2.90	0.29	0.30	13.77	0.66	0.43	6.34	J	4.24	4.77
10A-002	2.50	10A08005		0.75	0.07	0.25	0.83	0.06	0.23	5.94	U	---	5.94
10A-002	3.50	10A08006		ARCHIVED									
10A-003	1.50	10A08007		1.50	0.08	0.32	2.85	0.10	0.20	10.60	U	---	10.60
10A-003	5.00	10A08008		0.88	0.06	0.22	1.43	0.07	0.18	8.79	U	---	8.79
10A-003	7.00	10A08009		ARCHIVED									
10A-004	2.00	10A08010		2.83	0.13	0.38	6.78	0.17	0.29	11.50	U	---	11.50
10A-004	3.00	10A08011		1.09	0.08	0.23	1.08	0.06	0.18	8.29	U	---	8.29
10A-004	4.50	10A08012		ARCHIVED									
10A-005	2.50	10A08013		2.78	0.12	0.33	3.17	0.11	0.22	9.20	U	---	9.20
10A-005	3.00	10A08014		1.62	0.09	0.26	1.64	0.08	0.22	10.60	U	---	10.60
10A-005	4.50	10A08015		ARCHIVED									
10A-006	2.50	10A08016		3.00	0.13	0.39	3.43	0.12	0.25	10.20	U	---	10.20
		<i>ThermoRetec</i> ⁽²⁾		2.84	0.30	0.24	3.37	0.25	0.38	3.33	J	2.53	3.49
10A-006	2.50	10A08017	X	3.68	0.14	0.39	4.04	0.13	0.29	15.60	U	---	15.60
10A-006	5.00	10A08018		1.20	0.09	0.28	1.25	0.08	0.30	9.19	U	---	9.19
10A-006	8.50	10A08019		ARCHIVED									
10A-007	0.50	10A08020		1.44	0.07	0.24	2.90	0.09	0.19	9.46	U	---	9.46
10A-007	4.50	10A08021		2.59	0.16	0.35	2.54	0.11	0.24	10.50	U	---	10.50
10A-007	8.50	10A08022		0.80	0.07	0.20	1.01	0.06	0.23	7.67	U	---	7.67
10A-008	2.50	10A08023		2.81	0.16	0.57	8.69	0.23	0.56	13.60	U	---	13.60
10A-008	4.50	10A08024		0.81	0.08	0.19	0.95	0.07	0.25	5.77	U	---	5.77
10A-008	6.50	10A08025		ARCHIVED									
10A-009	1.50	10A08026		1.71	0.09	0.30	2.41	0.08	0.21	10.70	U	---	10.70
10A-009	3.00	10A08027		1.78	0.09	0.29	1.75	0.08	0.21	11.40	U	---	11.40
10A-009	4.50	10A08028		ARCHIVED									
10A-010				NO HOLE- REFUSAL									

**Table 10-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
10A-011	1.50	10A08029		3.45	0.14	0.16	3.53	0.12	0.27	4.22	J	2.93	9.64
10A-011	4.50	10A08030		1.01	0.08	0.23	1.23	0.07	0.25	8.58	U	---	8.58
10A-011	6.00	10A08031		ARCHIVED									
10A-012				NO HOLE- REFUSAL									
10A-013	0.50	10A08032		9.99	0.23	0.46	19.00	0.31	0.38	14.60	U	---	14.60
<i>ThermoRetec</i> ⁽²⁾		10A08032		9.58	0.64	0.36	19.71	0.91	0.56	1.26	U	4.02	5.59
10A-013	5.00	10A08033		0.65	0.07	0.18	1.20	0.07	0.23	5.94	U	---	5.94
10A-013	6.00	10A08034		ARCHIVED									
10A-014	0.50	10A08035		8.41	0.21	0.58	21.85	0.34	0.42	22.70	U	---	22.70
<i>ThermoRetec</i> ⁽²⁾		10A08035		6.51	0.47	0.32	19.45	0.88	0.48	5.32	J	4.21	5.27
10A-014	2.50	10A08036		0.89	0.08	0.18	1.09	0.07	0.23	6.24	U	---	6.24
<i>ThermoRetec</i> ⁽²⁾		10A08036		0.89	0.15	0.11	1.40	0.13	0.18	2.08		1.84	2.00
10A-014	2.50	10A08037	X	0.99	0.07	0.21	1.37	0.06	0.17	8.25	U	---	8.25
10A-014	5.00	10A08038		ARCHIVED									
10A-015	2.50	10A08039		0.94	0.10	0.27	2.30	0.08	0.27	7.00	U	---	7.00
10A-016	6.00	10A08040		1.03	0.08	0.21	1.32	0.07	0.27	9.36	U	---	9.36
10A-016	15.50	10A08041		0.92	0.10	0.27	1.36	0.09	0.32	7.37	U	---	7.37
10A-017	8.50	10A08042		6.92	0.25	0.99	60.32	0.81	0.74	32.29		7.62	30.20
10A-017	9.50	10A08043		0.39	0.06	0.18	0.81	0.05	0.18	4.92	U	---	4.92
10A-017	11.00	10A08044		ARCHIVED									
10A-018	6.00	10A08045		0.41	0.05	0.18	0.47	0.05	0.19	6.24	U	---	6.24
10A-018	9.50	10A08046		0.50	0.06	0.15	0.54	0.05	0.17	4.33	U	---	4.33
10A-018	11.00	10A08047		ARCHIVED									
10A-019	4.50	10A08048		1.60	0.11	0.34	3.81	0.13	0.39	13.30	U	---	13.30
10A-019	5.50	10A08049		0.70	0.08	0.23	0.93	0.06	0.22	5.39	U	---	5.39
10A-019	9.00	10A08050		ARCHIVED									
10A-020	4.50	10A08051		1.80	0.10	0.41	6.72	0.16	0.28	10.40	U	---	10.40
10A-020	6.00	10A08052		0.89	0.07	0.23	1.06	0.06	0.18	8.82	U	---	8.82
10A-020	8.50	10A08053		ARCHIVED									
10A-021	2.00	10A08054		42.51	0.82	1.63	127.45	1.57	1.17	46.60	U	---	46.60
10A-021	6.50	10A08055		0.68	0.07	0.22	0.99	0.05	0.17	8.08	U	---	8.08
10A-021	8.50	10A08056		ARCHIVED									

**Table 10-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
10A-022	4.50	10A08057		7.38	0.31	1.43	128.81	1.54	1.02	39.60	U	---	39.60
10A-022	6.50	10A08058		0.93	0.08	0.20	1.44	0.08	0.29	9.35	U	---	9.35
10A-022	6.50	10A08059	X	0.91	0.08	0.25	1.30	0.07	0.24	6.32	U	---	6.32
10A-022	9.00	10A08060		ARCHIVED									
10A-023	5.00	10A08061		0.70	0.06	0.20	0.69	0.04	0.15	6.88	U	---	6.88
10A-023	6.50	10A08062		2.45	0.12	0.16	4.11	0.15	0.44	10.70	U	---	10.70
10A-023	8.50	10A08063		ARCHIVED									
10A-024	3.00	10A08064		1.49	0.06	0.31	4.13	0.11	0.22	11.30	U	---	11.30
10A-024	6.00	10A08065		0.75	0.08	0.22	0.85	0.06	0.21	5.24	U	---	5.24
10A-024	8.50	10A08066		ARCHIVED									
10A-025	2.50	10A08067		2.72	0.13	0.33	2.97	0.10	0.27	12.80	U	---	12.80
10A-025	4.50	10A08068		0.84	0.08	0.24	1.09	0.07	0.24	7.95	U	---	7.95
10A-025	6.00	10A08069		ARCHIVED									
10A-026	2.00	10A08070		4.15	0.14	0.41	10.77	0.21	0.31	16.70	U	---	16.70
10A-026	5.00	10A08071		0.93	0.08	0.26	1.32	0.06	0.17	6.45	U	---	6.45
10A-026	6.50	10A08072		ARCHIVED									
10A-027	4.50	10A08073		27.37	0.54	1.24	77.12	1.01	0.88	35.70	U	---	35.70
10A-027	6.50	10A08074		0.77	0.08	0.28	1.71	0.08	0.28	9.54	U	---	9.54
10A-027	8.50	10A08075		ARCHIVED									
10A-028	2.00	10A08076		3.97	0.15	0.46	11.15	0.23	0.37	19.60	U	---	19.60
<i>ThermoRetec</i> ⁽²⁾		<i>10A08076</i>		<i>3.01</i>	<i>0.33</i>	<i>0.31</i>	<i>9.31</i>	<i>0.50</i>	<i>0.46</i>	<i>1.61</i>	<i>U</i>	<i>2.09</i>	<i>4.27</i>
10A-028	3.00	10A08077		2.91	0.14	0.45	2.68	0.12	0.26	10.70	U	---	10.70
10A-028	4.50	10A08078		ARCHIVED									
10A-029	2.00	10A08079		4.63	0.18	0.59	11.73	0.25	0.40	21.20	U	---	21.20
<i>ThermoRetec</i> ⁽²⁾		<i>10A08079</i>		<i>4.29</i>	<i>0.39</i>	<i>0.33</i>	<i>10.73</i>	<i>0.59</i>	<i>0.47</i>	<i>9.05</i>	<i>J</i>	<i>5.44</i>	<i>5.25</i>
10A-029	3.00	10A08080		0.84	0.07	0.22	1.47	0.08	0.23	6.52	U	---	6.52
10A-029	7.00	10A08081		0.76	0.07	0.34	7.53	0.16	0.26	13.70	U	---	13.70
10A-029	8.50	10A08082		0.84	0.09	0.26	2.90	0.09	0.16	7.04	U	---	7.04
10A-029	10.50	10A08083		ARCHIVED									
10A-030	5.00	10A08084		2.04	0.09	0.30	4.95	0.12	0.24	12.50	U	---	12.50
10A-030	9.50	10A08085		1.10	0.08	0.22	1.97	0.09	0.26	6.57	U	---	6.57
10A-030	9.50	10A08086	X	1.25	0.07	0.24	2.18	0.08	0.20	9.77	U	---	9.77
10A-030	10.50	10A08087		ARCHIVED									

**Table 10-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
10A-031	1.00	10A08088		2.78	0.12	0.41	4.21	0.13	0.26	10.20	U	---	10.20
10A-031	5.00	10A08089		1.19	0.08	0.26	1.11	0.06	0.18	8.64	U	---	8.64
10A-031	6.50	10A08090		ARCHIVED									
10A-032	2.00	10A08091		1.98	0.10	0.35	4.31	0.12	0.24	9.12	U	---	9.12
10A-032	4.50	10A08092		0.97	0.07	0.26	1.58	0.08	0.29	8.90	U	---	8.90
10A-032	8.50	10A08093		ARCHIVED									
10A-033	0.50	10A08094		1.61	0.08	0.27	3.52	0.10	0.19	7.73	U	---	7.73
10A-033	2.00	10A08095		0.69	0.06	0.21	0.80	0.06	0.22	5.51	U	---	5.51
10A-033	4.50	10A08096		ARCHIVED									
10A-034	3.00	10A08097		1.24	0.07	0.27	1.51	0.07	0.18	8.73	U	---	8.73
10A-034	4.50	10A08098		1.67	0.14	0.34	2.42	0.13	0.41	9.85	U	---	9.85
10A-034	8.50	10A08099		ARCHIVED									
10A-035	2.50	10A08100		1.18	0.09	0.25	1.55	0.08	0.28	9.39	U	---	9.39
10A-035	4.50	10A08101		0.79	0.09	0.25	0.89	0.07	0.26	6.72	U	---	6.72
10A-035	6.00	10A08102		ARCHIVED									
10A-036	2.00	10A08103		126.98	2.02	4.84	1058.82	10.73	4.58	158.00	U	---	158.00
10A-036	6.50	10A08104		0.45	0.07	0.20	0.61	0.05	0.18	4.70	U	---	4.70
10A-036	9.00	10A08105		ARCHIVED									
10A-037	6.00	10A08106		1.30	0.09	0.30	2.06	0.10	0.35	8.20	U	---	8.20
10A-037	9.50	10A08107		0.86	0.09	0.25	1.00	0.07	0.26	8.80	U	---	8.80
10A-037	12.50	10A08108		ARCHIVED									
10A-038	2.00	10A08109		1.56	0.08	0.29	3.58	0.10	0.18	7.33	U	---	7.33
10A-038	4.50	10A08110		0.96	0.07	0.21	1.40	0.06	0.16	7.97	U	---	7.97
10A-038	4.50	10A08111	X	0.57	0.08	0.28	0.96	0.07	0.22	5.35	U	---	5.35
10A-038	7.00	10A08112		0.90	0.07	0.22	1.18	0.07	0.27	8.72	U	---	8.72
10A-039	1.50	10A08113		2.03	0.10	0.35	7.30	0.17	0.25	10.20	U	---	10.20
10A-039	2.00	10A08114		0.68	0.06	0.20	1.02	0.06	0.23	7.51	U	---	7.51
10A-039	3.50	10A08115		0.45	0.07	0.23	0.80	0.06	0.20	4.89	U	---	4.89
10A-040	1.50	10A08116		2.97	0.13	0.40	8.82	0.19	0.46	2.69	J	4.81	16.00
10A-040	2.50	10A08117		0.84	0.09	0.25	1.96	0.08	0.25	6.60	U	---	6.60
10A-040	5.00	10A08118		ARCHIVED									

**Table 10-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
10A-041	1.50	10A08119		1.04	0.07	0.24	1.35	0.07	0.18	9.27	U	---	9.27
10A-041	3.00	10A08120		0.77	0.08	0.16	1.03	0.06	0.21	5.73	U	---	5.73
10A-041	4.50	10A08121		ARCHIVED									
10A-042	1.00	10A08122		0.98	0.10	0.32	1.96	0.10	0.34	11.10	U	---	11.10
10A-042	2.00	10A08123		0.83	0.07	0.23	1.19	0.07	0.22	5.92	U	---	5.92
10A-042	4.50	10A08124		ARCHIVED									
10A-043	2.00	10A08125		2.06	0.10	0.31	5.45	0.13	0.26	13.80	U	---	13.80
10A-043	4.50	10A08126		1.04	0.08	0.23	1.75	0.08	0.29	6.69	U	---	6.69
10A-043	6.00	10A08127		ARCHIVED									
10A-044	0.50	10A08128		1.45	0.07	0.22	2.29	0.08	0.19	9.12	U	---	9.12
10A-044	1.50	10A08129		0.92	0.07	0.16	0.99	0.05	0.12	5.11	U	---	5.11
10A-044	1.50	10A08130	X	0.86	0.08	0.20	1.06	0.06	0.25	8.03	U	---	8.03
10A-044	4.50	10A08131		ARCHIVED									
10A-045	2.00	10A08132		2.03	0.09	0.27	3.49	0.10	0.20	8.35	U	---	8.35
10A-045	4.50	10A08133		0.81	0.09	0.30	1.72	0.09	0.32	10.80	U	---	10.80
10A-045	6.00	10A08134		ARCHIVED									
10A-046	0.50	10A08135		1.77	0.09	0.36	8.63	0.17	0.26	9.81	U	---	9.81
<i>ThermoRetec</i> ⁽²⁾		<i>10A08135</i>		2.02	0.21	0.22	9.59	0.48	0.33	2.00	U	2.29	3.33
10A-046	1.50	10A08136		0.80	0.07	0.21	1.36	0.07	0.23	8.27	U	---	8.27
10A-046	3.00	10A08137		ARCHIVED									
10A-047	2.00	10A08138		0.77	0.07	0.22	1.10	0.06	0.14	5.22	U	---	5.22
10A-047	3.00	10A08139		0.74	0.06	0.21	1.05	0.05	0.16	7.90	U	---	7.90
10A-047	4.50	10A08140		ARCHIVED									
10A-048	2.00	10A08141		0.64	0.07	0.22	1.02	0.06	0.20	5.18	U	---	5.18
10A-048	3.00	10A08142		0.94	0.07	0.21	1.22	0.07	0.25	8.43	U	---	8.43
10A-048	4.50	10A08143		ARCHIVED									
10A-049	1.50	10A08144		ARCHIVED									
10A-049	2.50	10A08145		1.04	0.08	0.24	1.28	0.06	0.18	8.39	U	---	8.39
10A-049	5.50	10A08146		ARCHIVED									
10A-050	1.00	10A08147		1.64	0.08	0.24	3.14	0.09	0.20	7.38	U	---	7.38
10A-050	2.00	10A08148		0.83	0.07	0.22	1.23	0.07	0.23	8.23	U	---	8.23
10A-050	4.50	10A08149		ARCHIVED									

**Table 10-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
10A-051	1.50	10A08150		1.18	0.07	0.20	1.28	0.07	0.24	6.21	U	---	6.21
10A-051	2.50	10A08151		0.73	0.07	0.25	1.15	0.06	0.17	8.24	U	---	8.24
10A-051	4.50	10A08152		0.67	0.05	0.13	0.76	0.05	0.20	4.56	U	---	4.56
10A-051	4.50	10A08153	X	0.65	0.06	0.18	0.93	0.06	0.22	7.21	U	---	7.21
10A-052	4.50	10A08154		3.70	0.16	0.57	10.40	0.23	0.36	14.60	U	---	14.60
10A-052	5.50	10A08155		1.05	0.09	0.26	1.28	0.08	0.31	10.20	U	---	10.20
10A-052	7.00	10A08156		ARCHIVED									
10A-053	3.00	10A08157		8.59	0.23	0.60	22.35	0.37	0.44	17.70	U	---	17.70
<i>ThermoRetec</i> ⁽²⁾		10A08157		7.15	0.54	0.39	21.31	0.99	0.58	2.54	U	4.24	5.61
10A-053	4.50	10A08158		1.75	0.10	0.29	4.21	0.13	0.35	9.00	U	---	9.00
10A-053	7.00	10A08159		ARCHIVED									
10A-054	2.00	10A08160		0.85	0.08	0.22	1.72	0.08	0.26	8.66	U	---	8.66
10A-054	3.50	10A08161		0.60	0.07	0.18	1.05	0.06	0.20	6.67	U	---	6.67
10A-054	4.50	10A08162		ARCHIVED									
10A-055	1.00	10A08163		0.43	0.00	0.43	1.40	0.08	0.26	6.48	U	---	6.48
10A-055	2.00	10A08164		0.89	0.08	0.21	1.10	0.06	0.15	5.42	U	---	5.42
10A-055	4.50	10A08165		ARCHIVED									
10A-056	1.50	10A08166		0.83	0.07	0.21	1.36	0.07	0.28	8.91	U	---	8.91
10A-056	2.50	10A08167		0.38	0.06	0.18	0.64	0.05	0.19	4.65	U	---	4.65
10A-056	4.50	10A08168		ARCHIVED									
10A-057	3.00	10A08169		0.83	0.08	0.25	1.29	0.07	0.27	9.41	U	---	9.41
10A-057	5.00	10A08170		0.83	0.09	0.21	1.09	0.07	0.25	6.12	U	---	6.12
10A-057	6.00	10A08171		ARCHIVED									
10A-058	0.50	10A08172		14.29	0.34	1.15	102.53	1.17	0.92	46.20	U	---	46.20
10A-058	5.00	10A08173		1.66	0.09	0.29	2.42	0.09	0.22	10.50	U	---	10.50
10A-058	5.00	10A08174	X	1.49	0.09	0.27	2.05	0.10	0.30	7.11	U	---	7.11
10A-058	6.50	10A08175		ARCHIVED									
10A-059	2.00	10A08176		0.90	0.06	0.22	1.02	0.05	0.16	7.65	U	---	7.65
10A-059	4.50	10A08177		0.71	0.08	0.23	0.81	0.06	0.21	5.59	U	---	5.59
10A-059	6.00	10A08178		ARCHIVED									
10A-060	1.00	10A08179		1.96	0.10	0.27	3.26	0.11	0.35	12.20	U	---	12.20
10A-060	2.00	10A08180		0.81	0.07	0.16	0.96	0.06	0.23	5.38	U	---	5.38
10A-060	4.50	10A08181		ARCHIVED									

**Table 10-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
10A-061	1.00	10A08182		0.79	0.07	0.19	1.05	0.06	0.22	7.79	U	---	7.79
10A-061	2.00	10A08183		0.63	0.07	0.20	0.88	0.06	0.20	5.09	U	---	5.09
10A-061	4.50	10A08184		ARCHIVED									
10A-062	0.50	10A08185		1.80	0.13	0.43	7.51	0.20	0.52	12.80	U	---	12.80
10A-062	1.00	10A08186		0.93	0.08	0.27	1.36	0.07	0.27	8.83	U	---	8.83
10A-062	4.50	10A08187		ARCHIVED									
10A-063	0.50	10A08188		5.98	0.20	0.68	33.00	0.46	0.50	20.00	U	---	20.00
10A-063	2.00	10A08189		0.60	0.06	0.18	0.75	0.06	0.23	6.89	U	---	6.89
10A-063	4.50	10A08190		ARCHIVED									
10A-064	0.50	10A08191		1.91	0.10	0.33	4.64	0.14	0.25	9.63	U	---	9.63
10A-064	2.00	10A08192		0.77	0.08	0.23	1.18	0.07	0.27	8.65	U	---	8.65
10A-064	4.50	10A08193		ARCHIVED									
10A-065	0.50	10A08194		1.26	0.10	0.38	5.18	0.15	0.27	10.30	U	---	10.30
10A-065	2.00	10A08195		0.74	0.08	0.23	0.95	0.06	0.26	8.38	U	---	8.38
10A-065	2.00	10A08196	X	0.70	0.07	0.19	0.97	0.06	0.20	5.27	U	---	5.27
10A-065	4.50	10A08197		ARCHIVED									
10A-066	0.50	10A08198		2.36	0.13	0.42	6.68	0.19	0.53	18.10	U	---	18.10
<i>ThermoRetec</i> ⁽²⁾		10A08198		2.17	0.29	0.33	5.89	0.53	0.46	8.18	J	4.89	4.71
10A-066	5.00	10A08199		1.07	0.08	0.23	1.77	0.08	0.28	6.72	U	---	6.72
10A-066	6.00	10A08200		ARCHIVED									
10A-067	1.00	10A08201		1.24	0.07	0.27	2.41	0.08	0.20	9.81	U	---	9.81
10A-067	3.00	10A08202		0.67	0.08	0.23	1.23	0.07	0.26	6.35	U	---	6.35
10A-067	5.00	10A08203		ARCHIVED									
10A-068	2.00	10A08204		6.75	0.22	0.61	28.76	0.46	0.54	30.20	U	---	30.20
10A-068	2.50	10A08205		1.11	0.07	0.26	2.68	0.09	0.18	7.01	U	---	7.01
10A-068	4.50	10A08206		ARCHIVED									
10A-069	0.50	10A08207		3.63	0.15	0.51	12.58	0.26	0.40	21.50	U	---	21.50
<i>ThermoRetec</i> ⁽²⁾		10A08207		3.29	0.34	0.32	11.95	0.61	0.46	3.89	U	3.98	4.90
10A-069	1.50	10A08208		0.55	0.05	0.18	0.66	0.05	0.20	5.27	U	---	5.27
10A-069	4.50	10A08209		ARCHIVED									

**Table 10-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
10A-070	0.50	10A08210		12.54	0.29	0.81	51.92	0.69	0.63	33.30	U	---	33.30
10A-070	2.00	10A08211		0.93	0.07	0.21	1.21	0.06	0.15	5.50	U	---	5.50
10A-071	1.50	10A08212		2.09	0.10	0.34	4.60	0.12	0.25	11.90	U	---	11.90
<i>ThermoRetec</i> ⁽²⁾		10A08212		1.64	0.19	0.18	4.21	0.26	0.26	2.00	UJ	2.05	2.71
10A-071	2.00	10A08213		1.14	0.09	0.27	1.45	0.07	0.15	6.48	U	---	6.48
10A-072	1.00	10A08214		1.64	0.11	0.33	2.45	0.10	0.29	13.00	U	---	13.00
10A-073	1.00	10A08215		1.78	0.12	0.37	1.83	0.09	0.22	7.61	U	---	7.61
10A-073	2.00	10A08216		1.21	0.11	0.29	1.43	0.09	0.33	11.00	U	---	11.00
10A-073	2.00	10A08217	X	1.02	0.09	0.21	1.12	0.08	0.29	7.09	U	---	7.09
10A-073	4.50	10A08218		ARCHIVED									
10A-074	1.00	10A08219		1.31	0.09	0.31	4.01	0.12	0.34	11.70	U	---	11.70
10A-074	2.00	10A08220		2.15	0.13	0.30	2.25	0.10	0.22	9.46	U	---	9.46
10A-074	4.50	10A08221		ARCHIVED									
10A-075	1.50	10A08222		2.70	0.12	0.35	3.74	0.12	0.28	13.90	U	---	13.90
10A-075	4.50	10A08223		0.94	0.08	0.22	1.19	0.06	0.15	6.07	U	---	6.07
10A-075	6.50	10A08224		ARCHIVED									
10A-076	2.00	10A08225		2.86	0.13	0.35	3.02	0.10	0.28	12.80	U	---	12.80
10A-076	4.50	10A08226		2.13	0.13	0.29	2.26	0.10	0.25	9.15	U	---	9.15
10A-076	5.50	10A08227		ARCHIVED									
10A-077	1.50	10A08228		4.12	0.15	0.42	4.16	0.13	0.32	16.80	U	---	16.80
10A-077	1.50	10A08229	X	3.40	0.16	0.37	3.47	0.12	0.27	11.10	U	---	11.10
10A-077	4.50	10A08230		2.33	0.13	0.34	2.57	0.10	0.26	13.00	U	---	13.00
10A-077	5.50	10A08231		ARCHIVED									
10A-078	1.50	10A08232		3.47	0.13	0.33	3.31	0.11	0.26	9.62	U	---	9.62
10A-078	2.00	10A08233		2.16	0.13	0.37	1.01	0.09	0.41	12.00	U	---	12.00
10A-078	7.00	10A08234		ARCHIVED									
10A-079	0.50	10A08235		5.57	0.17	0.50	13.52	0.25	0.34	13.90	U	---	13.90
<i>ThermoRetec</i> ⁽²⁾		10A08235		4.67	0.38	0.31	13.23	0.67	0.45	3.44	J	2.97	4.47
10A-079	4.50	10A08236		0.98	0.07	0.22	1.30	0.06	0.18	8.51	U	---	8.51
10A-079	6.00	10A08237		ARCHIVED									

**Table 10-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
10A-080	0.50	10A08238		3.74	0.17	0.56	15.29	0.31	0.41	16.60	U	---	16.60
<i>ThermoRetec⁽²⁾</i>		10A08238		3.67	0.37	0.34	14.81	0.75	0.53	2.62	U	2.89	5.44
10A-080	2.50	10A08239		0.50	0.07	0.21	0.76	0.05	0.20	6.55	U	---	6.55
10A-080	4.50	10A08240		ARCHIVED									
10A-081	1.50	10A08241		2.64	0.12	0.41	6.60	0.17	0.30	10.60	U	---	10.60
10A-081	4.50	10A08242		1.26	0.10	0.29	2.35	0.09	0.29	10.10	U	---	10.10
10A-081	6.00	10A08243		ARCHIVED									
10A-082	1.00	10A08244		2.82	0.13	0.44	9.50	0.21	0.31	12.20	U	---	12.20
10A-082	2.50	10A08245		2.88	0.12	0.35	4.37	0.13	0.28	14.20	U	---	14.20
10A-083	1.50	10A08246		1.25	0.10	0.36	1.79	0.10	0.31	7.47	U	---	7.47
10A-083	2.00	10A08247		0.90	0.07	0.19	1.09	0.06	0.25	7.65	U	---	7.65
10A-083	4.50	10A08248		ARCHIVED									
10A-084	1.50	10A08249		3.62	0.16	0.49	10.40	0.23	0.35	14.70	U	---	14.70
10A-084	2.00	10A08250		0.64	0.08	0.26	1.13	0.07	0.24	7.86	U	---	7.86
10A-084	4.50	10A08251		0.67	0.07	0.21	0.98	0.06	0.21	5.33	U	---	5.33
10A-084	4.50	10A08252	X	0.73	0.08	0.25	1.15	0.07	0.26	8.77	U	---	8.77
10A-085	2.50	10A08253		2.87	0.16	0.37	3.02	0.13	0.42	10.20	U	---	10.20
10A-085	3.00	10A08254		1.57	0.10	0.31	1.77	0.08	0.22	10.80	U	---	10.80
10A-085	6.00	10A08255		ARCHIVED									
10A-086	2.00	10A08256		1.30	0.08	0.23	2.05	0.08	0.17	7.09	U	---	7.09
10A-086	4.50	10A08257		1.05	0.08	0.27	1.70	0.07	0.19	9.43	U	---	9.43
10A-086	5.50	10A08258		ARCHIVED									
10A-087	0.50	10A08259		1.25	0.09	0.31	3.03	0.10	0.19	7.40	U	---	7.40
10A-087	1.50	10A08260		0.68	0.06	0.18	0.72	0.05	0.20	6.81	U	---	6.81
10A-087	4.50	10A08261		ARCHIVED									
10A-088	0.50	10A08262		0.94	0.11	0.30	0.98	0.10	0.34	8.25	U	---	8.25
10A-088	5.00	10A08263		1.74	0.12	0.29	2.11	0.10	0.27	12.70	U	---	12.70
10A-088	7.00	10A08264		ARCHIVED									
10A-089	2.50	10A08265		2.80	0.14	0.18	2.90	0.11	0.23	10.20	U	---	10.20
10A-089	3.50	10A08266		1.36	0.09	0.27	1.56	0.08	0.31	10.20	U	---	10.20
10A-089	5.00	10A08267		0.66	0.07	0.19	0.65	0.05	0.19	4.51	U	---	4.51

**Table 10-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
<i>10A-090</i>	3.00	10A08268		0.75	0.06	0.18	0.91	0.06	0.24	7.34	U	---	7.34
<i>10A-090</i>	5.00	10A08269		0.61	0.07	0.20	0.77	0.06	0.21	5.14	U	---	5.14
<i>10A-090</i>	6.50	10A08270		1.84	0.10	0.27	1.60	0.08	0.22	10.40	U	---	10.40
<i>10A-091</i>	2.00	10A08271		1.26	0.10	0.28	2.44	0.10	0.31	7.65	U	---	7.65
<i>10A-091</i>	3.00	10A08272		0.76	0.08	0.25	0.84	0.06	0.24	7.46	U	---	7.46
<i>10A-091</i>	5.00	10A08273		0.77	0.07	0.21	1.02	0.05	0.14	5.02	U	---	5.02
<i>10A-092</i>	1.00	10A08274		1.18	0.09	0.24	1.13	0.07	0.30	10.20	U	---	10.20
<i>10A-092</i>	5.00	10A08275		0.54	0.07	0.20	0.75	0.05	0.21	4.77	U	---	4.77
<i>10A-092</i>	7.00	10A08276		0.59	0.07	0.19	0.59	0.05	0.22	7.03	U	---	7.03
<i>10A-092</i>	7.00	10A08277	X	0.42	0.06	0.16	0.54	0.05	0.16	4.42	U	---	4.42

Error: 2 sigma (95% confidence interval)

- Not Applicable
- U Undetected or Negative Concentration Less Than the MDA
- J Estimated
- MDA Minimum Detectable Activity

- (1) The sample marked with an "X" for duplicate is a duplicate of the sample listed directly above it. Duplicate samples are prepared by homogenizing soil above and below the centerpoint and then separating for analysis. The depth listed is the center point.
- (2) Approximately 10% of all radiological soil samples collected under the PDI Program were sent to ThermoRetec, an off-site laboratory, for confirmatory radiological analyses. Results from ThermoRetec are presented in this table in italicized font immediately below the MISS On-Site field laboratory result for that same sample.

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020582	10A-020584	10A-020586
	Sample Location	10A-001	10A-002	10A-003
	Sample Depth (feet)	5 - 8	6 - 9	6 - 8
	Sample Date	03/29/00	03/29/00	03/29/00
	Units			
<i>Miscellaneous</i>				
Chromium VI	mg/kg	0.46U	0.46U	0.49U
Corrosivity by pH	Soil pH	7.2	7.7	6.7
Cyanide, Reactive	mg/kg	0.50U	0.50U	0.50U
Cyanide, Total	mg/kg	0.57U	0.55U	0.66
Sulfide, Reactive	mg/kg	24.0U	24.0U	24.0U
<i>PCBs and Pesticides</i>				
4,4'-DDD	ug/kg	3.8U	7.7U	4.1U
4,4'-DDE	ug/kg	3.8U	7.7U	4.1U
4,4'-DDT	ug/kg	3.8U	7.7U	4.1U
Aldrin	ug/kg	1.9U	3.9U	2.0U
Alpha-BHC	ug/kg	1.9U	3.9U	2.0U
alpha-Chlordane	ug/kg	1.9U	3.9U	2.0U
Aroclor-1016	ug/kg	38U	38U	41U
Aroclor-1221	ug/kg	77U	77U	82U
Aroclor-1232	ug/kg	38U	38U	41U
Aroclor-1242	ug/kg	38U	38U	41U
Aroclor-1248	ug/kg	38U	38U	41U
Aroclor-1254	ug/kg	38U	38U	41U
Aroclor-1260	ug/kg	38U	38U	41U
Beta-BHC	ug/kg	1.9U	3.9U	2.0U
Delta-BHC	ug/kg	1.9U	3.9U	2.0U
Dieldrin	ug/kg	3.8U	7.7U	4.1U
Endosulfan I	ug/kg	1.9U	3.9U	2.0U
Endosulfan II	ug/kg	3.8U	7.7U	4.1U
Endosulfan sulfate	ug/kg	3.8U	7.7U	4.1U
Endrin	ug/kg	3.8U	7.7U	4.1U
Endrin aldehyde	ug/kg	3.8U	7.7U	4.1U
Endrin ketone	ug/kg	3.8U	7.7U	4.1U
gamma-BHC (Lindane)	ug/kg	1.9U	3.9U	2.0U
gamma-Chlordane	ug/kg	1.9U	3.9U	2.0U
Heptachlor	ug/kg	1.9U	3.9U	2.0U
Heptachlor epoxide	ug/kg	1.9U	3.9U	2.0U
Methoxychlor	ug/kg	19U	39U	20U
Toxaphene	ug/kg	190U	390U	200U

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020582	10A-020584	10A-020586
	Sample Location	10A-001	10A-002	10A-003
	Sample Depth (feet)	5 - 8	6 - 9	6 - 8
	Sample Date	03/29/00	03/29/00	03/29/00
	Units			
Rare Earth Metals				
Cerium, Total	mg/kg	103	16.5	34
Dysprosium, Total	mg/kg	1.2	0.94	1.3
Lanthanum, Total	mg/kg	58.4	6.2	20.7
Neodymium, Total	mg/kg	43.2	7	15.4
Yttrium, Total	mg/kg	3.9	4.5	6.9
Semivolatile Organics				
1,2,4-Trichlorobenzene	ug/kg	380U	1900U	410U
1,2-Dichlorobenzene	ug/kg	380U	1900U	410U
1,3-Dichlorobenzene	ug/kg	380U	1900U	410U
1,4-Dichlorobenzene	ug/kg	380U	1900U	410U
2,2'-oxybis(1-Chloropropane)	ug/kg	380U	1900U	410U
2,4,5-Trichlorophenol	ug/kg	960U	4800U	1000U
2,4,6-Trichlorophenol	ug/kg	380U	1900U	410U
2,4-Dichlorophenol	ug/kg	380U	1900U	410U
2,4-Dimethylphenol	ug/kg	380U	1900U	410U
2,4-Dinitrophenol	ug/kg	960U	4800U	1000U
2,4-Dinitrotoluene	ug/kg	380U	1900U	410U
2,6-Dinitrotoluene	ug/kg	380U	1900U	410U
2-Chloronaphthalene	ug/kg	380U	1900U	410U
2-Chlorophenol	ug/kg	380U	1900U	410U
2-Methylnaphthalene	ug/kg	380U	1900U	37J
2-Methylphenol	ug/kg	380U	1900U	410U
2-Nitroaniline	ug/kg	960U	4800U	1000U
2-Nitrophenol	ug/kg	380U	1900U	410U
3,3'-Dichlorobenzidine	ug/kg	380U	1900U	410U
3-Nitroaniline	ug/kg	960U	4800U	1000U
4,6-Dinitro-2-methylphenol	ug/kg	960U	4800U	1000U
4-Bromophenyl-phenylether	ug/kg	380U	1900U	410U
4-Chloro-3-methylphenol	ug/kg	380U	1900U	410U
4-Chloroaniline	ug/kg	380U	1900U	410U
4-Chlorophenyl-phenylether	ug/kg	380U	1900U	410U
4-Methylphenol	ug/kg	380U	1900U	410U
4-Nitroaniline	ug/kg	960U	4800U	1000U
4-Nitrophenol	ug/kg	960U	4800U	1000U
Acenaphthene	ug/kg	380U	1900U	410U
Acenaphthylene	ug/kg	380U	1900U	410U
Anthracene	ug/kg	380U	1900U	24J
Benzo(a)anthracene	ug/kg	380U	1900U	84J
Benzo(a)pyrene	ug/kg	380U	1900U	86J
Benzo(b)fluoranthene	ug/kg	380U	1900U	110J

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020582	10A-020584	10A-020586
	Sample Location	10A-001	10A-002	10A-003
	Sample Depth (feet)	5 - 8	6 - 9	6 - 8
	Sample Date	03/29/00	03/29/00	03/29/00
Units				
<i>Semivolatile Organics (continued)</i>				
Benzo(g,h,i)perylene	ug/kg	380U	1900U	75J
Benzo(k)fluoranthene	ug/kg	380U	1900U	99J
bis(2-Chloroethoxy)methane	ug/kg	380U	1900U	410U
bis(2-Chloroethyl)ether	ug/kg	380U	1900U	410U
bis(2-Ethylhexyl)phthalate	ug/kg	380U	1900U	34BJ
Butylbenzylphthalate	ug/kg	380U	1900U	410U
Carbazole	ug/kg	380U	1900U	410U
Chrysene	ug/kg	380U	1900U	170J
Di-n-Butylphthalate	ug/kg	380U	1900U	38BJ
Di-n-Octyl phthalate	ug/kg	380U	1900U	410U
Dibenz(a,h)anthracene	ug/kg	380U	1900U	33J
Dibenzofuran	ug/kg	380U	1900U	410U
Diethylphthalate	ug/kg	380U	1900U	410U
Dimethylphthalate	ug/kg	380U	1900U	410U
Fluoranthene	ug/kg	380U	170J	200J
Fluorene	ug/kg	380U	1900U	410U
Hexachlorobenzene	ug/kg	380U	1900U	410U
Hexachlorobutadiene	ug/kg	380U	1900U	410U
Hexachlorocyclopentadiene	ug/kg	380U	1900U	410U
Hexachloroethane	ug/kg	380U	1900U	410U
Indeno(1,2,3-cd)pyrene	ug/kg	380U	1900U	64J
Isophorone	ug/kg	380U	1900U	410U
N-Nitroso-Di-n-propylamine	ug/kg	380U	1900U	410U
N-Nitrosodiphenylamine (1)	ug/kg	380U	450J	410U
Naphthalene	ug/kg	380U	1900U	35J
Nitrobenzene	ug/kg	380U	1900U	410U
Pentachlorophenol	ug/kg	960U	4800U	1000U
phenanthrene	ug/kg	380U	1900U	200J
phenol	ug/kg	380U	1900U	410U
Pyrene	ug/kg	380U	130J	160J
<i>Total Metals</i>				
Aluminum, Total	mg/kg	5080	4750	3680
Antimony, Total	mg/kg	0.14U	0.17U	6.2
Arsenic, Total	mg/kg	4.1	1.9	11
Barium, Total	mg/kg	19.4	30.6	99.5
Beryllium, Total	mg/kg	0.28	0.32	0.47
Boron, Total	mg/kg	1.3	1.6	4.1
Cadmium, Total	mg/kg	0.02U	0.03U	0.16
Calcium, Total	mg/kg	385	909	7610
Chromium, Total	mg/kg	7.2	8.6	5850

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020582	10A-020584	10A-020586
	Sample Location	10A-001	10A-002	10A-003
	Sample Depth (feet)	5 - 8	6 - 9	6 - 8
	Sample Date	03/29/00	03/29/00	03/29/00
Units				
Total Metals (continued)				
Cobalt, Total	mg/kg	2.5	3.6	4.1
Copper, Total	mg/kg	11.1	8.8	45.2
Iron, Total	mg/kg	9620	12100	8610
Lead, Total	mg/kg	3.9	15.8	80.3
Lithium, Total	mg/kg	6.4	23.3	15.6
Magnesium, Total	mg/kg	1200	1070	694
Manganese, Total	mg/kg	71.7	122	135
Mercury, Total	mg/kg	0.02U	0.05	0.22
Nickel, Total	mg/kg	7.1	7	7.3
Potassium, Total	mg/kg	311	297	340
Selenium, Total	mg/kg	0.34U	0.41U	0.72
Silver, Total	mg/kg	0.07U	0.08U	0.11U
Sodium, Total	mg/kg	82.1	68	116
Thallium, Total	mg/kg	0.29U	0.35U	0.44U
Vanadium, Total	mg/kg	10.3	13.5	13
Zinc, Total	mg/kg	21.8	22.5	52
Volatile Organics				
1,1,1-Trichloroethane	ug/kg	580U	850U	700U
1,1,2,2-Tetrachloroethane	ug/kg	580U	850U	700U
1,1,2-Trichloroethane	ug/kg	580U	850U	700U
1,1-Dichloroethane	ug/kg	580U	850U	700U
1,1-Dichloroethene	ug/kg	580U	850U	700U
1,2-Dichloroethane	ug/kg	580U	850U	700U
1,2-Dichloroethene (total)	ug/kg	580U	850U	700U
1,2-Dichloropropane	ug/kg	580U	850U	700U
2-Butanone	ug/kg	1200U	1700U	1400U
2-Hexanone	ug/kg	1200U	1700U	1400U
4-Methyl-2-pentanone	ug/kg	1200U	1700U	1400U
Acetone	ug/kg	1200U	1700U	1400U
Benzene	ug/kg	580U	850U	700U
Bromodichloromethane	ug/kg	580U	850U	700U
Bromoform	ug/kg	580U	850U	700U
Bromomethane	ug/kg	1200U	1700U	1400U
Carbon Disulfide	ug/kg	580U	850U	700U
Carbon Tetrachloride	ug/kg	580U	850U	700U
Chlorobenzene	ug/kg	580U	850U	700U
Chloroethane	ug/kg	1200U	1700U	1400U
Chloroform	ug/kg	580U	850U	700U

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020582	10A-020584	10A-020586
	Sample Location	10A-001	10A-002	10A-003
	Sample Depth (feet)	5 - 8	6 - 9	6 - 8
	Sample Date	03/29/00	03/29/00	03/29/00
	Units			
<i>Volatile Organics (continued)</i>				
Chloromethane	ug/kg	1200U	1700U	1400U
cis-1,3-Dichloropropene	ug/kg	580U	850U	700U
Dibromochloromethane	ug/kg	580U	850U	700U
Ethylbenzene	ug/kg	580U	850U	700U
Methylene Chloride	ug/kg	580U	850U	700U
Styrene	ug/kg	580U	850U	700U
Tetrachloroethene	ug/kg	580U	850U	700U
Toluene	ug/kg	580U	850U	700U
Trans-1,3-Dichloropropene	ug/kg	580U	850U	700U
Trichloroethene	ug/kg	580U	850U	700U
Vinyl Chloride	ug/kg	1200U	1700U	1400U
Xylene (total)	ug/kg	580U	850U	700U
<i>TCLP Metals</i>				
Arsenic	ug/L	22.9U	22.9U	22.9U
Barium	ug/L	242	334	113
Cadmium	ug/L	4.1U	4.1U	4.1U
Chromium	ug/L	3.4U	3.4U	164
Lead	ug/L	26.6U	26.6U	26.6U
Mercury	ug/L	0.1U	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U	49.7U
Silver	ug/L	3.7U	3.7U	3.7U
<i>TCLP Pesticides</i>				
Alpha-Chlordane	ug/L	0.5U	0.5U	0.5U
Endrin	ug/L	1U	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5U	0.5U	0.5U
Heptachlor	ug/L	0.5U	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5U	0.5U	0.5U
Methoxychlor	ug/L	5U	5U	5U
Toxaphene	ug/L	50U	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U	5U
2,4-D	ug/L	10U	10U	10U

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020582	10A-020584	10A-020586
	Sample Location	10A-001	10A-002	10A-003
	Sample Depth (feet)	5 - 8	6 - 9	6 - 8
	Sample Date	03/29/00	03/29/00	03/29/00
	Units			
<i>TCLP Volatiles</i>				
1,1-Dichloroethene	mg/L	0.025U	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U	0.05U
Benzene	mg/L	0.025U	0.088	0.007J
Carbon tetrachloride	mg/L	0.025U	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>				
1,4-Dichlorobenzene	mg/L	0.05U	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U	0.05U

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020588	10A-020590	10A-020592
	Sample Location	10A-004	10A-005	10A-006
	Sample Depth (feet)	10 - 13	5 - 9	5 - 9
	Sample Date	03/29/00	04/03/2000	04/03/2000
	Units			
<i>Miscellaneous</i>				
Chromium VI	mg/kg	0.44U	0.44U	0.45U
Corrosivity by pH	Soil pH	9	6.5	7.3
Cyanide, Reactive	mg/kg	0.50U	0.50U	0.50U
Cyanide, Total	mg/kg	0.55U	0.53U	0.53U
Sulfide, Reactive	mg/kg	24.0U	24.0U	24.0U
<i>PCBs and Pesticides</i>				
4,4'-DDD	ug/kg	3.6U	3.7U	3.8U
4,4'-DDE	ug/kg	3.6U	3.7U	3.8U
4,4'-DDT	ug/kg	3.6U	3.7U	3.8U
Aldrin	ug/kg	1.8U	1.8U	1.9U
Alpha-BHC	ug/kg	1.8U	1.8U	1.9U
alpha-Chlordane	ug/kg	1.8U	1.8U	1.9U
Aroclor-1016	ug/kg	36U	37U	38U
Aroclor-1221	ug/kg	72U	74U	75U
Aroclor-1232	ug/kg	36U	37U	38U
Aroclor-1242	ug/kg	36U	37U	38U
Aroclor-1248	ug/kg	36U	37U	38U
Aroclor-1254	ug/kg	36U	37U	38U
Aroclor-1260	ug/kg	36U	37U	38U
Beta-BHC	ug/kg	1.8U	1.8U	1.9U
Delta-BHC	ug/kg	1.8U	1.8U	1.9U
Dieldrin	ug/kg	3.6U	3.7U	3.8U
Endosulfan I	ug/kg	1.8U	1.8U	1.9U
Endosulfan II	ug/kg	3.6U	3.7U	3.8U
Endosulfan sulfate	ug/kg	3.6U	3.7U	3.8U
Endrin	ug/kg	3.6U	3.7U	3.8U
Endrin aldehyde	ug/kg	3.6U	3.7U	3.8U
Endrin ketone	ug/kg	3.6U	3.7U	3.8U
gamma-BHC (Lindane)	ug/kg	1.8U	1.8U	1.9U
gamma-Chlordane	ug/kg	1.8U	1.8U	1.9U
Heptachlor	ug/kg	1.8U	1.8U	1.9U
Heptachlor epoxide	ug/kg	1.8U	1.8U	1.9U
Methoxychlor	ug/kg	18U	18U	19U
Toxaphene	ug/kg	180U	180U	190U

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020588	10A-020590	10A-020592
	Sample Location	10A-004	10A-005	10A-006
	Sample Depth (feet)	10 - 13	5 - 9	5 - 9
	Sample Date	03/29/00	04/03/2000	04/03/2000
Units				
<i>Rare Earth Metals</i>				
Cerium, Total	mg/kg	23.2	30.3	28.9
Dysprosium, Total	mg/kg	2	2	2.3
Lanthanum, Total	mg/kg	10.3	12	10.8
Neodymium, Total	mg/kg	14.7	17	16.1
Yttrium, Total	mg/kg	8.4	8.2	8.3
<i>Semivolatile Organics</i>				
1,2,4-Trichlorobenzene	ug/kg	360U	740U	380U
1,2-Dichlorobenzene	ug/kg	360U	740U	380U
1,3-Dichlorobenzene	ug/kg	360U	740U	380U
1,4-Dichlorobenzene	ug/kg	360U	740U	380U
2,2'-oxybis(1-Chloropropane)	ug/kg	360U	740U	380U
2,4,5-Trichlorophenol	ug/kg	910U	1800U	940U
2,4,6-Trichlorophenol	ug/kg	360U	740U	380U
2,4-Dichlorophenol	ug/kg	360U	740U	380U
2,4-Dimethylphenol	ug/kg	360U	740U	380U
2,4-Dinitrophenol	ug/kg	910U	1800U	940U
2,4-Dinitrotoluene	ug/kg	360U	740U	380U
2,6-Dinitrotoluene	ug/kg	360U	740U	380U
2-Chloronaphthalene	ug/kg	360U	740U	380U
2-Chlorophenol	ug/kg	360U	740U	380U
2-Methylnaphthalene	ug/kg	360U	4000	380U
2-Methylphenol	ug/kg	360U	740U	380U
2-Nitroaniline	ug/kg	910U	1800U	940U
2-Nitrophenol	ug/kg	360U	740U	380U
3,3'-Dichlorobenzidine	ug/kg	360U	740U	380U
3-Nitroaniline	ug/kg	910U	1800U	940U
4,6-Dinitro-2-methylphenol	ug/kg	910U	1800U	940U
4-Bromophenyl-phenylether	ug/kg	360U	740U	380U
4-Chloro-3-methylphenol	ug/kg	360U	740U	380U
4-Chloroaniline	ug/kg	360U	740U	380U
4-Chlorophenyl-phenylether	ug/kg	360U	740U	380U
4-Methylphenol	ug/kg	360U	740U	380U
4-Nitroaniline	ug/kg	910U	1800U	940U
4-Nitrophenol	ug/kg	910U	1800U	940U
Acenaphthene	ug/kg	360U	8100D	380U
Acenaphthylene	ug/kg	360U	190J	380U
Anthracene	ug/kg	360U	2000	380U
Benzo(a)anthracene	ug/kg	360U	1400	380U
Benzo(a)pyrene	ug/kg	360U	520J	380U
Benzo(b)fluoranthene	ug/kg	360U	560J	380U

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020588	10A-020590	10A-020592
	Sample Location	10A-004	10A-005	10A-006
	Sample Depth (feet)	10 - 13	5 - 9	5 - 9
	Sample Date	03/29/00	04/03/2000	04/03/2000
Units				
<i>Semivolatile Organics (continued)</i>				
Benzo(g,h,i)perylene	ug/kg	360U	160J	380U
Benzo(k)fluoranthene	ug/kg	360U	640J	380U
bis(2-Chloroethoxy)methane	ug/kg	360U	740U	380U
bis(2-Chloroethyl)ether	ug/kg	360U	740U	380U
bis(2-Ethylhexyl)phthalate	ug/kg	120BJ	120J	36JB
Butylbenzylphthalate	ug/kg	360U	740U	380U
Carbazole	ug/kg	360U	1300	380U
Chrysene	ug/kg	360U	1200	380U
Di-n-Butylphthalate	ug/kg	21BJ	740U	20J
Di-n-Octyl phthalate	ug/kg	360U	740U	380U
Dibenz(a,h)anthracene	ug/kg	360U	740U	380U
Dibenzofuran	ug/kg	360U	4400	380U
Diethylphthalate	ug/kg	360U	740U	380U
Dimethylphthalate	ug/kg	360U	740U	380U
Fluoranthene	ug/kg	360U	8100D	380U
Fluorene	ug/kg	360U	4700	380U
Hexachlorobenzene	ug/kg	360U	740U	380U
Hexachlorobutadiene	ug/kg	360U	740U	380U
Hexachlorocyclopentadiene	ug/kg	360U	740U	380U
Hexachloroethane	ug/kg	360U	740U	380U
Indeno(1,2,3-cd)pyrene	ug/kg	360U	160J	380U
Isophorone	ug/kg	360U	740U	380U
N-Nitroso-Di-n-propylamine	ug/kg	360U	740U	380U
N-Nitrosodiphenylamine (1)	ug/kg	360U	740U	380U
Naphthalene	ug/kg	360U	16000D	380U
Nitrobenzene	ug/kg	360U	740U	380U
Pentachlorophenol	ug/kg	910U	1800U	940U
Phenanthrene	ug/kg	360U	15000D	380U
Phenol	ug/kg	360U	67J	380U
Pyrene	ug/kg	360U	5700	380U
<i>Total Metals</i>				
Aluminum, Total	mg/kg	3310	4900	6170
Antimony, Total	mg/kg	0.15U	0.17U	0.24
Arsenic, Total	mg/kg	3.5	7.3	2
Barium, Total	mg/kg	41.5	45.4	44.4
Beryllium, Total	mg/kg	0.62	0.53	0.43
Boron, Total	mg/kg	2.7	4.8	3.6
Cadmium, Total	mg/kg	0.02U	0.03U	0.03U
Calcium, Total	mg/kg	3660	1330	938
Chromium, Total	mg/kg	28	12.7	10

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020588	10A-020590	10A-020592
	Sample Location	10A-004	10A-005	10A-006
	Sample Depth (feet)	10 - 13	5 - 9	5 - 9
	Sample Date	03/29/00	04/03/2000	04/03/2000
Units				
Total Metals (continued)				
Cobalt, Total	mg/kg	4.5	3.4	5.4
Copper, Total	mg/kg	6.3	19.8	5.7
Iron, Total	mg/kg	12600	12900	12900
Lead, Total	mg/kg	11.6	8	5.8
Lithium, Total	mg/kg	4.4	8.8	5.7
Magnesium, Total	mg/kg	1140	1370	1330
Manganese, Total	mg/kg	457	110	451
Mercury, Total	mg/kg	0.02U	0.11	0.02U
Nickel, Total	mg/kg	10.3	8.3	8.8
Potassium, Total	mg/kg	565	832	630
Selenium, Total	mg/kg	0.4	0.42U	0.43U
Silver, Total	mg/kg	0.07U	0.09U	0.09U
Sodium, Total	mg/kg	158	136	70.2
Thallium, Total	mg/kg	0.31U	0.36U	0.36U
Vanadium, Total	mg/kg	16.5	16.1	14.2
Zinc, Total	mg/kg	18.8	23	18
Volatile Organics				
1,1,1-Trichloroethane	ug/kg	510U	830U	540U
1,1,2,2-Tetrachloroethane	ug/kg	510U	830U	540U
1,1,2-Trichloroethane	ug/kg	510U	830U	540U
1,1-Dichloroethane	ug/kg	510U	830U	540U
1,1-Dichloroethene	ug/kg	510U	830U	540U
1,2-Dichloroethane	ug/kg	510U	830U	540U
1,2-Dichloroethene (total)	ug/kg	510U	830U	540U
1,2-Dichloropropane	ug/kg	510U	830U	540U
2-Butanone	ug/kg	1000U	1700U	1100U
2-Hexanone	ug/kg	1000U	1700U	1100U
4-Methyl-2-pentanone	ug/kg	1000U	1700U	1100U
Acetone	ug/kg	1000U	1700U	1100U
Benzene	ug/kg	510U	830U	540U
Bromodichloromethane	ug/kg	510U	830U	540U
Bromoform	ug/kg	510U	830U	540U
Bromomethane	ug/kg	1000U	1700U	1100U
Carbon Disulfide	ug/kg	510U	830U	540U
Carbon Tetrachloride	ug/kg	510U	830U	540U
Chlorobenzene	ug/kg	510U	830U	540U
Chloroethane	ug/kg	1000U	1700U	1100U
Chloroform	ug/kg	510U	830U	540U

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020588	10A-020590	10A-020592
	Sample Location	10A-004	10A-005	10A-006
	Sample Depth (feet)	10 - 13	5 - 9	5 - 9
	Sample Date	03/29/00	04/03/2000	04/03/2000
Units				
<i>Volatile Organics (continued)</i>				
Chloromethane	ug/kg	1000U	1700U	1100U
cis-1,3-Dichloropropene	ug/kg	510U	830U	540U
Dibromochloromethane	ug/kg	510U	830U	540U
Ethylbenzene	ug/kg	510U	830U	540U
Methylene Chloride	ug/kg	510U	830U	540U
Styrene	ug/kg	510U	830U	540U
Tetrachloroethene	ug/kg	510U	830U	540U
Toluene	ug/kg	510U	830U	540U
Trans-1,3-Dichloropropene	ug/kg	510U	830U	540U
Trichloroethene	ug/kg	510U	830U	540U
Vinyl Chloride	ug/kg	1000U	1700U	1100U
Xylene (total)	ug/kg	510U	830U	540U
<i>TCLP Metals</i>				
Arsenic	ug/L	30U	27.5	22.9U
Barium	ug/L	158	413	507J
Cadmium	ug/L	4.1U	4.1U	4.1U
Chromium	ug/L	3.4U	3.4U	3.4U
Lead	ug/L	26.6U	26.6U	26.6U
Mercury	ug/L	0.1U	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U	49.7U
Silver	ug/L	3.7U	3.7U	3.7U
<i>TCLP Pesticides</i>				
Alpha-Chlordane	ug/L	0.5U	0.5U	0.5U
Endrin	ug/L	1U	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5U	0.5U	0.5U
Heptachlor	ug/L	0.5U	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5U	0.5U	0.5U
Methoxychlor	ug/L	5U	5U	5U
Toxaphene	ug/L	50U	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U	14U
2,4-D	ug/L	10U	10U	29U

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020588	10A-020590	10A-020592
	Sample Location	10A-004	10A-005	10A-006
	Sample Depth (feet)	10 - 13	5 - 9	5 - 9
	Sample Date	03/29/00	04/03/2000	04/03/2000
Units				
<i>TCLP Volatiles</i>				
1,1-Dichloroethene	mg/L	0.025U	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U	0.05U
Benzene	mg/L	0.025U	.035B	0.025U
Carbon tetrachloride	mg/L	0.025U	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>				
1,4-Dichlorobenzene	mg/L	0.05U	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U	0.05U

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020779	10A-020781
	Sample Location	10A-007	10A-008
	Sample Depth (feet)	2 - 5	10 - 15
	Sample Date	03/29/00	03/29/00
	Units		
<i>Miscellaneous</i>			
Chromium VI	mg/kg	0.45U	0.48U
Corrosivity by pH	Soil pH	5.5	7.2
Cyanide, Reactive	mg/kg	0.5U	0.5U
Cyanide, Total	mg/kg	0.53U	0.59U
Sulfide, Reactive	mg/kg	24.0U	24.0U
<i>PCBs and Pesticides</i>			
4,4'-DDD	ug/kg	3.8U	3.7U
4,4'-DDE	ug/kg	3.8U	3.7U
4,4'-DDT	ug/kg	3.8U	3.7U
Aldrin	ug/kg	1.9U	1.9U
Alpha-BHC	ug/kg	1.9U	1.9U
alpha-Chlordane	ug/kg	1.9U	1.9U
Aroclor-1016	ug/kg	38U	37U
Aroclor-1221	ug/kg	75U	74U
Aroclor-1232	ug/kg	38U	37U
Aroclor-1242	ug/kg	38U	37U
Aroclor-1248	ug/kg	38U	37U
Aroclor-1254	ug/kg	38U	37U
Aroclor-1260	ug/kg	38U	37U
Beta-BHC	ug/kg	1.9U	1.9U
Delta-BHC	ug/kg	1.9U	1.9U
Dieldrin	ug/kg	3.8U	3.7U
Endosulfan I	ug/kg	1.9U	1.9U
Endosulfan II	ug/kg	3.8U	3.7U
Endosulfan sulfate	ug/kg	3.8U	3.7U
Endrin	ug/kg	3.8U	3.7U
Endrin aldehyde	ug/kg	3.8U	3.7U
Endrin ketone	ug/kg	3.8U	3.7U
gamma-BHC (Lindane)	ug/kg	1.9U	1.9U
gamma-Chlordane	ug/kg	1.9U	1.9U
Heptachlor	ug/kg	1.9U	1.9U
Heptachlor epoxide	ug/kg	1.9U	1.9U
Methoxychlor	ug/kg	19U	19U
Toxaphene	ug/kg	190U	190U

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020779	10A-020781
	Sample Location	10A-007	10A-008
	Sample Depth (feet)	2 - 5	10 - 15
	Sample Date	03/29/00	03/29/00
Units			
<i>Rare Earth Metals</i>			
	mg/kg	29	24.2
Cerium, Total	mg/kg	2.3	1.6
Dysprosium, Total	mg/kg	10.8	11
Lanthanum, Total	mg/kg	17.4	12.4
Neodymium, Total	mg/kg	9.2	6.7
Yttrium, Total			
<i>Semivolatile Organics</i>			
1,2,4-Trichlorobenzene	ug/kg	380U	370U
1,2-Dichlorobenzene	ug/kg	380U	370U
1,3-Dichlorobenzene	ug/kg	380U	370U
1,4-Dichlorobenzene	ug/kg	380U	370U
2,2'-oxybis(1-Chloropropane)	ug/kg	380U	370U
2,4,5-Trichlorophenol	ug/kg	940U	930U
2,4,6-Trichlorophenol	ug/kg	380U	370U
2,4-Dichlorophenol	ug/kg	380U	370U
2,4-Dimethylphenol	ug/kg	380U	370U
2,4-Dinitrophenol	ug/kg	940U	930U
2,4-Dinitrotoluene	ug/kg	380U	370U
2,6-Dinitrotoluene	ug/kg	380U	370U
2-Chloronaphthalene	ug/kg	380U	370U
2-Chlorophenol	ug/kg	380U	370U
2-Methylnaphthalene	ug/kg	380U	370U
2-Methylphenol	ug/kg	380U	370U
2-Nitroaniline	ug/kg	940U	930U
2-Nitrophenol	ug/kg	380U	370U
3,3'-Dichlorobenzidine	ug/kg	380U	370U
3-Nitroaniline	ug/kg	940U	930U
4,6-Dinitro-2-methylphenol	ug/kg	940U	930U
4-Bromophenyl-phenylether	ug/kg	380U	370U
4-Chloro-3-methylphenol	ug/kg	380U	370U
4-Chloroaniline	ug/kg	380U	370U
4-Chlorophenyl-phenylether	ug/kg	380U	370U
4-Methylphenol	ug/kg	380U	370U
4-Nitroaniline	ug/kg	940U	930U
4-Nitrophenol	ug/kg	940U	930U
Acenaphthene	ug/kg	380U	370U
Acenaphthylene	ug/kg	380U	370U
Anthracene	ug/kg	380U	370U
Benzo(a)anthracene	ug/kg	27J	370U
Benzo(a)pyrene	ug/kg	24J	370U
Benzo(b)fluoranthene	ug/kg	380U	370U

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020779	10A-020781
	Sample Location	10A-007	10A-008
	Sample Depth (feet)	2 - 5	10 - 15
	Sample Date	03/29/00	03/29/00
Units			
<i>Semivolatile Organics (continued)</i>			
Benzo(g,h,i)perylene	ug/kg	380U	370U
Benzo(k)fluoranthene	ug/kg	24J	370U
bis(2-Chloroethoxy)methane	ug/kg	380U	370U
bis(2-Chloroethyl)ether	ug/kg	380U	370U
bis(2-Ethylhexyl)phthalate	ug/kg	380U	48BJ
Butylbenzylphthalate	ug/kg	380U	370U
Carbazole	ug/kg	380U	370U
Chrysene	ug/kg	32J	370U
Di-n-Butylphthalate	ug/kg	26J	24BJ
Di-n-Octyl phthalate	ug/kg	380U	370U
Dibenz(a,h)anthracene	ug/kg	380U	370U
Dibenzofuran	ug/kg	380U	370U
Diethylphthalate	ug/kg	380U	370U
Dimethylphthalate	ug/kg	380U	370U
Fluoranthene	ug/kg	49J	370U
Fluorene	ug/kg	380U	370U
Hexachlorobenzene	ug/kg	380U	370U
Hexachlorobutadiene	ug/kg	380U	370U
Hexachlorocyclopentadiene	ug/kg	380U	370U
Hexachloroethane	ug/kg	380U	370U
Indeno(1,2,3-cd)pyrene	ug/kg	380U	370U
Isophorone	ug/kg	380U	370U
N-Nitroso-Di-n-propylamine	ug/kg	380U	370U
N-Nitrosodiphenylamine (1)	ug/kg	380U	370U
Naphthalene	ug/kg	380U	370U
Nitrobenzene	ug/kg	380U	370U
Pentachlorophenol	ug/kg	940U	930U
Phenanthrene	ug/kg	22J	370U
Phenol	ug/kg	380U	370U
Pyrene	ug/kg	63J	370U
<i>Total Metals</i>			
Aluminum, Total	mg/kg	5660	3670
Antimony, Total	mg/kg	0.17U	0.19U
Arsenic, Total	mg/kg	2.3	2
Barium, Total	mg/kg	46.2	57.1
Beryllium, Total	mg/kg	0.96	0.31
Boron, Total	mg/kg	4.9	2.4
Cadmium, Total	mg/kg	0.03U	0.03U
Calcium, Total	mg/kg	918	941
Chromium, Total	mg/kg	11.3	6.8

Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020779	10A-020781
	Sample Location	10A-007	10A-008
	Sample Depth (feet)	2 - 5	10 - 15
	Sample Date	03/29/00	03/29/00
Units			
Total Metals (continued)			
Cobalt, Total	mg/kg	5.3	4.6
Copper, Total	mg/kg	4.6	8.6
Iron, Total	mg/kg	14300	8970
Lead, Total	mg/kg	8	2.9
Lithium, Total	mg/kg	9.3	8.7
Magnesium, Total	mg/kg	1550	1080
Manganese, Total	mg/kg	360	89.6
Mercury, Total	mg/kg	0.02U	0.02U
Nickel, Total	mg/kg	10	9.1
Potassium, Total	mg/kg	762	476
Selenium, Total	mg/kg	0.42U	0.47U
Silver, Total	mg/kg	0.09U	0.1U
Sodium, Total	mg/kg	147	89.6
Thallium, Total	mg/kg	0.36U	0.4U
Vanadium, Total	mg/kg	12.9	12
Zinc, Total	mg/kg	22	24
Volatile Organics			
1,1,1-Trichloroethane	ug/kg	1100U	560U
1,1,2,2-Tetrachloroethane	ug/kg	1100U	560U
1,1,2-Trichloroethane	ug/kg	1100U	560U
1,1-Dichloroethane	ug/kg	1100U	560U
1,1-Dichloroethene	ug/kg	1100U	560U
1,2-Dichloroethane	ug/kg	1100U	560U
1,2-Dichloroethene (total)	ug/kg	1100U	560U
1,2-Dichloropropane	ug/kg	1100U	560U
2-Butanone	ug/kg	2100U	1100U
2-Hexanone	ug/kg	2100U	1100U
4-Methyl-2-pentanone	ug/kg	2100U	1100U
Acetone	ug/kg	2100U	1100U
Benzene	ug/kg	1100U	560U
Bromodichloromethane	ug/kg	1100U	560U
Bromoform	ug/kg	1100U	560U
Bromomethane	ug/kg	2100U	1100U
Carbon Disulfide	ug/kg	1100U	560U
Carbon Tetrachloride	ug/kg	1100U	560U
Chlorobenzene	ug/kg	1100U	560U
Chloroethane	ug/kg	2100U	1100U
Chloroform	ug/kg	1100U	560U

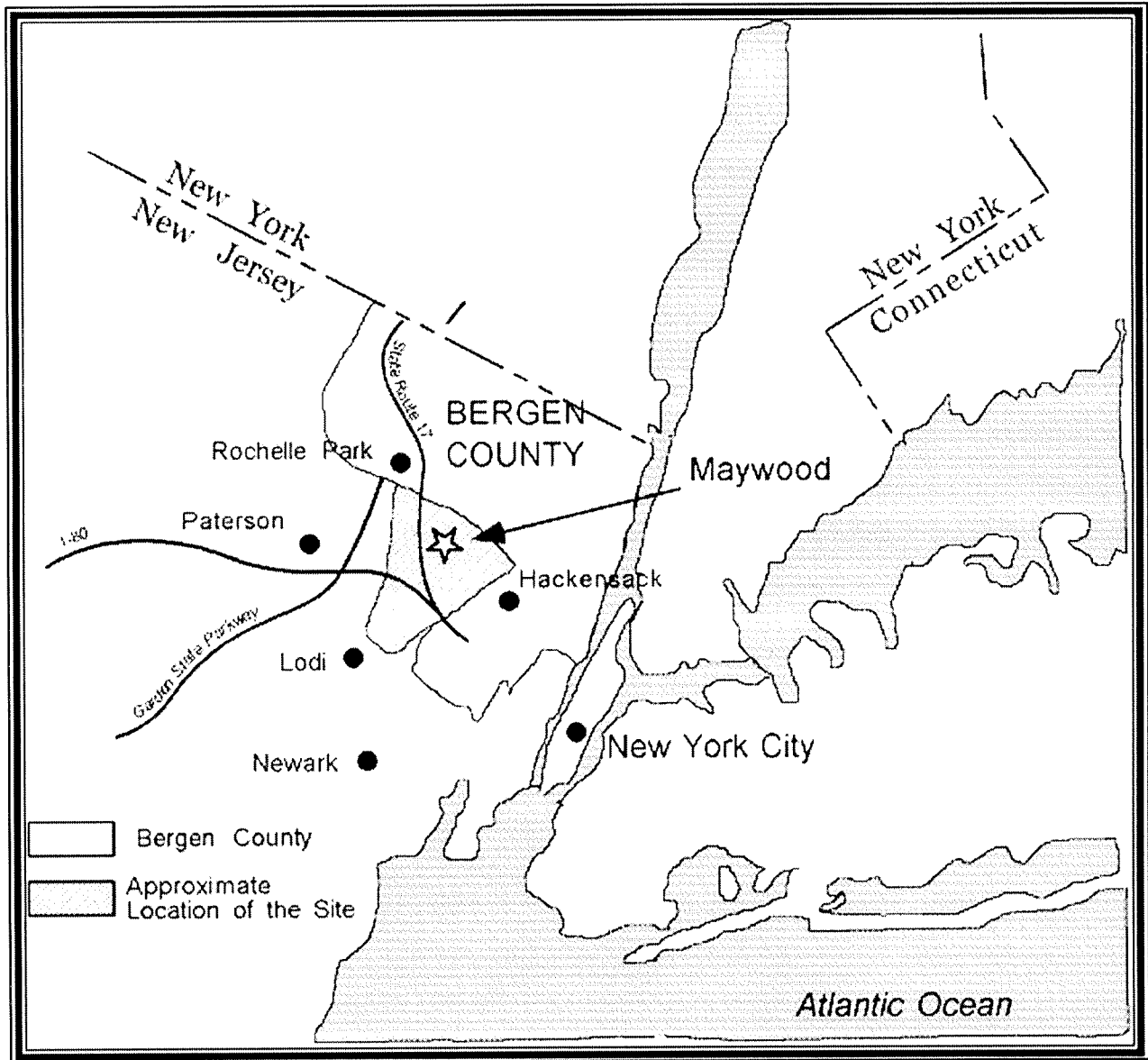
Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020779	10A-020781
	Sample Location	10A-007	10A-008
	Sample Depth (feet)	2 - 5	10 - 15
	Sample Date	03/29/00	03/29/00
Units			
<i>Volatile Organics (continued)</i>			
Chloromethane	ug/kg	2100U	1100U
cis-1,3-Dichloropropene	ug/kg	1100U	560U
Dibromochloromethane	ug/kg	1100U	560U
Ethylbenzene	ug/kg	1100U	560U
Methylene Chloride	ug/kg	1100U	560U
Styrene	ug/kg	1100U	560U
Tetrachloroethene	ug/kg	1100U	560U
Toluene	ug/kg	1100U	560U
Trans-1,3-Dichloropropene	ug/kg	1100U	560U
Trichloroethene	ug/kg	1100U	560U
Vinyl Chloride	ug/kg	2100U	1100U
Xylene (total)	ug/kg	1100U	560U
<i>TCLP Metals</i>			
Arsenic	ug/L	22.9U	22.9U
Barium	ug/L	420J	1220J
Cadmium	ug/L	4.1U	4.1U
Chromium	ug/L	3.4U	3.4
Lead	ug/L	26.6U	26.6U
Mercury	ug/L	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U
Silver	ug/L	3.7U	3.7U
<i>TCLP Pesticides</i>			
Alpha-Chlordane	ug/L	0.5U	0.5U
Endrin	ug/L	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5U	0.5U
Heptachlor	ug/L	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5U	0.5U
Methoxychlor	ug/L	5U	5U
Toxaphene	ug/L	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U
2,4-D	ug/L	10U	10U


Table 10-5: Summary of Environmental Analytical Data

Parameter	Sample ID	10A-020779	10A-020781
	Sample Location	10A-007	10A-008
	Sample Depth (feet)	2 - 5	10 - 15
	Sample Date	03/29/00	03/29/00
Units			
<i>TCLP Volatiles</i>			
1,1-Dichloroethene	mg/L	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U
Benzene	mg/L	0.025U	0.025U
Carbon tetrachloride	mg/L	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>			
1,4-Dichlorobenzene	mg/L	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U

B (inorganics) Value Between Method Detection Limit and Reporting Limit
 B (organics) Found in Associated Blank
 U Undetected Values
 J Estimated Value
 BJ Found in Blank; is an Estimated Value



NOT TO SCALE

<p>U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS NEW YORK DISTRICT</p> <p>US ARMY CORPS OF ENGINEERS</p> <p>FUSRAP FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM</p>	<p> STONE & WEBSTER, INC.</p> <p>Prepared by: MALCOLM PIRNIE</p> <p>File Name: MPI-CH10</p>
--	--

**LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY**

PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

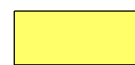
Contract Number:
DACW41-98-R-0034

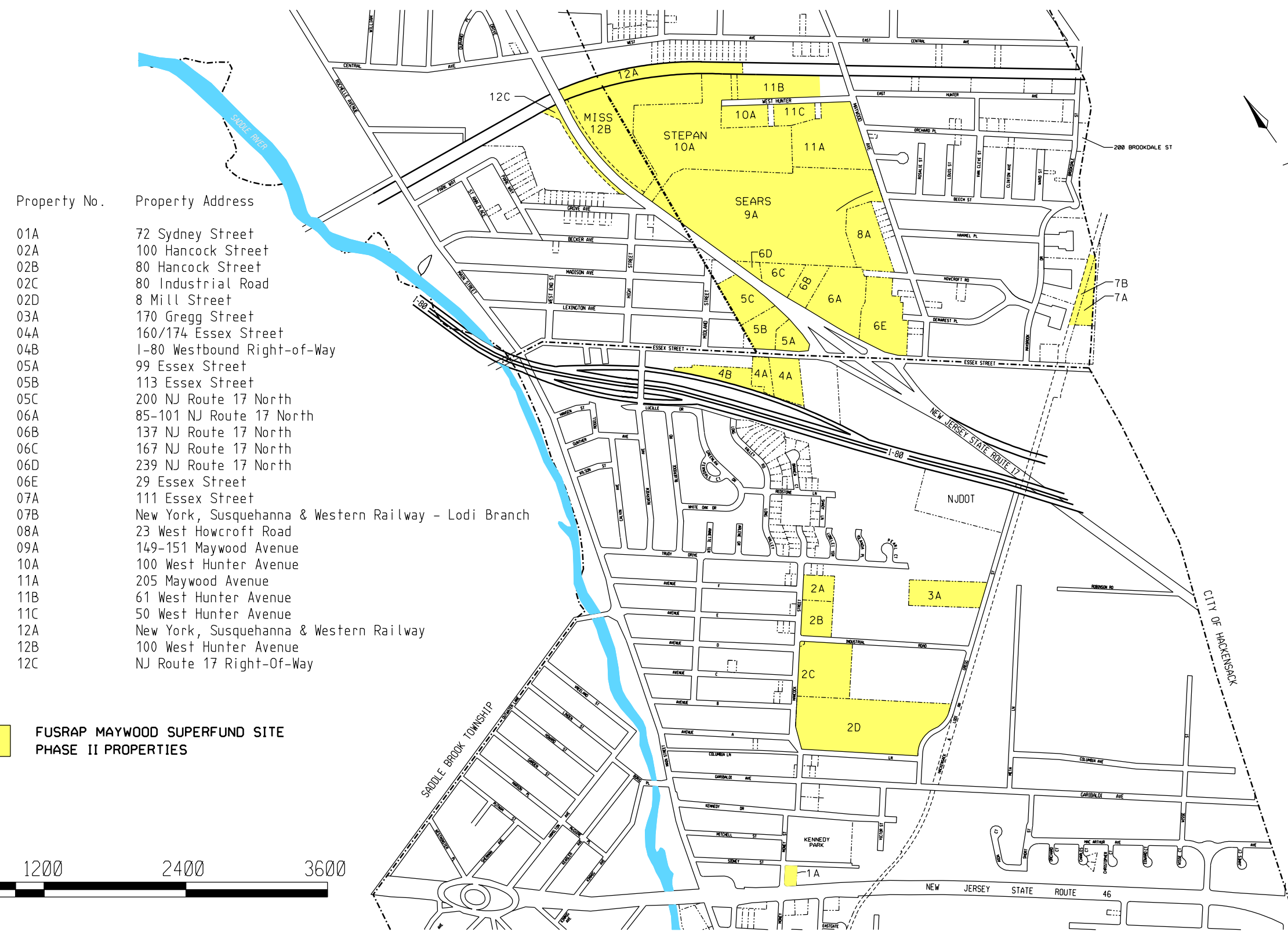
Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 10-1

Cluster No.	Property No.	Property Address
1	01A	72 Sydney Street
2	02A	100 Hancock Street
	02B	80 Hancock Street
	02C	80 Industrial Road
	02D	8 Mill Street
3	03A	170 Gregg Street
4	04A	160/174 Essex Street
	04B	1-80 Westbound Right-of-Way
5	05A	99 Essex Street
	05B	113 Essex Street
	05C	200 NJ Route 17 North
6	06A	85-101 NJ Route 17 North
	06B	137 NJ Route 17 North
	06C	167 NJ Route 17 North
	06D	239 NJ Route 17 North
7	06E	29 Essex Street
	07A	111 Essex Street
8	07B	New York, Susquehanna & Western Railway - Lodi Branch
	08A	23 West Howcroft Road
9	09A	149-151 Maywood Avenue
10	10A	100 West Hunter Avenue
11	11A	205 Maywood Avenue
	11B	61 West Hunter Avenue
	11C	50 West Hunter Avenue
12	12A	New York, Susquehanna & Western Railway
	12B	100 West Hunter Avenue
	12C	NJ Route 17 Right-Of-Way


 FUSRAP MAYWOOD SUPERFUND SITE
PHASE II PROPERTIES



U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT



US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

 **STONE & WEBSTER, INC.**

Prepared by:
**MALCOLM
PIRNIE**

File Name:
\\MAYWOOD\TASK0318\CLUSTER REPORT\REV 1\FIGURE10-2.DGN

LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY

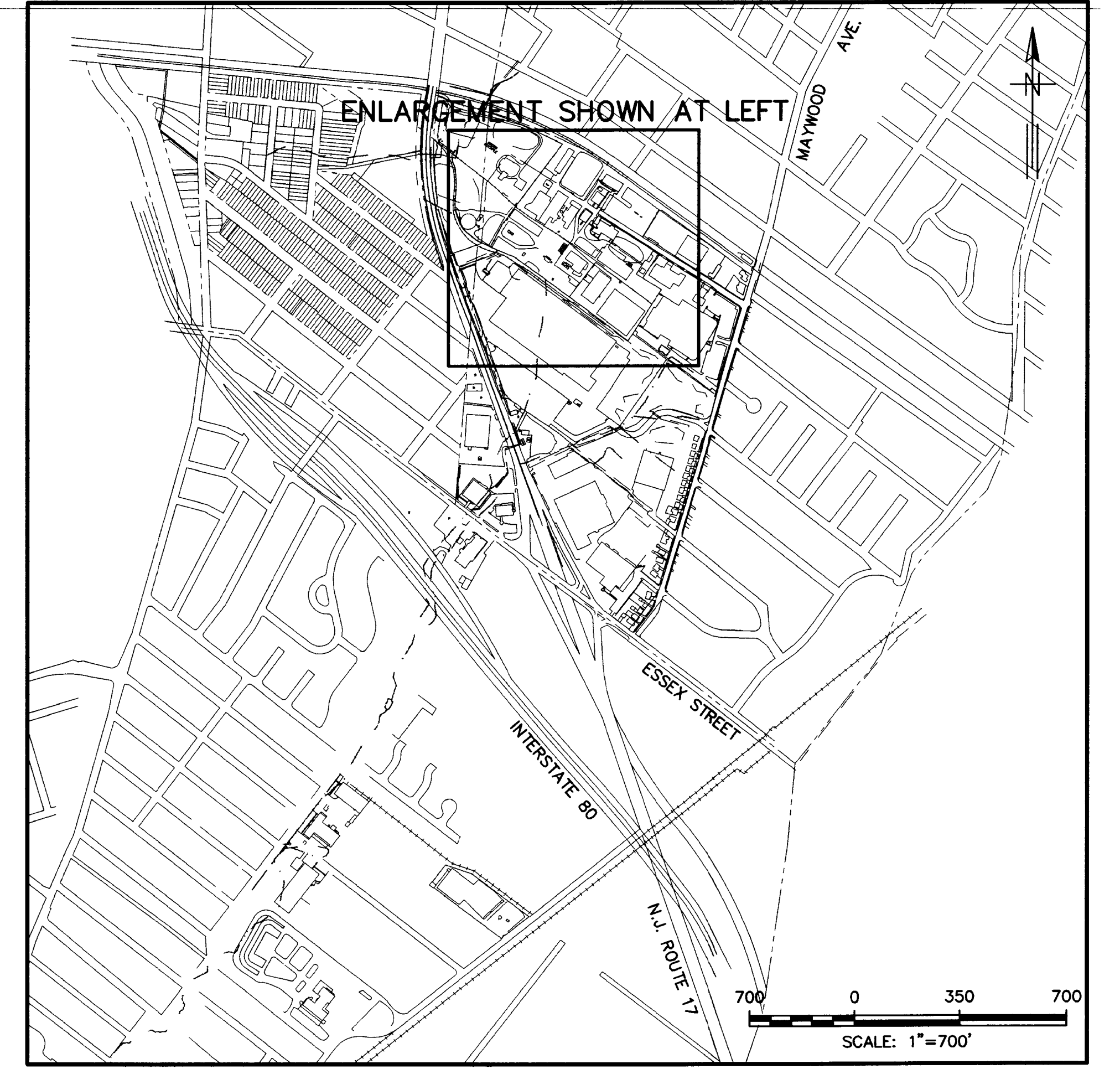
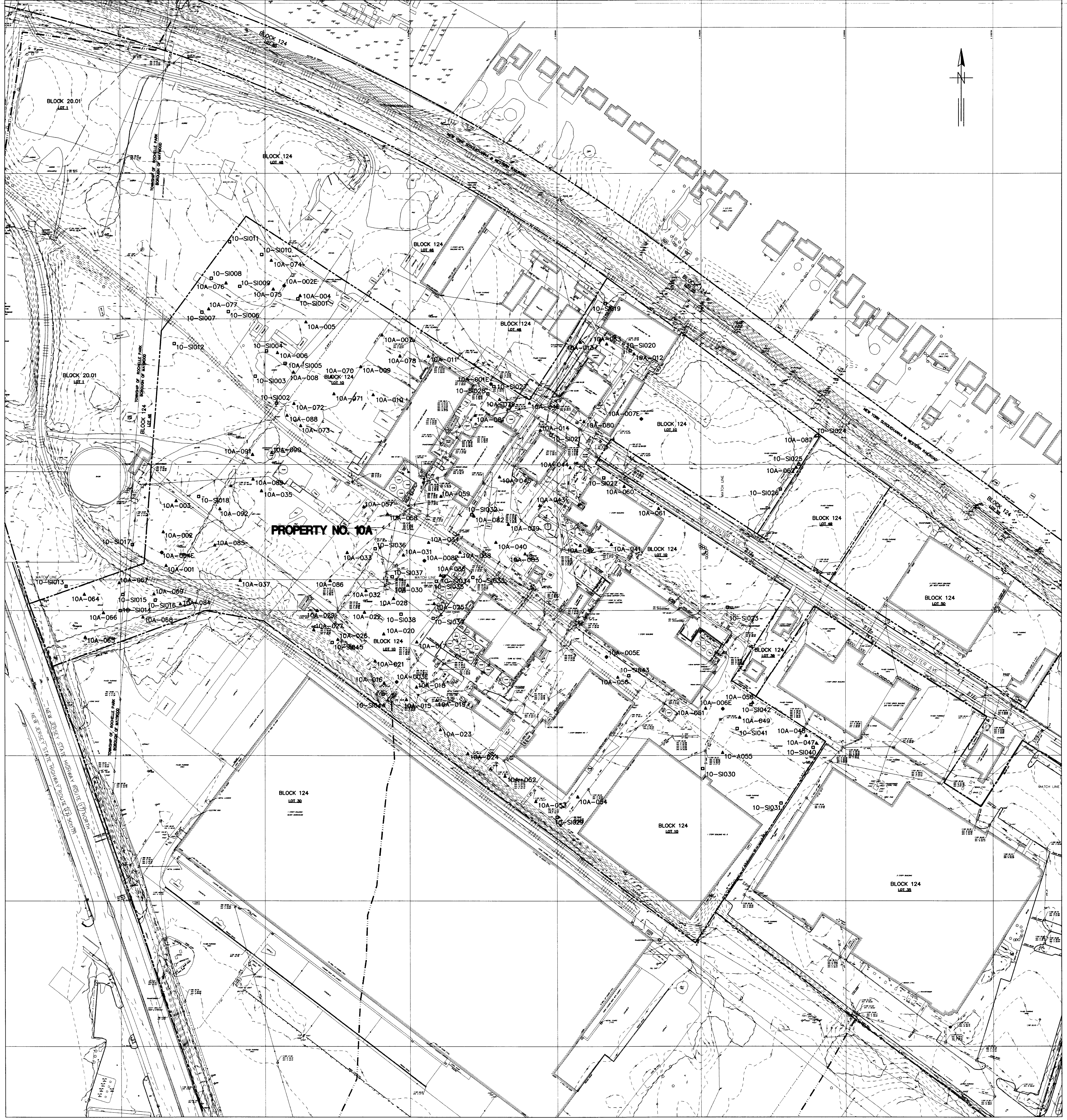
PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

Contract Number:
DACW41-99-D-9001

Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 10-2



KEY MAP

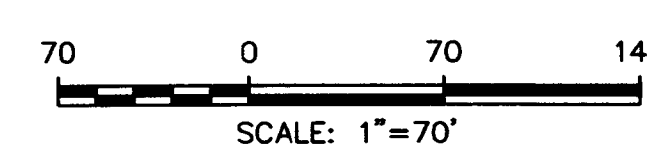
LEGEND

- PROPERTY BOUNDARY
- ▨ EXISTING BUILDING
- - - EXISTING 1' CONTOUR
- - - - - APPROXIMATE LOCATION OF HISTORIC LODI BROOK CHANNEL

SAMPLE SYMBOL	SAMPLE TYPE	NUMBER OF SAMPLING LOCATIONS
▲	DIRECT PUSH SOIL PROBE LOCATIONS (RADIOLOGICAL)	92
□	SURFACE ISOCs LOCATIONS	45
⊕	DIRECT PUSH SOIL PROBE LOCATION (ENVIRONMENTAL)	8

- NOTES:
- THIS SURVEY SHOWS CONDITIONS AS OF OCTOBER 1999 BASED ON AERIAL MAPPING PREPARED BY GEOD CORP. AND GROUND SURVEY BY GARDEN STATE ENGINEERING SURVEYING AND PLANNING.
 - VERTICAL DATUM IS REFERENCED TO NGVD 1929.
 - HORIZONTAL DATUM IS REFERENCED TO NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 1927.
 - THE LOCATION OF THE HISTORIC LODI BROOK SHOWN ON THIS SHEET WAS APPROXIMATED BASED UPON REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS FROM APRIL 6, 1940.

CLUSTER NO. 10 100 WEST HUNTER AVENUE (STEPAN COMPANY) (10A)

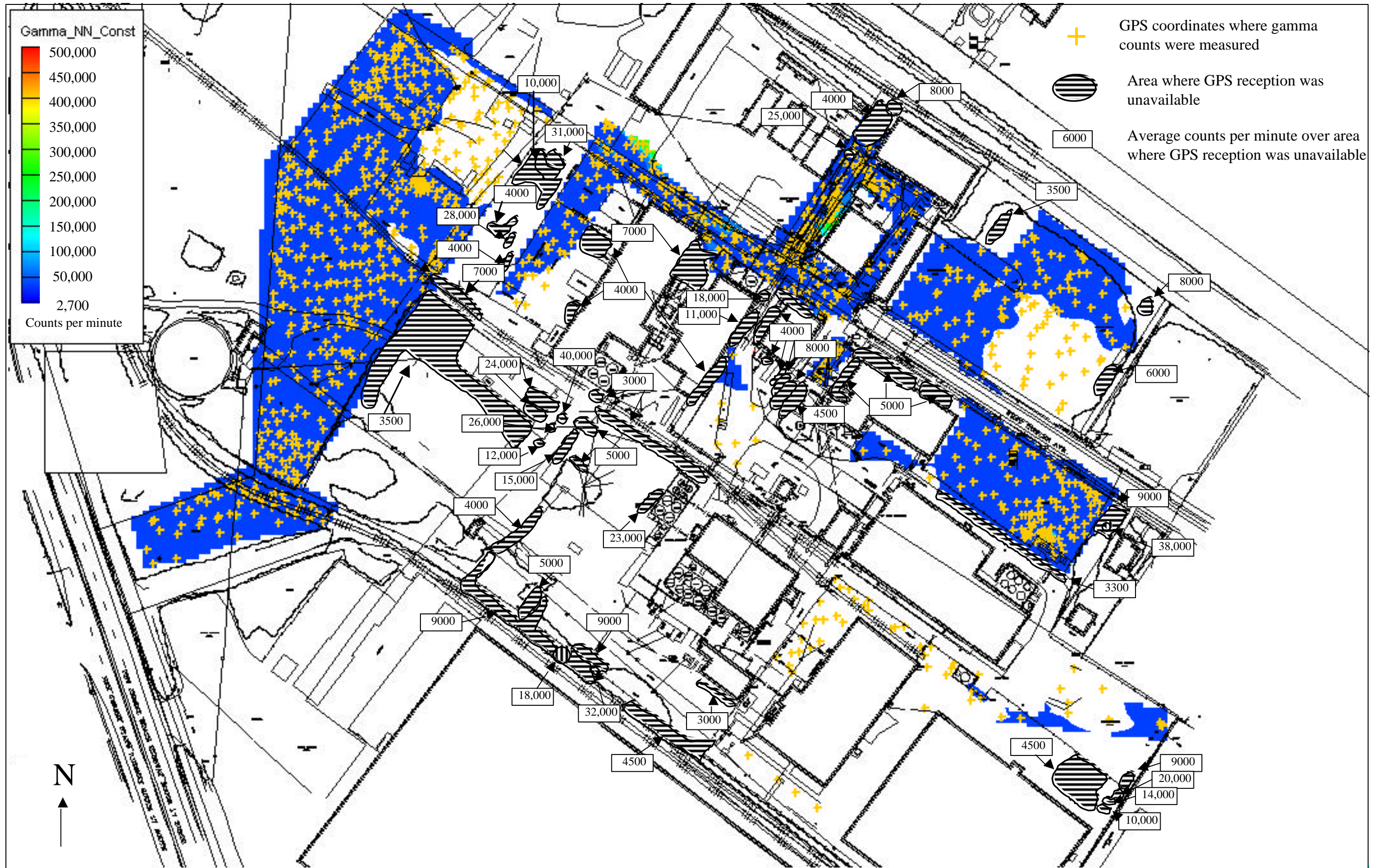


U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

STONE & WEBSTER ENVIRONMENTAL
TECHNOLOGY & SERVICES
MACTEM
7/21/00
S&W-C10

CLUSTER NO. 10
SAMPLE LOCATION MAP
PRE-DESIGN INVESTIGATION REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD LOCAL AND
ROCHELLE PARK, NEW JERSEY

Contract Number: DCM41-99-D-9001
Job Number: 0675
Sheet: 1003
Figure Number: 10-3



Lower Contour Limit = $1.5 \times \text{Background} = 1.5 \times 1800 = 2700$ counts per minute
 Upper Contour Limit = Highest measurement across entire Maywood Site: approx. 500,000 counts per minute

Property Cluster No. 10: 100 West Hunter Ave. (Stepan Company)
 Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 10-4

APPENDIX 10-A

Variations from the PDI Work Plan

**Letters Informing EPA and NJDEP of Use of Geoprobes⁰
In Lieu of Downhole ISOCS**



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Angela Carpenter
Remedial Project Manager
Federal Facilities Section
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Dear Ms. Carpenter:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in your December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Donna Gaffigan, NJDEP



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

December 8, 1999

REPLY TO
ATTENTION OF

Programs and Project Management Division

Ms. Donna Gaffigan
Case Manager
Bureau of Case Management
New Jersey Department of Environmental Protection
401 E State St
Trenton, NJ 08625-0600

Dear Ms. Gaffigan:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in USEPA's December 1, 1999, letter under separate cover.

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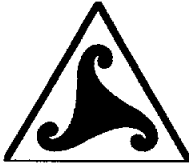
ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Angela Carpenter, EPA

Revisions to Standard Operating Procedure No. SW-MWD-509-0



**STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION**

TITLE:

Soil Probe Investigation

NO.:

SW-MWD-509-0

PAGE

1 of 8 plus Attachment 1

DATE:

February 2000

APPROVED:

Prepared by:

Project Chemist

Reviewed by:

PDI Task Manager

Richard Skyness 2/29/00
Project Engineer

[Signature] 2/29/00
Project Manager

1.0 PURPOSE

This Stone & Webster Standard Operating Procedure (SOP), **Soil Probe Investigation** shall be employed when collecting subsurface soil samples using the direct push soil probe method at the FUSRAP Maywood Superfund Site (hereafter referred to as the Maywood Site) properties with known or suspected soil and/or groundwater contamination.

2.0 SCOPE

This procedure details the materials, equipment, and methods common to soil probe investigation activities. Consult the site-specific project plans and work plans for proposed soil probe locations. Always consult site-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Task Manager prior to implementation and shall be documented in project field logbooks.**

3.0 REFERENCES

Stone & Webster Maywood SOP 102 - Downhole Gamma Radiation Logging

Stone & Webster Maywood SOP 307 - Surface and Shallow Subsurface Soil Sampling

Stone & Webster Maywood SOP 308 - Soil Borings and Sampling

Stone & Webster Maywood SOP 401 - Photoionization Detector (PID)

Stone & Webster Maywood SOP 504 - Labeling, Packaging, and Shipping Environmental Samples

Stone & Webster Maywood SOP 505 - Cuttings and Fluids Management

Stone & Webster Maywood SOP 506 - Decontamination

Stone & Webster Maywood SOP 507 - Field Notebook Content and Control

U.S.E.P.A., A Compendium of Superfund Field Operation Methods, Document EPA/540/P-87/001, December, 1987.

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	2 of 8

DEFINITIONS

Stone & Webster Team – personnel of the Stone & Webster Team that includes for this SOP: Stone & Webster, Malcolm Pirnie, Franklin Environmental Services, Inc., Safety & Ecology Corporation (SEC), and Garden State Surveying, Engineering and Planning, Inc. The Stone & Webster Team shall perform soil probe investigation activities, except those activities specified as performed by the Subcontractor.

Subcontractor – personnel of the direct push soil probe firm.

Direct Push Soil Probe – generic name for advancing media sampling piping/tubes with only direct mechanical force. They are typically hollow steel rods advanced using a percussive force (powered hammer) and driven directly into unconsolidated soil. There are two types of direct push soil probes. One is a single rod system (i.e., macrocore) and the other is a dual tube or cased system. The latter, which will be the method of choice for most Maywood Site investigations, utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Drive rods used with the cased system are usually made from a high-grade steel alloy and are retracted after sampling.

4.0 RESPONSIBILITIES

5.1 Project Manager - Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 Project Environmental Engineer - Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for direct push soil probe activities.

5.3 Project Superintendent - Designated by the Project Manager to supervise investigative activities by Stone & Webster Team and Subcontractor personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in monitoring soil probe investigation activities in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each workday. The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil probe investigation activities and deviations from this SOP.

5.4 Site Personnel (including the data logger) - Required to read and sign the Maywood Site Safety and Health Plan (SSHP), have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil probe investigation activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

5.5 Site Safety & Health Officer - Responsible for ensuring that all site workers (Stone & Webster and Subcontractor) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.6 Task Manager – Responsible to plan, implement, and closeout field work requiring direct push technology.

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5.7 Subcontractor - Required to read and sign the SSHP, have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. Subcontractors shall report directly to the Task Manager or his designee.

6.0 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS FOR SOIL PROBE INVESTIGATION

The following is a list of equipment and material that is commonly used on all projects when the direct push probe technique is performed in the unconsolidated soils. Refer also to related SOP equipment and material requirements to ensure completeness.

Items required by Subcontractor:

- Direct push probe equipment - of appropriate size and direct push probe and sampling capabilities; vehicle mounted; direct push probe sampling tools used to advance boring (i.e., direct push small diameter rods; and augers, if required) equipment, labor, and supplies to maintain optimal efficiency
- Environmentally-safe lubricants
- Backfill material for probe holes, as required
- Soil sample collection and logging supplies – **See Stone & Webster Maywood SOP 308, Soil Borings and Sampling**
- Decontamination supplies - **See Stone & Webster Maywood SOP 506, Decontamination**

Items carried by Stone & Webster Team on-site personnel

- **SSHP To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Clipboard
- Pencils
- Six-foot-ruler
- Pocket knife
- Camera (optional), check with Project Manager if required
- Volatile organic compound vapor meter equipped with photoionization detector (PID) and other air surveillance monitoring equipment, as required by the SSHP
- Radiation meter
- Site boring logs
- Blank soil probe logs
- Weighted measuring tape
- Water level measuring device - **See Stone & Webster Maywood SOP 410, Groundwater Level Measurement**, Interface probe, if needed
- Paper towels
- Chain of Custody forms

7.0 DIRECT PUSH PROBE ACTIVITIES

7.1 General Considerations

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Prior to selecting the direct push probe method for a specific property, the objectives of the field investigation must be established. These property-specific objectives shall include one or more of the following Maywood Pre-Design Investigation (PDI) program objectives:

- Soil classification/evaluation - the direct push soil probe technique will be able to accommodate the collection of soils for characterization purposes.
- Characterization of hydrogeologic conditions - the direct push soil probe technique shall allow for the characterization of each stratigraphic zone, and water level measurements.
- Evaluation of soil contamination - the direct push soil probe technique shall provide the appropriate sample collection methods, must not introduce contaminants into the probe hole or otherwise alter the existing soil or groundwater chemistry, and should not result in subsurface cross contamination during or after installation of direct push probe.

7.2 Direct Push Probe Activities

Prior to commencing direct push soil probe fieldwork, several activities should be performed. These activities, which include both pre-mobilization office tasks and pre-installation field tasks, are discussed below. Once the pre-installation activities are completed, direct push soil probe installation may commence.

7.2.1 Pre-Mobilization Tasks

1. The Stone & Webster Team and Subcontractor shall acquire as much geologic and hydrogeologic information about the site as possible. This information may include possible soil and groundwater contamination present, groundwater table depths and fluctuations, surficial and bedrock geology, approximate thickness of the unconsolidated zone, depth to top of weathered rock, depth to competent rock, and site access.
2. Soil probe locations shall be marked in the field by the Stone & Webster Team with either paint or flags/stakes during pre-mobilization tasks, and surveyed using a global positioning system (GPS). The Stone & Webster Team shall check and verify that the soil probe location corresponds to the location on the project plans. The Stone & Webster Team and Subcontractor shall check to see if visible structures will prevent the completion of proposed soil probes at specific locations.
3. The Stone & Webster Team shall communicate with the Subcontractor regarding the requirements of the direct push soil probe program and required geologic and environmental information. Inform the Subcontractor of the environmental sampling program that the project shall follow. This information includes sampling frequency, sampling depths, type of sample required (soil or groundwater), the length of casing, direct push soil probe method (i.e., macrocore, dual tube, etc.), number and type of soil samplers required, and special sampling techniques. Ensure that probe hole backfill is selected in accordance with the project specifications.
4. The Subcontractor shall ensure that all utilities in the vicinity of the proposed boring(s) have been cleared by the appropriate authorized parties (e.g., New Jersey One-Call System at 1-800-272-1000, owner, etc.) or, if utilities exist, are visibly marked on the ground surface in the area of the proposed boring. In addition, keep a safe working distance (pursuant to OSHA) from overhead utilities. **NOTE: The party responsible for having utilities cleared shall be identified. If the responsible party is not clearly identified then the Task Manager shall establish the responsible party. Ensure that utilities have been cleared prior to installation of soil probe.**

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7.2.2 Pre-Installation Field Tasks

Sampling equipment shall be decontaminated prior to use, using pressure or manual washing of the rig, direct push soil probe, and tools, as required to prevent introducing off-site contamination. The direct push soil probe related equipment shall be decontaminated on site prior to direct push soil probe activities. Refer to **Stone & Webster Maywood SOP 506, Decontamination** for specific instructions.

7.3 General Direct Push Soil Probe Method Procedures

The following sections outline general direct push soil probe procedures used in unconsolidated soil materials.

1. Assuming a vertical soil probe, the Subcontractor shall set the direct push rig over the proposed soil probe location. Level the direct push rig and ensure that the direct push rods used to advance the soil probe are in a vertical position directly above the hole.
2. The inspecting Stone & Webster Team shall obtain and record measurements of tools to be used for direct push probe operations. Down-hole measurements taken by the Subcontractors shall be to the nearest 0.1 foot.
3. The Subcontractor shall begin sampling or advancement of soil probe to the desired depth utilizing the direct push method described below. Samples shall be taken using the steps described in Section 8.1.1.
4. When the direct push advancement tools are lowered into the probe hole, the Stone & Webster Team shall keep track of tool lengths to check Subcontractor's stated depth of soil probe.
5. The Stone & Webster Team shall make certain that the Subcontractor is performing depth measurements with a ruler and known tool lengths and not visually judging ("eyeballing") casing and tool projections above the ground. The Stone & Webster Team shall maintain a mental note of depth to bottom of soil probe by keeping track of the linear feet of tools in and above the ground. By mentally subtracting the "stick-up" above the ground, the Stone & Webster Team can maintain a constant approximate check on the soil probe depth and Subcontractor's indicated depths.
6. The breathing zone shall be screened by a designee of the Stone & Webster Team Site Safety and Health Officer for total volatile organic vapors using an organic vapor analyzer as outlined in the SSHP. A lower explosive limit meter (LEL) shall be employed if required in SSHP. Record the measured readings at the depth and time of reading on the boring log.
7. During direct push probe activities, both the Stone & Webster Team and Subcontractor shall record production, mechanical and/or sampling difficulties and the sequence of activities. Also record rig mobilization time, rig set-up time, and probe commencement and completion times. This information should be recorded in a field log book. The Stone & Webster Team shall also record pertinent details on the soil probe log (See Attachment A for blank soil probe log).
8. Refusal of direct push probe advancement tools (i.e., casing refusal) is defined as when the probe hole cannot be advanced using regular advancement methods. Generally, refusal can be identified by the following characteristics:
 - Advancement of probe hole is not noticeable or is very slow
 - A change in the frequency/pitch of the direct push probe equipment
 - The direct push probe downpressure may be significantly higher than under "normal" conditions. The direct push rig may be lifted off the ground surface.
9. If refusal is encountered in the soil probe, refer to **Stone & Webster Maywood SOP 308, Soil Borings and Sampling** for specific instructions. If the probe hole cannot be advanced, relocate the probe hole within approximately 5 feet distant from the original location and start with the

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work in Section Paragraph 7.2.1. Measure the distance and direction from the original location, and record this information in the field logbook. The actual distance of movement necessary may be greater depending on the site conditions. If the required movement is greater than 5 feet, contact the Task Manager for direction.

10. Downhole gamma radiation logging will be performed, *where feasible* by the Stone & Webster Team as described in Section 8.1.1 below (**See Stone & Webster Maywood SOP 102, Downhole Gamma Radiation Logging**).
11. When the probe hole is completed and the area is cleaned up, all contaminated equipment, including down-hole tools, hand tools, and direct push rig shall be decontaminated by the Subcontractor (**See Stone & Webster Maywood SOP 506, Decontamination**) and as directed by the Radiation Safety Officer (RSO).
12. The Stone & Webster Team shall record the soil probe location on the project drawings.

8.0 METHOD-SPECIFIC SOIL SCREENING AND SAMPLING

In this section, the soil screening and sampling procedure for the direct push soil probe method is described.

8.1 Direct Push Probe Services

The direct push probe rig is a hydraulically powered percussion/direct push machine used for small diameter subsurface investigations. It can obtain continuous soil cores, discreet soil samples, groundwater samples and vapor samples along with installation of permanent sparge points.

8.1.1 Procedures for Screening and Sampling Direct Push Probe Soil Samples

Following is the procedure to be used at the Maywood Site for screening and sampling direct push probe soil cores.

1. Each 4-foot soil core sample will remain in the polyvinyl chloride/polyethylene terephthalate (PVC/PETG) liner and marked with the appropriate field identification number, sealed with rubber end caps for liners, and placed into a designated (2 inch ID) PVC container (including PVC end caps) supplied by the Subcontractor for storage. Pertinent sample data will also be marked on the PVC container.
2. Downhole gamma logging will be accomplished, *where feasible* by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.
3. Each soil probe hole will be backfilled for the full length, in accordance with project requirements.
4. The sealed PVC containers will be transported by the Stone & Webster Team to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. All Building 76 sample documentation, field screening, and sampling tasks shall be performed by the Stone & Webster Team. Sample documentation will include the preparation of a soil probe log containing the following pertinent field documentation: soil probe identification number and location; soil column description; soil screening data, and photo-documentation. **Stone & Webster Maywood SOP 507, Field Notebook Content and Control**, shall be followed. Sample documentation information shall be recorded electronically.
5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each

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soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integration taken at each marked location and recorded.

6. The soil cores will then be screened for total volatile organic vapors using a PID (see **Stone & Webster Maywood SOP 401, Photoionization Detector (PID)**). A series of small perforations will be made through the liner at 12-inch increments.
7. The soil cores will be described generally in accordance with the Unified Soil Classification system, based on visual observations through the liners and soil extracted from the small perforations. Prior to storage, these perforations will be sealed with tape. The soil descriptions developed will be marked with an "FC" note to define the description as a field classification.
8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.
9. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.
11. Extracted samples shall be prepared in accordance with the Safety and Ecology Corporation (SEC) on-site field laboratory soil preparation practice/SOP.
12. Analysis for ROC on extracted sections of the soil core will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector, or equivalent. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.
14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.
15. Sampling tools will be decontaminated before each boring, after collecting each soil sample, and after each boring.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term "blind duplicates"), thus eliminating potential bias in the test measurement.

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If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.

ATTACHMENT 1

PDI SOIL PROBE LOG SHEET				
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator			XXX	
Activity Designator			AAA PDI	
Field Measurement/Sample Collection Designator			VV SP	
Station Number			N N N	
Media			m m SB	
Sample Type			n	
Sequential Sample Number			##### (see Below)	
Location		Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date			Date	
Time			Time	
Logger			Logger	
Detector Model #		SPA-3	PID Model #	Multi-RAE
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		
Comments:				
1. MPI No. _____.				
2. Direct-push location grouted with BenSeal.				
_____		_____		_____
Signature (Down Hole Gamma Logging)				Date
_____		_____		_____
Signature (Core Gamma Logging)				Date
_____		_____		_____
Signature (PID Logging)				Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)														
					X	X	X	#	#	#	#	#	#						
0.0																			
0.5																			
1.0																			
1.5																			
2.0																			
2.5																			
3.0																			
3.5																			
4.0																			
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24.0																			

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 G:\3674009\PDI Report\AppdxA\SOP509FINAL.doc

TABLE 1-A: REVISIONS TO SOP SW-MWD-509-0

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>Section 8.1.1 Procedures for Screening and Sampling Direct Push Soil Samples 2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a Bicon 3/8- inch x 3/8- inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. The detector shall be positioned below the bottom of the casing to allow gamma log readings in the uncased portion of the probe hole. The casing shall be extracted at 6-inch increments and a 30-second count reading shall be taken at each increment.</p>	<p>2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. The sodium iodide detector preamplifier is connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector™ multi-channel analyzer/amplifier/high voltage power supply. The system is controlled, and the data stored, via a notebook computer. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.</p>	<p>Cabrera Services, Inc. developed this procedure as a cost effective site characterization method. Better sensitivity of the 1-inch x 1-inch detector used by Cabrera Services, Inc. allows gross gamma measurements through the soil probe casings, thereby increasing soil probe production rates.</p>	<p>January 11, 2000, without waterproof container. Sealed solid casing installed following extraction of MacroCore or Dual Tube system. January 28, 2000, with waterproof container. Eliminated need of sealed solid casing.</p>
<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The acetate liner shall be marked off at 6-inch intervals. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Readings shall consist of 10-second integrations taken every six inches and recorded.</p>	<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the PVC/PET liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integrations taken at the marked locations and recorded.</p>	<p>Continuous scanning of the soil core provides complete coverage, longer counting time at the regions of interest, and minimizes redundancy of the downhole gamma measurements.</p>	<p>January 11, 2000</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>8. A minimum of three soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238 based on field radiological screening and gamma logging values. At a minimum, one soil sample will be taken at the highest reading location (suspected FUSRAP waste); a second soil sample shall be collected where the readings approach a constant value (suspected transition zone); and a third soil sample shall be collected within the zone of constant readings (below suspected transition zone). Additional samples may be taken based on the Task Manager's direction.</p>	<p>8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.</p>	<p>Suspected FUSRAP waste and suspected transition zones may not be present in each direct push location.</p>	<p>Selection of archived samples began February 21, 2000.</p>
<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored in Building 76 for future reference.</p>	<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.</p>	<p>Based on laboratory analysis there may be the need to collect additional samples from the stored soil cores.</p>	<p>January 11, 2000</p>
<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a USACE-certified off-site laboratory, for confirmatory ROC analysis. Soil samples shall be placed in labeled containers provided by the laboratory, then placed in coolers maintained at 4°C. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>Samples will be sealed in containers provided by the SEC on-site field laboratory.</p> <p>Preservation (i.e., 4°C) is not required for ROC analysis.</p>	<p>February 28, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>14. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.</p>	<p>14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.</p>	<p>Sample storage will be returned to the FUSRAP Maywood Superfund Site for future disposition.</p>	<p>January 11, 2000</p>
<p>9.0 QUALITY ASSURANCE/QUALITY CONTROL Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment rinsate blanks and duplicates. Equipment rinsate blanks must be collected each day that sampling occurs or each decontamination event, whichever is less, per matrix per parameter per field crew, per equipment type (assuming reusable sampling equipment is used). This QA/QC requirement may be modified based on conversations with USACE, USEPA, and NJDEP. Field duplicate samples must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement. Field duplicate samples must represent no less than 10 % of the total number of samples per matrix per parameter per area of study. Field duplicate gamma radiation readings shall also be recorded at a frequency of 10% of the total gamma radiation readings.</p> <p>Matrix spike/matrix duplicate (MS/MD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat</p>	<p>Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement.</p> <p>If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given</p>	<p>Swipe sample is a more representative QC check of loose surface alpha radioactivity than aqueous rinsate sample.</p> <p>Reduction from 10% to 5% duplicate samples based on large number of soil samples proposed for PDI. In addition, 5% is consistent with NJDEP Field Sampling Procedures Manual for field duplicates and EPA guidelines for MS/MSD analysis. Electronic mail sent to EPA and NJDEP regarding reduction in duplicate percentage on January 28, 2000.</p>	<p>Equipment blank revision implemented on January 11, 2000.</p> <p>Reduction from 10% to 5% duplicate samples implemented week of February 7, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
no less than 10% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.	method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.		

Revised PDI Work Plan Table 5-1

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

PROPERTY CLUSTER NUMBER ⁽⁸⁾	NUMBER OF SAMPLING LOCATIONS						NUMBER OF SAMPLES FOR ANALYSIS BY PARAMETER ⁽⁶⁾								
	RADIOLOGICAL SURVEY				GEOTECH	ENVIR	GEOTECHNICAL					CHEMICAL ANALYSES			
	SOIL PROBES ⁽¹⁾	SOIL PROBE DEPTHS (FT) (ESTIMATED)	SOIL PROBE RADIOLOGICAL ANALYSES ⁽²⁾	SURFACE SOIL RADIOLOGICAL ANALYSES ⁽³⁾	SOIL BORINGS ⁽⁴⁾	SOIL BORINGS ^(4,5)	SPECIFIC GRAVITY	ATTERBERG LIMITS	GRAIN SIZE	TRIAXIAL TESTS ⁽⁷⁾	CONSOLID. TESTS ⁽⁷⁾	WATER CONTENT	CHROMIUM SPECIATION	TCL/TAL	FULL RCRA CHAR.
1	13	12	39	5	3	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
2	96	16	288	50	22	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
3	10	8	30	5	2	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
4	32	12	96	15	4	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
5	79	8	237	40	8	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
6	85	16	255	40	12	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
7	28	16	84	15	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
8	26	16	78	15	6	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
9	131	16	393	65	17	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
10	106	24	318	55	16	6	TBD	TBD	TBD	TBD	TBD	TBD	6	6	6
11	16	8	48	10	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
12	151	24	453	75	17	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
TOTALS	773	N/A	2319	390	115	47	---	---	---	---	---	---	47	47	47

NOTES:

- 1 Soil probes installed using direct-push method, to the depth shown or refusal.
- 2 At a minimum, three separate soil samples (one soil sample from within the suspected FUSRAP waste, one in transition zone, and one below the transition zone) will be selected for analysis of the ROC by the on-site field laboratory. A total of 2319 subsurface soil samples (i.e., 3 X 773) will be selected for ROC analysis by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 3 Five surface soil samples will be randomly collected from up to 10% of the 773 soil probe locations for radiological analyses and comparative evaluation of surface ISOCs measurement. A total of 390 surface soil samples (i.e., 5 X 78) will be selected for ROC analyses by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 4 Depths and quantities to be determined in field based on radiological data, structure foundations depths, etc.
- 5 Advanced to depth of radiological contamination.
- 6 Sample Analyses Rationale:
 - 6a Chromium Speciation - Speciation of trivalent and hexavalent chromium for health and safety purposes.
 - 6b TCL/TAL - Detection of organic and inorganic constituents to assess the potential for the presence of commingled radiological and chemical contamination.

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

6c	RCRA Characteristics - To support transportation & disposal activities
6d	Geotechnical Parameters (Specific Gravity, Atterberg Limits, Grain Size, Water Content) - To characterize physical properties of soil for excavation and remediation.
7	Triaxial tests and consolidation tests will be performed on undisturbed tube samples to determine strength and consolidation parameters of fine-grained materials, where present. These parameters will be used to perform bearing capacity and settlement analyses where excavations are adjacent to structures.
8	Property Clusters are defined as follows: <i>PROPERTY CLUSTER NO. 1: 72 SIDNEY ST. (A.K.A 88 MONEY ST.)</i> <i>PROPERTY CLUSTER NO. 2: 100, 80 HANCOCK ST., 80 INDUSTRIAL RD., AND NJVIS</i> <i>PROPERTY CLUSTER NO. 3: 170 GREGG ST.</i> <i>PROPERTY CLUSTER NO. 4: 160/174 ESSEX ST., I-80 RIGHT-OF-WAY</i> <i>PROPERTY CLUSTER NO. 5: 99 ESSEX ST, 113 ESSEX ST., 200 ROUTE 17 SOUTH</i> <i>PROPERTY CLUSTER NO. 6: 29 ESSEX ST., 85-101 ROUTE 17 NORTH, 137 ROUTE 17 NORTH, 167 ROUTE 17 NORTH, 239 ROUTE 17 NORTH</i> <i>PROPERTY CLUSTER NO. 7: 111 ESSEX ST. - SCANEL/HACKENSACK AND LODI RAILROAD</i> <i>PROPERTY CLUSTER NO. 8: 23 WEST HOWCROFT RD.</i> <i>PROPERTY CLUSTER NO.9: 149-151 MAYWOOD AVE.</i> <i>PROPERTY CLUSTER NO.10: 100 W. HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.11: 205 MAYWOOD AVENUE AND 50 & 61 WEST HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.12: 100 W. HUNTER AVE., NY, SUSQUEHANNA AND WESTERN RAILROAD, AND NJ ROUTE 17</i>

Rationale of Intrusive Sample Location Relocations

PDI Soil Probe Variance Log

Cluster No.: 10

Property Address: Property No. 10A – 100 West Hunter Ave. (Stepan Company)

Sample Location Map: Figure 10-3

Number of Revised Soil Probe Locations: 49

Rationale for Revisions

Geoprobe locations on the Cluster No. 10 property were extensively field-revised for several reasons. The strip of area surrounding the secure building (Bldg. 8) is steeply sloped on the east and south sides and is inaccessible to a soil probe rig. Additionally, the strip along the east side serves as a common boundary with NRC-licensed Burial Pit 3, which is not within the scope of the PDI. Similarly, locations within the boundary of NRC-licensed Burial Pit 1 were relocated. Furthermore, major renovations were underway in other areas of this cluster, particularly in the southeastern portion of the property, limiting access to a soil probe rig. Lastly, the property has numerous above- and below-ground utilities and drainage and transfer lines. Based on field checks with a portable gamma meter, sample points were also relocated to accessible areas with locally elevated gamma counts. Specific revisions to sample locations are as follows:

- 10A-012 – Moved closer to the building to an area exhibiting elevated gamma counts
- 10A-020 – Moved west approximately 35 feet to an area exhibiting elevated gamma counts
- 10A-027 – Moved northwest approximately 35 feet to an accessible area
- 10A-032 – Moved southwest approximately 30 feet to an area exhibiting elevated gamma counts
- 10A-033 – Moved west approximately 20 feet to an area exhibiting elevated gamma counts
- 10A-035 – Moved east approximately 70 feet to an area exhibiting elevated gamma counts
- 10A-039 – Moved northwest approximately 350 feet to an area with sparse coverage
- 10A-040 – Moved northwest approximately 280 feet to an area with sparse coverage
- 10A-041 – Moved southwest approximately 70 feet to an accessible area
- 10A-042 – Moved off area adjacent to NRC-licensed Burial Pit 3 northwest approximately 400 feet to an area exhibiting elevated gamma counts
- 10A-043 – Moved off NRC-licensed Burial Pit 1 southwest approximately 350 feet to area with sparse coverage
- 10A-044 – Moved west approximately 30 feet to an area exhibiting elevated gamma counts

- 10A-045 – Moved off NRC-licensed Burial Pit 1 southwest approximately 350 feet to an area exhibiting elevated gamma counts
- 10A-049 – Moved off NRC-licensed Burial Pit 1 south approximately 480 feet to an area requiring additional points to compensate for loss of other local area soil probes
- 10A-051 – Moved west approximately 30 feet to accessible area
- 10A-052 – Moved east approximately 15 feet off steep slope mound
- 10A-054 – Moved east approximately 30 feet to accessible area
- 10A-056 – Moved west approximately 30 feet to area near Building 8 requiring additional coverage
- 10A-057 – Moved west approximately 35 feet to an area exhibiting elevated gamma counts
- 10A-061 – Moved north approximately 700 feet out of NRC-licensed Burial Pit 3 area to area requiring additional coverage
- 10A-064 – Moved southwest approximately 250 feet to the corridor to NJ Route 17 to investigate elevated ISOCS in area
- 10A-065 – Moved southwest approximately 490 feet to the corridor to NJ Route 17 to investigate elevated ISOCS in area
- 10A-070 – Moved west approximately 35 feet to an area exhibiting elevated gamma counts
- 10A-071 – Moved southwest approximately 35 feet to an area exhibiting elevated gamma counts
- 10A-073 – Moved east approximately 160 feet to an area requiring additional coverage
- 10A-075 – Moved north approximately 70 feet to investigate elevated ISOCS in area
- 10A-080 – Moved southeast approximately 100 feet away from utility lines to area requiring coverage
- 10A-081 – Moved south approximately 70 feet away from utilities
- 10A-086 – Moved slightly closer to an area exhibiting elevated gamma counts
- 10A-088 – Moved southeast approximately 140 feet to an area exhibiting elevated gamma counts
- Locations 10A-089, 10A-090, 10A-091, and 10A-092 were added to the PDI program to investigate localized areas exhibiting elevated gamma counts
- Locations 10090, 10091, 10094, and 10100 originally proposed in the PDIWP were deleted from Cluster No. 10 because they were inaccessible due to the presence of the ditch alongside and behind Building 8.
- Locations 10035 and 10061 originally proposed in the PDIWP were deleted from Cluster No. 10 because they were obstructed by parked tractor trailers.
- Locations 10086, 10087, 10088, and 10089 originally proposed in the PDIWP were deleted from Cluster No. 10 because they became redundant given the relocation of other geoprobes.

Notes:

1. This list provides specific rationale for the relocation/deletion/addition of intrusive radiological sampling locations due to revised understanding of anticipated radiological contamination. This revised understanding was based on further review of previous data collected by others, and review of surface gamma survey and ISOCS data collected by the Team under this PDI program.
2. Base mapping used in the PDIWP (Stone & Webster, 1999a) has been revised by the Team. Accordingly, a number of intrusive sample locations needed to be relocated due to previously unforeseen physical restrictions (i.e., presence of underground utilities, unacceptable proximity to buildings/roadways, revisions to previously mapped property limits). This table is not intended to provide detailed rationale for points moved due to new mapping.

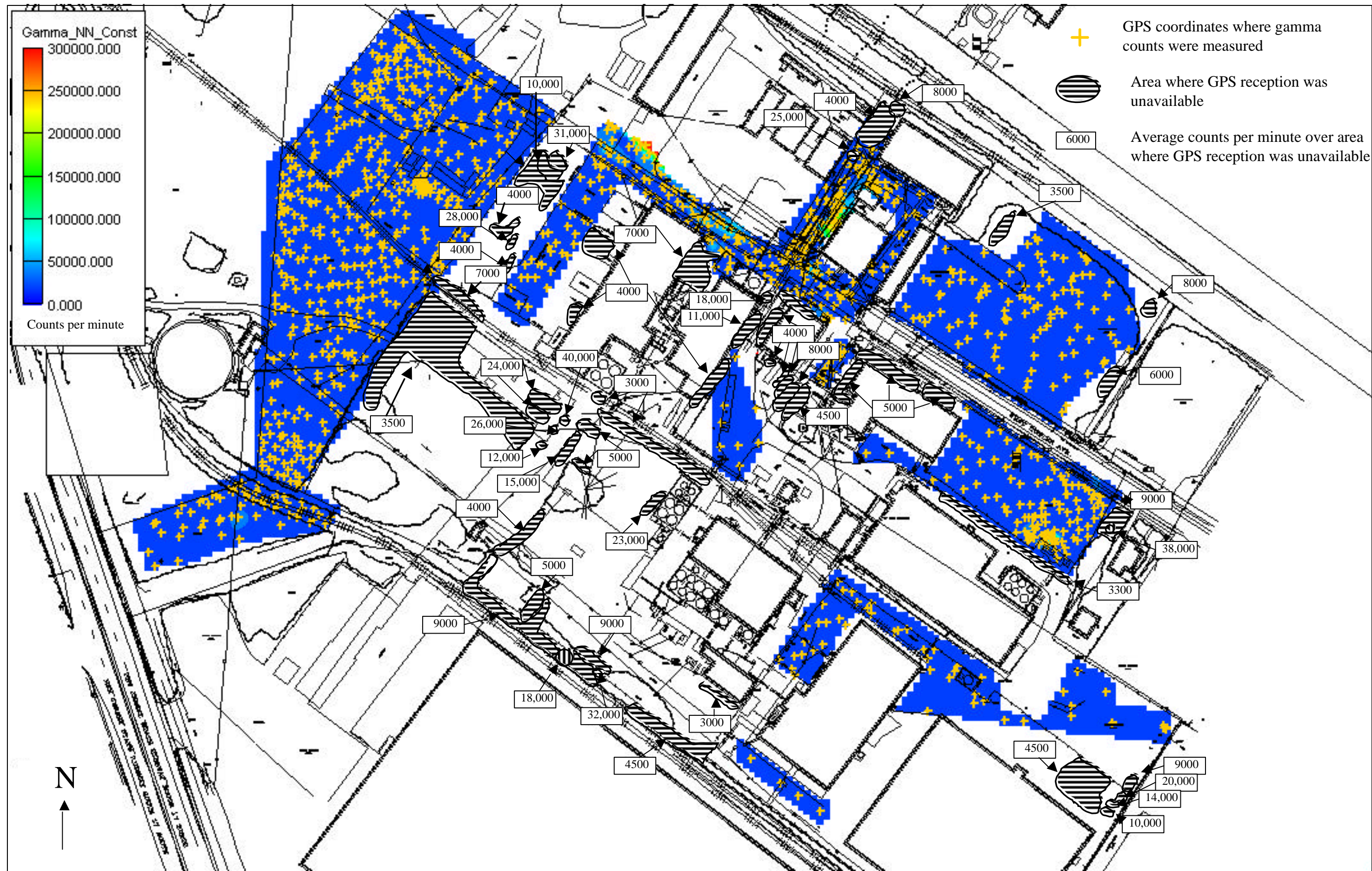
Outlier Protocol (Gamma Scan Anomalies)

Protocol for Addressing Gamma Scan Anomalies (Outliers)

Maywood FUSRAP Superfund Site

Pre-Design Investigation

1. Anomalous surface gamma scan measurements **greater than 2500 cpm for shielded areas (e.g. asphalt covered surfaces), or 3500 cpm for unshielded areas (e.g. bare soil) but, less than 6,000 cpm (1" x 1" NaI detector)** will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL. Note, these count rates are approximately one and one-half times background on shielded and unshielded surfaces.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization (i.e., eliminates the potential for elevated levels of radiological contamination at depth or provides adequate information on the existence of radiological contamination with depth) **will not be further investigated during the PDI.**
 - C. Anomalous areas that do not have previous data that are adequate for characterization **will only be investigated during the PDI if proposed soil probe locations can be moved to these locations without compromising the quality of the data from the proposed locations.** Additional soil probe locations **will not be added** to the program.
 - D. Anomalous areas where additional PDI investigations (based on 1.C) will be performed but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
2. Anomalous areas exhibiting a surface gamma count rate **greater than or equal to 6,000 cpm** (based on a 1" x 1" NaI detector) will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be as follows: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization **will not be further investigated during the PDI.**
 - C. Anomalous areas with previous data that are not adequate for characterization **will be investigated further during the PDI.** Proposed soil probe locations **will be moved** to these locations if possible, or additional soil probe locations **will be added** to the PDI program. These additional soil probes will be used to define the nature and extent of contamination within these previously unidentified areas; the quantity of additional borings is to be determined on a site-by-site basis.
 - D. Anomalous areas that require additional PDI investigations (based on 2.C) but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
3. All anomalous areas and their dispositions will be documented in the PDI.



Property Cluster No. 10: 100 West Hunter Ave. (Stepan Company)

Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 10-A1

Reduction in Field Duplicate and MS/MSD Frequency

Navon, Daria

Subject: FW: Reduction in field duplicate and MS/MSD frequency request

----- Forwarded by David Doyle/Environmental/SWEC on 01/28/2000
02:54 PM -----

"Shonkwiler, Glen D NWK" <Glen.D.Shonkwiler@nwk02.usace.army.mil> on 01/28/2000
02:00:15 PM

To: "carpenter.angela@epamail.epa.gov" <carpenter.angela@epamail.epa.gov>, "dgaffica@dep.state.nj.us" <dgaffica@dep.state.nj.us>
cc: "Roos, Allen D NAN02" <Allen.D.Roos@nan02.usace.army.mil>, "Medary, Richard T NWK" <Richard.T.Medary@nwk02.usace.army.mil>, "Mellema, Doug W NWK" <Doug.W.Mellema@nwk02.usace.army.mil>, "Speckin, Paul D NWK" <Paul.D.Speckin@nwk02.usace.army.mil> (bcc: David Doyle/Environmental/SWEC)

Subject: Reduction in field duplicate and MS/MSD frequency request

Angela/Donna, with this email, USACE is notifying EPA and NJDEP of our intent to reduce the number of field duplicates and MS/MSD samples required in the Maywood Chemical Site CDQMP for the PDI sampling from 10% to 5%. The 10% frequency is a USACE-internal QC standard which USACE plans to reduce based on the large number of soil samples collected during the Pre-Design Investigation (PDI). The reduction in frequency would affect field duplicate samples collected for radionuclides of concern (ROC) and analysis by the on-site field laboratory; field duplicate gamma radiation readings (both downhole and core sample); photoionization detector (PID) or flame ionization (FID) readings; and MS/MSD samples analyzed by the off-site laboratory. It is anticipated that greater than 2000 soil samples will be analyzed by the on-site field laboratory and gamma radiation and PID readings will exceed 10,000 measurements.

Five percent is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and EPA guidelines for MS/MSD analysis. EPA Region II does not have a specific QA/QC guideline for field duplicate samples. The guideline is therefore on a case-by-case basis, in accordance with the site-specific project plans.

Please note that the 10 percent of the samples analyzed by the on-site field laboratory will still be sent to a certified off-site laboratory for confirmatory ROC analysis.

We will continue to adhere to the current 10 percent until EPA and NJ notifies USACE of its concurrence with this deviation from the CDQMP (for the PDI only). Your attention to this matter is greatly appreciated, since reduction of this QA/QC guideline will help to increase production during the Pre-Design Investigation without, in the opinion of USACE, impacting

quality and usability of the data.

Thanks,
Glen Shonkwiler
Remedial Investigations & Remedial Design Manager
Hazardous, Toxic, & Radioactive Waste Branch
U. S. Army Corps of Engineers
CENWK-EC-EA RM 610
601 E 12th St
Kansas City, MO 64106
(816) 983-3561
(816) 426-5550/5949 (fax)
glen.d.shonkwiler@usace.army.mil

APPENDIX 10-B

**PDI Soil Probe Log Sheets
(Radiological Data)**

PDI Soil Probe Log Sheet
LEGEND

List of Abbreviations:

--- = not applicable	lt = light
blk = black	MDA = minimum detectable activity
bn = brown	med = medium
cl = clay	n/r = no recovery
cnts = counts	pCi/g = picoCuries per gram
Conc. = concentration	ppm = parts per million
dk = dark	SAA = same as above
DUP = duplicate	sc = clayey sand
f = fine	sec = seconds
gm = silty gravel	sm = silty sand
gp = poorly-graded gravel	sp = poorly-graded sand
gw = well-graded gravel	sw = well-graded sand
gy = gray	tr = trace
J = estimated	U = unidentified or negative conc. less than MDA
lg = large	wht = white

List of General Comments:

- 4x4 truck-mounted model 5400 and track-mounted model 54DT Geoprobe[®] were used to collect samples. Manual direct push methodology required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- Holes were grouted with BenSeal[®]
- Gamma measurements were taken at center point
- Duplicate samples marked with an "X" for duplicate were prepared by homogenizing soil above and below the center point and then separating for analysis.
- The depth listed is the center point
- Error: 2 sigma (95% confidence interval)

Tube Types

1-inch diameter = Dual Tube (actual 1.3-inch diameter)

2-inch diameter = Macro-Core[®] (actual 1.7-inch diameter)

Sample Intervals

Dual Tube – 13 inches

Macro-Core[®] – 8 inches

Manual Direct Push – 24 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752076	2164328	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Date
Date	02/25/2000	03/20/2000	Date	03/21/2000
Time	9:04	14:55	Time	10:22
Logger	C. Hales	S. Ng	Logger	J Dekoskie
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter 4 to 8 feet= 1-inch diameter 8 to 12 feet= 1-inch diameter	Native @ 2.0'
--	---------------

<u>Field Original Signed</u> _____ Signature (Down Hole Gamma Logging)	<u>02/25/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (Core Gamma Logging)	<u>03/20/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (PID Logging)	<u>03/21/2000</u> _____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752134	2164323	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/20/2000	03/21/2000	
Time	9:43	15:15	10:40	
Logger	C. Hales	S. Ng	J Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet= 1-inch diameter
 8 to 12 feet= 1-inch diameter
 12 to 16 feet= 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752187	2164346	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/20/2000	03/21/2000	
Time	10:14	15:50	11:05	
Logger	C. Hales	S. Ng	J Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet = 2-inch diameter	Native @ 4.0'
--	---------------

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ Date 02/25/2000
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ Date 03/20/2000
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ Date 03/21/2000

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752494	2164570	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/20/2000	03/21/2000	
Time	11:26	16:55	12:33	
Logger	C. Hales	S. Ng	J Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	Native @ 3.0'
4 to 8 feet= 1-inch diameter	
8 to 12 feet= 1-inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/20/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752442	2164521	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/21/2000	03/21/2000	15:00
Time	12:25	7:35	15:00	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	44-10	CENAN 21811	
Scaler Model #	N/A	21779		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 5.0
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 12.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752472	2164702	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/21/2000	03/21/2000	
Time	13:20	8:05	13:53	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C442E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 5.5
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 6.4 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752408	2164549	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/21/2000	03/21/2000	
Time	13:20	8:25	14:20	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.0

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752418	2164665	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/21/2000	03/21/2000	
Time	13:40	8:35	14:41	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C442E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752369	2164686	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date				
Time				
Logger				
Detector Model #				
Detector Serial #				
Scaler Model #				
Scaler Serial #				

Comments:

Hit refusal. No samples collected.

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752436	2164782	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/21/2000	03/21/2000	
Time	14:15	10:10	14:58	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C442E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.0

4 to 8 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752439	2165135	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date				
Time				
Logger				
Detector Model #				
Detector Serial #				
Scaler Model #				
Scaler Serial #				

Comments:

Hit refusal. No samples collected.

Signature (Down Hole Gamma Logging)	Date
Signature (Core Gamma Logging)	Date
Signature (PID Logging)	Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)														
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP					
0.0	---					N/A															
0.5																					
1.0																					
1.5																					
2.0																					
2.5																					
3.0																					
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Recovery

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752460	2165041	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/21/2000	03/21/2000	
Time	15:05	10:30	15:13	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C442E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 2.5

4 to 8 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/21/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.0	0.0-1.0: blk sm and gp														
0.5	3769		2900				1	0	A	0	0	8	0	3	2					
1.0	3127				0.0	1.0-2.0: bn sm tr gp														
1.5	628																			
2.0	333	327	604	606	0.0	2.0-3.7: red bn sm tr gp														
2.5	298																			
3.0	268		529		0.0															
3.5	226		612			3.7-4.0: no recovery														
4.0	259				0.3	4.0-6.2: red/bn sm w/gp														
4.5	270		543																	
5.0			493		0.9		1	0	A	0	0	8	0	3	3					
5.5																				
6.0			517		0.8		1	0	A	0	0	8	0	3	4					
6.5																				
7.0																				
7.5																				
8.0																				
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Recovery

0-4 feet: 45 inches
4-8 feet: 26 inches

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5	1	0	A	0	0	8	0	3	2	9.99	0.23	0.46	19.00	0.31	0.38	14.60	U	---	14.60
1.0																			
1.5																			
2.0																			
2.5																			
3.0																			
3.5																			
4.0																			
4.5																			
5.0	1	0	A	0	0	8	0	3	3	0.65	0.07	0.18	1.20	0.07	0.23	5.94	U	---	5.94
5.5																			
6.0	1	0	A	0	0	8	0	3	4	ARCHIVED									
6.5																			
7.0																			
7.5																			
8.0																			
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	014
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752308	2164972	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/21/2000	03/21/2000	15:28
Time	15:01	10:55	15:28	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C436E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 1.0

4 to 8 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/21/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	#	DUP			
0.0	---				0.0	0.0-2.1: bn sm tr gp, sc														
0.5	1594		1401	1451			1	0	A	0	0	8	0	3	5					
1.0	636				0.0															
1.5	411																			
2.0	292		565		0.0	2.1-3.1: red sm tr gp														
2.5	292		566				1	0	A	0	0	8	0	3	6					
3.0	243	240			0.0	3.1-4.0: no recovery	1	0	A	0	0	8	0	3	7	X				
3.5	250																			
4.0	258				0.0	4.0-6.6: red sm tr gp														
4.5	258		485																	
5.0	213		436		0.0		1	0	A	0	0	8	0	3	8					
5.5	236		465																	
6.0	226				0.0															
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Recovery

0-4 feet: 37 inches
4-8 feet: 32 inches

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	0	3	5		8.41	0.21	0.58	21.85	0.34	0.42	22.70	U	---	22.70
1.0																				
1.5																				
2.0																				
2.5	1	0	A	0	0	8	0	3	6		0.89	0.08	0.18	1.09	0.07	0.23	6.24	U	---	6.24
3.0	1	0	A	0	0	8	0	3	7	X	0.99	0.07	0.21	1.37	0.06	0.17	8.25	U	---	8.25
3.5																				
4.0																				
4.5																				
5.0	1	0	A	0	0	8	0	3	8		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	--

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	015
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	751846	2164744

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/21/2000	03/21/2000	
Time	8:05	11:10	13:47	
Logger	E. Barbour/B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C442E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

1 to 4 feet = 2-inch diameter

<i>Field Original Signed</i>	02/28/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/21/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/21/2000
Signature (PID Logging)	Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)														
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP					
0.0	---				0.0	0.0-2.6: bn sm w/gp															
0.5	234																				
1.0	253		516		0.3																
1.5	235		590																		
2.0	290		617		0.5																
2.5	335		611	622			1	0	A	0	0	8	0	3	9						
3.0	327	329			n/r																
3.5	429																				
4.0	609																				
4.5	742																				
5.0	606																				
5.5	541																				
6.0																					
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24.0																					

Recovery

0-4 feet: 33 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	016
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751875	2164706	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/21/2000	03/21/2000	
Time	8:35	11:30	15:53	
Logger	E. Barbour/B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C442E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 9.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

12 to 16 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
---	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	017
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	751946	2164762

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/21/2000	03/22/2000	
Time	8:48	13:10	7:35	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 9.0
4 to 8 feet = 2-inch diameter	
8 to 12 feet = 2-inch diameter	Depth to groundwater at 19.7 feet
12 to 16 feet = 2-inch diameter	
16 to 20 feet = 2-inch diameter	

<u>Field Original Signed</u> Signature (Down Hole Gamma Logging)	<u>02/28/2000</u> Date
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<u>Field Original Signed</u> Signature (Core Gamma Logging)	<u>03/21/2000</u> Date
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<u>Field Original Signed</u> Signature (PID Logging)	<u>03/22/2000</u> Date
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	018
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751868	2164762	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/21/2000	03/22/2000	
Time	9:00	13:45	8:15	
Logger	E. Barbour/B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C442E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 9.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

12 to 16 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/22/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	019
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751845	2164796	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/21/2000	03/22/2000	
Time	9:40	14:15	9:15	
Logger	E. Barbour/B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C442E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 5.5
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 9.8 feet
12 to 16 feet = 1-inch diameter	

<i>Field Original Signed</i>	02/28/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/21/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/22/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	10A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	020	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751959	2164705	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	02/28/2000	03/21/2000	Date 03/22/2000
Time	9:23	15:45	Time 10:10
Logger	C. Hales	S. Ng	Logger J. Dekoskie
Detector Model #	G1	44-10	PID Model # Multi-RAE
Detector Serial #	C436E	21779	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet = 2-inch diameter </div> <div style="width: 45%;"> native at 5.0 </div> </div>			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 02/28/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/21/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/22/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	021
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751913	2164690	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/21/2000	03/22/2000	
Time	9:45	16:00	10:20	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 6.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/22/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	022
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	751996	2164671

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/21/2000	03/22/2000	
Time	10:05	17:05	10:47	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 5.0'

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

12 to 16 feet = 2-inch diameter

<u>Field Original Signed</u> Signature (Down Hole Gamma Logging)	<u>02/28/2000</u> Date
<u>Field Original Signed</u> Signature (Core Gamma Logging)	<u>03/21/2000</u> Date
<u>Field Original Signed</u> Signature (PID Logging)	<u>03/22/2000</u> Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	023
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751794	2164803	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/21/2000	03/22/2000	
Time	10:05	17:30	11:02	
Logger	E.Barbour/B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C442E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @6.0'

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/22/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	024
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751753	2164849	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/22/2000	
Time	10:30	7:45	11:20	
Logger	B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C442E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 4.0'

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

<i>Field Original Signed</i>	02/28/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/22/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/22/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	025
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752011	2164792	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/22/2000	
Time	11:42	8:13	12:38	
Logger	B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C442E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 5.0'

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/22/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	026
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751950	2164626	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/22/2000	
Time	11:14	8:30	13:15	
Logger	C Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @4.0'

4 to 8 feet = 1.2-inch diameter

8 to 12 feet = 2-inch diameter

12 to 16 feet= 2- inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/22/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	027
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751966	2164584	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/22/2000	
Time	11:40	9:05	13:42	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 6.0'

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

12 to 16 feet= 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/22/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	028
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752020	2164722	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/22/2000	7:35
Time	12:00	9:30	03/22/2000	7:35
Logger	B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C442E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 5.0'

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/22/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	029
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751999	2164590	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/23/2000	
Time	11:59	11:10	8:20	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native @ 4.0'
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 11.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/23/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	030
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752043	2164746	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/23/2000	
Time	13:35	11:35	8:48	
Logger	B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C442E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 10.0'

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/23/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	031
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752094	2164739	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/23/2000	
Time	14:15	12:10	9:28	
Logger	B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C442E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 5.0'

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

12 to 16 feet = 2- inch diameter

<i>Field Original Signed</i>	02/28/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/22/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/23/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	032
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752033	2164674	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/23/2000	
Time	13:30	13:30	9:58	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 4.0'

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/23/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.0	0.0-3.4: blk sm & gp														
0.5	443																			
1.0	582				0.0															
1.5	787																			
2.0	1023		711	698	0.0		1	0	A	0	0	8	0	9	1					
2.5	858																			
3.0	633		638		0.0															
3.5	568																			
4.0	430				0.0															
4.5	410		494				1	0	A	0	0	8	0	9	2					
5.0	334				0.0															
5.5	232	217																		
6.0	219				n/r															
6.5	237																			
7.0	258				n/r															
7.5	315																			
8.0	268				0.0															
8.5	238		483			1	0	A	0	0	8	0	9	3						
9.0	228				0.0															
9.5	258																			
10.0	260				0.0															
10.5	275																			
11.0	258				n/r															
11.5																				
12.0					n/r															
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				
18.5																				
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet: 41 inches
 4-8 feet: 19 inches
 8-12 feet: 35 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	033
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752098	2164642	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/23/2000	
Time	13:55	13:45	10:20	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2'

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/23/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	0	9	4		1.61	0.08	0.27	3.52	0.10	0.19	7.73	U	---	7.73
1.0																				
1.5																				
2.0	1	0	A	0	0	8	0	9	5		0.69	0.06	0.21	0.80	0.06	0.22	5.51	U	---	5.51
2.5																				
3.0																				
3.5																				
4.0																				
4.5	1	0	A	0	0	8	0	9	6		ARCHIVED									
5.0																				
5.5																				
6.0																				
6.5																				
7.0																				
7.5																				
8.0																				
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
11.5																				
12.0																				
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				
18.5																				
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	034
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752116	2164783	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/23/2000	
Time		14:00	11:05	
Logger	B.Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C442E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 8.5'

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/23/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)														
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP					
0.0	---				0.0	0.0-3.4: blk sm &gp															
0.5	106																				
1.0	296				0.0																
1.5	317																				
2.0	328				0.0																
2.5	363	283	537	567																	
3.0	303		569		0.0		1	0	A	0	0	8	0	9	7						
3.5	323																				
4.0	420				0.0																
4.5	426		498				1	0	A	0	0	8	0	9	8						
5.0	426				0.0																
5.5	379		479																		
6.0	326				n/r																
6.5	258																				
7.0	218				n/r																
7.5	219	214																			
8.0	163				0.0																
8.5	228		438			1	0	A	0	0	8	0	9	9							
9.0	194				0.0																
9.5	273																				
10.0					n/r																
10.5																					
11.0					n/r																
11.5																					
12.0																					
12.5																					
13.0																					
13.5																					
14.0																					
14.5																					
15.0																					
15.5																					
16.0																					
16.5																					
17.0																					
17.5																					
18.0																					
18.5																					
19.0																					
19.5																					
20.0																					
20.5																					
21.0																					
21.5																					
22.0																					
22.5																					
23.0																					
23.5																					
24.0																					

Recovery

0-4 feet : 40 inches
 4-8 feet : 22 inches
 8-12 feet : 22 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	035
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752204	2164494	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/23/2000	
Time	14:14	14:20	11:30	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 3'

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/23/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	036
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752060	2164803	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/23/2000	
Time		14:35	12:25	
Logger	B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C442E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 5'

4 to 8 feet = 1.2-inch diameter

8 to 12 feet = 2-inch diameter

12 to 16 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/23/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	037
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752051	2164457	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	02/22/2000		
Time	14:47	15:00		
Logger	C. Hales	S. Ng		
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	038
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752099	2164836	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/28/2000	03/22/2000	03/23/2000	
Time	15:16	16:15	14:40	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 4.5'

4 to 8 feet = 1.2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/28/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/23/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	039
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752147	2164918	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/22/2000	03/23/2000	
Time	8:10	16:40	15:10	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2'

4 to 8 feet = 1.2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/23/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	#	DUP			
0.0	---				0.0	0.0-1.5: blk sm w/ gp														
0.5	465																			
1.0	511				1.2															
1.5	667		819	955		1.5-3.6: red/bn sm tr gp	1	0	A	0	0	8	1	1	3					
2.0	324		511		3.1		1	0	A	0	0	8	1	1	4					
2.5	284		499																	
3.0	265				3.0															
3.5	214		527			3.6-4.0: no recovery	1	0	A	0	0	8	1	1	5					
4.0	217				6.0	4.0-7.0: red/bn sm w/gp														
4.5	247																			
5.0	250	219	527		28.4															
5.5	224																			
6.0	252				25.1															
6.5	240																			
7.0	261				n/r	7.0-8.0: no recovery														
7.5	250																			
8.0	270				5.6	8.0-10.1: bn/red sm														
8.5	252																			
9.0	269		558		22.4															
9.5	287																			
10.0	243				35.3	10.1-11.7: blk sm &gp														
10.5																				
11.0					12.2															
11.5																				
12.0																				
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				
18.5																				
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5						Recovery														
22.0						0-4 feet : 45 inches														
22.5						4-8 feet : 36 inches														
23.0						8-12 feet : 43 inches														
23.5																				
24.0																				

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	040
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752116	2164897	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/22/2000	03/23/2000	
Time	8:38	17:10	15:38	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2.8'

4 to 8 feet = 1.2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/22/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/23/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	041
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752112	2165095	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/23/2000	03/24/2000	
Time	9:50	7:45	7:25	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 1.0'

4 to 8 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/24/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)														
		DUP		DUP			X	X	X	#	#	#	#	#	#	#	DUP				
0.0	---				0.0	0.0-3.4: red sm tr gp															
0.5	198																				
1.0	235				0.0																
1.5	251		566				1	0	A	0	0	8	1	1	9						
2.0	254				0.0																
2.5	228																				
3.0	263		568	598	0.0		1	0	A	0	0	8	1	2	0						
3.5	251	276																			
4.0	273				0.0		4.0-7.7: red sm tr gp														
4.5	271		507					1	0	A	0	0	8	1	2	1					
5.0	313				0.0																
5.5	260		526																		
6.0	285				0.0																
6.5	269																				
7.0	226				0.0																
7.5						7.7-8.0: no recovery															
8.0																					
8.5																					
9.0																					
9.5																					
10.0																					
10.5																					
11.0																					
11.5																					
12.0																					
12.5																					
13.0																					
13.5																					
14.0																					
14.5																					
15.0																					
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16.5																					
17.0																					
17.5																					
18.0																					
18.5																					
19.0																					
19.5																					
20.0																					
20.5																					
21.0																					
21.5																					
22.0																					
22.5																					
23.0																					
23.5																					
24.0																					

Recovery

0-4 feet : 42 inches

4-8 feet : 45 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	042
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752110	2165041	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/23/2000	03/24/2000	
Time	9:30	7:55	7:45	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 0.5'

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	043
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752179	2164971	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/23/2000	03/24/2000	
Time	10:27	8:40	8:00	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 1.1'

4 to 8 feet = 1.2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	044
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752244	2165023	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/23/2000	03/24/2000	
Time	10:42	8:35	8:20	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 1'

4 to 8 feet = 1.2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/24/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	1	2	8		1.45	0.07	0.22	2.29	0.08	0.19	9.12	U	---	9.12
1.0																				
1.5	1	0	A	0	0	8	1	2	9		0.92	0.07	0.16	0.99	0.05	0.12	5.11	U	---	5.11
2.0	1	0	A	0	0	8	1	3	0	X	0.86	0.08	0.20	1.06	0.06	0.25	8.03	U	---	8.03
2.5																				
3.0																				
3.5																				
4.0																				
4.5	1	0	A	0	0	8	1	3	1		ARCHIVED									
5.0																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	045
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752228	2164903	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/23/2000	03/24/2000	
Time	11:20	8:50	8:42	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 4.5'

4 to 8 feet = 1.2-inch diameter

8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	046
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752355	2164953	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/23/2000	03/24/2000	9:05
Time	11:37	9:10	03/24/2000	9:05
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C 436E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 1.5'

4 to 8 feet = 1.2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/24/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	1	3	5		1.77	0.09	0.36	8.63	0.17	0.26	9.81	U	---	9.81
1.0																				
1.5	1	0	A	0	0	8	1	3	6		0.80	0.07	0.21	1.36	0.07	0.23	8.27	U	---	8.27
2.0																				
2.5																				
3.0	1	0	A	0	0	8	1	3	7		ARCHIVED									
3.5																				
4.0																				
4.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	047
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751771	2165449	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/23/2000	03/24/2000	
Time	13:25	11:30	9:28	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 1.0'

4 to 8 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	048
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751784	2165432	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/23/2000	03/24/2000	
Time	13:42	11:50	9:43	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2.0'
 4 to 8 feet = 1.2-inch diameter
 8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/24/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	049
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751815	2165317	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/23/2000	03/27/2000	
Time	14:12	13:25	8:00	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 1.3'

4 to 8 feet = 1.2-inch diameter

8 to 12 feet= 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/27/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	050
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751841	2165339	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/23/2000	03/27/2000	
Time	14:31	13:55	8:40	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2.0'
4 to 8 feet = 1-inch diameter
8 to 12 feet = 1 inch diameter

Field Original Signed
Signature (Down Hole Gamma Logging) 02/29/2000
Date

Field Original Signed
Signature (Core Gamma Logging) 03/23/2000
Date

Field Original Signed
Signature (PID Logging) 03/27/2000
Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator		X X X	10A
Activity Designator		A A A	PDI
Field Measurement / Sample Collection Designator		V V	SP
Station Number		N N N	051
Media		m m	SB
Sample Type		n	0
Sequential Sample Number		# # # # #	(See Below)
Location		Northing (NAD 1927)	Easting (NAD 1927)
		751831	2165258
		Photoionization Detector (PID) Logging	
		Gamma Logging	
	Down Hole	Core	
Date	02/29/2000	03/23/2000	Date
Time	15:10	14:15	Time
Logger	C. Hales	S. Ng	Logger
Detector Model #	G1	44-10	PID Model #
Detector Serial #	C 436E	21779	PID Serial #
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: 0 to 4 feet = 2-inch diameter native @ 2.0' 4 to 8 feet = 1.2-inch diameter 8 to 12 feet = 2 inch diameter			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 02/29/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/23/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/27/2000 Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	052
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751714	216492	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/23/2000	03/27/2000	
Time	8:31	14:40	9:30	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 5.5'

4 to 8 feet = 1.2-inch diameter

8 to 12 feet = 2 inch diameter

12 to 16 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/27/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	053
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	751671	2164964

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Date
Date	03/01/2000	03/23/2000	03/27/2000	03/27/2000
Time	8:55	15:25	10:50	
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter native @ 7.0'
- 4 to 8 feet = 1.5-inch diameter
- 8 to 12 feet = 1 inch diameter
- 12 to 16 feet = 1 inch diameter

<u>Field Original Signed</u> _____ Signature (Down Hole Gamma Logging)	<u>03/01/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (Core Gamma Logging)	<u>03/23/2000</u> _____ Date
<u>Field Original Signed</u> _____ Signature (PID Logging)	<u>03/27/2000</u> _____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	054
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751679	2165036	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/23/2000	03/27/2000	
Time	9:20	15:45	11:30	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 4.0'

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1 inch diameter

12 to 16 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/27/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	055
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751755	2165287	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/23/2000	03/27/2000	
Time	9:53	16:05	13:00	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2.0'

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/27/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	056
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751885	2165107	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/24/2000	03/29/2000	
Time	10:39	7:40	13:15	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 4.5'

4 to 8 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/27/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	057
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752177	2164670	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/24/2000	03/27/2000	
Time	11:37	8:00	14:27	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2.0'

4 to 8 feet = 1.2-inch diameter

8 to 12 feet = 2 inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/27/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	058
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752165	2164711	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/24/2000	03/27/2000	
Time	11:52	8:30	14:51	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 5.0'

4 to 8 feet = 1.2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/27/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	059
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752195	2164804	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/24/2000	03/27/2000	
Time	13:05	9:10	15:08	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 4.0'
 4 to 8 feet = 1.2-inch diameter
 8 to 12 feet = 2-inch diameter
 12 to 14 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/27/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	060
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752212	2165118	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/24/2000	03/27/2000	
Time	14:04	9:35	15:28	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2.0'

4 to 8 feet = 1.2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/27/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	061
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752174	2165177	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/24/2000	03/27/2000	
Time	14:23	11:00	15:40	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C 436E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2.0'

4 to 8 feet = 1.2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/27/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	062
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752244	2165414	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/24/2000	03/28/2000	8:05
Time	14:46	11:15	J. Dekoskie	Multi-RAE
Logger	C. Hales	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	44-10	PID Serial #	
Detector Serial #	C 436E	21779		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 4.0'

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

12 to 16 feet = 2-inch diameter

<i>Field Original Signed</i>	03/01/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/24/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/28/2000
Signature (PID Logging)	Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.0	0.0-0.7: bn sm														
0.5	642		735			0.7-2.0: red sm tr gp	1	0	A	0	0	8	1	8	5					
1.0	395		491		0.0		1	0	A	0	0	8	1	8	6					
1.5	289																			
2.0	249				n/r	2.0-4.0: no recovery														
2.5	239																			
3.0	242				n/r															
3.5	213																			
4.0	231				0.0	4.0-5.1: red gp & sm														
4.5	195		488				1	0	A	0	0	8	1	8	7					
5.0	213	177			0.0	5.1-7.1: red sm tr gp														
5.5	199																			
6.0	195				0.0															
6.5	197																			
7.0	195				0.0	7.1-8.0: no recovery														
7.5	247																			
8.0	265				0.0	8.0-10.7: red sm w/ gp														
8.5	243																			
9.0	230				0.0															
9.5	255																			
10.0	243				0.0															
10.5			538			10.7-12.0: no recovery														
11.0					n/r															
11.5																				
12.0					0.0	12.0-14.0: red sm tr gp														
12.5			560	525																
13.0					0.0															
13.5			544																	
14.0					n/r															
14.5																				
15.0					n/r															
15.5																				
16.0					n/r															
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19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5						Recovery														
22.0						0-4 feet : 24 inches														
22.5						4-8 feet : 37 inches														
23.0						8-12 feet : 33 inches														
23.5						12-16 feet: 23 inches														
24.0																				

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	1	8	5		1.80	0.13	0.43	7.51	0.20	0.52	12.80	U	---	12.80
1.0	1	0	A	0	0	8	1	8	6		0.93	0.08	0.27	1.36	0.07	0.27	8.83	U	---	8.83
1.5																				
2.0																				
2.5																				
3.0																				
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4.0																				
4.5	1	0	A	0	0	8	1	8	7		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	063
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752457	2165087	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/24/2000	03/28/2000	8:25
Time	15:06	13:40		
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C 436E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 1.5'

4 to 8 feet = 1.2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/28/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	1	8	8		5.98	0.20	0.68	33.00	0.46	0.50	20.00	U	---	20.00
1.0																				
1.5																				
2.0	1	0	A	0	0	8	1	8	9		0.60	0.06	0.18	0.75	0.06	0.23	6.89	U	---	6.89
2.5																				
3.0																				
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4.5	1	0	A	0	0	8	1	9	0		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	064
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752027	2164187	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/24/2000	03/28/2000	
Time	15:40	14:05	8:43	
Logger	B.Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C442E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 1.0'

4 to 8 feet = 1.2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/28/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	1	9	1		1.91	0.10	0.33	4.64	0.14	0.25	9.63	U	---	9.63
1.0																				
1.5																				
2.0	1	0	A	0	0	8	1	9	2		0.77	0.08	0.23	1.18	0.07	0.27	8.65	U	---	8.65
2.5																				
3.0																				
3.5																				
4.0																				
4.5	1	0	A	0	0	8	1	9	3		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	065
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751954	2164189	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/24/2000	03/28/2000	9:10
Time	8:29	16:35		
Logger	B.Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C442E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native @ 2.0'
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 7.4 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/24/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/28/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	1	9	4		1.26	0.10	0.38	5.18	0.15	0.27	10.30	U	---	10.30
1.0																				
1.5																				
2.0	1	0	A	0	0	8	1	9	5		0.74	0.08	0.23	0.95	0.06	0.26	8.38	U	---	8.38
2.5	1	0	A	0	0	8	1	9	6	X	0.70	0.07	0.19	0.97	0.06	0.20	5.27	U	---	5.27
3.0																				
3.5																				
4.0																				
4.5	1	0	A	0	0	8	1	9	7		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	066
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751996	2164221	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/27/2000	03/28/2000	9:31
Time	9:00	7:50	J. Dekoskie	Multi-RAE
Logger	B.Bowers	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	44-10	PID Serial #	
Detector Serial #	C442E	21779		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 1.5'

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

<i>Field Original Signed</i>	03/02/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/27/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/28/2000
Signature (PID Logging)	Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	1	9	8		2.36	0.13	0.42	6.68	0.19	0.53	18.10	U	---	18.10
1.0																				
1.5																				
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5																				
5.0	1	0	A	0	0	8	1	9	9		1.07	0.08	0.23	1.77	0.08	0.28	6.72	U	---	6.72
5.5																				
6.0	1	0	A	0	0	8	2	0	0		ARCHIVED									
6.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	067
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752047	2164248	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/27/2000	03/28/2000	
Time	9:40	8:30	10:15	
Logger	B.Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C442E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 1.5'

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/27/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	068
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751988	2164288	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/27/2000	03/28/2000	
Time	10:15	9:15	10:32	
Logger	B.Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C442E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2.0'

4 to 8 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/27/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/28/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.0	0.0-1.6: red sw														
0.5	203																			
1.0	362				0.0	1.6-2.9: red sw tr gp														
1.5	925																			
2.0	2903		1779	1792	0.0		1	0	A	0	0	8	2	0	4					
2.5	924		543			1	0	A	0	0	8	2	0	5						
3.0	416				n/r	2.9-4.0: no recovery														
3.5	302																			
4.0	252	243			0.0	4.0-6.9: red sm w/ gp, tr sc														
4.5	211		469				1	0	A	0	0	8	2	0	6					
5.0	226				0.0															
5.5	221																			
6.0	273		477		0.0															
6.5	291																			
7.0	245				n/r															
7.5	222																			
8.0					n/r															
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
11.5																				
12.0																				
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19.5																				
20.0																				
20.5																				
21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

Recovery

0-4 feet : 35 inches

4-8 feet : 35 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	069
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752028	2164307	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/02/2000	03/27/2000	03/28/2000	
Time	10:40	9:30	10:47	
Logger	B.Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C442E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2.0'

4 to 8 feet = 1.2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/02/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/27/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/28/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	2	0	7		3.63	0.15	0.51	12.58	0.26	0.40	21.50	U	---	21.50
1.0																				
1.5	1	0	A	0	0	8	2	0	8		0.55	0.05	0.18	0.66	0.05	0.20	5.27	U	---	5.27
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5	1	0	A	0	0	8	2	0	9		ARCHIVED									
5.0																				
5.5																				
6.0																				
6.5																				
7.0																				
7.5																				
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23.5																				
24.0																				

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	070
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752401	2164614	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/27/2000	03/28/2000	11:06
Time	14:45	11:20		
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C443E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2.0'

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/27/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/28/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	2	1	0		12.54	0.29	0.81	51.92	0.69	0.63	33.30	U	---	33.30
1.0																				
1.5																				
2.0	1	0	A	0	0	8	2	1	1		0.93	0.07	0.21	1.21	0.06	0.15	5.50	U	---	5.50
2.5																				
3.0																				
3.5																				
4.0																				
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24.0																				

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	071
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752371	2164619	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/27/2000	03/28/2000	11:14
Time	14:30	11:40		
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C443E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native @ 2.5'

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/27/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	072
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752354	2164550	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/27/2000	03/28/2000	
Time	15:00	11:55	11:24	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/27/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Tel: (201) 226-6600 FAX: (201) 226-6660			
Site Designator	X X X	10A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	073	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location		Northing (NAD 1927)	Easting (NAD 1927)
		752316	2164561
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/06/2000	03/27/2000	Date
Time	15:05	13:20	Time
Logger	J. Marsden	S. Ng	Logger
Detector Model #	G1	44-10	PID Model #
Detector Serial #	C443E	21779	PID Serial #
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> 0 to 4 feet = 2-inch diameter 4 to 8 feet= 2-inch diameter </div> <div> Native @ 5.5' </div> </div>			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		03/06/2000 <hr style="width: 80%; margin: 0 auto;"/> Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		03/27/2000 <hr style="width: 80%; margin: 0 auto;"/> Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		03/28/2000 <hr style="width: 80%; margin: 0 auto;"/> Date	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	074
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752600	2164511	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/06/2000	03/27/2000	03/28/2000	
Time	8:07	15:15	13:50	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter 4 to 8 feet= 1-inch diameter 8 to 12 feet= 1-inch diameter 12 to 16 feet = 1-inch diameter	Native @ 5.0'
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_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/06/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/27/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/28/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	075
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752551	2164514	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/07/2000	03/27/2000	03/29/2000	
Time	8:37	15:45	8:55	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C443E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet= 1-inch diameter
 8 to 12 feet= 1-inch diameter
 12 to 16 feet = 1-inch diameter

Native @ 4.0'

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/27/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/29/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Tel: (201) 226-6600
FAX: (201) 226-6660

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	076
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	752561	2164433

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	03/07/2000	03/27/2000	03/29/2000	
Time	8:55	16:15	9:18	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	Multi-RAE	
Detector Serial #	C443E	21779	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter Native @ 5.0'
4 to 8 feet= 1-inch diameter
8 to 12 feet= 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	03/07/2000 _____ Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	03/27/2000 _____ Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	03/29/2000 _____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	077
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752517	2164403	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	
Date	03/07/2000	03/27/2000	Date	03/29/2000
Time	9:55	16:55	Time	9:38
Logger	J. Marsden	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet= 1-inch diameter
 8 to 12 feet= 1-inch diameter

Native @ 5.0'

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	03/07/2000 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	03/27/2000 Date
<i>Field Original Signed</i> Signature (PID Logging)	03/29/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	078
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752436	2164733	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/07/2000	03/28/2000	03/29/2000	
Time	11:10	7:45	9:46	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter 8 to 12 feet = 2-inch diameter	Native @ 5.5'
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_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/29/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.0	0.0-0.5: gy gp														
0.5	137					0.5-2.0: blk sw														
1.0	409				0.0	2.0-2.9: dk gy sm w/ wht silt														
1.5	500	485	659	663			1	0	A	0	0	8	2	3	2					
2.0	392		528		0.0		1	0	A	0	0	8	2	3	3					
2.5	243		530																	
3.0	228				n/r	2.9-4.0: no recovery														
3.5	90																			
4.0	78				0.0	4.0-5.2: wht silt														
4.5	106																			
5.0	141		454		0.0	5.2-7.3: bn sm														
5.5	149																			
6.0	150				0.0															
6.5	154	179																		
7.0	160		559		0.0	7.3-8.0: no recovery	1	0	A	0	0	8	2	3	4					
7.5	211																			
8.0	225				0.0	8.0-11.3: bn/red sm w/ gp														
8.5	234																			
9.0	188				0.0															
9.5	196		556																	
10.0	201				0.0															
10.5	162																			
11.0	239																			
11.5	267	258																		
12.0																				
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				
18.5																				
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5						Recovery														
22.0						0-4 feet: 35 inches														
22.5						4-8 feet: 39 inches														
23.0						8-12 feet: 40 inches														
23.5																				
24.0																				

<h2 style="margin: 0;">PDI SOIL PROBE LOG SHEET</h2>					
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling			
Tel: (201) 226-6600 FAX: (201) 226-6660					
Site Designator	X X X	10A			
Activity Designator	A A A	PDI			
Field Measurement / Sample Collection Designator	V V	SP			
Station Number	N N N	079			
Media	m m	SB			
Sample Type	n	0			
Sequential Sample Number	# # # # #	(See Below)			
Location		Northing (NAD 1927)	Easting (NAD 1927)		
		752361	2164903		
		Gamma Logging		Photoionization Detector (PID) Logging	
		Down Hole	Core	Date	Time
Date		03/07/2000	03/28/2000	03/29/2000	
Time		11:30	8:10	10:03	
Logger		J. Marsden	S. Ng	J. Dekoskie	
Detector Model #		G1	44-10	Multi-RAE	
Detector Serial #		C443E	21779	PID Serial #	CENAN 21811
Scaler Model #		N/A	2224		
Scaler Serial #		N/A	132842		
Comments:					
0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter		Native @ 4.0'			
<div style="display: flex; justify-content: space-between; align-items: flex-start; margin-top: 10px;"> <div style="text-align: center; width: 45%;"> <hr style="border: 0.5px solid black; margin: 5px 0;"/> <i>Field Original Signed</i> Signature (Down Hole Gamma Logging) </div> <div style="text-align: center; width: 20%;"> <hr style="border: 0.5px solid black; margin: 5px 0;"/> 03/07/2000 Date </div> </div> <div style="margin-top: 20px; text-align: center; width: 45%;"> <hr style="border: 0.5px solid black; margin: 5px 0;"/> <i>Field Original Signed</i> Signature (Core Gamma Logging) </div> <div style="margin-top: 20px; text-align: center; width: 20%;"> <hr style="border: 0.5px solid black; margin: 5px 0;"/> 03/28/2000 Date </div> <div style="margin-top: 20px; text-align: center; width: 45%;"> <hr style="border: 0.5px solid black; margin: 5px 0;"/> <i>Field Original Signed</i> Signature (PID Logging) </div> <div style="margin-top: 20px; text-align: center; width: 20%;"> <hr style="border: 0.5px solid black; margin: 5px 0;"/> 03/29/2000 Date </div>					

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5	1	0	A	0	0	8	2	3	5		5.57	0.17	0.50	13.52	0.25	0.34	13.90 U	---	13.90
1.0																			
1.5																			
2.0																			
2.5																			
3.0																			
3.5																			
4.0																			
4.5	1	0	A	0	0	8	2	3	6		0.98	0.07	0.22	1.30	0.06	0.18	8.51 U	---	8.51
5.0																			
5.5																			
6.0	1	0	A	0	0	8	2	3	7		ARCHIVED								
6.5																			
7.0																			
7.5																			
8.0																			
8.5																			
9.0																			
9.5																			
10.0																			
10.5																			
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23.0																			
23.5																			
24.0																			

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	080
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752323	2165047	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/07/2000	03/28/2000	03/29/2000	10:18
Time	11:55	8:35	J. Dekoskie	Multi-RAE
Logger	J. Marsden	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	44-10	PID Serial #	
Detector Serial #	C443E	21779		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	Native @ 2.5'
4 to 8 feet = 2-inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/29/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	2	3	8		3.74	0.17	0.56	15.29	0.31	0.41	16.60	U	---	16.60
1.0																				
1.5																				
2.0																				
2.5	1	0	A	0	0	8	2	3	9		0.50	0.07	0.21	0.76	0.05	0.20	6.55	U	---	6.55
3.0																				
3.5																				
4.0																				
4.5	1	0	A	0	0	8	2	4	0		ARCHIVED									
5.0																				
5.5																				
6.0																				
6.5																				
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24.0																				

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	081
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752334	2164862	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Date
Date	03/07/2000	03/28/2000	03/29/2000	
Time	12:05	8:50	10:31	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet= 2-inch diameter

Native @ 2.0'

Field Original Signed 03/07/2000
 Signature (Down Hole Gamma Logging) Date

Field Original Signed 03/28/2000
 Signature (Core Gamma Logging) Date

Field Original Signed 03/29/2000
 Signature (PID Logging) Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	082
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752161	2164860	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/07/2000	03/28/2000	03/29/2000	
Time	13:25	10:20	10:41	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/29/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	083
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752096	2164946	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/07/2000	03/28/2000	03/29/2000	
Time	13:45	10:35	10:48	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter Native @ 3.0'
 4 to 8 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/29/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	084
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752011	2164353	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/09/2000	03/28/2000	03/29/2000	11:00
Time	9:10	11:00	J. Dekoskie	Multi-RAE
Logger	J. Marsden	S. Ng	CENAN 21811	
Detector Model #	G1	44-10		
Detector Serial #	C443E	21779		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter Native @ 3.0'

4 to 8 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/29/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	085
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752111	2164413	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/09/2000	03/28/2000	03/29/2000	
Time	9:55	11:20	11:45	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter Native @ 4.0'

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/29/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	086
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752050	2164612	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/09/2000	03/28/2000	03/29/2000	
Time	10:20	13:40	12:10	
Logger	J. Marsden	S. Ng	J. Dekoskie	
Detector Model #	G1	44-10	PID Model #	Multi-RAE
Detector Serial #	C443E	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter Native @ 3.0'

4 to 8 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/29/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.2	0.0-1.9: bn/red sm w/ gp														
0.5	244																			
1.0	222				4.1															
1.5	318																			
2.0	386		665	623	35.3	1.9-2.9: red sm w/ gp	1	0	A	0	0	8	2	5	6					
2.5	306		521																	
3.0	307		624		18.9	2.9-3.7: bn sm tr sc														
3.5	264		600																	
4.0	273				4.1	4.0-5.4: bn sm some sc														
4.5	224		559				1	0	A	0	0	8	2	5	7					
5.0	179				0.9	5.4-7.3: dk gy sm some sc														
5.5	188		493				1	0	A	0	0	8	2	5	8					
6.0	198		498		0.3															
6.5	212																			
7.0	179	179			0.3															
7.5																				
8.0																				
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9.5																				
10.0																				
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23.5																				
24.0																				

Recovery

0-4 feet: 44 inches
4-8 feet: 40 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	10A	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	087	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752298	2165447	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/09/2000	03/28/2000	Date 03/29/2000
Time	11:10	14:05	Time 12:26
Logger	J. Marsden	S. Ng	Logger J. Dekoskie
Detector Model #	G1	44-10	PID Model # Multi-RAE
Detector Serial #	C443E	21779	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> 0 to 4 feet = 2-inch diameter 4 to 8 feet = 2-inch diameter </div> <div style="width: 45%;"> Native @ 1.0' </div> </div>			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/09/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/28/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/29/2000 Date	

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	2	5	9		1.25	0.09	0.31	3.03	0.10	0.19	7.40	U	---	7.40
1.0																				
1.5	1	0	A	0	0	8	2	6	0		0.68	0.06	0.18	0.72	0.05	0.20	6.81	U	---	6.81
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5	1	0	A	0	0	8	2	6	1		ARCHIVED									
5.0																				
5.5																				
6.0																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	088
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752334	2164538	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		03/28/2000	03/29/2000	
Time		14:30	12:40	
Logger		S. Ng	J. Dekoskie	
Detector Model #		44-10	PID Model #	Multi-RAE
Detector Serial #		21779	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 2 feet = 3/4-inch diameter Native @ 6.0'

2 to 4 feet = -----

4 to 6 feet = 3/4 -inch diameter

6 to 8 feet = 3/4-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/28/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/29/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	0	A	0	0	8	2	6	2		0.94	0.11	0.30	0.98	0.10	0.34	8.25	U	---	8.25
1.0																				
1.5																				
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5																				
5.0	1	0	A	0	0	8	2	6	3		1.74	0.12	0.29	2.11	0.10	0.27	12.70	U	---	12.70
5.5																				
6.0																				
6.5																				
7.0	1	0	A	0	0	8	2	6	4		ARCHIVED									
7.5																				
8.0																				
8.5																				
9.0																				
9.5																				
10.0																				
10.5																				
11.0																				
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19.5																				
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21.0																				
21.5																				
22.0																				
22.5																				
23.0																				
23.5																				
24.0																				

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	089
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752224	2164479	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/30/2000	04/03/2000	04/04/2000	
Time	9:55	15:25	13:40	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	C443E	44-10	PID Model #	Multi-RAE
Detector Serial #	G1	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	Native @ 4.5'
4 to 8 feet = 2-inch diameter	
8 to 12 feet = 2 -inch diameter	Depth to groundwater at 1.5 feet

<i>Field Original Signed</i>	03/30/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	04/03/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	04/04/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	090
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/30/2000	04/03/2000	Date	04/04/2000
Time	10:30	15:50	Time	14:20
Logger	C. Hales	S. Ng	Logger	J. Lincoln
Detector Model #	C443E	44-10	PID Model #	Multi-RAE
Detector Serial #	G1	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	Native @ 6.0'
4 to 8 feet = 2-inch diameter	
8 to 12 feet = 2 -inch diameter	Depth to groundwater at 4.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/30/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 04/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 04/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	091
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752267	2164479	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/30/2000	04/03/2000	04/04/2000	
Time	10:52	16:05	14:50	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	C443E	44-10	PID Model #	Multi-RAE
Detector Serial #	G1	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	Native @ 6.0'
4 to 8 feet = 2-inch diameter	
8 to 12 feet = 2 -inch diameter	Depth to groundwater at 3.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/30/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 04/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 04/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	10A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	092
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752173	2164422	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/30/2000	04/03/2000	04/04/2000	
Time	11:20	16:25	14:45	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	C443E	44-10	PID Model #	Multi-RAE
Detector Serial #	G1	21779	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	Native @ 8.0'
4 to 8 feet = 2-inch diameter	
8 to 12 feet = 2 -inch diameter	Depth to groundwater at 4.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/30/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 04/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 04/04/2000 Date

APPENDIX 10-C

Environmental Boring Log Sheets

10A-020582

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	10a
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)

	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	752388.452	2164889.082	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		3/29	Date	3/29
Time		0845	Time	0845
Logger		G. MARKET	Logger	G. MARKET
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

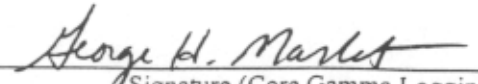
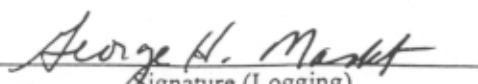
1. MPI No. ENV-10-10013 ← location moved 4' due EAST from marked location.

2. Direct-push location grouted with BenSeal.

0700 - 0845 - H+S + STANDBY

0845 - 0930 - SOIL SAMPLE 5' - 8' (due to running SAND)

0930 - 1030 - H₂O SAMPLE

 _____ Signature (Core Gamma Logging)	3/29/00 _____ Date
 _____ Signature (Logging)	3/29/00 _____ Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	100% RECV-	1	0	a	0	8	0	5	8	2
0.5				SM 5YR 2.5/1									
1.0	0	0.0	0.0										
1.5				Trace black + coal									
2.0													
2.5													
3.0													
3.5													
4.0		↓	↓	SP 5YR 2.5/1									
4.5		↑	↑										
5.0		0.0	0.0										
5.5													
6.0													
6.5				SW 5YR 2.5/4									
7.0				GC 5YR 2.5/4									
7.5		↓	↓	100% RECV.									
8.0		↑	↑	GC 5YR 2.5/4									
8.5													
9.0		0.0	0.0										
9.5													
10.0													
10.5		↓	↓										
11.0				fluxing sand									
11.5													
12.0				REFUSAL @ 11.75									
12.5													
13.0													
13.5													
14.0													
14.5													
15.0													
15.5													
16.0													
16.5													
17.0													
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

H₂O @ 6.45'
 ▽
 =

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
 STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 10a 020583

PROJECT: <i>FUSRAP MAYWOOD</i>	SITE: <i>10a</i>	Page <u>1</u> of <u>1</u>
Project No: <i>08575053</i>	Client: <i>USACE</i>	
Contractor: <i>TERRA PROBE INC.</i>	SAMPLE DEPTH:	
Start Date/Time: <i>3/29 0930</i>	Completion Date/Time: <i>1035</i>	Well Diameter:

Development Method/Equipment:

Logged by: *G. MARKT* Water Level (ft bgs): *6.45* Protection Level: *D*

Pre-development DTW (PVC) (ft): *6.45* DTB (PVC) (ft): *11.75*

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.025 \text{ gal}$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) = -$

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) = -$

Minimum Purge Volume (gal) (3 well volumes) = *2.13 0.40 gal*

Development Purge/Discharge Rate (gpm): *-*

Maximum Drawdown During Purging (ft): *-*

Total Quantity Purged: *0.50 gal*

Disposition of Purge Water: \Rightarrow *STORED @ MISS*

Hours of Development: *-*

Hours of Decon: *-*

Hours of Standby: *-*

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
<i>0930</i>	<i>-</i>	<i>6.45</i>	<i>-</i>	<i>11.7</i>	<i>6.47</i>	<i>.464</i>	<i>999+</i>	
		<i>6.45</i>	<i>-</i>	<i>11.6</i>	<i>6.49</i>	<i>.375</i>	<i>999+</i>	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

SCREEN 6' \rightarrow 10'
1 do = 2.87
2 do = 5.6

flow rate \Rightarrow 1.15 min./1 liter

10A-020584
002

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Site Designator	XXX	10a
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	008
Media	m m	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)

Location	Northing (NAD 1927) 452557.008	Easting (NAD 1927) 2164532.824	Elevation (NGVD 1929)
----------	-----------------------------------	-----------------------------------	-----------------------

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		3/29	Date	3/29
Time		1030	Time	1030
Logger		G. MARKET	Logger	G. MARKET
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

- MPI No. ENV-10-10018
- Direct-push location grouted with BenSeal.

1030 - 1045 - SOIL SAMPLE 6' → 9'
 1045 - 1145 - H₂O SAMPLE (shear on sample H₂O)
 2nd SOIL SAMPLE (MS/MSD)
 1145 - 1200 - STEAM CLEAR
 1200 - 1215 - STEAM CLEAR

George H. Market
 Signature (Core Gamma Logging)

3/29/00
 Date

George H. Market
 Signature (Logging)

3/29/00
 Date

H₂O
@ 4.5
▽
=

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	50% Recv. GM5YR	1	0	a	0	2	0	5	8	4
0.5				2.5/1									
1.0		0.0											
1.5			0.0										
2.0													
2.5													
3.0													
3.5		▽	▽	GP 2 GLEY 3/10g									
4.0		↑	↑										
4.5													
5.0													
5.5		0.0	0.0										
6.0				SM 2 GLEY 2.5/SBG									
6.5				cobble									
7.0													
7.5		▽	▽										
8.0		2		SP 2 GLEY 2.5/SBG									
8.5			↑	?									
9.0		↑											
9.5		0.0	0.0	GC 5YR 4/4									
10.0													
10.5													
11.0													
11.5		▽	▽										
12.0				REFUSAL @ 12'									
12.5													
13.0													
13.5													
14.0													
14.5													
15.0													
15.5													
16.0													
16.5													
17.0													
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
10a020585
 Page 1 of 1

PROJECT: FUSRAP MAYWOOD SITE: 10a
 Project No: 08575053 Client: USACE

Contractor: TERRA PROBE INC. SAMPLE DEPTH:

Start Date/Time: 3/29/04 Completion Date/Time: 1200 Well Diameter:

Development Method/Equipment:

Logged by: G. MARKT Water Level (ft bgs): Protection Level: D

Pre-development DTW (PVC) (ft): 4.5' DTB (PVC) (ft): 10

Post-development DTW (PVC) (ft): —

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3 \Rightarrow 0.14$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) = —

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) = —

Minimum Purge Volume (gal) (3 well volumes) = 0.4

Development Purge/Discharge Rate (gpm): —

Maximum Drawdown During Purging (ft): —

Total Quantity Purged: \Rightarrow 0.5 gal

Disposition of Purge Water: STORED @ MISS

Hours of Development: —

Hours of Decon: —

Hours of Standby: —

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1045	—	4.5	—	10.7	6.63	1.10	999+	
		4.5	—	10.2	6.66	.898	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

$1' d_0 = 0.70$ $2' d_0 = 2.64$ Flow rate \Rightarrow 1.25 min / 1 liter
 SCREEN 6' \Rightarrow 10'

10A-020586
003

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Task Description: GWRI
Job Number: 085750503
Activity: Direct-Push Sampling

Tel: (201) 226-6600
FAX: (201) 226-6660

Site Designator	XXX	10a
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	003
Media	m m	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)

	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	751876.934	2164727.134	

Gamma Logging		Photoionization Detector (PID) Logging	
Down Hole	Core		
Date	3/29	Date	3/29
Time	1300	Time	1300
Logger	G. MARKET	Logger	G. MARKET
Detector Model #		PID Model #	Multi-RAE
Detector Serial #		PID Serial #	CENAN 21811
Scaler Model #			
Scaler Serial #			

Comments:

- MPI No. ENV-10-10107
- Direct-push location grouted with BenSeal.

1300 - 1315 SOIL SAMPLE 6' → 8'

1315 - 1400 H₂O SAMPLE

1400 - 1415 2nd SOIL SAMPLING (DUPLICATE)

George H. Market
Signature (Core Gamma Logging)

3/29/00
Date

George H. Market
Signature (Logging)

3/29/00
Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↓	↑	50% RECV	1	0	2	0	2	0	5	8	4
0.5		↓	↑	6M, brick, quartz, metals, (Fill materials)									
1.0		↓	↑										
1.5		0.0	0.0										
2.0													
2.5		↓	↓										
3.0		↓	↓										
3.5		↓	↓										
4.0		↓	↑	75% RECV.									
4.5		2		*									
5.0		↑											
5.5		0.0	0.0										
6.0				GC 54R 4/6									
6.5		↓	↓										
7.0		↓	↓	SC 54R 3/3									
7.5		↓	↓	cobble @ 7.5									
8.0		↑	↑	100% RECV SO									
8.5				16164 2.5/N									
9.0		0.0	0.0										
9.5													
10.0		↓	↓										
10.5													
11.0		↓	↓	GC 54R 4/4									
11.5													
12.0				REFUSAL @ 12'									
12.5													
13.0													
13.5													
14.0													
14.5													
15.0				* noted blue residue at 4.5 mixed with brick (second sampling at this depth)									
15.5													
16.0													
16.5													
17.0													
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 10a 020587

PROJECT: FUSRAP MAYWOOD	SITE: 10a	Page 1 of 1
Project No: 08675053	Client: USACE	
Contractor: TERRA PROBE INC		SAMPLE DEPTH:
Start Date/Time: 3/29	Completion Date/Time:	Well Diameter:

Development Method/Equipment:

Logged by:	Water Level (ft bgs):	Protection Level: D
------------	-----------------------	----------------------------

Pre-development DTW (PVC) (ft): _____ DTB (PVC) (ft): _____

Post-development DTW (PVC) (ft): _____

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ _____

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$ _____

Minimum Purge Volume (gal) (3 well volumes) = _____

Development Purge/Discharge Rate (gpm): _____

Maximum Drawdown During Purging (ft): _____

Total Quantity Purged: _____

Disposition of Purge Water: _____

Hours of Development: _____

Hours of Decon: _____

Hours of Standby: _____

NO WATER FOUND AT THIS LOCATION -

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks

Notes: = be bgs = below ground surface D = well diameter
 PVC = below top of PVC DTB = depth to bottom of well D (2-inch well) = 0.167 feet
 DTW = depth to water gpm = gallons per minute D (2.5-inch well) = 0.208 feet

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	10a
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)

Location	Northing (NAD 1927) 752099.129	Easting (NAD 1927) 2164320.746	Elevation (NGVD 1929)
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	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		3/29	Date	3/29
Time		1415	Time	1415
Logger		G. MARKT	Logger	G. MARKT
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

- MPI No. ENV-10-10001
- Direct-push location grouted with BenSeal.

1415 - 1430 - SOIL SAMPLE 10' → 13'
 1430 - 1530 - H₂O SAMPLE

<u>George H. Markt</u> Signature (Core Gamma Logging)	<u>3/29/00</u> Date
<u>George H. Markt</u> Signature (Logging)	<u>3/29/00</u> Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)									
					X	X	X	#	#	#	#	#		
0.0				50% RECV										
0.5		A	A	SM54R4/4 coal fragments	1	0	2	0	2	0	5	8	8	
1.0				pieces of concrete										
1.5		0.0	0.0											
2.0				SM54R4/4										
2.5														
3.0														
3.5														
4.0		A	A	70% RECV										
4.5														
5.0														
5.5		0.0	0.0	GC64R4/4										
6.0														
6.5														
7.0														
7.5														
8.0				70% RECV										
8.5														
9.0		0.0	0.0											
9.5														
10.0														
10.5														
11.0														
11.5		0.0	0.0											
12.0														
12.5				SM54R4/4										
13.0				REFUSAL @ 13'										
13.5														
14.0														
14.5														
15.0														
15.5														
16.0														
16.5														
17.0														
17.5														
18.0														
18.5														
19.0														
19.5														
20.0														
20.5														
21.0														
21.5														
22.0														
22.5														
23.0														
23.5														
24.0														

*
H₂O @ 10.9'

* from 8.0' to 11.0' only
3' recovery due to expanding soil

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 10a 020589

PROJECT: FUSRAP MAYWOOD SITE: 10a Page 1 of 1

Project No: 08575053 Client: USACE

Contractor: TERRA PROBE INC. SAMPLE DEPTH:

Start Date/Time: 3/89 Completion Date/Time: Well Diameter:

Development Method/Equipment:

Logged by: G, MARKT Water Level (ft bgs): 10.9 Protection Level: D

Pre-development DTW (PVC) (ft): 10.9 DTB (PVC) (ft): 13'

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(ft)/4 \times \pi \times (DTB-DTW)(ft) \times 7.48 \text{ gal/ft}^3$

(2-inch well = $0.164 \times (DTB-DTW)(ft)$) =

(2.5-inch well = $0.255 \times (DTB-DTW)(ft)$) =

Minimum Purge Volume (gal) (3 well volumes) =

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

Total Quantity Purged:

Disposition of Purge Water:

Hours of Development:

Hours of Decon:

Hours of Standby:

NO WATER

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
		10.9						

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

GWRI SOIL PROBE LOG SHEET



FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: GWRI Job Number: 085750503 Activity: Direct-Push Sampling
---	---

Site Designator	XXX	10A
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)
Location	Northing (NAD 1927)	Easting (NAD 1927) Elevation (NGVD 1929)

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		4/3	Date	4/3
Time		1015	Time	1015
Logger		G. MARKT	Logger	G. MARKT
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

1. MPI No. ENV-10-10500*
 2. Direct-push location grouted with BenSeal.
- 1015-1030 - SOIL SAMPLE 5' ⇒ 9'
 1030-1200 - H₂O SAMPLE
 1200-1315 - H₂O SAMPLE (CONT.) MS/MSD

 _____ Signature (Core Gamma Logging)	4/3/2000 _____ Date
 _____ Signature (Logging)	4/3/2000 _____ Date

* ADDED LOCATION, NO EASTING/NORTHING COORDINATES AVAILABLE AT SAMPLING TIME -

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑		80% Recv.	1	0	A	0	2	0	5	9	0
0.5				GC 2 GLEY 2.5/10BG									
1.0													
1.5		0.0											
2.0				SW 2 GLEY 2.5/10BG									
2.5				trace brick, bolt									
3.0				SW 5YR 4/4 trace									
3.5				brick + coal									
4.0		↑		80% Recv									
4.5				GC 5YR 4/4									
5.0		0.0											
5.5													
6.0													
6.5													
7.0													
7.5													
8.0		0.0											
8.5													
9.0				GRAVEL (wet approx 3")									
9.5				REFUSAL @ 9'									
10.0													
10.5													
11.0													
11.5													
12.0													
12.5													
13.0													
13.5													
14.0													
14.5													
15.0													
15.5													
16.0													
16.5													
17.0													
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

H₂O @ 8.6'

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID:
 10A020591

PROJECT: <i>FUSRAP MAYWOOD</i>	SITE: <i>10A</i>	Page <i>1</i> of <i>1</i>
Project No: <i>085750503</i>	Client: <i>USACE</i>	
Contractor: <i>TERRA PROBE INC -</i>		SAMPLE DEPTH: <i>5' PVC SCREEN</i>
Start Date/Time: <i>4/3 1030</i>	Completion Date/Time: <i>1315</i>	Well Diameter: <i>4" RISER</i>

Development Method/Equipment:

Logged by: <i>G. MARKT</i>	Water Level (ft bgs): <i>8.6</i>	Protection Level: <i>D</i>
Pre-development DTW (PVC) (ft): <i>8.6</i>	DTB (PVC) (ft): <i>9'</i>	

Post-development DTW (PVC) (ft):
 Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$
 (2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) =
 (2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) =
 Minimum Purge Volume (gal) (3 well volumes) =
 Development Purge/Discharge Rate (gpm):
 Maximum Drawdown During Purging (ft):

tal Quantity Purged:

Disposition of Purge Water:

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
<i>1030</i>	<i>-</i>	<i>8.6</i>	<i>-</i>	<i>15.3</i>	<i>5.56</i>	<i>1.31</i>	<i>999+</i>	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

do = 6.3

flow rate = 1:30"/lts

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	10A
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	006
Media	mm	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)

	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	751830.341	2165287.809	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		4/3	Date	4/3
Time		1315	Time	1315
Logger		G. MARKS	Logger	G. MARKS
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

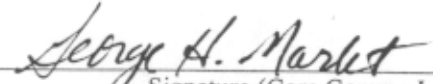
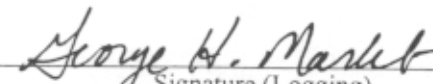
Comments:

1. MPI No. ENV-10-10020
2. Direct-push location grouted with BenSeal.

1315-1330 SOIL SAMPLE 5'→9'

1330 - 1445 - H₂O SAMPLE

1445 - 1515 - steam clean

 _____ Signature (Core Gamma Logging)	4/3/00 _____ Date
 _____ Signature (Logging)	4/3/00 _____ Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)							
					X	X	X	#	#	#	#	#
0.0		↑	↑	80% RECV - GC	0	2	0					
0.5		↑	↑	2 GLEY 4/SBG	1	0	A	0	2	0	5	9
1.0		↑	0.0	(processed stone)								
1.5		0.0		SW 2 GLEY 4/SB								
2.0				trace brick, coal and								
2.5				cinders								
3.0		↓	↓	SC 5YR 3/2								
3.5		↓	↓	SM 5YR 3/4								
4.0		↑	↑	90% RECV								
4.5		↑	↑									
5.0		↑	↑	GC 5YR 4/4								
5.5		0.0	0.0									
6.0				SM 5YR 4/4								
6.5												
7.0		↓	↓									
7.5		↓	↓	GC 5YR 4/4								
8.0		↓	↓	75% RECV.								
8.5		0.0	0.0	SM 5YR 4/4								
9.0		↓	↓	SW 2 GLEY 3/5 (1")								
9.5		↓	↓	GC 5YR 4/4								
10.0				REFUSAL @								
10.5				10ft.								
11.0												
11.5												
12.0												
12.5												
13.0												
13.5												
14.0												
14.5												
15.0												
15.5												
16.0												
16.5												
17.0												
17.5												
18.0												
18.5												
19.0												
19.5												
20.0												
20.5												
21.0												
21.5												
22.0												
22.5												
23.0												
23.5												
24.0												

H₂O
@ 8.5'

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 10A 020593

PROJECT: <i>FUSRAP MAYWOOD</i>	SITE: <i>10A</i>	Page <u>1</u> of <u>1</u>
Project No: <i>085750503</i>	Client: <i>USACE</i>	
Contractor: <i>TERRA PROBE INC.</i>		SAMPLE DEPTH: <i>5' → 9'</i>
Start Date/Time: <i>4/3 1330</i>	Completion Date/Time: <i>1445</i>	Well Diameter: <i>1.5' screen, 1 riser</i>
Development Method/Equipment:		
Logged by: <i>G. MARKT</i>	Water Level (ft bgs): <i>8.5'</i>	Protection Level: <i>D</i>
Pre-development DTW (PVC) (ft): <u>8.5'</u>	DTB (PVC) (ft): <u>10'</u>	

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) =

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) =

Minimum Purge Volume (gal) (3 well volumes) =

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

Total Quantity Purged:

Disposition of Purge Water:

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
<i>1330</i>	<i>—</i>	<i>8.5'</i>	<i>—</i>	<i>15.2</i>	<i>5.24</i>	<i>.452</i>	<i>999+</i>	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

do = 5.8 (bulb broken, needs replacement)

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	10A
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	007
Media	m m	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)
Location	Northing (NAD 1927)	Easting (NAD 1927) Elevation (NGVD 1929)





	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		4/4	Date	4/4
Time		0830	Time	0830
Logger		G.MARKT	Logger	G.MARKT
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

- MPI No ENV-10-10501 *
- Direct-push location grouted with BenSeal.

0815 - 0830 SOIL SAMPLE 2' ⇒ 5'

0830 - 0930 H₂O SAMPLE

 _____ Signature (Core Gamma Logging)	 _____ Date
 _____ Signature (Logging)	 _____ Date

* ADDED LOCATION - NO COORDINATES AVAILABLE AT SAMPLING TIME -

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0	↑	↑	↑	100% RECV, GM 2 GLEY	1	0	A	0	2	0	7	7	9
0.5	↑	↑	↑	2.5/10BG (moist)									
1.0	↑	↑	↑	GC 5YR 4/4									
1.5	↑	↑	↑										
2.0	↑	↑	↑										
2.5	0.0	0.0	0.0										
3.0													
3.5		↓	↓	(1" SP material)									
4.0		↓	↓										
4.5		↓	↓										
5.0				REFUSAL @ 5'									
5.5													
6.0													
6.5													
7.0													
7.5													
8.0													
8.5													
9.0													
9.5													
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21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

H₂O
@ 3.75
▽

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 10A020780

PROJECT: FUSRAP MAYWOOD	SITE: 10A007	Page 1 of 1
Project No: 085750503	Client: USACE	
Contractor: TERRA PROBE INC		SAMPLE DEPTH: 1 PVC SCREEN 5'
Start Date/Time: 4/4 0830	Completion Date/Time:	Well Diameter:
Development Method/Equipment:		
Logged by: G. MARKT	Water Level (ft bgs): 3.75	Protection Level: D
Pre-development DTW (PVC) (ft): 3.75	DTB (PVC) (ft): 5'	

Post-development DTW (PVC) (ft):
 Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$
 (2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) =
 (2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) =
 Minimum Purge Volume (gal) (3 well volumes) =
 Development Purge/Discharge Rate (gpm):
 Maximum Drawdown During Purging (ft):

Total Quantity Purged:
 Disposition of Purge Water:
 Hours of Development:
 Hours of Decon:
 Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
0830	—	3.75	—	15.8	5.7	1.31	732	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

20 = 6.96
 flow rate = 3:00/20

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	10A
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	008
Media	m m	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)

Location	Northing (NAD 1927) 1752085.058	Easting (NAD 1927) 2164775.172	Elevation (NGVD 1929)
----------	------------------------------------	-----------------------------------	-----------------------

Gamma Logging		Photoionization Detector (PID) Logging	
Date	Down Hole	Date	Core
		4/4	
		0930	
		G. MARKT	

- Comments:
- MPI No. ENV-10-10021
 - Direct-push location grouted with BenSeal.

0930-1000 SOIL SAMPLE 10' ⇒ 15' } LIQUIFIES
 1000-1030 H₂O SAMPLE } when compressing
 SOILS

George H. Markt
 Signature (Core Gamma Logging) 4/4/2000
 Date

George H. Markt
 Signature (Logging) 4/4/2000
 Date

H₂O
@ 4.5
▽

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)												
					X	X	X	#	#	#	#	#					
0.0				REC.V.													
0.5				100% GM5YR4/1													
1.0				GC5YR4/4	1	0	A	0	2	0	7	8	1				
1.5		0.0	0.0														
2.0																	
2.5																	
3.0																	
3.5				GM2-6LEY2.5/10G													
4.0																	
4.5				100% REC.V.													
5.0		0.0															
5.5			0.0	SC 1 GLEY2.5/10G													
6.0				(peat)													
6.5				SC5YR2.5/10													
7.0		0.0		BLK 6' → 6.5'													
7.5			20														
8.0			50														
8.5				100% REC.V.													
9.0				SP5YR2.5/2 (wet)													
9.5																	
10.0		0.0	0.0														
10.5																	
11.0																	
11.5																	
12.0																	
12.5		0.0															
13.0		3															
13.5			0.0	SC5YR4/6													
14.0																	
14.5		0.0		GC5YR4/6													
15.0																	
15.5				GM5YR4/4													
16.0				SC5YR3/3													
16.5				REFUSAL @ 16'													
17.0																	
17.5																	
18.0																	
18.5																	
19.0																	
19.5																	
20.0																	
20.5																	
21.0																	
21.5																	
22.0																	
22.5																	
23.0																	
23.5																	
24.0																	

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 10A 020782

Page 1 of 1

PROJECT: FUSRAP MAYWOOD

SITE: 10A-008

Project No: 085750503

Client: USACE

Contractor: TERRA PROBE INC.

SAMPLE DEPTH: 12' → 16'

Start Date/Time: 4/4 1000

Completion Date/Time: 1030

Well Diameter: 1" PVC SCREEN

Development Method/Equipment:

Logged by: G. MARKT

Water Level (ft bgs): 4.5'

Protection Level: D

Pre-development DTW (PVC) (ft): 4.5'

DTB (PVC) (ft): 16'

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$

Minimum Purge Volume (gal) (3 well volumes) =

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

gal Quantity Purged:

Disposition of Purge Water:

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1000	-	4.5		15.0	6.94	1.48	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

$t_0 = 1.23$

flow rate = $1:55''/0.5$

Table 10-1: Properties Comprising Each Cluster

Cluster No.	Property No.	Properties (occupant)	Township/Borough	Property Block & Lot
1	01A	72 Sidney St. (Vacant)	Lodi	Block 164, Lots 1 and 5
2	02A	100 Hancock Street (AT&T)	Lodi	Block 205.03, Lot 2.04
	02B	80 Hancock Street (Vacant)	Lodi	Block 205.03, Lot 2.03
	02C	80 Industrial Road (American Jewel Windows)	Lodi	Block 205.02, Lot 4.02
	02D	8 Mill St. (NJVIS)	Lodi	Block 205.02, Lot 1.05
3	03A	170 Gregg Street (Bergen Cable)	Lodi	Block 205, Lot 1.02
4	04A	160/174 Essex Street (Bank of New York)	Lodi	Block 186.01, Lot 1 and Block 174, Lot 1.02
	04B	I-80 Westbound Right-of-Way (NJDOT)	Lodi	Not Applicable
5	05A	99 Essex Street (Joseph Muscarelle, Inc.)	Maywood	Block 125, Lot 1
	05B	113 Essex Street (Bank of New York)	Maywood	Block 125, Lot 2
	05C	200 NJ Route 17 South (Sears Appliance Repair)	Maywood	Block 125, Lot 3
6	06A	85-101 NJ Route 17 North (Architectural Windows)	Maywood	Block 124, Lot 4
	06B	137 NJ Route 17 North (Ramsey Auto Group)	Maywood	Block 124, Lot 3
	06C	167 NJ Route 17 North (Sunoco Station - Inactive)	Maywood	Block 124, Lot 2
	06D	239 NJ Route 17 North (Gulf Station)	Maywood	Block 124, Lot 1
	06E	29 Essex Street (Federal Express Corporation)	Maywood	Block 124, Lot 5
7	07A	111 Essex Street (Scanel Company, Inc.)	Maywood	Block 131, Lots 1,2,3,4
	07B	New York, Susquehanna & Western Railway - Lodi Branch	Maywood	Block 131, Lot 8
8	08A	23 West Howcroft Road (Maywood Furniture, Inc.)	Maywood	Block 124, Lot 17
9	09A	149-151 Maywood Avenue (Sears Logistical Services)	Maywood; Rochelle Park	Block 124, Lot 30; Block 17.02, Lot 1
10	10A	100 West Hunter Avenue (Stepan Company)	Maywood; Rochelle Park	Block 124, Lot 10; Block 18.02, Lot 2
11	11A	205 Maywood Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
	11B	61 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 50
	11C	50 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
12	12A	New York, Susquehanna & Western Railway	Maywood; Rochelle Park	Block 124, Lot 55 and Block 110, Lot 1
	12B	100 West Hunter Avenue (MISS)	Maywood; Rochelle Park	Block 124, Lot 46 and Block 20.01, Lot 1
	12C	New Jersey Route 17 (NJDOT)	Rochelle Park	Not Applicable

PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 11 – Revision 1

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

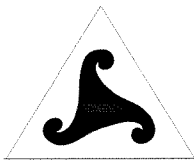
SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18

Submitted to:

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Submitted by:



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May 2001

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**PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 11 – Revision 1**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18**

RECORD OF REVISIONS

Revision 0: Original Issue

Revision 1: The Final PDI Report (Revision 0) was submitted in July 2000. Revision 1 to the Final PDI Report incorporates the following significant changes: revision to text headers and footers; addition of results of confirmatory radiological analyses to [Table 11-4](#); and addition of Toxicity Characteristic Leaching Procedure (TCLP) data to [Table 11-5](#).

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ACRONYMS AND ABBREVIATIONS

AT&T	American Telephone & Telegraph
BNI	Bechtel National, Inc.
C	Degrees Centigrade
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
Conc.	Concentration
CQCP	Contractor Quality Control Plan
DOE	U.S. Department of Energy
EPP	Environmental Protection Plan
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	grams
GMS	Groundwater Modeling System
GPR	Ground Penetrating Radar
GPS	Global Positioning System
ID	Identification
ISOCS	In Situ Object Counting System
keV	kilo electron volts
kg	kilogram
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCW	Maywood Chemical Works
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
mg	milligram
MHTDP	Materials Handling, Transportation and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJVIS	New Jersey Vehicle Inspection Station
NYS&W	New York, Susquehanna & Western Railway
ORNL	Oak Ridge National Laboratories
pCi	picoCurie
PDI	Pre-Design Investigation
PDIWP	Pre-Design Investigation Work Plan
PID	Photoionization Detector
PVC/PET	Polyvinyl Chloride/Polyethylene Teraphthalate
QA	Quality Assurance
QC	Quality Control
QCSR	Quality Control Summary Report
Ra-226	Radium-226
Rn-222	Radon-222

RCRA	Resource Conservation and Recovery Act
RESRAD	Department of Energy Computer Code; RESidual RADioactivity
ROC	Radionuclides of Concern
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
St.	Street
Th-232	Thorium-232
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
ug	microgram
U-238	Uranium-238
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency

1.0 SITE BACKGROUND AND PHYSICAL SETTING

1.1 General Site Overview

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (hereafter referred to as the Maywood Site) is located in a highly developed area of Bergen County in northeastern New Jersey, in the Boroughs of Maywood and Lodi and the Township of Rochelle Park (Figure 11-1). Portions of the Maywood Site are radiologically impacted from process wastes and residues associated with the recovery and refining of thorium and thorium compounds from monazite ores by the Maywood Chemical Works (MCW) from 1916 to 1956 (Bechtel National, Inc., BNI, 1992).

Waste produced at MCW was a fine sand-like material containing residual thorium with lesser amounts of uranium and its daughter products including radium. Wastes and residues were disposed in low-lying areas west of processing facilities. In the early 1930s, a portion of these wastes and residues was separated from the main property by construction of New Jersey State Highway 17 (NJ Route 17). Additionally, the former channel of Lodi Brook runs through the majority of the properties making up the Maywood Site. Some of the contaminated materials are assumed to have eroded from the facility area and were transported downstream via Lodi Brook (Figure 11-2). In addition, from 1928 to 1944, local residents were known to use process waste in their lawns and gardens and as fill material (BNI, 1992). These are the major mechanisms for distribution of radiologically-contaminated materials on the Maywood Site.

The Maywood Site consists of 88 designated residential, commercial, municipal, and state or federal properties. All 64 Phase I properties (including all residential and municipal properties) have either been remediated by the U.S. Department of Energy (DOE) or U.S. Army Corps of Engineers (USACE) or are currently being addressed under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). The remaining 24 Phase II properties are being addressed by the Stone & Webster Team (i.e., Team).

1.2 Pre-Design Investigation Scope

On December 29, 1998, the USACE issued a Scope of Services for the design and remediation of the remaining 24 commercial and government properties. These properties potentially contain deposits of radioactive material in surface and subsurface soils resulting from operations of the former MCW. They have been designated as the Phase II properties.

A Pre-Design Investigation Work Plan (PDIWP, Stone & Webster, 1999a) was submitted in October 1999 for the Phase II properties. The purpose of the PDIWP was to address data gaps necessary to complete remedial design efforts. In determining additional data needs, it was assumed that remediation of radiologically-impacted soils would be conducted on “accessible soils” only. Accessible soils are defined as soils not under permanent structures such as buildings and roadways. Data acquisition was limited to accessible soils only.

A preliminary evaluation was performed to determine the human health risk from leaving subsurface radiologically-impacted soils proximate to these structures. The RESidual RADioactivity (RESRAD) computer code was utilized to quantify the dose and risk under a

number of assumed conditions. Based on the preliminary results, it was determined that any radioactive residues left adjacent to existing buildings, roadways, and railways would need a minimum of two feet of clean soil cover to be protective of human health. As such, it has been assumed that where radiologically-contaminated soils exist at depth adjacent to structures, at least the top two feet of radiologically-contaminated soil would be removed adjacent to the structure to a six foot horizontal setback, and then sloped at two horizontal to one vertical (2H:1V) to the required depth. However, it is recognized that site-specific calculations will need to be made during the remedial design phase in order to determine the actual depth of excavation adjacent to each structure, the horizontal setback, and the slope to final excavation depths (Stone & Webster, 1999a).

In preparing the PDIWP, the 24 Phase II properties were sub-divided into 12 clusters. The purpose of the clustering was to take a 'collective' view of a set of contiguous properties to efficiently secure needed pre-design investigation (PDI) information for those properties. [Table 11-1](#) lists the 12 clusters for the Phase II properties, from south to north. The reader is directed to the PDIWP for additional background information (Stone & Webster, 1999a).

The purpose of this PDI Report is to present data collected during the PDI for Cluster No. 11. The evaluation of PDI data, along with data collected by others during previous investigations, is documented separately.

2.0 PDI FIELD ACTIVITIES

PDI activities were performed by the following Team members:

Stone & Webster, Inc.	Team leader and engineering services
Malcolm Pirnie, Inc.	Engineering services
Science & Ecology Corporation.....	Health physics services
Cabrera Services, Inc.	Radiological survey support
Canberra Industries, Inc.	Radiological survey support
Garden State Surveying, Engineering, and Planning, Inc.	Surveying and mapping
NAEVA Geophysics, Inc.	Geophysical investigation
TerraProbe, Inc.	Direct push services
Franklin Environmental Services, Inc.....	Construction services
ThermoRetec	Radiological sample analysis
RECRA LabNet.....	Environmental sample analysis
Kestrel Environmental Technologies, Inc.....	Data validation

PDI activities involved non-intrusive surveys followed by intrusive investigations. The preliminary, non-intrusive PDI activities (including surface gamma scans, surface In-Situ Object Counting System (ISOCS) readings, geophysical surveys and field surveying) were initiated in August 1999. The intrusive portion of the PDI program began in January 2000 and was completed in April 2000. [Table 11-2](#) presents a summary of PDI intrusive field activities. For logistical reasons, PDI environmental borings were performed at the outset of the Groundwater Remedial Investigation program during the latter part of March and beginning of April 2000.

PDI field activities were conducted in accordance with the PDIWP, and in compliance with procedures established in the following project documents: Contractor Quality Control Plan (CQCP), Site Safety and Health Plan (SSHP), General Environmental Protection Plan (EPP), Chemical Data Quality Management Plan (CDQMP), and the Materials Handling, Transportation and Disposal Plan (MHTDP), (Stone & Webster, 1999b, c, and d, 2000a, 2000b, respectively). Variances in methodology and sample locations between the PDIWP and the actual PDI execution are discussed below.

2.1 Variances from PDIWP

This section discusses deviations in methodologies and sample locations from the approved PDIWP.

2.1.1 Methodology Variances

Methodology variances from the PDIWP were as follows:

- The PDIWP called for the use of an ISOCS utilizing germanium gamma spectroscopy to quantify radionuclide activity in soil. Following approval of the PDIWP, regulatory concerns regarding the use of ISOCS for subsurface investigation were raised. The PDIWP was subsequently modified by replacing intrusive ISOCS sampling with conventional sample

collection using direct push methods to collect soil cores for laboratory analysis. Due to this change, Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled “Soil Probe Investigation” was developed and followed. Refer to the USACE letters dated December 8, 1999 from the Project Manager, Mr. Allen Roos, informing the U.S. Environmental Protection Agency (USEPA) Project Manager, Ms. Angela Carpenter, and the New Jersey Department of Environmental Protection (NJDEP) Case Manager, Ms. Donna Gaffigan, of the modification, as presented in [Appendix 11-A](#). The USEPA approved use of SOP-SW-MWD-509-0 on December 29, 1999 and NJDEP approved it on January 20, 2000.

- A Bicon® Model G1 one-inch by one-inch (1” x 1”) sodium iodide (NaI) detector was substituted for the originally proposed 3/8” x 3/8” NaI detector for downhole gamma logging. This substitution was needed to provide greater detector sensitivity through the soil probe casing. Due to the addition of this detector, SOP number SW-MWD-509-0 entitled “Soil Probe Investigation” was revised. These revisions are outlined in [Table 1-A](#) in [Appendix 11-A](#). The 3/8” x 3/8” NaI detector was used only when the manual direct push method was employed. Manual direct push methodology was required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- The CDQMP originally specified a frequency of 10% for field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. This corresponds to the USACE internal quality control standard. However, due to the significant number of samples to be collected as part of the PDI program (totaling approximately 2000 soil samples and in excess of 10,000 gamma count rate and photoionization detector (PID) readings), the USACE agreed to reduce the frequency to 5%, which is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and USEPA guidelines for MS/MSD analysis. USEPA Region II does not have a specific guideline for field duplicate samples. Refer to the USACE and USEPA/NJDEP correspondence in [Appendix 11-A](#).
- The PDIWP stipulates that geotechnical borings with associated laboratory testing may be required in order to provide design parameters in locations where excavation may impact adjacent structures. Since radiological clean-up criteria have yet to be finalized, final assessment of limits of radiological contamination cannot be made at this time. The geotechnical investigation program was suspended from the PDI. During the design process, existing geotechnical information will be evaluated for design and a determination will be made if supplemental data are needed.

2.1.2 Sample Location Variances

The PDIWP was developed with the intent that proposed sample locations would be deleted, added, or moved as additional information regarding site features and contamination distribution became available during the course of the PDI implementation. In accordance with this approach, sample locations as proposed in the PDIWP were deleted, added, or moved for the following reasons:

- Base mapping developed subsequent to completion of the PDIWP provided additional information regarding underground utility locations and other site features. Proposed sample

locations proximate to these utilities and site features were moved in order to minimize impacts.

- Review of surface gamma survey data collected as part of the PDI, coupled with additional review of data from previous investigations performed by BNI and ORNL, indicated that certain proposed intrusive locations should either be moved or could be deleted. To address potential areas of surface radiological contamination not previously identified as areas of concern, a protocol was established for determining the need for additional intrusive sampling locations. Refer to “Protocol For Addressing Gamma Scan Anomalies” in [Appendix 11-A](#).

Specific rationale for the deletion, addition, or movement of locations proposed in the PDIWP are summarized in [Appendix 11-A](#).

2.2 Geophysical Surveys

Between September 20, 1999 and March 2, 2000, NAEVA Geophysics, Inc. conducted geophysical investigations on the Maywood Site. The purpose of these investigations was to delineate surface traces of detectable underground utilities in the vicinity of proposed exploratory boring sites. Equipment selected for this investigation included: a Fisher TW-6 Pipe and Cable Locator; a Radiodetection RD432PDL-2 Utility Locator; a Subsite 75 Utility Locator, a 3M Dynatel 2250 Cable Locator, and a GSSI SIR-3 ground penetrating radar (GPR) system with a 300 MHz antenna. Details of the surveys are presented in the NAEVA report (NAEVA, 2000).

2.3 Sample Locations

In October 1999, Garden State Engineering, Surveying, and Planning, Inc. performed a ground survey of the Maywood Site properties. Results of the ground survey were combined with aerial mapping prepared by GEOD Corporation to produce new base mapping for the Maywood Site. This new base mapping replaced the mapping used to generate the PDIWP drawings.

Sample points for the surface gamma survey, surface ISOCS measurements, direct push (Geoprobe[®]) sampling, and environmental sampling were located in the field using a Global Positioning System (GPS). A Trimble 4800 Site Surveyor system with a 4700 base receiver, GPS antenna, radio antenna, and ancillary equipment were used to perform GPS surveys. Base stations were set up and calibrated at specified bench-mark locations established by the surveyor. Following base receiver set up, sampling points were located. Field markings (spray paint, flags, and stakes) were used to identify intrusive sampling locations for radiological and environmental direct push mobile rigs, as well as surface ISOCS locations.

Coordinates for intrusive sample locations were determined from new PDI sample location maps which reflected updated base mapping and modified sample locations; surface ISOCS locations were identified based on original PDIWP mapping. For the surface gamma survey, GPS was used to record locations of gamma scan measurements. Where GPS instrumentation could not be utilized due to signal disruption (e.g., tree coverage, building interference, non-availability of satellites, or poor satellite reception due to weather conditions), sample locations were based on identification of site features and scaling off base mapping.

2.4 Surface Gamma Surveys

Surface gamma surveys for all of the Phase II properties were conducted from August 1999 to March 2000. Surveys were conducted to obtain distribution of surface radiological contamination for health and safety reasons, as well as to verify existing data. Measurements were collected by suspending a 1" x 1" NaI gamma scintillation detector coupled to a Ludlum Model 12 ratemeter within a few inches of the ground surface. A health physics technician walked transects (approximately four to six feet wide) covering the properties while slowly swinging the detector in a serpentine motion. Transects were spaced to assure full areal coverage with some overlap. Gamma count measurements were taken approximately every 15 to 20 feet; measurement frequency was increased in areas exhibiting elevated gamma counts. Minimum detectable concentrations (MDCs) for this detector for the radionuclides of concern (ROC) are approximately 4.7 picoCurie per gram (pCi/g) for Radium-226 (Ra-226), 3.0 pCi/g for Thorium-232 (Th-232), and 121.0 pCi/g for Uranium-238 (U-238), correcting for volume and distance from the source (Multi-Agency Radiation Survey and Site Investigation Manual, MARSSIM, 1997). Gamma count data were stored with associated locations in the GPS recorder. In some instances where locations could not be recorded with a GPS (as stipulated above), measurements were manually recorded on the PDI maps.

2.5 Surface ISOCS Measurements

Surface ISOCS measurements were collected at selected locations where environmental, geotechnical, and radiological shallow boreholes were proposed in the PDIWP. Surface ISOCS measurements were collected to identify and quantify radionuclide activity in surface soil, beneath shielded areas (e.g., areas covered with gravel, asphalt, and concrete), and in areas proposed for environmental borings.

Gamma spectroscopy measurements of surface soil were collected using the Canberra high-purity germanium ISOCS and assuming uniform radioactivity distribution in soil. The high-purity germanium detector was positioned in a "downward-looking" direction perpendicular to the ground surface at a height of three feet. The detector was collimated using a lead shield subtending a 90-degree angle, which provided a surface soil viewing area approximately six feet in diameter. The back and side of the detector were shielded with two-inch thick lead O-rings. The detector collimator and shielding were used to ensure that radioactivity detected by the probe originated only from the six-foot diameter area beneath the detector, hence minimizing one possible source of error in the measurements.

2.6 Direct Push Soil Probes

Direct push soil probes (using truck-mounted model 5400 Geoprob[®] or track-mounted model 54DT Geoprob[®]) were used to collect soil samples for radiological and environmental parameter analysis. Two types of direct push soil probes were used: a single rod system (i.e., Macro-Core[®]) and a dual tube (or cased) system. The latter system utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Samples were collected in four-foot soil cores within polyvinyl chloride/polyethylene terephthalate (PVC/PET) liners, marked with the appropriate field identification number, sealed with rubber end caps, and placed

into a two-inch inner diameter PVC container (including PVC end caps) for transport and storage.

For sample locations that were inaccessible to the mounted direct push rigs, soil cores were collected using a manual direct push method. Two-foot cores approximately one inch in diameter were collected using an electric powered hand-held vibratory hammer.

Prior to commencing intrusive sampling, underground utilities in the vicinity of the proposed boring locations were identified by reviewing PDI geophysical survey data, and by contacting the appropriate authorized parties (i.e., New Jersey One-Call System, and the property owner). In addition, a safe working distance from overhead utilities was maintained.

Sampling equipment (the rig, direct push soil probe casing and tools) was decontaminated prior to use and following each borehole installation using pressure or manual washing. Each soil probe hole was backfilled for the full length using Benseal[®] bentonite in accordance with project requirements. For areas covered by asphalt, cold patch was placed at the surface.

2.6.1 Downhole Gamma Logging

Measurements were taken with a Bicron[®] Model G1 1" x 1" NaI gamma detector sealed in a waterproof stainless steel container. The instrument MDCs are approximately 3.6 pCi/g for Ra-226, 2.3 pCi/g for Th-232, and 92.0 pCi/g for U-238, which are approximately 75% of the surface MDCs listed in Section 2.4. This estimate assumes a geometry factor of 0.50, where a four pi geometry (i.e., a sphere) when scanning downhole is approximately half of a two pi geometry (i.e., a hemisphere) when scanning the ground surface. However, this reduction in the MDCs is modified by the 0.3-inch steel casing in the hole, which results in an approximate 33% reduction in the gammas seen by the detector as calculated by the computer code Microshield[™]. The correction factor is therefore calculated by dividing the geometry factor (0.50) by the steel casing reduction factor (0.66), yielding approximately 0.75. The NaI detector was connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector[™] multi-channel analyzer/amplifier/high voltage power supply. The system was controlled, and the data stored, via notebook computer. Ten-second integrated gross gamma measurements were recorded at each 6-inch depth increment in the cased soil probe holes and data entered onto the PDI Soil Probe Log Sheets (see [Appendix 11-B](#)). In areas where samples were collected using the manual direct push method, a Bicron[®] 3/8" x 3/8" NaI gamma detector coupled to a Ludlum Model 2221 scaler/ratemeter was used to take 30 to 60-second gross gamma measurements in uncased soil probe holes. The MDCs for this instrument are estimated to be approximately 1.9 pCi/g for Ra-226 and 2.3 pCi/g for Th-232, as provided by the vendor. There is no correction factor for these MDCs.

2.6.2 Direct Push Core Screening/Sample Collection

Sealed PVC containers collected from direct push mobile and manual rigs were transported to the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation added to the PDI Soil Probe Log Sheets (see [Appendix 11-B](#)) included soil column description and soil screening data. Field screening for radiological activity was performed on soil cores contained in the PVC/PET liner. A collimated Eberline

SPA-3 2" x 2" NaI detector (or Ludlum Model 44-10) coupled to a Ludlum Model 2221 scaler/ratemeter was used to measure gamma activity. The detector was positioned approximately 0.5 inch above the soil core, on a guide, to ensure that this distance was maintained over the entire length of each soil core. Continuous scanning of the soil core was performed at an approximate rate of three inches per second. The instrument MDC, taken from MARSSIM, is estimated to be 2.8 pCi/g for Ra-226, 1.8 pCi/g for Th-232, and 80 pCi/g for U-238 (MARSSIM, 1997). Although the MARSSIM MDC values are based upon an open area, it was assumed that the slower scan time compensated for the different geometry. An indelible marker was used to mark the liner where elevated readings were identified during scanning. Total integrated gross gamma counts were accumulated over a 30-second interval and recorded.

Soil cores were also screened for total volatile organic vapors using a PID. A series of small perforations were made along the PVC/PET liner at 12-inch increments to expose soil to the PID. Perforations were sealed with tape after PID screening. Screening results were recorded on the PDI Soil Probe Logs.

Prior to obtaining samples, each core was photographed using a digital camera. A brief soil field classification description of each core was entered onto the PDI Soil Probe Log Sheet.

Soil samples were selected from each direct push location for analysis of the ROC: Th-232, Ra-226, and U-238. Samples were selected based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample was taken at the highest reading location (suspected FUSRAP waste, if present, as defined in the Federal Facilities Agreement dated November, 1991; DOE and USEPA, 1991); a second soil sample was collected where the readings approached a constant value (suspected transition zone, if present); and a third soil sample was collected within the zone of constant readings (below suspected transition zone). When soil cores exhibited uniform count rates (i.e., elevated gamma measurements were not identified), three samples per soil probe location were collected.

Selected samples were obtained from each core sufficient to fill a 300-milliliter sample container. Samples were labeled and capped at either end with plastic caps. Caps were color-coded for 'top' and 'bottom' of the original hole. Each extracted section of the soil core was replaced with a wooden spacer to indicate what portion of the soil core was sampled. The spacer was labeled with the sample identification number of the soil removed for testing. After screening and sample extraction, remaining portions of each soil core were placed back into the appropriate PVC container, with the wooden spacer in its appropriate location, and stored on-site for future reference. The section of core tube containing the sample was then transferred to the MISS on-site laboratory for sample preparation and analysis.

Evaluation of all gamma log data led to the archiving of selected samples. That is, a number of the direct push soil probes exhibited 'constant' count rates over the depth interval. In these cases, rather than having all samples analyzed at this time, the deepest prepared sample was not counted but archived. By doing this, as laboratory results confirm that radiological contamination does not exist at that soil probe location, unnecessary analytical work is

prevented. Samples that were archived are noted on the PDI Soil Logs in [Appendix 11-B](#) and on [Table 11-4](#).

As described above, a collimated Eberline SPA-3 or Ludlum Model 44-10 2" x 2" NaI detector was used to measure gamma activity for the soil cores, while a Bicron[®] Model G1 1" x 1" NaI gamma detector was used for the downhole measurements. The 2" x 2" NaI detector (Eberline SPA-3 or Ludlum Model 44-10) provided confirmation of downhole measurements and greater sensitivity for sample selection than the 1" x 1" NaI gamma detector.

2.6.3 Sample Preparation

Soil samples were screened to remove small debris and oven-dried to obtain moisture content and to facilitate grinding. Grinding assured sample homogenization. Samples were then transferred to a 300-milliliter commercially supplied metal can. Lids were secured on cans, after which they were shelved for 21 days. The 21-day period was required to allow radon and its daughter products to in-grow and establish secular equilibrium between Ra-226, Radon-222 (Rn-222), and the gamma-emitting daughters.

2.6.4 Laboratory Data

Analysis for ROC on selected samples was performed at the MISS on-site field laboratory using a Canberra high-purity germanium detector. All testing in the MISS on-site field laboratory was completed in accordance with the procedures outlined in the CDQMP. MISS on-site field laboratory data have been entered onto the PDI Soil Probe Log sheets (see [Appendix 11-B](#)).

The Project Chemist evaluated 10% of the MISS on-site field laboratory radiological data packages; the evaluation is included in the PDI Quality Control Summary Report (QCSR; Stone & Webster, 2000c). The laboratory qualified the reported data when the germanium detector measurement system fell outside of one of the control limits during quality control check runs. Data qualification procedures are described in the PDI QCSR.

Ten percent of the samples analyzed by the MISS on-site field laboratory were sent to a USACE-approved off-site laboratory (ThermoRetec) for confirmatory analysis of the ROC. Following analysis, all soil samples were returned to the Maywood Site for storage and future reference. Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the off-site confirmatory radiological data. Radiological data were evaluated using the USACE's Radiological Data Quality Evaluation Guidance, as presented in the CDQMP. The data validation reports for the radiological confirmatory sample results are provided in the PDI QCSR.

2.7 Environmental Sampling

A limited number of soil samples were collected for environmental analyses in order to identify potential chemical contamination commingled with the radioactive waste. This information would aid in assessing waste classification (i.e., whether hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), is commingled with radioactive waste) as well as provide data for worker health and safety. Samples for environmental analysis were

collected using direct push Macro-Core[®] methodology. Sampling depths were based on the anticipated depth of radiological contamination. Soils exhibiting the highest PID readings or visual contamination were collected and sent for laboratory analysis by a USACE and NJDEP certified laboratory (RECRA LabNet). Samples were analyzed for RCRA disposal characteristics (ignitability, reactivity, corrosivity, and toxicity characteristic leaching procedure TCLP), the Target Compound List (TCL) and the Target Analyte List (TAL) with chromium speciation.

During performance of environmental borings, environmental boring log sheets were completed for each boring. Copies of the completed log sheets are included in [Appendix 11-C](#).

Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the environmental data. Environmental data were evaluated using the USACE's Data Quality Evaluation Guidance, as presented in the CDQMP. In addition, the USEPA Region II SOP No. HW-24, Revision I, June 1999, was also applied. The data validation reports for the environmental sample results are provided in the PDI QCSR.

2.8 Geotechnical Sampling

Radiological cleanup criteria have yet to be finalized, therefore final assessment of the extent of radiological contamination cannot be made at this time. The geotechnical investigation program was therefore suspended from the PDI. Following approximate determination of limits of excavation during the design phase, existing geotechnical information will be evaluated for remedial design purposes. If it is decided that additional information is required, then the geotechnical program will be reinstated, as necessary.

2.9 Quality Assurance/Quality Control

Field and laboratory activities were completed in accordance with the CQCP and the CDQMP. Data reflecting adherence to the Quality Assurance / Quality Control (QA/QC) program was documented and presented in the PDI QCSR.

2.10 Health and Safety

All PDI investigation activities were conducted in compliance with the SSHP and associated protocols and directives. Field crews received daily briefings at 'Plan of the Day' meetings prior to any work activities. These meetings reviewed daily health and safety issues such as potential inclement weather, as well as reviews of general site health and safety directives.

3.0 CLUSTER DESCRIPTION AND PDI RESULTS

3.1 Cluster No. 11 Description

Cluster No. 11 consists of three properties in the Borough of Maywood, all owned by Myron Manufacturing:

- Property No. 11A – 205 Maywood Ave.
- Property No. 11B – 61 West Hunter Ave.
- Property No. 11C – 50 West Hunter Ave.

The paragraphs below provide detailed descriptions of each property. In general, Cluster No. 11 is bounded to the north by the New York, Susquehanna, & Western Railway (Cluster No. 12), to the east by Maywood Ave. (residential area), to the south by 149-151 Maywood Ave. (Sears Logistical Services, Cluster No. 9), and to the west by 100 W. Hunter Ave. (Stepan Company, Cluster No. 10).

3.1.1 Property No. 11A – 205 Maywood Ave.

Property No. 11A occupies Block 124, Lot 35 in the Borough of Maywood. A 135,000 square-foot building on the property houses the main manufacturing facility and offices for Myron Manufacturing. Myron Manufacturing makes calendars, planners, and personalized business supplies. The manufacture of these products includes cutting of vinyl for covers, gilding, stitching, typesetting, imprinting, and assembly of products (BNI, 1994). The facility operates three shifts: Monday through Thursday 7:00 a.m. to 5:30 p.m., Monday through Thursday 7:00 p.m. to 5:30 a.m., and a Friday/Saturday/Sunday shift from 7 a.m. to 6:30 p.m. (Stone & Webster, 1999e). The manufacturing facility operates fifty weeks per year, shutting down usually the first two weeks in July, leaving a skeleton crew.

The area under investigation at Property No. 11A is along the property boundary between Myron and Cluster No. 10 (Stepan Company) in the rear of the facility. The emergency exits for the facility are located in the rear, adjacent to the area under investigation; coordination with the fire department will be required if remediation is warranted.

3.1.2 Property No. 11B – 61 West Hunter Ave.

Property No. 11B occupies Block 124, Lot 50 in the Borough of Maywood. There is a 21,250 square-foot one-story cinder block building with a brick veneer on the property. This building houses telemarketing personnel engaged in the sale of Myron products (BNI, 1994). The building contains small offices, a large training room, an open area occupied by telemarketing employees, restrooms, and an employee lunchroom (BNI, 1994). The area under investigation at Property No. 11B is in the northwestern corner of the property.

3.1.3 *Property No. 11C – 50 West Hunter Ave.*

Property No. 11C occupies Block 124, Lot 35 in the Borough of Maywood. There is a 21,250 square-foot two-story brick veneer building on the property. Previously, this building was leased by Myron Manufacturing. Currently, the building is occupied by Myron personnel and used for warehousing and distribution. The area under investigation at Property No. 11C is the western portion of the property consisting mainly of a paved parking area.

Refer to [Figure 11-3](#) for more specific details of site features.

3.2 **Radiological Data**

3.2.1 *Surface Gamma Survey*

A surface gamma survey was performed at Cluster No. 11. Data, recorded using GPS, was entered into the Groundwater Modeling System (GMS) software package and contoured to a two-dimensional grid using the “Natural Neighbor” contouring protocol. “Natural Neighbor” interpolation is based on the Thiessen polygon network of the scatter point set. Data are interpolated based on distance as well as topological relationships (Boss International, Inc., 2000).

Results of the gamma scan survey for Cluster No. 11 are presented graphically on [Figure 11-4](#) and [Figure 11-A1](#) (Appendix 11-A). [Figure 11-4](#) presents surface gamma scan data in context of the Maywood Site: the upper limit of the contour range is the maximum gamma count measurement detected at the Maywood Site, and the lower contour range represents 1.5 times the background gamma count rate for Cluster No. 11 (background is approximately 2,000 counts per minute for Cluster No. 11). [Figure 11-A1](#) provides a more detailed, cluster-specific, presentation of the gamma scan data, with contoured ranges corresponding to actual minimum and maximum measured gross gamma counts recorded at Cluster No. 11.

3.2.2 *Surface ISOCS Measurements*

Surface ISOCS measurements were taken at 11 locations on Cluster No. 11; locations are shown on [Figure 11-3](#). Results of surface ISOCS measurements are presented on [Table 11-3](#).

3.2.3 *Direct Push Soil Probes*

Sixteen (16) direct push soil probes were performed at Cluster No. 11 for radiological purposes. Soil probe locations are shown on [Figure 11-3](#).

3.2.3.1 Downhole Gamma Logging

Results from downhole gamma logging measurements taken at soil probe locations are presented on the PDI Soil Probe Logs included in [Appendix 11-B](#).

3.2.3.2 Direct Push Core Screening/Sample Collection

Results of soil core screening activities performed at the MISS radiological screening laboratory are recorded on PDI Soil Probe Logs included in [Appendix 11-B](#).

3.2.3.3 MISS On-Site Field Laboratory Data and ThermoRectec Confirmatory Data

Fifty-one (51) soil samples were collected for laboratory analysis from the 16 soil probe locations at Cluster No. 11. Thirty-six (36) of the 51 samples were sent for analysis (including four duplicates); 15 were archived. Laboratory data consisting of soil concentrations of the ROC are presented on the soil probe logs in [Appendix 11-B](#), and summarized on [Table 11-4](#). Archived samples are also recorded on the logs and the table.

Four of the soil samples analyzed by the MISS on-site field laboratory were sent to ThermoRetec for confirmatory analysis. Results of the confirmatory analyses performed by ThermoRetec are shown in [Table 11-4](#).

As part of the data quality objective process, a comparison study was performed between the MISS on-site field laboratory and the ThermoRetec laboratory data. The results of the comparison can be found under separate cover (Stone & Webster, 2000d).

3.3 Environmental Data

Two environmental borings were drilled at Cluster No. 11, and two soil samples were collected for environmental analysis. A summary of the environmental analytical data is presented on [Table 11-5](#). [Figure 11-3](#) shows the locations of the borings. In addition, the environmental boring log sheets are included in [Appendix 11-C](#).

REFERENCES

Bechtel National, Inc. Remedial Investigation Report for the Maywood Site, DOE/OR/21949-337; December 1992.

Bechtel National, Inc. Results of Radon and Gamma Radiation Measurements at 19 Commercial and Governmental Properties of the Maywood Site, DE-AC05-91OR21949; August 1994.

Boss International, Inc. and Brigham Young University. Groundwater Modeling System (GMS) User's Manual; 2000.

Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM); EPA-402-R-97-016; NUREG-1575; December, 1997.

NAEVA Geophysics, Inc. Results of Subsurface Investigation for the FUSRAP Maywood Superfund Site; 2000.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Work Plan*, FUSRAP Maywood Superfund Site. Boston, MA; October 1999a.

Stone & Webster Environmental Technology & Services. *Final Contractor Quality Control Plan*, FUSRAP Maywood Superfund Site. Boston, MA; October 1999b.

Stone & Webster Environmental Technology & Services. *Final Site Safety and Health Plan*, FUSRAP Maywood Superfund Site. Boston, MA, August 1999c.

Stone & Webster Environmental Technology & Services. *Final General Environmental Protection Plan*, FUSRAP Maywood Superfund Site. Boston, MA; November 1999d.

Stone & Webster Environmental Technology & Services. *Notes on Trip Reports*, FUSRAP Maywood Superfund Site. Boston, MA; April 1999e.

Stone & Webster Environmental Technology & Services. *Chemical Data Quality Management Plan, Revision 1*, FUSRAP Maywood Superfund Site. Boston, MA; February 2000a.

Stone & Webster Environmental Technology & Services. *Materials Handling/Transportation and Disposal Plan*, FUSRAP Maywood Superfund Site. Boston, MA; January 2000b.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Quality Control Summary Report*, FUSRAP Maywood Superfund Site. Boston, MA; March 2000c.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Radiological Data Comparison Study*, FUSRAP Maywood Superfund Site. Boston, MA; December 2000d.

U.S. Department of Energy and U.S. Environmental Protection Agency. Federal Facility Agreement for the Maywood Interim Storage Site; November, 1991.

Table 11-1: Properties Comprising Each Cluster

Cluster No.	Property No.	Properties (occupant)	Township/Borough	Property Block & Lot
1	01A	72 Sidney St. (Vacant)	Lodi	Block 164, Lots 1 and 5
2	02A	100 Hancock Street (AT&T)	Lodi	Block 205.03, Lot 2.04
	02B	80 Hancock Street (Vacant)	Lodi	Block 205.03, Lot 2.03
	02C	80 Industrial Road (American Jewel Windows)	Lodi	Block 205.02, Lot 4.02
	02D	8 Mill St. (NJVIS)	Lodi	Block 205.02, Lot 1.05
3	03A	170 Gregg Street (Bergen Cable)	Lodi	Block 205, Lot 1.02
4	04A	160/174 Essex Street (Bank of New York)	Lodi	Block 186.01, Lot 1 and Block 174, Lot 1.02
	04B	I-80 Westbound Right-of-Way (NJDOT)	Lodi	Not Applicable
5	05A	99 Essex Street (Joseph Muscarelle, Inc.)	Maywood	Block 125, Lot 1
	05B	113 Essex Street (Bank of New York)	Maywood	Block 125, Lot 2
	05C	200 NJ Route 17 South (Sears Appliance Repair)	Maywood	Block 125, Lot 3
6	06A	85-101 NJ Route 17 North (Architectural Windows)	Maywood	Block 124, Lot 4
	06B	137 NJ Route 17 North (Ramsey Auto Group)	Maywood	Block 124, Lot 3
	06C	167 NJ Route 17 North (Sunoco Station - Inactive)	Maywood	Block 124, Lot 2
	06D	239 NJ Route 17 North (Gulf Station)	Maywood	Block 124, Lot 1
	06E	29 Essex Street (Federal Express Corporation)	Maywood	Block 124, Lot 5
7	07A	111 Essex Street (Scanel Company, Inc.)	Maywood	Block 131, Lots 1,2,3,4
	07B	New York, Susquehanna & Western Railway - Lodi Branch	Maywood	Block 131, Lot 8
8	08A	23 West Howcroft Road (Maywood Furniture, Inc.)	Maywood	Block 124, Lot 17
9	09A	149-151 Maywood Avenue (Sears Logistical Services)	Maywood; Rochelle Park	Block 124, Lot 30; Block 17.02, Lot 1
10	10A	100 West Hunter Avenue (Stepan Company)	Maywood; Rochelle Park	Block 124, Lot 10; Block 18.02, Lot 2
11	11A	205 Maywood Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
	11B	61 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 50
	11C	50 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
12	12A	New York, Susquehanna & Western Railway	Maywood; Rochelle Park	Block 124, Lot 55 and Block 110, Lot 1
	12B	100 West Hunter Avenue (MISS)	Maywood; Rochelle Park	Block 124, Lot 46 and Block 20.01, Lot 1
	12C	New Jersey Route 17 (NJDOT)	Rochelle Park	Not Applicable

Table 11-2: Summary of PDI Intrusive Field Activities

Cluster No.	Property No.	Property Address	Occupant	Planned			Actual			Schedule (Year 2000)
				Probe Locations	Depth (ft)	Footage (ft)	Probe Locations	Depth (ft)	Footage (ft)	
1	01A	72 Sydney Street	Vacant	13	12	156	15	12	188	Jan. 11, 12, Mar. 31
2	02A	100 Hancock Street	AT&T	17	16	272	17	6 - 12	194	Jan. 27, Feb. 1, 2, Mar. 16
	02B	80 Hancock Street	Vacant	18	16	288	Pending Right of Entry Agreement			
	02C	80 Industrial Road	American Jewel Windows	23	16	368	20	12	272	Jan. 21, 24, 28, Feb. 1
	02D	8 Mill Street	NJVIS	38	16	608	44	12 - 16	593	Jan. 13, 14, 18, 19, 20, 21
3	03A	170 Gregg Street	Bergen Cable	10	8	80	10	8	62	Jan. 12, 13
4	04A	160/174 Essex Street	Bank of New York	25	12	300	23	4 - 12	427	Feb. 2, 3, 4
	04B	I-80 Right-of-Way	NJDOT	7	12	84	7	8 - 12	69	Feb. 2, 4, Mar. 31
5	05A	99 Essex Street	Joseph Muscarelle, Inc.	38	8	304	38	8	318	Feb. 23, 24, Mar. 17
	05B	113 Essex Street	Bank of New York	18	8	144	21	4 - 16	171	Feb. 8, 10, 16
	05C	200 NJ Route 17 South	Sears Appliance Repair	23	8	184	16	8 - 10	129	Feb. 15, 16, Mar. 2
6	06A	85-101 NJ Route 17 North	Architectural Windows	17	12	204	17	8 - 18	196	Feb. 9, 10, 16, Mar. 16
	06B	137 NJ Route 17 North	Ramsey Auto Group	15	12	190	13	10 - 12	145	Feb. 9, 16, 25
	06C	167 NJ Route 17 North	Sunoco Station - Inactive	27	12	324	19	3 - 14	239	Feb. 11, Mar. 8
	06D	239 NJ Route 17 North	Gulf Station	19	12	228	2	11 - 12	23	Feb. 16
	06E	29 Essex Street	Federal Express Corporation	7	12	84	9	7 - 12	95	Feb. 16, Mar. 31
7	07A	111 Essex Street	Scanel Company, Inc.	12	16	192	12	12 - 22	161	Feb. 21, 22, 23
	07B	NYS&W - Lodi Branch	NYS&W - Lodi Branch	16	16	256	11	6 - 16	115	Feb. 21, 22
8	08A	23 West Howcroft Street	Maywood Furniture, Inc.	26	16	416	25	7 - 16	321	Feb. 17, 21
9	09A	149-151 Maywood Avenue	Sears Logistical Services	131	16	2096	72	4 - 16	574	Mar. 2, 3, 6, 7, 8, 9, 15
10	10A	100 West Hunter Avenue	Stepan Company	106	24	2544	92	4 - 24	1076	Feb. 25, 28, 29, Mar. 1, 2, 6, 7, 9, 16, 30
11	11A	205 Maywood Avenue	Myron Manufacturing	5	8	40	5	8 - 12	44	Feb. 16
	11B	61 West Hunter Avenue	Myron Manufacturing	9	8	72	10	8 - 16	87	Feb. 15, 21
	11C	50 West Hunter Avenue	Myron Manufacturing	1	8	8	1	8	8	Feb. 15
12	12A	NYS&W	NYS&W	31	24	744	27	12 - 27	335	Feb. 18, 22, 24, Mar. 16, 30
	12B	100 West Hunter Avenue	MISS	120	24	2880	100	7 - 26	1769	Feb. 4, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24, 25, 29, Mar. 1, 7, 8, 9
	12C	NJ Route 17	NJDOT	0	0	0	0	0	0	<i>No investigations planned.</i>
TOTALS:				772		13,066	626		7,611	

Table 11-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
11B-SI001-SS-0-1	0.52	19.0	0.20	1.14	16.0	0.11	< 3.92	-----	3.92
11B-SI002-SS-0-1	0.56	17.5	0.25	1.41	14.6	0.01	< 3.69	-----	3.69
11B-SI003-SS-0-1	0.51	19.0	0.30	1.47	14.4	0.01	< 3.85	-----	3.85
11B-SI004-SS-0-1	0.19	30.5	0.03	0.22	40.0	0.01	< 2.62	-----	2.62
11B-SI005-SS-0-1	0.52	18.0	0.24	1.51	14.0	0.01	< 3.83	-----	3.83
11B-SI006-SS-0-1	0.52	19.7	0.22	1.73	13.0	0.01	< 3.93	-----	3.93
11B-SI007-SS-0-1 (1)	0.40	20.7	0.20	0.90	17.0	0.09	< 3.25	-----	3.25
11B-SI007-SS-1-1 (1)	0.42	20.8	0.20	0.77	20.5	0.08	< 3.01	-----	3.01
11B-SI008-SS-0-1	0.25	28.0	0.19	0.30	33.0	0.11	< 2.73	-----	2.73
11B-SI009-SS-0-1	0.41	21.4	0.21	0.87	18.3	0.01	< 5.06	-----	5.06
11B-SI010-SS-0-1	0.20	34.7	0.17	0.21	44.8	0.01	< 2.69	-----	2.69
11B-SI011-SS-0-1	0.28	26.0	0.16	0.37	27.3	0.08	< 2.78	-----	2.78

* Reported data are taken from the Nuclide Identification Report.

MDA : Minimum Detectable Activity

Error: 2 sigma (95% confidence interval)

< : Nuclide undetected or less than the MDA. The nuclide is assumed to be present at the MDA Value.

----- Not Applicable

(1) Sample (-0-1) and its duplicate (-1-1)

**Table 11-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results								
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
11A-001	4.50	11A10000		1.09	0.11	0.28	1.47	0.09	0.31	7.05 U	---	7.05
11A-001	5.00	11A10001		0.69	0.07	0.21	0.99	0.05	0.15	5.35 U	---	5.35
11A-001	7.00	11A10002		ARCHIVED								
11A-002	1.50	11A10003		0.75	0.08	0.22	0.99	0.06	0.24	7.76 U	---	7.76
11A-002	3.00	11A10004		0.56	0.06	0.20	0.75	0.06	0.19	4.74 U	---	4.74
11A-002	3.00	11A10005	X	0.70	0.07	0.18	0.86	0.06	0.21	7.46 U	---	7.46
11A-002	5.00	11A10006		ARCHIVED								
11A-003	1.00	11A10007		0.80	0.07	0.20	1.11	0.06	0.22	1.88 J	1.58	5.24
11A-003	1.50	11A10008		0.85	0.07	0.22	1.08	0.06	0.17	8.05 U	---	8.05
11A-003	4.50	11A10009		ARCHIVED								
11A-004	2.00	11A10010		1.20	0.09	0.32	1.54	0.07	0.21	10.70 U	---	10.70
11A-004	3.00	11A10011		0.80	0.08	0.19	0.86	0.06	0.23	5.67 U	---	5.67
11A-004	4.50	11A10012		ARCHIVED								
11A-005	1.50	11A10013		1.25	0.10	0.33	1.90	0.09	0.33	10.60 U	---	10.60
<i>ThermoRetec</i> ⁽²⁾		<i>11A10013</i>		<i>1.29</i>	<i>0.18</i>	<i>0.18</i>	<i>1.63</i>	<i>0.23</i>	<i>0.28</i>	<i>1.31 UJ</i>	<i>2.19</i>	<i>2.93</i>
11A-005	1.50	11A10014	X	1.27	0.09	0.31	1.90	0.08	0.22	10.70 U	---	10.70
<i>ThermoRetec</i> ⁽²⁾		<i>11A10014</i>		<i>1.31</i>	<i>0.16</i>	<i>0.16</i>	<i>1.84</i>	<i>0.15</i>	<i>0.26</i>	<i>2.63</i>	<i>2.10</i>	<i>2.48</i>
11A-005	2.50	11A10015		0.81	0.08	0.21	0.98	0.07	0.24	5.94 U	---	5.94
11A-005	4.50	11A10016		ARCHIVED								
11B-001	1.50	11B10100		0.82	0.07	0.21	1.13	0.07	0.24	8.28 U	---	8.28
11B-001	4.50	11B10101		0.41	0.06	0.19	0.70	0.05	0.20	4.60 U	---	4.60
11B-001	7.00	11B10102		ARCHIVED								
11B-002	1.00	11B10103		1.01	0.10	0.29	1.89	0.09	0.29	10.60 U	---	10.60
11B-002	2.00	11B10104		0.68	0.07	0.13	0.77	0.06	0.21	5.17 U	---	5.17
11B-002	7.00	11B10105		ARCHIVED								
11B-003	1.00	11B10106		1.04	0.07	0.24	1.50	0.08	0.28	9.29 U	---	9.29
11B-003	4.50	11B10107		0.80	0.09	0.23	1.24	0.07	0.26	6.15 U	---	6.15
<i>ThermoRetec</i> ⁽²⁾		<i>11B10107</i>		<i>0.89</i>	<i>0.14</i>	<i>0.16</i>	<i>1.52</i>	<i>0.19</i>	<i>0.21</i>	<i>3.06</i>	<i>1.99</i>	<i>2.22</i>
11B-003	4.50	11B10108	X	1.08	0.09	0.25	1.48	0.08	0.29	9.38 U	---	9.38
<i>ThermoRetec</i> ⁽²⁾		<i>11B10108</i>		<i>0.91</i>	<i>0.17</i>	<i>0.16</i>	<i>1.58</i>	<i>0.18</i>	<i>0.21</i>	<i>0.60 UJ</i>	<i>2.06</i>	<i>2.33</i>
11B-003	7.50	11B10109		ARCHIVED								
11B-004	0.50	11B10110		1.43	0.13	0.37	3.01	0.12	0.26	10.40 U	---	10.40
11B-004	1.00	11B10111		0.76	0.09	0.25	1.22	0.08	0.29	10.60 U	---	10.60

**Table 11-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results								
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
<i>11B-005</i>	1.50	11B10112		1.02	0.06	0.25	1.45	0.06	0.19	8.57 U	---	8.57
<i>11B-005</i>	2.50	11B10113		0.79	0.08	0.21	0.81	0.06	0.24	5.58 U	---	5.58
<i>11B-005</i>	5.50	11B10114		ARCHIVED								
<i>11B-006</i>	2.50	11B10115		0.55	0.06	0.16	0.78	0.05	0.18	4.53 U	---	4.53
<i>11B-006</i>	4.50	11B10116		0.81	0.06	0.23	1.04	0.06	0.25	7.97 U	---	7.97
<i>11B-006</i>	6.00	11B10117		ARCHIVED								
<i>11B-007</i>	2.00	11B10118		0.56	0.06	0.19	0.77	0.05	0.18	4.52 U	---	4.52
<i>11B-007</i>	2.00	11B10119	X	0.69	0.06	0.19	1.02	0.06	0.21	7.21 U	---	7.21
<i>11B-007</i>	4.50	11B10120		0.65	0.07	0.16	0.75	0.05	0.19	5.01 U	---	5.01
<i>11B-007</i>	6.50	11B10121		ARCHIVED								
<i>11B-008</i>	1.50	11B10122		1.01	0.07	0.25	1.24	0.07	0.29	9.04 U	---	9.04
<i>11B-008</i>	2.00	11B10123		0.90	0.07	0.21	0.98	0.05	0.14	5.43 U	---	5.43
<i>11B-008</i>	4.50	11B10124		ARCHIVED								
<i>11B-009</i>	1.50	11B10125		1.00	0.08	0.20	1.12	0.07	0.26	8.20 U	---	8.20
<i>11B-009</i>	2.50	11B10126		0.55	0.07	0.19	0.80	0.05	0.19	5.18 U	---	5.18
<i>11B-009</i>	5.00	11B10127		ARCHIVED								
<i>11B-010</i>	2.00	11B10128		0.89	0.07	0.18	0.90	0.06	0.23	7.39 U	---	7.39
<i>11B-010</i>	3.00	11B10129		0.64	0.06	0.16	0.68	0.05	0.18	4.72 U	---	4.72
<i>11B-010</i>	4.50	11B10130		ARCHIVED								
<i>11C-001</i>	1.00	11C10200		1.20	0.10	0.27	2.14	0.10	0.32	11.00 U	---	11.00
<i>11C-001</i>	3.00	11C10201		0.76	0.07	0.19	1.11	0.06	0.21	5.69 U	---	5.69
<i>11C-001</i>	5.50	11C10202		ARCHIVED								

Error: 2 sigma (95% confidence interval)

--- Not Applicable

U Undetected or Negative Concentration Less Than the MDA

J Estimated

MDA Minimum Detectable Activity

(1) The sample marked with an "X" for duplicate is a duplicate of the sample listed directly above it. Duplicate samples are prepared by homogenizing soil above and below the centerpoint and then separating for analysis. The depth listed is the center point.

(2) Approximately 10% of all radiological soil samples collected under the PDI Program were sent to ThermoRetec, an off-site laboratory, for confirmatory radiological analyses. Results from ThermoRetec are presented in this table in italicized font immediately below the MISS On-Site field laboratory result for that same sample.

Table 11-5: Summary of Environmental Analytical Data

Parameter	Sample ID	11A-020594	11B-020596
	Sample Location	11A-001	11B-001
	Sample Depth (feet)	3 - 6	2 - 5
	Sample Date	03/27/00	03/27/00
	Units		
<i>Miscellaneous</i>			
Chromium VI	mg/kg	0.44U	0.46U
Corrosivity by pH	Soil pH	7.5	7.5
Cyanide, Reactive	mg/kg	0.50U	0.50U
Cyanide, Total	mg/kg	0.55U	0.57U
Sulfide, Reactive	mg/kg	24.0U	24.0U
<i>PCBs and Pesticides</i>			
4,4'-DDD	ug/kg	18U	3.8U
4,4'-DDE	ug/kg	18U	3.8U
4,4'-DDT	ug/kg	18U	3.8U
Aldrin	ug/kg	9.2U	1.9U
Alpha-BHC	ug/kg	9.2U	1.9U
alpha-Chlordane	ug/kg	9.2U	1.9U
Aroclor-1016	ug/kg	37U	38U
Aroclor-1221	ug/kg	74U	75U
Aroclor-1232	ug/kg	37U	38U
Aroclor-1242	ug/kg	37U	38U
Aroclor-1248	ug/kg	37U	38U
Aroclor-1254	ug/kg	37U	38U
Aroclor-1260	ug/kg	37U	38U
Beta-BHC	ug/kg	9.2U	1.9U
Delta-BHC	ug/kg	9.2U	1.9U
Dieldrin	ug/kg	18U	3.8U
Endosulfan I	ug/kg	9.2U	1.9U
Endosulfan II	ug/kg	18U	3.8U
Endosulfan sulfate	ug/kg	18U	3.8U
Endrin	ug/kg	18U	3.8U
Endrin aldehyde	ug/kg	18U	3.8U
Endrin ketone	ug/kg	18U	3.8U
gamma-BHC (Lindane)	ug/kg	9.2U	1.9U
gamma-Chlordane	ug/kg	9.2U	1.9U
Heptachlor	ug/kg	9.2U	1.9U
Heptachlor epoxide	ug/kg	9.2U	1.9U
Methoxychlor	ug/kg	92U	19U
Toxaphene	ug/kg	920U	190U

Table 11-5: Summary of Environmental Analytical Data

Parameter	Sample ID	11A-020594	11B-020596
	Sample Location	11A-001	11B-001
	Sample Depth (feet)	3 - 6	2 - 5
	Sample Date	03/27/00	03/27/00
	Units		
<i>Rare Earth Metals</i>			
Cerium, Total	mg/kg	15.2	23.7
Dysprosium, Total	mg/kg	0.6	1.3
Lanthanum, Total	mg/kg	6.7	9.6
Neodymium, Total	mg/kg	8	11.6
Yttrium, Total	mg/kg	2.7	6.7
<i>Semivolatile Organics</i>			
1,2,4-Trichlorobenzene	ug/kg	370U	380U
1,2-Dichlorobenzene	ug/kg	370U	380U
1,3-Dichlorobenzene	ug/kg	370U	380U
1,4-Dichlorobenzene	ug/kg	370U	380U
2,2'-oxybis(1-Chloropropane)	ug/kg	370U	380U
2,4,5-Trichlorophenol	ug/kg	920U	950U
2,4,6-Trichlorophenol	ug/kg	370U	380U
2,4-Dichlorophenol	ug/kg	370U	380U
2,4-Dimethylphenol	ug/kg	370U	380U
2,4-Dinitrophenol	ug/kg	920U	950U
2,4-Dinitrotoluene	ug/kg	370U	380U
2,6-Dinitrotoluene	ug/kg	370U	380U
2-Chloronaphthalene	ug/kg	370U	380U
2-Chlorophenol	ug/kg	370U	380U
2-Methylnaphthalene	ug/kg	370U	380U
2-Methylphenol	ug/kg	370U	380U
2-Nitroaniline	ug/kg	920U	950U
2-Nitrophenol	ug/kg	370U	380U
3,3'-Dichlorobenzidine	ug/kg	370U	380U
3-Nitroaniline	ug/kg	920U	950U
4,6-Dinitro-2-methylphenol	ug/kg	920U	950U
4-Bromophenyl-phenylether	ug/kg	370U	380U
4-Chloro-3-methylphenol	ug/kg	370U	380U
4-Chloroaniline	ug/kg	370U	380U
4-Chlorophenyl-phenylether	ug/kg	370U	380U
4-Methylphenol	ug/kg	370U	380U
4-Nitroaniline	ug/kg	920U	950U
4-Nitrophenol	ug/kg	920U	950U
Acenaphthene	ug/kg	370U	380U
Acenaphthylene	ug/kg	370U	380U
Anthracene	ug/kg	370U	28J
Benzo(a)anthracene	ug/kg	370U	130J
Benzo(a)pyrene	ug/kg	370U	150J
Benzo(b)fluoranthene	ug/kg	370U	150J

Table 11-5: Summary of Environmental Analytical Data

Parameter	Sample ID	11A-020594	11B-020596
	Sample Location	11A-001	11B-001
	Sample Depth (feet)	3 - 6	2 - 5
	Sample Date	03/27/00	03/27/00
Units			
<i>Semivolatile Organics (continued)</i>			
Benzo(g,h,i)perylene	ug/kg	370U	120J
Benzo(k)fluoranthene	ug/kg	370U	150J
bis(2-Chloroethoxy)methane	ug/kg	370U	380U
bis(2-Chloroethyl)ether	ug/kg	370U	380U
bis(2-Ethylhexyl)phthalate	ug/kg	41BJ	180BJ
Butylbenzylphthalate	ug/kg	370U	380U
Carbazole	ug/kg	370U	380U
Chrysene	ug/kg	370U	180J
Di-n-butylphthalate	ug/kg	19BJ	25BJ
Di-n-octyl phthalate	ug/kg	370U	280J
Dibenz(a,h)anthracene	ug/kg	370U	380U
Dibenzofuran	ug/kg	370U	380U
Diethylphthalate	ug/kg	370U	380U
Dimethylphthalate	ug/kg	370U	380U
Fluoranthene	ug/kg	370U	240J
Fluorene	ug/kg	370U	380U
Hexachlorobenzene	ug/kg	370U	380U
Hexachlorobutadiene	ug/kg	370U	380U
Hexachlorocyclopentadiene	ug/kg	370U	380U
Hexachloroethane	ug/kg	370U	380U
Indeno(1,2,3-cd)pyrene	ug/kg	370U	110J
Isophorone	ug/kg	370U	380U
N-Nitroso-di-n-propylamine	ug/kg	370U	380U
N-Nitrosodiphenylamine (1)	ug/kg	370U	380U
Naphthalene	ug/kg	370U	380U
Nitrobenzene	ug/kg	370U	380U
Pentachlorophenol	ug/kg	920U	950U
phenanthrene	ug/kg	370U	80J
phenol	ug/kg	370U	380U
Pyrene	ug/kg	370U	210J
<i>Total Metals</i>			
Aluminum, Total	mg/kg	5360	6950
Antimony, Total	mg/kg	0.16U	0.19
Arsenic, Total	mg/kg	1.4	2.8
Barium, Total	mg/kg	51.2	39.5
Beryllium, Total	mg/kg	0.33	0.41
Boron, Total	mg/kg	3	2.6
Cadmium, Total	mg/kg	0.03U	0.05
Calcium, Total	mg/kg	837	1340
Chromium, Total	mg/kg	10.6	10.3

Table 11-5: Summary of Environmental Analytical Data

Parameter	Sample ID	11A-020594	11B-020596
	Sample Location	11A-001	11B-001
	Sample Depth (feet)	3 - 6	2 - 5
	Sample Date	03/27/00	03/27/00
Units			
Total Metals (continued)			
Cobalt, Total	mg/kg	4.6	4.2
Copper, Total	mg/kg	6.2	10.9
Iron, Total	mg/kg	12100	12000
Lead, Total	mg/kg	5.7	24.6
Lithium, Total	mg/kg	3.8	6.6
Magnesium, Total	mg/kg	1360	1340
Manganese, Total	mg/kg	221	261
Mercury, Total	mg/kg	0.02U	0.11
Nickel, Total	mg/kg	7.1	8.6
Potassium, Total	mg/kg	514	426
Selenium, Total	mg/kg	0.40U	0.41U
Silver, Total	mg/kg	0.08U	0.08U
Sodium, Total	mg/kg	101	140
Thallium, Total	mg/kg	0.34U	0.34U
Vanadium, Total	mg/kg	12.3	15.4
Zinc, Total	mg/kg	20.6	39.1
Volatile Organics			
1,1,1-Trichloroethane	ug/kg	530U	630U
1,1,2,2-Tetrachloroethane	ug/kg	530U	630U
1,1,2-Trichloroethane	ug/kg	530U	630U
1,1-Dichloroethane	ug/kg	530U	630U
1,1-Dichloroethene	ug/kg	530U	630U
1,2-Dichloroethane	ug/kg	530U	630U
1,2-Dichloroethene (total)	ug/kg	530U	630U
1,2-Dichloropropane	ug/kg	530U	630U
2-Butanone	ug/kg	1100U	1300U
2-Hexanone	ug/kg	1100U	1300U
4-Methyl-2-pentanone	ug/kg	1100U	1300U
Acetone	ug/kg	1100U	1300U
Benzene	ug/kg	530U	630U
Bromodichloromethane	ug/kg	530U	630U
Bromoform	ug/kg	530U	630U
Bromomethane	ug/kg	1100U	1300U
Carbon Disulfide	ug/kg	530U	630U
Carbon Tetrachloride	ug/kg	530U	630U
Chlorobenzene	ug/kg	530U	630U
Chloroethane	ug/kg	1100U	1300U
Chloroform	ug/kg	530U	630U

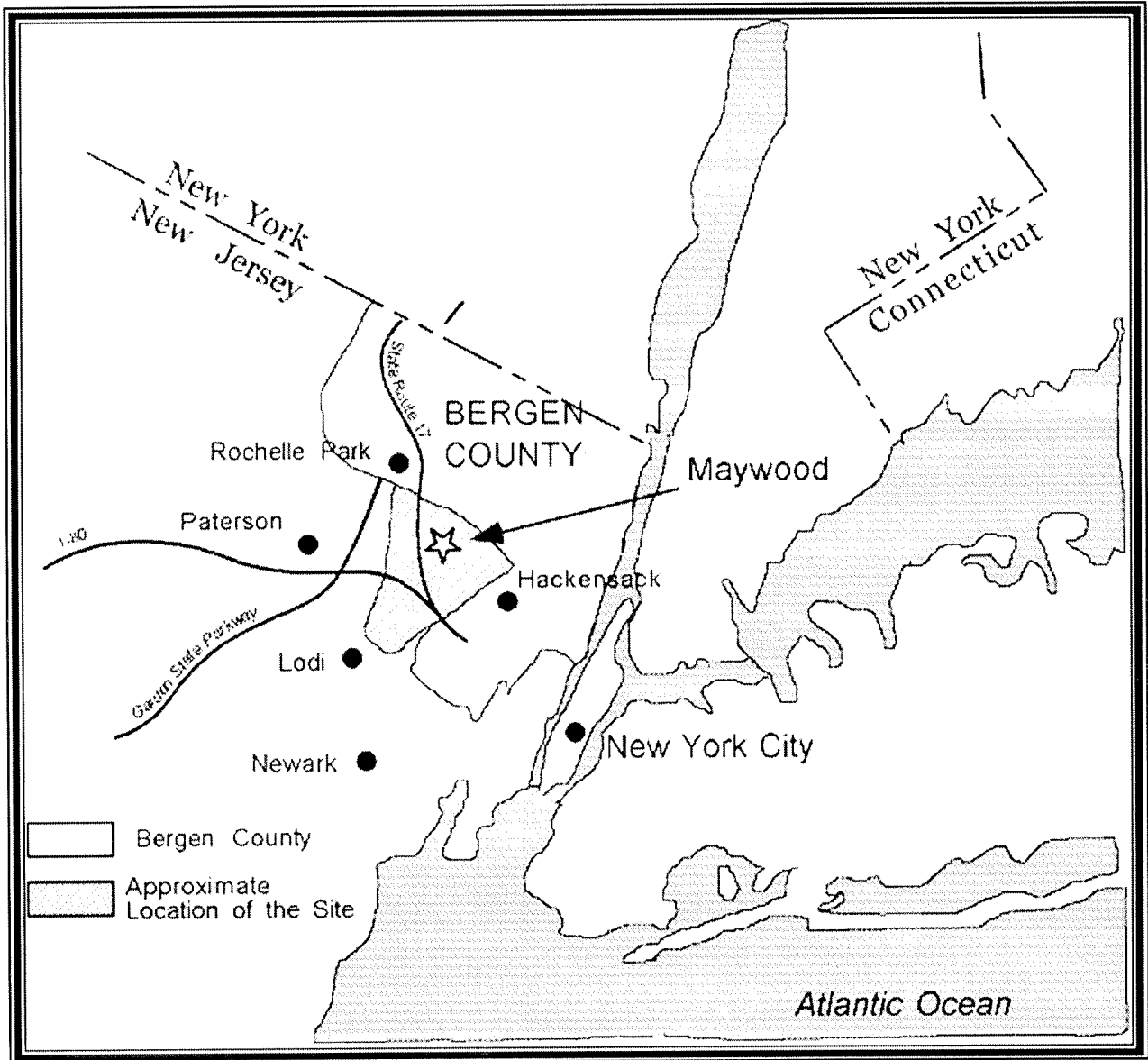
Table 11-5: Summary of Environmental Analytical Data

Parameter	Sample ID	11A-020594	11B-020596
	Sample Location	11A-001	11B-001
	Sample Depth (feet)	3 - 6	2 - 5
	Sample Date	03/27/00	03/27/00
Units			
<i>Volatile Organics (continued)</i>			
Chloromethane	ug/kg	1100U	1300U
cis-1,3-Dichloropropene	ug/kg	530U	630U
Dibromochloromethane	ug/kg	530U	630U
Ethylbenzene	ug/kg	530U	630U
Methylene Chloride	ug/kg	89BJ	150BJ
Styrene	ug/kg	530U	630U
Tetrachloroethene	ug/kg	530U	630U
Toluene	ug/kg	530U	630U
Trans-1,3-Dichloropropene	ug/kg	530U	630U
Trichloroethene	ug/kg	530U	630U
Vinyl Chloride	ug/kg	1100U	1300U
Xylene (total)	ug/kg	530U	630U
<i>TCLP Metals</i>			
Arsenic	ug/L	22.9U	22.9U
Barium	ug/L	336	307
Cadmium	ug/L	4.1U	7.6U
Chromium	ug/L	3.4U	3.4U
Lead	ug/L	26.6U	26.6U
Mercury	ug/L	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U
Silver	ug/L	3.7U	3.7U
<i>TCLP Pesticides</i>			
Alpha-Chlordane	ug/L	0.5U	0.5U
Endrin	ug/L	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5U	0.5U
Heptachlor	ug/L	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5U	0.5U
Methoxychlor	ug/L	5U	5U
Toxaphene	ug/L	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U
2,4-D	ug/L	10U	10U

Table 11-5: Summary of Environmental Analytical Data

Parameter	Sample ID	11A-020594	11B-020596
	Sample Location	11A-001	11B-001
	Sample Depth (feet)	3 - 6	2 - 5
	Sample Date	03/27/00	03/27/00
Units			
<i>TCLP Volatiles</i>			
1,1-Dichloroethene	mg/L	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U
Benzene	mg/L	0.025U	0.025U
Carbon tetrachloride	mg/L	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>			
1,4-Dichlorobenzene	mg/L	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U

U Undetected Values
 J Estimated Value
 BJ Found in Blank; is an Estimated Value



NOT TO SCALE

U.S. ARMY ENGINEER DIVISION
 CORPS OF ENGINEERS
 NEW YORK DISTRICT
 US ARMY CORPS OF ENGINEERS
FUSRAP
 FORMERLY UTILIZED SITES
 REMEDIAL ACTION PROGRAM



STONE & WEBSTER, INC.

Prepared by:

**MALCOLM
 PIRNIE**

File Name:

MPI-CH11

**LOCATION OF MAYWOOD SITE
 BERGEN COUNTY, NEW JERSEY**

PDI REPORT
 FUSRAP MAYWOOD SUPERFUND SITE
 MAYWOOD, LODI, AND
 ROCHELLE PARK, NEW JERSEY

Contract Number:
 DACW41-98-R-0034

Job Number 08575

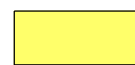
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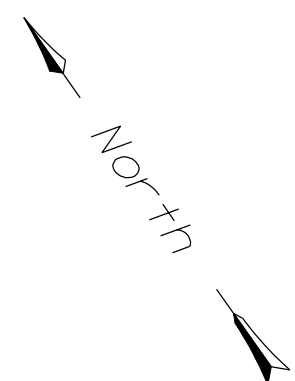
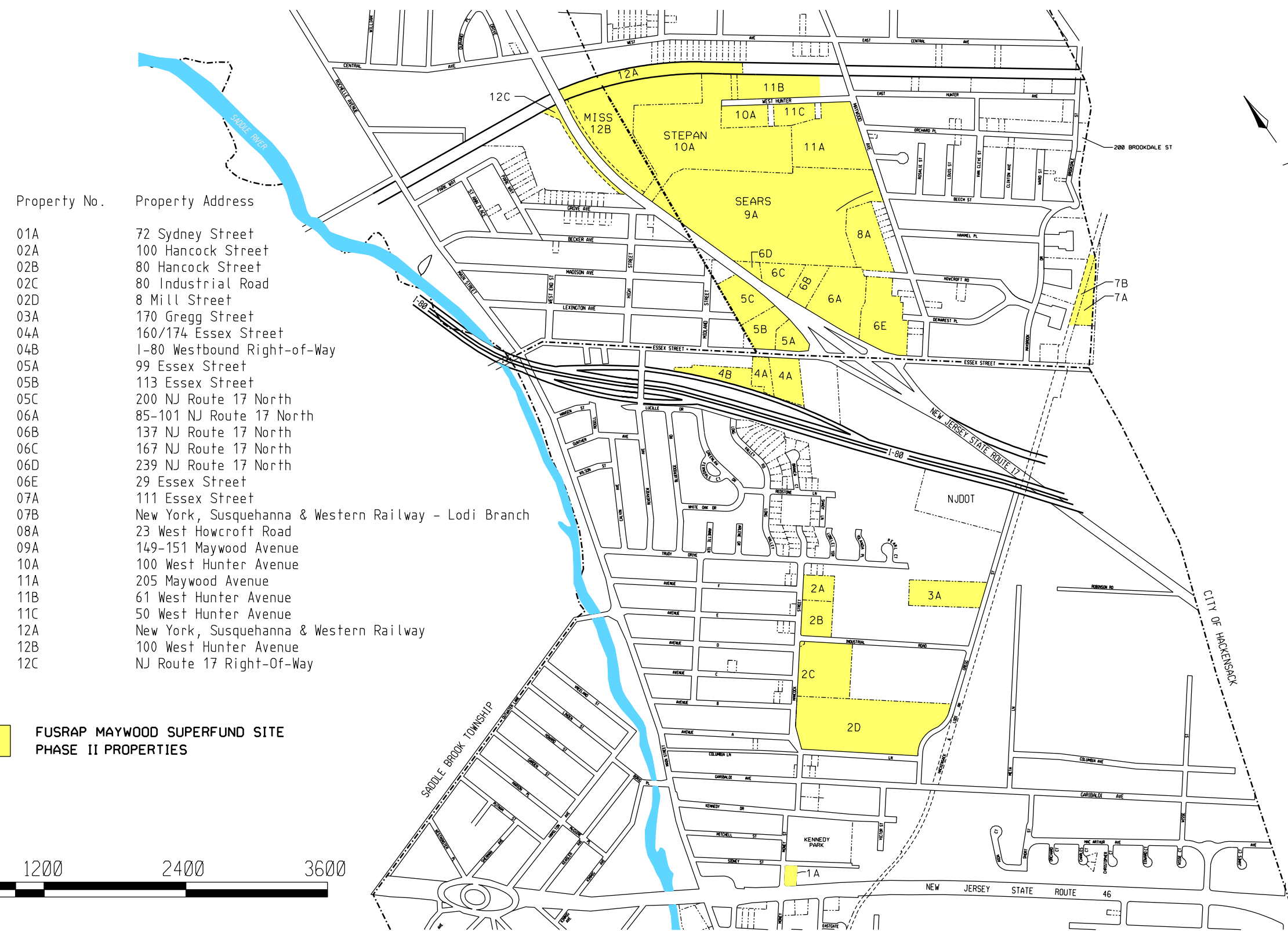
WBS# 18

Figure Number:

FIGURE 11-1

Cluster No.	Property No.	Property Address
1	01A	72 Sydney Street
2	02A	100 Hancock Street
	02B	80 Hancock Street
	02C	80 Industrial Road
	02D	8 Mill Street
3	03A	170 Gregg Street
4	04A	160/174 Essex Street
5	04B	1-80 Westbound Right-of-Way
	05A	99 Essex Street
6	05B	113 Essex Street
	05C	200 NJ Route 17 North
	06A	85-101 NJ Route 17 North
	06B	137 NJ Route 17 North
	06C	167 NJ Route 17 North
7	06D	239 NJ Route 17 North
	06E	29 Essex Street
8	07A	111 Essex Street
	07B	New York, Susquehanna & Western Railway - Lodi Branch
9	08A	23 West Howcroft Road
10	09A	149-151 Maywood Avenue
11	10A	100 West Hunter Avenue
	11A	205 Maywood Avenue
	11B	61 West Hunter Avenue
12	11C	50 West Hunter Avenue
	12A	New York, Susquehanna & Western Railway
	12B	100 West Hunter Avenue
	12C	NJ Route 17 Right-Of-Way

 FUSRAP MAYWOOD SUPERFUND SITE
PHASE II PROPERTIES




U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT



US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

STONE & WEBSTER, INC.



Prepared by:
**MALCOLM
PIRNIE**

File Name:
\\MAYWOOD\TASK0318\CLUSTER REPORT\REV 1\FIGURE11-2.DGN

LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY

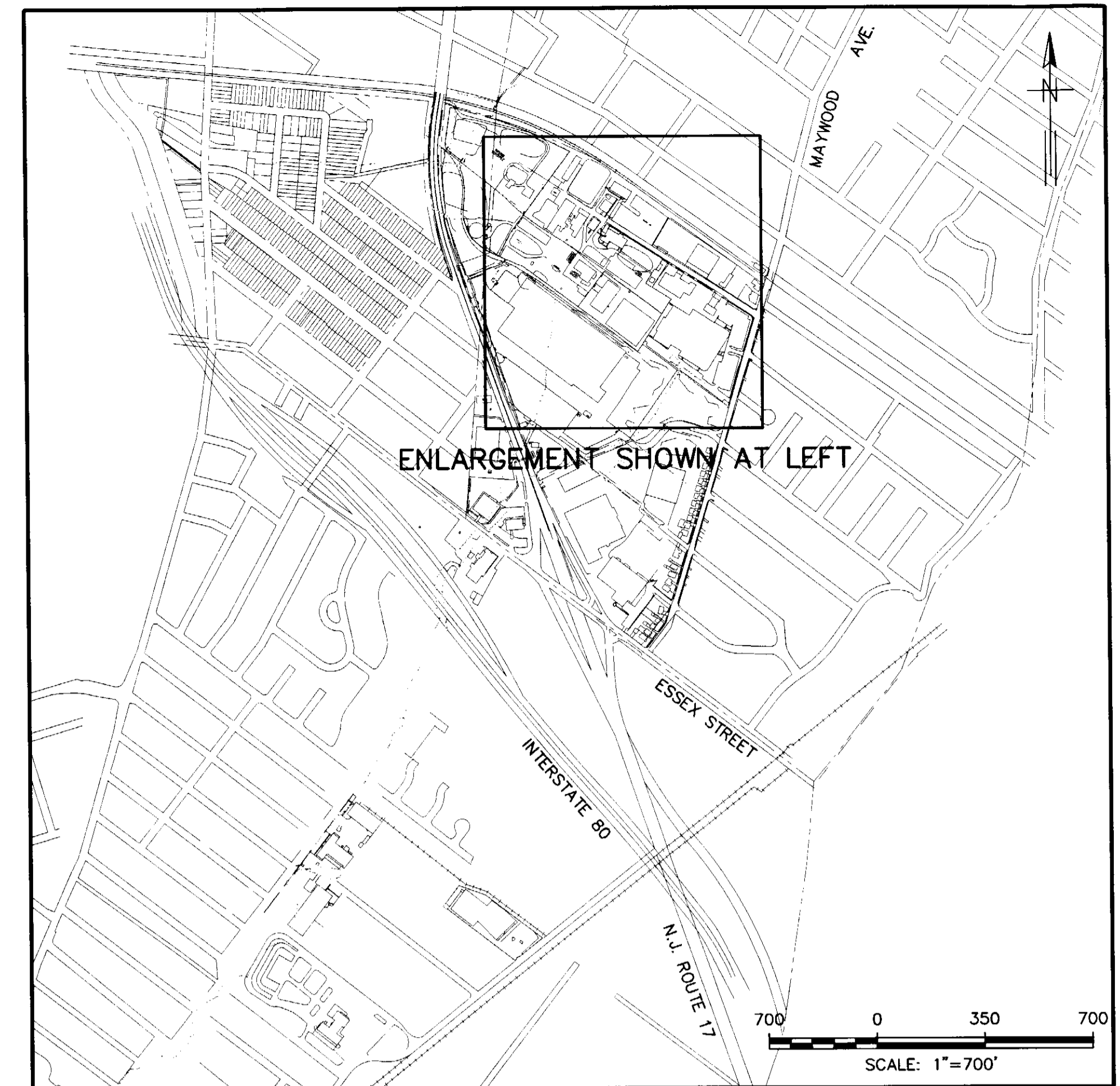
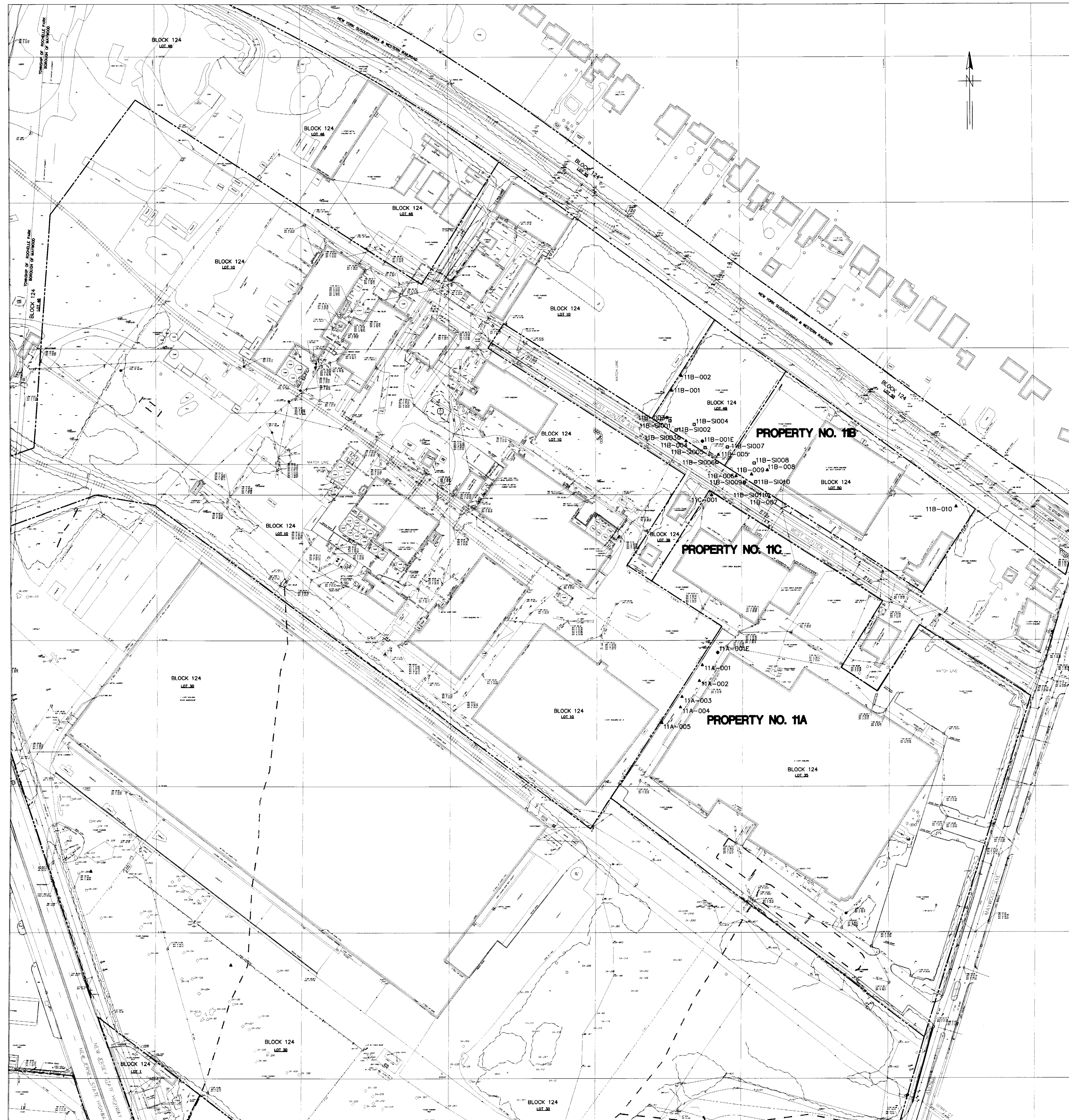
PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

Contract Number:
DACW41-99-D-9001

Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 11-2



KEY MAP

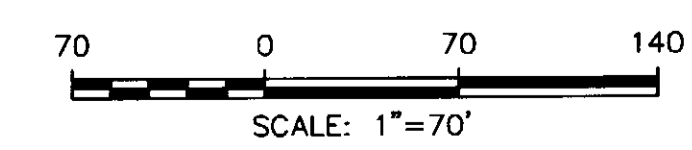
LEGEND

	PROPERTY BOUNDARY
	EXISTING BUILDING
	EXISTING 1' CONTOUR
	APPROXIMATE LOCATION OF HISTORIC LODI BROOK CHANNEL

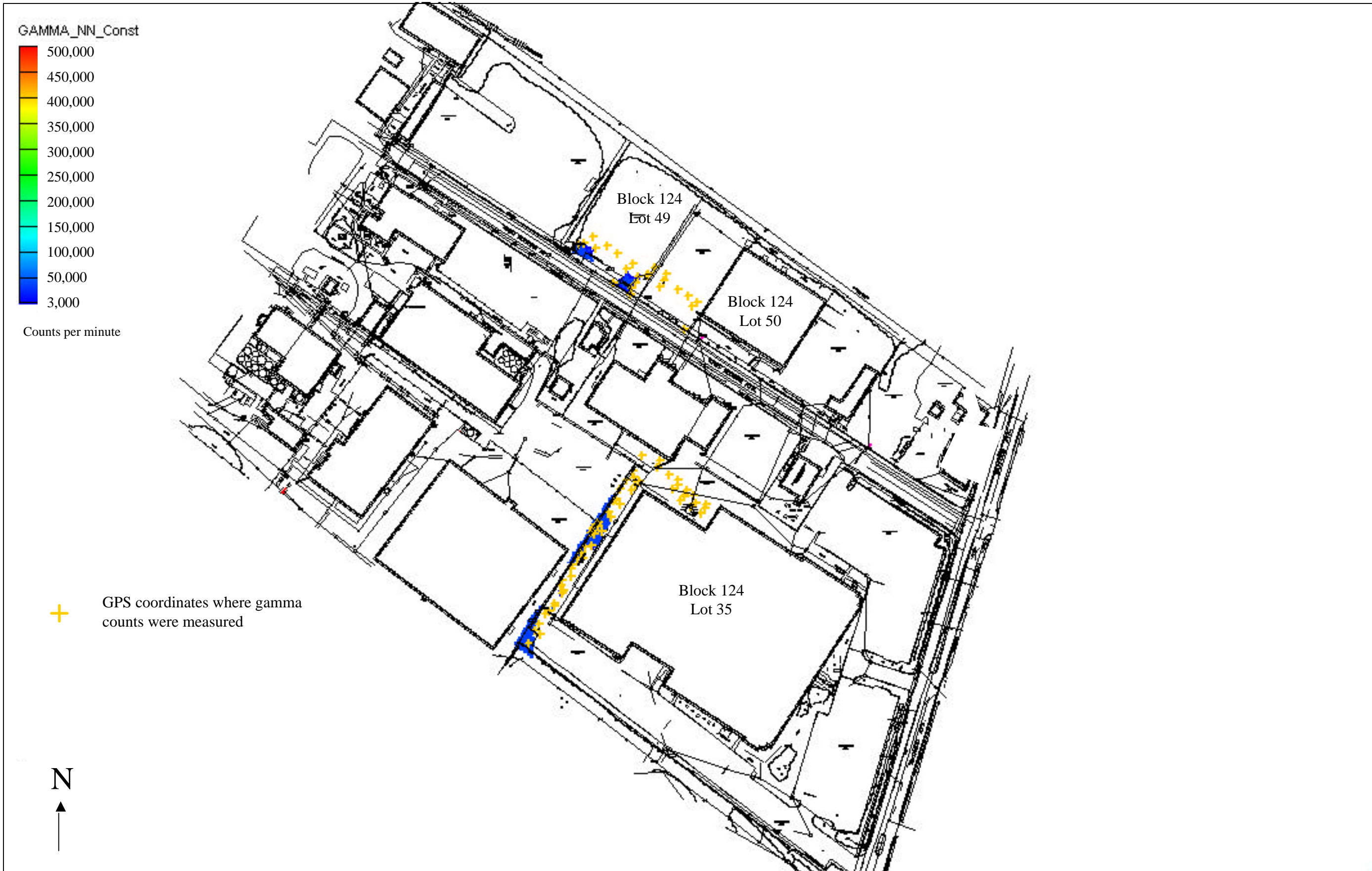
SAMPLE SYMBOL	SAMPLE TYPE	NUMBER OF SAMPLING LOCATIONS
	DIRECT PUSH SOIL PROBE LOCATIONS (RADIOLOGICAL)	16
	SURFACE ISOCs LOCATIONS	11
	DIRECT PUSH SOIL PROBE LOCATION (ENVIRONMENTAL)	2

- NOTES:
1. THIS SURVEY SHOWS CONDITIONS AS OF OCTOBER 1999 BASED ON AERIAL MAPPING PREPARED BY GEOD CORP. AND GROUND SURVEY BY GARDEN STATE ENGINEERING SURVEYING AND PLANNING.
 2. VERTICAL DATUM IS REFERENCED TO NGVD 1929.
 3. HORIZONTAL DATUM IS REFERENCED TO NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 1927.
 4. THE LOCATION OF THE HISTORIC LODI BROOK SHOWN ON THIS SHEET WAS APPROXIMATED BASED UPON REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS FROM APRIL 6, 1940.

CLUSTER NO. 11 205 MAYWOOD AVENUE (MYRON MANUFACTURING) (11A)
61 WEST HUNTER AVENUE (11B)
50 WEST HUNTER AVENUE (11C)



		<p>Cluster No. 11 SAMPLE LOCATION MAP</p> <p>PRE-DESIGN INVESTIGATION REPORT FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, COO. AVE. ROCHELLE PARK, NEW JERSEY</p>	<p>Sheet Number: SACM-11-01-001</p> <p>Job Number: 06575</p> <p>WSP 3</p> <p>WSP 18</p> <p>Figure Number: 11-3</p>
<p>Drawn by: CS</p> <p>Date: 7/21/00</p>	<p>Reviewed by: [Signature]</p> <p>Date: [Signature]</p> <p>File Name: \$MPY-C11</p>		



Lower Contour Limit = 1.5 X Background = 1.5 X 2000 = 3000 counts per minute

Upper Contour Limit = Highest measurement across entire Maywood Site: approx. 500,000 counts per minute

Property Cluster No. 11: 205 Maywood Ave., 61 W.Hunter Ave., and 50 W. Hunter Ave. (Myron Manufacturing)

Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 11-4

APPENDIX 11-A

Variations from the PDI Work Plan

**Letters Informing EPA and NJDEP of Use of Geoprobes⁰
In Lieu of Downhole ISOCS**



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Angela Carpenter
Remedial Project Manager
Federal Facilities Section
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Dear Ms. Carpenter:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in your December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Donna Gaffigan, NJDEP



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

December 8, 1999

REPLY TO
ATTENTION OF

Programs and Project Management Division

Ms. Donna Gaffigan
Case Manager
Bureau of Case Management
New Jersey Department of Environmental Protection
401 E State St
Trenton, NJ 08625-0600

Dear Ms. Gaffigan:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in USEPA's December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
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- all pertinent field documentation
- soil probe identification number
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We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Angela Carpenter, EPA

Revisions to Standard Operating Procedure No. SW-MWD-509-0



**STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION**

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE: 1 of 8 plus Attachment 1
	DATE: February 2000

APPROVED:

Prepared by:
Project Chemist

Reviewed by:
PDI Task Manager

Richard Skyness 2/29/00
Project Engineer

[Signature] 2/29/00
Project Manager

1.0 PURPOSE

This Stone & Webster Standard Operating Procedure (SOP), **Soil Probe Investigation** shall be employed when collecting subsurface soil samples using the direct push soil probe method at the FUSRAP Maywood Superfund Site (hereafter referred to as the Maywood Site) properties with known or suspected soil and/or groundwater contamination.

2.0 SCOPE

This procedure details the materials, equipment, and methods common to soil probe investigation activities. Consult the site-specific project plans and work plans for proposed soil probe locations. Always consult site-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Task Manager prior to implementation and shall be documented in project field logbooks.**

3.0 REFERENCES

Stone & Webster Maywood SOP 102 - Downhole Gamma Radiation Logging

Stone & Webster Maywood SOP 307 - Surface and Shallow Subsurface Soil Sampling

Stone & Webster Maywood SOP 308 - Soil Borings and Sampling

Stone & Webster Maywood SOP 401 - Photoionization Detector (PID)

Stone & Webster Maywood SOP 504 - Labeling, Packaging, and Shipping Environmental Samples

Stone & Webster Maywood SOP 505 - Cuttings and Fluids Management

Stone & Webster Maywood SOP 506 - Decontamination

Stone & Webster Maywood SOP 507 - Field Notebook Content and Control

U.S.E.P.A., A Compendium of Superfund Field Operation Methods, Document EPA/540/P-87/001, December, 1987.

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	2 of 8

DEFINITIONS

Stone & Webster Team – personnel of the Stone & Webster Team that includes for this SOP: Stone & Webster, Malcolm Pirnie, Franklin Environmental Services, Inc., Safety & Ecology Corporation (SEC), and Garden State Surveying, Engineering and Planning, Inc. The Stone & Webster Team shall perform soil probe investigation activities, except those activities specified as performed by the Subcontractor.

Subcontractor – personnel of the direct push soil probe firm.

Direct Push Soil Probe – generic name for advancing media sampling piping/tubes with only direct mechanical force. They are typically hollow steel rods advanced using a percussive force (powered hammer) and driven directly into unconsolidated soil. There are two types of direct push soil probes. One is a single rod system (i.e., macrocore) and the other is a dual tube or cased system. The latter, which will be the method of choice for most Maywood Site investigations, utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Drive rods used with the cased system are usually made from a high-grade steel alloy and are retracted after sampling.

4.0 RESPONSIBILITIES

5.1 Project Manager - Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 Project Environmental Engineer - Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for direct push soil probe activities.

5.3 Project Superintendent - Designated by the Project Manager to supervise investigative activities by Stone & Webster Team and Subcontractor personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in monitoring soil probe investigation activities in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each workday. The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil probe investigation activities and deviations from this SOP.

5.4 Site Personnel (including the data logger) - Required to read and sign the Maywood Site Safety and Health Plan (SSHP), have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil probe investigation activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

5.5 Site Safety & Health Officer - Responsible for ensuring that all site workers (Stone & Webster and Subcontractor) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.6 Task Manager – Responsible to plan, implement, and closeout field work requiring direct push technology.

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	3 of 8

5.7 Subcontractor - Required to read and sign the SSHP, have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. Subcontractors shall report directly to the Task Manager or his designee.

6.0 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS FOR SOIL PROBE INVESTIGATION

The following is a list of equipment and material that is commonly used on all projects when the direct push probe technique is performed in the unconsolidated soils. Refer also to related SOP equipment and material requirements to ensure completeness.

Items required by Subcontractor:

- Direct push probe equipment - of appropriate size and direct push probe and sampling capabilities; vehicle mounted; direct push probe sampling tools used to advance boring (i.e., direct push small diameter rods; and augers, if required) equipment, labor, and supplies to maintain optimal efficiency
- Environmentally-safe lubricants
- Backfill material for probe holes, as required
- Soil sample collection and logging supplies – **See Stone & Webster Maywood SOP 308, Soil Borings and Sampling**
- Decontamination supplies - **See Stone & Webster Maywood SOP 506, Decontamination**

Items carried by Stone & Webster Team on-site personnel

- **SSHP To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Clipboard
- Pencils
- Six-foot-ruler
- Pocket knife
- Camera (optional), check with Project Manager if required
- Volatile organic compound vapor meter equipped with photoionization detector (PID) and other air surveillance monitoring equipment, as required by the SSHP
- Radiation meter
- Site boring logs
- Blank soil probe logs
- Weighted measuring tape
- Water level measuring device - **See Stone & Webster Maywood SOP 410, Groundwater Level Measurement**, Interface probe, if needed
- Paper towels
- Chain of Custody forms

7.0 DIRECT PUSH PROBE ACTIVITIES

7.1 General Considerations

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		PAGE	4 of 8

Prior to selecting the direct push probe method for a specific property, the objectives of the field investigation must be established. These property-specific objectives shall include one or more of the following Maywood Pre-Design Investigation (PDI) program objectives:

- Soil classification/evaluation - the direct push soil probe technique will be able to accommodate the collection of soils for characterization purposes.
- Characterization of hydrogeologic conditions - the direct push soil probe technique shall allow for the characterization of each stratigraphic zone, and water level measurements.
- Evaluation of soil contamination - the direct push soil probe technique shall provide the appropriate sample collection methods, must not introduce contaminants into the probe hole or otherwise alter the existing soil or groundwater chemistry, and should not result in subsurface cross contamination during or after installation of direct push probe.

7.2 Direct Push Probe Activities

Prior to commencing direct push soil probe fieldwork, several activities should be performed. These activities, which include both pre-mobilization office tasks and pre-installation field tasks, are discussed below. Once the pre-installation activities are completed, direct push soil probe installation may commence.

7.2.1 Pre-Mobilization Tasks

1. The Stone & Webster Team and Subcontractor shall acquire as much geologic and hydrogeologic information about the site as possible. This information may include possible soil and groundwater contamination present, groundwater table depths and fluctuations, surficial and bedrock geology, approximate thickness of the unconsolidated zone, depth to top of weathered rock, depth to competent rock, and site access.
2. Soil probe locations shall be marked in the field by the Stone & Webster Team with either paint or flags/stakes during pre-mobilization tasks, and surveyed using a global positioning system (GPS). The Stone & Webster Team shall check and verify that the soil probe location corresponds to the location on the project plans. The Stone & Webster Team and Subcontractor shall check to see if visible structures will prevent the completion of proposed soil probes at specific locations.
3. The Stone & Webster Team shall communicate with the Subcontractor regarding the requirements of the direct push soil probe program and required geologic and environmental information. Inform the Subcontractor of the environmental sampling program that the project shall follow. This information includes sampling frequency, sampling depths, type of sample required (soil or groundwater), the length of casing, direct push soil probe method (i.e., macrocore, dual tube, etc.), number and type of soil samplers required, and special sampling techniques. Ensure that probe hole backfill is selected in accordance with the project specifications.
4. The Subcontractor shall ensure that all utilities in the vicinity of the proposed boring(s) have been cleared by the appropriate authorized parties (e.g., New Jersey One-Call System at 1-800-272-1000, owner, etc.) or, if utilities exist, are visibly marked on the ground surface in the area of the proposed boring. In addition, keep a safe working distance (pursuant to OSHA) from overhead utilities. **NOTE: The party responsible for having utilities cleared shall be identified. If the responsible party is not clearly identified then the Task Manager shall establish the responsible party. Ensure that utilities have been cleared prior to installation of soil probe.**

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		PAGE	5 of 8

7.2.2 Pre-Installation Field Tasks

Sampling equipment shall be decontaminated prior to use, using pressure or manual washing of the rig, direct push soil probe, and tools, as required to prevent introducing off-site contamination. The direct push soil probe related equipment shall be decontaminated on site prior to direct push soil probe activities. Refer to **Stone & Webster Maywood SOP 506, Decontamination** for specific instructions.

7.3 General Direct Push Soil Probe Method Procedures

The following sections outline general direct push soil probe procedures used in unconsolidated soil materials.

1. Assuming a vertical soil probe, the Subcontractor shall set the direct push rig over the proposed soil probe location. Level the direct push rig and ensure that the direct push rods used to advance the soil probe are in a vertical position directly above the hole.
2. The inspecting Stone & Webster Team shall obtain and record measurements of tools to be used for direct push probe operations. Down-hole measurements taken by the Subcontractors shall be to the nearest 0.1 foot.
3. The Subcontractor shall begin sampling or advancement of soil probe to the desired depth utilizing the direct push method described below. Samples shall be taken using the steps described in Section 8.1.1.
4. When the direct push advancement tools are lowered into the probe hole, the Stone & Webster Team shall keep track of tool lengths to check Subcontractor's stated depth of soil probe.
5. The Stone & Webster Team shall make certain that the Subcontractor is performing depth measurements with a ruler and known tool lengths and not visually judging ("eyeballing") casing and tool projections above the ground. The Stone & Webster Team shall maintain a mental note of depth to bottom of soil probe by keeping track of the linear feet of tools in and above the ground. By mentally subtracting the "stick-up" above the ground, the Stone & Webster Team can maintain a constant approximate check on the soil probe depth and Subcontractor's indicated depths.
6. The breathing zone shall be screened by a designee of the Stone & Webster Team Site Safety and Health Officer for total volatile organic vapors using an organic vapor analyzer as outlined in the SSHP. A lower explosive limit meter (LEL) shall be employed if required in SSHP. Record the measured readings at the depth and time of reading on the boring log.
7. During direct push probe activities, both the Stone & Webster Team and Subcontractor shall record production, mechanical and/or sampling difficulties and the sequence of activities. Also record rig mobilization time, rig set-up time, and probe commencement and completion times. This information should be recorded in a field log book. The Stone & Webster Team shall also record pertinent details on the soil probe log (See Attachment A for blank soil probe log).
8. Refusal of direct push probe advancement tools (i.e., casing refusal) is defined as when the probe hole cannot be advanced using regular advancement methods. Generally, refusal can be identified by the following characteristics:
 - Advancement of probe hole is not noticeable or is very slow
 - A change in the frequency/pitch of the direct push probe equipment
 - The direct push probe downpressure may be significantly higher than under "normal" conditions. The direct push rig may be lifted off the ground surface.
9. If refusal is encountered in the soil probe, refer to **Stone & Webster Maywood SOP 308, Soil Borings and Sampling** for specific instructions. If the probe hole cannot be advanced, relocate the probe hole within approximately 5 feet distant from the original location and start with the

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
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work in Section Paragraph 7.2.1. Measure the distance and direction from the original location, and record this information in the field logbook. The actual distance of movement necessary may be greater depending on the site conditions. If the required movement is greater than 5 feet, contact the Task Manager for direction.

10. Downhole gamma radiation logging will be performed, *where feasible* by the Stone & Webster Team as described in Section 8.1.1 below (**See Stone & Webster Maywood SOP 102, Downhole Gamma Radiation Logging**).
11. When the probe hole is completed and the area is cleaned up, all contaminated equipment, including down-hole tools, hand tools, and direct push rig shall be decontaminated by the Subcontractor (**See Stone & Webster Maywood SOP 506, Decontamination**) and as directed by the Radiation Safety Officer (RSO).
12. The Stone & Webster Team shall record the soil probe location on the project drawings.

8.0 METHOD-SPECIFIC SOIL SCREENING AND SAMPLING

In this section, the soil screening and sampling procedure for the direct push soil probe method is described.

8.1 Direct Push Probe Services

The direct push probe rig is a hydraulically powered percussion/direct push machine used for small diameter subsurface investigations. It can obtain continuous soil cores, discreet soil samples, groundwater samples and vapor samples along with installation of permanent sparge points.

8.1.1 Procedures for Screening and Sampling Direct Push Probe Soil Samples

Following is the procedure to be used at the Maywood Site for screening and sampling direct push probe soil cores.

1. Each 4-foot soil core sample will remain in the polyvinyl chloride/polyethylene terephthalate (PVC/PETG) liner and marked with the appropriate field identification number, sealed with rubber end caps for liners, and placed into a designated (2 inch ID) PVC container (including PVC end caps) supplied by the Subcontractor for storage. Pertinent sample data will also be marked on the PVC container.
2. Downhole gamma logging will be accomplished, *where feasible* by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.
3. Each soil probe hole will be backfilled for the full length, in accordance with project requirements.
4. The sealed PVC containers will be transported by the Stone & Webster Team to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. All Building 76 sample documentation, field screening, and sampling tasks shall be performed by the Stone & Webster Team. Sample documentation will include the preparation of a soil probe log containing the following pertinent field documentation: soil probe identification number and location; soil column description; soil screening data, and photo-documentation. **Stone & Webster Maywood SOP 507, Field Notebook Content and Control**, shall be followed. Sample documentation information shall be recorded electronically.
5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	7 of 8

soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integration taken at each marked location and recorded.

6. The soil cores will then be screened for total volatile organic vapors using a PID (see **Stone & Webster Maywood SOP 401, Photoionization Detector (PID)**). A series of small perforations will be made through the liner at 12-inch increments.
7. The soil cores will be described generally in accordance with the Unified Soil Classification system, based on visual observations through the liners and soil extracted from the small perforations. Prior to storage, these perforations will be sealed with tape. The soil descriptions developed will be marked with an "FC" note to define the description as a field classification.
8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.
9. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.
11. Extracted samples shall be prepared in accordance with the Safety and Ecology Corporation (SEC) on-site field laboratory soil preparation practice/SOP.
12. Analysis for ROC on extracted sections of the soil core will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector, or equivalent. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.
14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.
15. Sampling tools will be decontaminated before each boring, after collecting each soil sample, and after each boring.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term "blind duplicates"), thus eliminating potential bias in the test measurement.

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE 8 of 8

If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.

ATTACHMENT 1

PDI SOIL PROBE LOG SHEET																
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling													
Site Designator			XXX													
Activity Designator			AAA PDI													
Field Measurement/Sample Collection Designator			VV SP													
Station Number			N N N													
Media			m m SB													
Sample Type			n													
Sequential Sample Number			# # # # # (see Below)													
		Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)												
Location																
		Gamma Logging		Photoionization Detector (PID) Logging												
	Down Hole	Core														
Date			Date													
Time			Time													
Logger			Logger													
Detector Model #	SPA-3		PID Model #	Multi-RAE												
Detector Serial #	CENAN 33401		PID Serial #	CENAN 21811												
Scaler Model #	2224															
Scaler Serial #	132842															
Comments: 1. MPI No. _____. 2. Direct-push location grouted with BenSeal.																
<table style="width: 100%; border: none;"> <tr> <td style="width: 60%; text-align: center; border: none;">_____</td> <td style="width: 40%; text-align: center; border: none;">_____</td> </tr> <tr> <td style="text-align: center; border: none;">Signature (Down Hole Gamma Logging)</td> <td style="text-align: center; border: none;">Date</td> </tr> <tr> <td style="width: 60%; text-align: center; border: none;">_____</td> <td style="width: 40%; text-align: center; border: none;">_____</td> </tr> <tr> <td style="text-align: center; border: none;">Signature (Core Gamma Logging)</td> <td style="text-align: center; border: none;">Date</td> </tr> <tr> <td style="width: 60%; text-align: center; border: none;">_____</td> <td style="width: 40%; text-align: center; border: none;">_____</td> </tr> <tr> <td style="text-align: center; border: none;">Signature (PID Logging)</td> <td style="text-align: center; border: none;">Date</td> </tr> </table>					_____	_____	Signature (Down Hole Gamma Logging)	Date	_____	_____	Signature (Core Gamma Logging)	Date	_____	_____	Signature (PID Logging)	Date
_____	_____															
Signature (Down Hole Gamma Logging)	Date															
_____	_____															
Signature (Core Gamma Logging)	Date															
_____	_____															
Signature (PID Logging)	Date															

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)									
					X	X	X	#	#	#	#	#	#	
0.0														
0.5														
1.0														
1.5														
2.0														
2.5														
3.0														
3.5														
4.0														
4.5														
5.0														
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¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 G:\3674009\PDI Report\AppdxA\SOP509FINAL.doc

TABLE 1-A: REVISIONS TO SOP SW-MWD-509-0

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>Section 8.1.1 Procedures for Screening and Sampling Direct Push Soil Samples 2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a Bicon 3/8- inch x 3/8- inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. The detector shall be positioned below the bottom of the casing to allow gamma log readings in the uncased portion of the probe hole. The casing shall be extracted at 6-inch increments and a 30-second count reading shall be taken at each increment.</p>	<p>2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. The sodium iodide detector preamplifier is connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector™ multi-channel analyzer/amplifier/high voltage power supply. The system is controlled, and the data stored, via a notebook computer. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.</p>	<p>Cabrera Services, Inc. developed this procedure as a cost effective site characterization method. Better sensitivity of the 1-inch x 1-inch detector used by Cabrera Services, Inc. allows gross gamma measurements through the soil probe casings, thereby increasing soil probe production rates.</p>	<p>January 11, 2000, without waterproof container. Sealed solid casing installed following extraction of MacroCore or Dual Tube system. January 28, 2000, with waterproof container. Eliminated need of sealed solid casing.</p>
<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The acetate liner shall be marked off at 6-inch intervals. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Readings shall consist of 10-second integrations taken every six inches and recorded.</p>	<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the PVC/PET liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integrations taken at the marked locations and recorded.</p>	<p>Continuous scanning of the soil core provides complete coverage, longer counting time at the regions of interest, and minimizes redundancy of the downhole gamma measurements.</p>	<p>January 11, 2000</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>8. A minimum of three soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238 based on field radiological screening and gamma logging values. At a minimum, one soil sample will be taken at the highest reading location (suspected FUSRAP waste); a second soil sample shall be collected where the readings approach a constant value (suspected transition zone); and a third soil sample shall be collected within the zone of constant readings (below suspected transition zone). Additional samples may be taken based on the Task Manager's direction.</p>	<p>8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.</p>	<p>Suspected FUSRAP waste and suspected transition zones may not be present in each direct push location.</p>	<p>Selection of archived samples began February 21, 2000.</p>
<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored in Building 76 for future reference.</p>	<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.</p>	<p>Based on laboratory analysis there may be the need to collect additional samples from the stored soil cores.</p>	<p>January 11, 2000</p>
<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a USACE-certified off-site laboratory, for confirmatory ROC analysis. Soil samples shall be placed in labeled containers provided by the laboratory, then placed in coolers maintained at 4°C. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>Samples will be sealed in containers provided by the SEC on-site field laboratory.</p> <p>Preservation (i.e., 4°C) is not required for ROC analysis.</p>	<p>February 28, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>14. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.</p>	<p>14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.</p>	<p>Sample storage will be returned to the FUSRAP Maywood Superfund Site for future disposition.</p>	<p>January 11, 2000</p>
<p>9.0 QUALITY ASSURANCE/QUALITY CONTROL Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment rinsate blanks and duplicates. Equipment rinsate blanks must be collected each day that sampling occurs or each decontamination event, whichever is less, per matrix per parameter per field crew, per equipment type (assuming reusable sampling equipment is used). This QA/QC requirement may be modified based on conversations with USACE, USEPA, and NJDEP. Field duplicate samples must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement. Field duplicate samples must represent no less than 10 % of the total number of samples per matrix per parameter per area of study. Field duplicate gamma radiation readings shall also be recorded at a frequency of 10% of the total gamma radiation readings.</p> <p>Matrix spike/matrix duplicate (MS/MD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat</p>	<p>Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement.</p> <p>If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given</p>	<p>Swipe sample is a more representative QC check of loose surface alpha radioactivity than aqueous rinsate sample.</p> <p>Reduction from 10% to 5% duplicate samples based on large number of soil samples proposed for PDI. In addition, 5% is consistent with NJDEP Field Sampling Procedures Manual for field duplicates and EPA guidelines for MS/MSD analysis. Electronic mail sent to EPA and NJDEP regarding reduction in duplicate percentage on January 28, 2000.</p>	<p>Equipment blank revision implemented on January 11, 2000.</p> <p>Reduction from 10% to 5% duplicate samples implemented week of February 7, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
no less than 10% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.	method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.		

Revised PDI Work Plan Table 5-1

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

PROPERTY CLUSTER NUMBER ⁽⁸⁾	NUMBER OF SAMPLING LOCATIONS						NUMBER OF SAMPLES FOR ANALYSIS BY PARAMETER ⁽⁶⁾								
	RADIOLOGICAL SURVEY				GEOTECH	ENVIR	GEOTECHNICAL					CHEMICAL ANALYSES			
	SOIL PROBES ⁽¹⁾	SOIL PROBE DEPTHS (FT) (ESTIMATED)	SOIL PROBE RADIOLOGICAL ANALYSES ⁽²⁾	SURFACE SOIL RADIOLOGICAL ANALYSES ⁽³⁾	SOIL BORINGS ⁽⁴⁾	SOIL BORINGS ^(4,5)	SPECIFIC GRAVITY	ATTERBERG LIMITS	GRAIN SIZE	TRIAXIAL TESTS ⁽⁷⁾	CONSOLID. TESTS ⁽⁷⁾	WATER CONTENT	CHROMIUM SPECIATION	TCL/TAL	FULL RCRA CHAR.
1	13	12	39	5	3	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
2	96	16	288	50	22	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
3	10	8	30	5	2	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
4	32	12	96	15	4	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
5	79	8	237	40	8	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
6	85	16	255	40	12	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
7	28	16	84	15	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
8	26	16	78	15	6	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
9	131	16	393	65	17	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
10	106	24	318	55	16	6	TBD	TBD	TBD	TBD	TBD	TBD	6	6	6
11	16	8	48	10	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
12	151	24	453	75	17	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
TOTALS	773	N/A	2319	390	115	47	---	---	---	---	---	---	47	47	47

NOTES:

- 1 Soil probes installed using direct-push method, to the depth shown or refusal.
- 2 At a minimum, three separate soil samples (one soil sample from within the suspected FUSRAP waste, one in transition zone, and one below the transition zone) will be selected for analysis of the ROC by the on-site field laboratory. A total of 2319 subsurface soil samples (i.e., 3 X 773) will be selected for ROC analysis by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 3 Five surface soil samples will be randomly collected from up to 10% of the 773 soil probe locations for radiological analyses and comparative evaluation of surface ISOCs measurement. A total of 390 surface soil samples (i.e., 5 X 78) will be selected for ROC analyses by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 4 Depths and quantities to be determined in field based on radiological data, structure foundations depths, etc.
- 5 Advanced to depth of radiological contamination.
- 6 Sample Analyses Rationale:
 - 6a Chromium Speciation - Speciation of trivalent and hexavalent chromium for health and safety purposes.
 - 6b TCL/TAL - Detection of organic and inorganic constituents to assess the potential for the presence of commingled radiological and chemical contamination.

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

6c	RCRA Characteristics - To support transportation & disposal activities
6d	Geotechnical Parameters (Specific Gravity, Atterberg Limits, Grain Size, Water Content) - To characterize physical properties of soil for excavation and remediation.
7	Triaxial tests and consolidation tests will be performed on undisturbed tube samples to determine strength and consolidation parameters of fine-grained materials, where present. These parameters will be used to perform bearing capacity and settlement analyses where excavations are adjacent to structures.
8	Property Clusters are defined as follows: <i>PROPERTY CLUSTER NO. 1: 72 SIDNEY ST. (A.K.A 88 MONEY ST.)</i> <i>PROPERTY CLUSTER NO. 2: 100, 80 HANCOCK ST., 80 INDUSTRIAL RD., AND NJVIS</i> <i>PROPERTY CLUSTER NO. 3: 170 GREGG ST.</i> <i>PROPERTY CLUSTER NO. 4: 160/174 ESSEX ST., I-80 RIGHT-OF-WAY</i> <i>PROPERTY CLUSTER NO. 5: 99 ESSEX ST, 113 ESSEX ST., 200 ROUTE 17 SOUTH</i> <i>PROPERTY CLUSTER NO. 6: 29 ESSEX ST., 85-101 ROUTE 17 NORTH, 137 ROUTE 17 NORTH, 167 ROUTE 17 NORTH, 239 ROUTE 17 NORTH</i> <i>PROPERTY CLUSTER NO. 7: 111 ESSEX ST. - SCANEL/HACKENSACK AND LODI RAILROAD</i> <i>PROPERTY CLUSTER NO. 8: 23 WEST HOWCROFT RD.</i> <i>PROPERTY CLUSTER NO.9: 149-151 MAYWOOD AVE.</i> <i>PROPERTY CLUSTER NO.10: 100 W. HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.11: 205 MAYWOOD AVENUE AND 50 & 61 WEST HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.12: 100 W. HUNTER AVE., NY, SUSQUEHANNA AND WESTERN RAILROAD, AND NJ ROUTE 17</i>

Rationale of Intrusive Sample Location Relocations

PDI Soil Probe Variance Log

Cluster No.: 11

Property Addresses: Property No. 11A - 205 Maywood Avenue
Property No. 11B - 61 West Hunter Ave.
Property No. 11C - 50 West Hunter Ave.

Sample Location Map: Figure 11-3

Number of Revised Soil Probe Locations: 12

Rationale for Revisions

- Sample location 11A-001 was moved approximately 20 feet southwest closer to the property boundary to better define the area
- Sample location 11A-003 was moved to the north approximately 20 feet to investigate an area of elevated gamma counts
- Sample location 11A-004 was moved to the north approximately 150 feet to the area between Myron and Stepan to compensate for the relocation of 11A-001 and 11A-003
- Sample location 11A-005 was moved approximately 20 feet west, closer to the fence line to investigate an area of elevated gamma counts
- Sample location 11B-001 was relocated to an area exhibiting elevated gamma counts by the fence west of 61 West Hunter Ave.
- Sample location 11B-002 was moved approximately 70 feet northwest to an area exhibiting elevated gamma counts by the fence west of 61 West Hunter Ave.
- Sample location 11B-004 was moved approximately 20 feet southwest to better define an area of elevated gamma counts
- Sample location 11B-005 was moved approximately 35 feet west to better investigate an area of elevated gamma counts
- Sample location 11B-006 was moved approximately 70 feet south, by the road, to better define an area of elevated gamma counts
- Sample location 11B-007 was moved approximately 20 feet southwest to better define an area of elevated gamma counts
- Sample location 11B-010, a site-wide background point, was moved southeast of Property No. 11B to a background location
- Sample location 11C-001 was moved from the northern side of Property No. 11A to the northwest corner of Property No. 11C to confirm no contaminated material at depth

Notes:

1. This list provides specific rationale for the relocation/deletion/addition of intrusive radiological sampling locations due to revised understanding of anticipated radiological contamination. This revised understanding was based on further review of previous data collected by others, and review of surface gamma survey and ISOCS data collected by the Team under this PDI program.
2. Base mapping used in the PDIWP (Stone & Webster, 1999a) has been revised by the Team. Accordingly, a number of intrusive sample locations needed to be relocated due to previously unforeseen physical restrictions (i.e., presence of underground utilities, unacceptable proximity to buildings/roadways, revisions to previously mapped property limits). This table is not intended to provide detailed rationale for points moved due to new mapping.

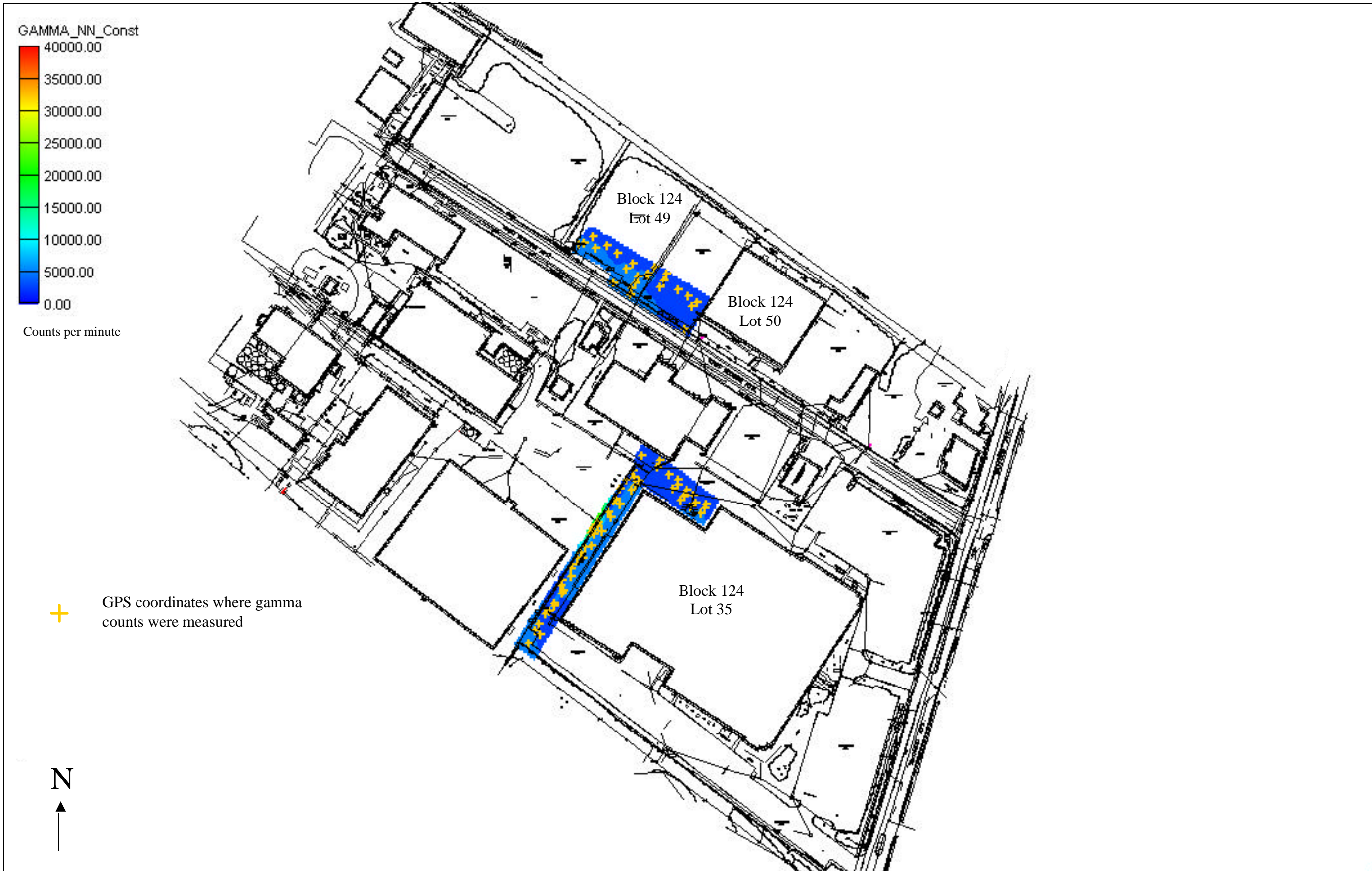
Outlier Protocol (Gamma Scan Anomalies)

Protocol for Addressing Gamma Scan Anomalies (Outliers)

Maywood FUSRAP Superfund Site

Pre-Design Investigation

1. Anomalous surface gamma scan measurements **greater than 2500 cpm for shielded areas (e.g. asphalt covered surfaces), or 3500 cpm for unshielded areas (e.g. bare soil) but, less than 6,000 cpm (1" x 1" NaI detector)** will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL. Note, these count rates are approximately one and one-half times background on shielded and unshielded surfaces.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization (i.e., eliminates the potential for elevated levels of radiological contamination at depth or provides adequate information on the existence of radiological contamination with depth) **will not be further investigated during the PDI.**
 - C. Anomalous areas that do not have previous data that are adequate for characterization **will only be investigated during the PDI if proposed soil probe locations can be moved to these locations without compromising the quality of the data from the proposed locations.** Additional soil probe locations **will not be added** to the program.
 - D. Anomalous areas where additional PDI investigations (based on 1.C) will be performed but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
2. Anomalous areas exhibiting a surface gamma count rate **greater than or equal to 6,000 cpm** (based on a 1" x 1" NaI detector) will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be as follows: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization **will not be further investigated during the PDI.**
 - C. Anomalous areas with previous data that are not adequate for characterization **will be investigated further during the PDI.** Proposed soil probe locations **will be moved** to these locations if possible, or additional soil probe locations **will be added** to the PDI program. These additional soil probes will be used to define the nature and extent of contamination within these previously unidentified areas; the quantity of additional borings is to be determined on a site-by-site basis.
 - D. Anomalous areas that require additional PDI investigations (based on 2.C) but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
3. All anomalous areas and their dispositions will be documented in the PDI.



Property Cluster No. 11: 205 Maywood Ave., 61 W.Hunter Ave., and 50 W. Hunter Ave. (Myron Manufacturing)

Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 11-A1

Reduction in Field Duplicate and MS/MSD Frequency

Navon, Daria

Subject: FW: Reduction in field duplicate and MS/MSD frequency request

----- Forwarded by David Doyle/Environmental/SWEC on 01/28/2000
02:54 PM -----

"Shonkwiler, Glen D NWK" <Glen.D.Shonkwiler@nwk02.usace.army.mil> on 01/28/2000
02:00:15 PM

To: "carpenter.angela@epamail.epa.gov" <carpenter.angela@epamail.epa.gov>, "dgaffica@dep.state.nj.us" <dgaffica@dep.state.nj.us>
cc: "Roos, Allen D NAN02" <Allen.D.Roos@nan02.usace.army.mil>, "Medary, Richard T NWK" <Richard.T.Medary@nwk02.usace.army.mil>, "Mellema, Doug W NWK" <Doug.W.Mellema@nwk02.usace.army.mil>, "Speckin, Paul D NWK" <Paul.D.Speckin@nwk02.usace.army.mil> (bcc: David Doyle/Environmental/SWEC)

Subject: Reduction in field duplicate and MS/MSD frequency request

Angela/Donna, with this email, USACE is notifying EPA and NJDEP of our intent to reduce the number of field duplicates and MS/MSD samples required in the Maywood Chemical Site CDQMP for the PDI sampling from 10% to 5%. The 10% frequency is a USACE-internal QC standard which USACE plans to reduce based on the large number of soil samples collected during the Pre-Design Investigation (PDI). The reduction in frequency would affect field duplicate samples collected for radionuclides of concern (ROC) and analysis by the on-site field laboratory; field duplicate gamma radiation readings (both downhole and core sample); photoionization detector (PID) or flame ionization (FID) readings; and MS/MSD samples analyzed by the off-site laboratory. It is anticipated that greater than 2000 soil samples will be analyzed by the on-site field laboratory and gamma radiation and PID readings will exceed 10,000 measurements.

Five percent is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and EPA guidelines for MS/MSD analysis. EPA Region II does not have a specific QA/QC guideline for field duplicate samples. The guideline is therefore on a case-by-case basis, in accordance with the site-specific project plans.

Please note that the 10 percent of the samples analyzed by the on-site field laboratory will still be sent to a certified off-site laboratory for confirmatory ROC analysis.

We will continue to adhere to the current 10 percent until EPA and NJ notifies USACE of its concurrence with this deviation from the CDQMP (for the PDI only). Your attention to this matter is greatly appreciated, since reduction of this QA/QC guideline will help to increase production during the Pre-Design Investigation without, in the opinion of USACE, impacting

quality and usability of the data.

Thanks,
Glen Shonkwiler
Remedial Investigations & Remedial Design Manager
Hazardous, Toxic, & Radioactive Waste Branch
U. S. Army Corps of Engineers
CENWK-EC-EA RM 610
601 E 12th St
Kansas City, MO 64106
(816) 983-3561
(816) 426-5550/5949 (fax)
glen.d.shonkwiler@usace.army.mil

APPENDIX 11-B

**PDI Soil Probe Log Sheets
(Radiological Data)**

PDI Soil Probe Log Sheet
LEGEND

List of Abbreviations:

--- = not applicable	lt = light
blk = black	MDA = minimum detectable activity
bn = brown	med = medium
cl = clay	n/r = no recovery
cnts = counts	pCi/g = picoCuries per gram
Conc. = concentration	ppm = parts per million
dk = dark	SAA = same as above
DUP = duplicate	sc = clayey sand
f = fine	sec = seconds
gm = silty gravel	sm = silty sand
gp = poorly-graded gravel	sp = poorly-graded sand
gw = well-graded gravel	sw = well-graded sand
gy = gray	tr = trace
J = estimated	U = unidentified or negative conc. less than MDA
lg = large	wht = white

List of General Comments:

- 4x4 truck-mounted model 5400 and track-mounted model 54DT Geoprobe[®] were used to collect samples. Manual direct push methodology required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- Holes were grouted with BenSeal[®]
- Gamma measurements were taken at center point
- Duplicate samples marked with an "X" for duplicate were prepared by homogenizing soil above and below the center point and then separating for analysis.
- The depth listed is the center point
- Error: 2 sigma (95% confidence interval)

Tube Types

1-inch diameter = Dual Tube (actual 1.3-inch diameter)

2-inch diameter = Macro-Core[®] (actual 1.7-inch diameter)

Sample Intervals

Dual Tube – 13 inches

Macro-Core[®] – 8 inches

Manual Direct Push – 24 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751708	2165431	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/23/2000	02/23/2000	12:25
Time	13:05	8:15		
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native at 1.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/23/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751680	2165426	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/23/2000	02/23/2000	13:10
Time	13:20	8:40	13:10	13:10
Logger	E. Barbour	S. Ng	J. Dekoskie	J. Dekoskie
Detector Model #	G1	SPA-3	Multi Rae	Multi Rae
Detector Serial #	C442E	33401	CENAN 21811	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native at 1.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/23/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751653	2165396	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/23/2000	02/23/2000	13:35
Time	13:45	9:00	13:35	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native at 2.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/23/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751635	2165393	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/23/2000	02/23/2000	14:00
Time	14:05	9:15	14:00	14:00
Logger	E. Barbour	S. Ng	J. Dekoskie	J. Dekoskie
Detector Model #	G1	SPA-3	Multi Rae	Multi Rae
Detector Serial #	C442E	33401	CENAN 21811	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native at approx. 4.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/23/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/23/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751609	2165361	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/16/2000	02/23/2000	02/23/2000	14:30
Time	14:25	9:40	14:30	14:30
Logger	E. Barbour	S. Ng	J. Dekoskie	J. Dekoskie
Detector Model #	G1	SPA-3	Multi Rae	Multi Rae
Detector Serial #	C442E	33401	CENAN 21811	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter

<i>Field Original Signed</i>	02/16/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/23/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/23/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752179	2165381	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/18/2000	02/21/2000	
Time	10:50	15:15	9:30	
Logger	D. Watters	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native material @ 6.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752204	2165398	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/18/2000	02/21/2000	
Time	10:25	15:25	9:40	
Logger	D. Watters	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi Rae	
Detector Serial #	C442E	33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native material @ 6.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752132	2165373	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/18/2000	02/21/2000	
Time	11:19	15:50	9:55	
Logger	D. Watters	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native material approx. 2.2 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752092	2165406	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		02/18/2000	02/21/2000	
Time		16:35	10:20	
Logger		S. Ng	J. Lincoln	
Detector Model #		SPA-3	PID Model #	Multi Rae
Detector Serial #		33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 4 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	02/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752032	2165491	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/21/2000	02/21/2000	11:20
Time	11:53	8:30	J. Lincoln	Multi Rae
Logger	D. Watters	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native material approx. 2 feet

<i>Field Original Signed</i>	02/14/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/21/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/21/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751996	2165547	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/21/2000	02/21/2000	11:30
Time	13:40	8:45	J. Lincoln	Multi Rae
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native material approx. 2 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752042	2165544	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/21/2000	02/21/2000	11:50
Time	14:05	8:55		
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native material approx. 2 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752035	2165517	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/21/2000	Date	02/21/2000
Time	14:45	9:10	Time	12:10
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter

Depth to groundwater 6.7 feet

Native material approx. 1 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751979	2165866	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	03/08/2000	03/08/2000	
Time	9:25	8:25	13:15	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native material approx. 3 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	11C
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	751999	2165449	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/18/2000	02/21/2000	
Time	12:17	16:45	12:25	
Logger	D. Watters	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi Rae
Detector Serial #	C442E	33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 2-inch diameter

Native material approx. 2.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/21/2000 Date

APPENDIX 11-C

Environmental Boring Log Sheets

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	11a
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)

	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	751729.236	2165457.603	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		3/27	Date	3/27
Time		1415	Time	1415
Logger		G.MARKT	Logger	G.MARKT
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	101914-CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

- MPI No. ENV-11-11016
- Direct-push location grouted with BenSeal.

1415 - 1430 - SOIL SAMPLE 3' - 6'
 1430 - 1600 - H₂O SAMPLE (LESS THAN 1/2 HOUR RECOVERY)
 1600 - 1615 - STEAM CLEAN

George H. Markt
 Signature (Core Gamma Logging)

3/27/00
 Date

George H. Markt
 Signature (Logging)

3/27/00
 Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)									
					X	X	X	#	#	#	#	#		
0.0		↑	↑	75% RECV. SW 2 GLEY	1	1								
0.5		↑	↑	4/100g with processed										
1.0				stone										
1.5		0.0	0.0											
2.0														
2.5				SM 54R 3/4										
3.0														
3.5		↓	↓	BOULDER										
4.0		↑	↑	85% RECV.										
4.5				SM 54R 3/4										
5.0														
5.5		0.0	0.0											
6.0														
6.5														
7.0														
7.5		↓	↓	SM (weathered bedrock)										
8.0				END OF BORING @ 8'										
8.5														
9.0														
9.5														
10.0				OVERDRILLED TO										
10.5				10' for GW SAMPLE										
11.0														
11.5														
12.0														
12.5														
13.0														
13.5														
14.0														
14.5														
15.0														
15.5														
16.0														
16.5														
17.0														
17.5														
18.0														
18.5														
19.0														
19.5														
20.0														
20.5														
21.0														
21.5														
22.0														
22.5														
23.0														
23.5														
24.0														

H₂O
Ca
S₂O₃

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
11A 020595
Page 1 of 1

PROJECT: FUSRAP MAYWOOD SITE: 11a

Project No: 085750503 Client: USACE

Contractor: TERRA PROBE INC SAMPLE DEPTH:

Start Date/Time: 3/27/00 1430 Completion Date/Time: 1600 Well Diameter:

Development Method/Equipment:

Logged by: G. MARKT Water Level (ft bgs): 5.9' (wet) Protection Level: D

Pre-development DTW (PVC) (ft): 5.9' DTB (PVC) (ft): 10'

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(ft)/4 \times \pi \times (DTB-DTW)(ft) \times 7.48 \text{ gal/ft}^3$

(2-inch well = $0.164 \times (DTB-DTW)(ft)$) =

(2.5-inch well = $0.255 \times (DTB-DTW)(ft)$) =

NO WATER RECOVERY

Minimum Purge Volume (gal) (3 well volumes) =

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

Total Quantity Purged:

Disposition of Purge Water:

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
17430		5.9'	-	13.6	7.84	0.361	999+	

Notes: be = below ground surface D = well diameter D (2-inch well) = 0.167 feet
PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
DTW = depth to water gpm = gallons per minute

SCREEN @ 6'-10'
DO = .64

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: GWRI Job Number: 085750503 Activity: Direct-Push Sampling
---	---

Site Designator

XXX

11B

Activity Designator

AAA

GWR

Field Measurement/Sample Collection Designator

VV

DP

Station Number

NNN

001

Media

m m

SB

Sample Type

n

0

Sequential Sample Number

#####

(see Below)

	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	752091.822	2165433.75	

Gamma Logging

Photoionization Detector (PID) Logging

Down Hole

Core

Date

3/27

Date

3/27

Time

1215

Time

1215

Logger

G. MARKT

Logger

G. MARKT

Detector Model #

PID Model #

Multi-RAE

Detector Serial #

PID Serial # 101914

~~CENAN 21811~~

Scaler Model #

Scaler Serial #

Comments:

1. MPI No. ENV-11-11000
2. Direct-push location grouted with BenSeal.

1215 - 1230 - SOIL SAMPLE 2'-6"

1230 - 1400 - H₂O SAMPLE (NO RECOVERY)

1400 - 1415 - STEAM CLEAN

George H. Markt
Signature (Core Gamma Logging)

3/27/00
Date

George H. Markt
Signature (Logging)

3/27/00
Date

H₂O
@ 7.0
▽
|||

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	60% RECV. SW5YR	1	1	6	0	2	0	5	9	6
0.5				2.5/1									
1.0													
1.5													
2.0		0.0	0.0										
2.5													
3.0		↓	↓	SW5YR 4/4 coal + organic matter, roots									
3.5													
4.0		↑	↑	75% RECV. SW5YR 4/4									
4.5													
5.0													
5.5		0.0	0.0										
6.0													
6.5		↓	↓	damp @ 6.5'									
7.0													
7.5		↓	↓	weathered bedrock									
8.0				END OF BORING @ 8'									
8.5													
9.0													
9.5													
10.0													
10.5													
11.0													
11.5													
12.0													
12.5													
13.0													
13.5													
14.0													
14.5													
15.0													
15.5													
16.0													
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19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
 STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID:
 11B 020597
 Page 1 of 1

PROJECT: FUSRAP MAYWOOD	SITE: 11B	SAMPLE ID: 11B 020597
Project No: 085750503	Client: USACE	Page 1 of 1
Contractor: TERRA PROBE INC.	SAMPLE DEPTH:	
Start Date/Time: 3/27/00 1230	Completion Date/Time: 1300	Well Diameter:
Development Method/Equipment: PERISTATIC PUMP		
Logged by:	Water Level (ft bgs): 7 (wet)	Protection Level: D
Pre-development DTW (PVC) (ft): 7' (?)	DTB (PVC) (ft): 10'	

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) =

NO WATER YIELD

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) =

Minimum Purge Volume (gal) (3 well volumes) =

NO SAMPLE COLLECTED

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

tal Quantity Purged:

Disposition of Purge Water:

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
		7'	NO H ₂ O FOR SAMPLE RECOVERY					

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

SCREEN @ 6'-10'

PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 12 – Revision 1

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

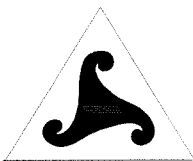
SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18

Submitted to:

Department of the Army
U.S. Army Engineer District, New York
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New York, New York 10278

Department of the Army
U.S. Army Engineer District, Kansas City
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700 Federal Building
Kansas City, Missouri 64106

Submitted by:



Stone & Webster, Inc.
100 West Hunter Ave.
Maywood, NJ 07607
May 2001

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Michael Ciminera
Field Operations Leader

**PRE-DESIGN INVESTIGATION REPORT:
CLUSTER NO. 12 – Revision 1**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 18**

RECORD OF REVISIONS

Revision 0: Original Issue

Revision 1: The Final PDI Report (Revision 0) was submitted in July 2000. Revision 1 to the Final PDI Report incorporates the following significant changes: revision to text headers and footers; addition of results of confirmatory radiological analyses to [Table 12-4](#); and addition of Toxicity Characteristic Leaching Procedure (TCLP) data to [Table 12-5](#).

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- Appendix 12-B: PDI Soil Probe Log Sheets**
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- 12-1 Properties Comprising Each Cluster**
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- 12-1 Location of Maywood Site, Bergen County, New Jersey**
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- 12-3 Cluster No. 12 Sample Location Map**
- 12-4 Cluster No. 12 Surface Gamma Survey Results**

ACRONYMS AND ABBREVIATIONS

AT&T	American Telephone & Telegraph
BNI	Bechtel National, Inc.
C	Degrees Centigrade
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
Conc.	Concentration
CQCP	Contractor Quality Control Plan
DOE	U.S. Department of Energy
EPP	Environmental Protection Plan
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	grams
GMS	Groundwater Modeling System
GPR	Ground Penetrating Radar
GPS	Global Positioning System
ID	Identification
ISOCS	In Situ Object Counting System
keV	kilo electron volts
kg	kilogram
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCW	Maywood Chemical Works
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
mg	milligram
MHTDP	Materials Handling, Transportation and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MSL	Mean Sea Level
NaI	Sodium Iodide
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJVIS	New Jersey Vehicle Inspection Station
NYS&W	New York, Susquehanna & Western Railway
ORNL	Oak Ridge National Laboratories
pCi	picoCurie
PDI	Pre-Design Investigation
PDIWP	Pre-Design Investigation Work Plan
PID	Photoionization Detector
PVC/PET	Polyvinyl Chloride/Polyethylene Teraphthalate
QA	Quality Assurance
QC	Quality Control
QCSR	Quality Control Summary Report
Ra-226	Radium-226

Rn-222	Radon-222
RCRA	Resource Conservation and Recovery Act
RESRAD	Department of Energy Computer Code; RESidual RADioactivity
ROC	Radionuclides of Concern
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
St.	Street
Th-232	Thorium-232
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
ug	microgram
U-238	Uranium-238
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency

1.0 SITE BACKGROUND AND PHYSICAL SETTING

1.1 General Site Overview

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (hereafter referred to as the Maywood Site) is located in a highly developed area of Bergen County in northeastern New Jersey, in the Boroughs of Maywood and Lodi and the Township of Rochelle Park (Figure 12-1). Portions of the Maywood Site are radiologically impacted from process wastes and residues associated with the recovery and refining of thorium and thorium compounds from monazite ores by the Maywood Chemical Works (MCW) from 1916 to 1956 (Bechtel National, Inc., BNI, 1992).

Waste produced at MCW was a fine sand-like material containing residual thorium with lesser amounts of uranium and its daughter products including radium. Wastes and residues were disposed in low-lying areas west of processing facilities. In the early 1930s, a portion of these wastes and residues was separated from the main property by construction of New Jersey State Highway 17 (NJ Route 17). Additionally, the former channel of Lodi Brook runs through the majority of the properties making up the Maywood Site. Some of the contaminated materials are assumed to have eroded from the facility area and were transported downstream via Lodi Brook (Figure 12-2). In addition, from 1928 to 1944, local residents were known to use process waste in their lawns and gardens and as fill material (BNI, 1992). These are the major mechanisms for distribution of radiologically-contaminated materials on the Maywood Site.

The Maywood Site consists of 88 designated residential, commercial, municipal, and state or federal properties. All 64 Phase I properties (including all residential and municipal properties) have either been remediated by the U.S. Department of Energy (DOE) or U.S. Army Corps of Engineers (USACE) or are currently being addressed under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). The remaining 24 Phase II properties are being addressed by the Stone & Webster Team (i.e., Team).

1.2 Pre-Design Investigation Scope

On December 29, 1998, the USACE issued a Scope of Services for the design and remediation of the remaining 24 commercial and government properties. These properties potentially contain deposits of radioactive material in surface and subsurface soils resulting from operations of the former MCW. They have been designated as the Phase II properties.

A Pre-Design Investigation Work Plan (PDIWP, Stone & Webster, 1999a) was submitted in October 1999 for the Phase II properties. The purpose of the PDIWP was to address data gaps necessary to complete remedial design efforts. In determining additional data needs, it was assumed that remediation of radiologically-impacted soils would be conducted on “accessible soils” only. Accessible soils are defined as soils not under permanent structures such as buildings and roadways. Data acquisition was limited to accessible soils only.

A preliminary evaluation was performed to determine the human health risk from leaving subsurface radiologically-impacted soils proximate to these structures. The RESidual RADioactivity (RESRAD) computer code was utilized to quantify the dose and risk under a

number of assumed conditions. Based on the preliminary results, it was determined that any radioactive residues left adjacent to existing buildings, roadways, and railways would need a minimum of two feet of clean soil cover to be protective of human health. As such, it has been assumed that where radiologically-contaminated soils exist at depth adjacent to structures, at least the top two feet of radiologically-contaminated soil would be removed adjacent to the structure to a six foot horizontal setback, and then sloped at two horizontal to one vertical (2H:1V) to the required depth. However, it is recognized that site-specific calculations will need to be made during the remedial design phase in order to determine the actual depth of excavation adjacent to each structure, the horizontal setback, and the slope to final excavation depths (Stone & Webster, 1999a).

In preparing the PDIWP, the 24 Phase II properties were sub-divided into 12 clusters. The purpose of the clustering was to take a 'collective' view of a set of contiguous properties to efficiently secure needed pre-design investigation (PDI) information for those properties. [Table 12-1](#) lists the 12 clusters for the Phase II properties, from south to north. The reader is directed to the PDIWP for additional background information (Stone & Webster, 1999a).

The purpose of this PDI Report is to present data collected during the PDI for Cluster No. 12. The evaluation of PDI data, along with data collected by others during previous investigations, is documented separately.

2.0 PDI FIELD ACTIVITIES

PDI activities were performed by the following Team members:

Stone & Webster, Inc.	Team leader and engineering services
Malcolm Pirnie, Inc.	Engineering services
Science & Ecology Corporation.....	Health physics services
Cabrera Services, Inc.	Radiological survey support
Canberra Industries, Inc.	Radiological survey support
Garden State Surveying, Engineering, and Planning, Inc.	Surveying and mapping
NAEVA Geophysics, Inc.	Geophysical investigation
TerraProbe, Inc.	Direct push services
Franklin Environmental Services, Inc.	Construction services
ThermoRetec	Radiological sample analysis
RECRA LabNet.....	Environmental sample analysis
Kestrel Environmental Technologies, Inc.	Data validation

PDI activities involved non-intrusive surveys followed by intrusive investigations. The preliminary, non-intrusive PDI activities (including surface gamma scans, surface In-Situ Object Counting System (ISOCS) readings, geophysical surveys and field surveying) were initiated in August 1999. The intrusive portion of the PDI program began in January 2000 and was completed in April 2000. [Table 12-2](#) presents a summary of PDI intrusive field activities. For logistical reasons, PDI environmental borings were performed at the outset of the Groundwater Remedial Investigation program during the latter part of March and beginning of April 2000.

PDI field activities were conducted in accordance with the PDIWP, and in compliance with procedures established in the following project documents: Contractor Quality Control Plan (CQCP), Site Safety and Health Plan (SSHP), General Environmental Protection Plan (EPP), Chemical Data Quality Management Plan (CDQMP), and the Materials Handling, Transportation and Disposal Plan (MHTDP), (Stone & Webster, 1999b, c, and d, 2000a, 2000b, respectively). Variances in methodology and sample locations between the PDIWP and the actual PDI execution are discussed below.

2.1 Variances from PDIWP

This section discusses deviations in methodologies and sample locations from the approved PDIWP.

2.1.1 Methodology Variances

Methodology variances from the PDIWP were as follows:

- The PDIWP called for the use of an ISOCS utilizing germanium gamma spectroscopy to quantify radionuclide activity in soil. Following approval of the PDIWP, regulatory concerns regarding the use of ISOCS for subsurface investigation were raised. The PDIWP was subsequently modified by replacing intrusive ISOCS sampling with conventional sample

collection using direct push methods to collect soil cores for laboratory analysis. Due to this change, Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled “Soil Probe Investigation” was developed and followed. Refer to the USACE letters dated December 8, 1999 from the Project Manager, Mr. Allen Roos, informing the U.S. Environmental Protection Agency (USEPA) Project Manager, Ms. Angela Carpenter, and the New Jersey Department of Environmental Protection (NJDEP) Case Manager, Ms. Donna Gaffigan, of the modification, as presented in [Appendix 12-A](#). The USEPA approved use of SOP-SW-MWD-509-0 on December 29, 1999 and NJDEP approved it on January 20, 2000.

- A Bicon® Model G1 one-inch by one-inch (1” x 1”) sodium iodide (NaI) detector was substituted for the originally proposed 3/8” x 3/8” NaI detector for downhole gamma logging. This substitution was needed to provide greater detector sensitivity through the soil probe casing. Due to the addition of this detector, SOP number SW-MWD-509-0 entitled “Soil Probe Investigation” was revised. These revisions are outlined in [Table 1-A](#) in [Appendix 12-A](#). The 3/8” x 3/8” NaI detector was used only when the manual direct push method was employed. Manual direct push methodology was required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- The CDQMP originally specified a frequency of 10% for field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. This corresponds to the USACE internal quality control standard. However, due to the significant number of samples to be collected as part of the PDI program (totaling approximately 2000 soil samples and in excess of 10,000 gamma count rate and photoionization detector (PID) readings), the USACE agreed to reduce the frequency to 5%, which is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and USEPA guidelines for MS/MSD analysis. USEPA Region II does not have a specific guideline for field duplicate samples. Refer to the USACE and USEPA/NJDEP correspondence in [Appendix 12-A](#).
- The PDIWP stipulates that geotechnical borings with associated laboratory testing may be required in order to provide design parameters in locations where excavation may impact adjacent structures. Since radiological clean-up criteria have yet to be finalized, final assessment of limits of radiological contamination cannot be made at this time. The geotechnical investigation program was suspended from the PDI. During the design process, existing geotechnical information will be evaluated for design and a determination will be made if supplemental data are needed.

2.1.2 Sample Location Variances

The PDIWP was developed with the intent that proposed sample locations would be deleted, added, or moved as additional information regarding site features and contamination distribution became available during the course of the PDI implementation. In accordance with this approach, sample locations as proposed in the PDIWP were deleted, added, or moved for the following reasons:

- Base mapping developed subsequent to completion of the PDIWP provided additional information regarding underground utility locations and other site features. Proposed sample

locations proximate to these utilities and site features were moved in order to minimize impacts.

- Review of surface gamma survey data collected as part of the PDI, coupled with additional review of data from previous investigations performed by BNI and ORNL, indicated that certain proposed intrusive locations should either be moved or could be deleted. To address potential areas of surface radiological contamination not previously identified as areas of concern, a protocol was established for determining the need for additional intrusive sampling locations. Refer to “Protocol For Addressing Gamma Scan Anomalies” in [Appendix 12-A](#).

Specific rationale for the deletion, addition, or movement of locations proposed in the PDIWP are summarized in [Appendix 12-A](#).

2.2 Geophysical Surveys

Between September 20, 1999 and March 2, 2000, NAEVA Geophysics, Inc. conducted geophysical investigations on the Maywood Site. The purpose of these investigations was to delineate surface traces of detectable underground utilities in the vicinity of proposed exploratory boring sites. Equipment selected for this investigation included: a Fisher TW-6 Pipe and Cable Locator; a Radiodetection RD432PDL-2 Utility Locator; a Subsite 75 Utility Locator, a 3M Dynatel 2250 Cable Locator, and a GSSI SIR-3 ground penetrating radar (GPR) system with a 300 MHz antenna. Details of the surveys are presented in the NAEVA report (NAEVA, 2000).

2.3 Sample Locations

In October 1999, Garden State Engineering, Surveying, and Planning, Inc. performed a ground survey of the Maywood Site properties. Results of the ground survey were combined with aerial mapping prepared by GEOD Corporation to produce new base mapping for the Maywood Site. This new base mapping replaced the mapping used to generate the PDIWP drawings.

Sample points for the surface gamma survey, surface ISOCS measurements, direct push (Geoprobe[®]) sampling, and environmental sampling were located in the field using a Global Positioning System (GPS). A Trimble 4800 Site Surveyor system with a 4700 base receiver, GPS antenna, radio antenna, and ancillary equipment were used to perform GPS surveys. Base stations were set up and calibrated at specified bench-mark locations established by the surveyor. Following base receiver set up, sampling points were located. Field markings (spray paint, flags, and stakes) were used to identify intrusive sampling locations for radiological and environmental direct push mobile rigs, as well as surface ISOCS locations.

Coordinates for intrusive sample locations were determined from new PDI sample location maps which reflected updated base mapping and modified sample locations; surface ISOCS locations were identified based on original PDIWP mapping. For the surface gamma survey, GPS was used to record locations of gamma scan measurements. Where GPS instrumentation could not be utilized due to signal disruption (e.g., tree coverage, building interference, non-availability of satellites, or poor satellite reception due to weather conditions), sample locations were based on identification of site features and scaling off base mapping.

2.4 Surface Gamma Surveys

Surface gamma surveys for all of the Phase II properties were conducted from August 1999 to March 2000. Surveys were conducted to obtain distribution of surface radiological contamination for health and safety reasons, as well as to verify existing data. Measurements were collected by suspending a 1" x 1" NaI gamma scintillation detector coupled to a Ludlum Model 12 ratemeter within a few inches of the ground surface. A health physics technician walked transects (approximately four to six feet wide) covering the properties while slowly swinging the detector in a serpentine motion. Transects were spaced to assure full areal coverage with some overlap. Gamma count measurements were taken approximately every 15 to 20 feet; measurement frequency was increased in areas exhibiting elevated gamma counts. Minimum detectable concentrations (MDCs) for this detector for the radionuclides of concern (ROC) are approximately 4.7 picoCurie per gram (pCi/g) for Radium-226 (Ra-226), 3.0 pCi/g for Thorium-232 (Th-232), and 121.0 pCi/g for Uranium-238 (U-238), correcting for volume and distance from the source (Multi-Agency Radiation Survey and Site Investigation Manual, MARSSIM, 1997). Gamma count data were stored with associated locations in the GPS recorder. In some instances where locations could not be recorded with a GPS (as stipulated above), measurements were manually recorded on the PDI maps.

2.5 Surface ISOCS Measurements

Surface ISOCS measurements were collected at selected locations where environmental, geotechnical, and radiological shallow boreholes were proposed in the PDIWP. Surface ISOCS measurements were collected to identify and quantify radionuclide activity in surface soil, beneath shielded areas (e.g., areas covered with gravel, asphalt, and concrete), and in areas proposed for environmental borings.

Gamma spectroscopy measurements of surface soil were collected using the Canberra high-purity germanium ISOCS and assuming uniform radioactivity distribution in soil. The high-purity germanium detector was positioned in a "downward-looking" direction perpendicular to the ground surface at a height of three feet. The detector was collimated using a lead shield subtending a 90-degree angle, which provided a surface soil viewing area approximately six feet in diameter. The back and side of the detector were shielded with two-inch thick lead O-rings. The detector collimator and shielding were used to ensure that radioactivity detected by the probe originated only from the six-foot diameter area beneath the detector, hence minimizing one possible source of error in the measurements.

2.6 Direct Push Soil Probes

Direct push soil probes (using truck-mounted model 5400 Geoprob[®] or track-mounted model 54DT Geoprob[®]) were used to collect soil samples for radiological and environmental parameter analysis. Two types of direct push soil probes were used: a single rod system (i.e., Macro-Core[®]) and a dual tube (or cased) system. The latter system utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Samples were collected in four-foot soil cores within polyvinyl chloride/polyethylene terephthalate (PVC/PET) liners, marked with the appropriate field identification number, sealed with rubber end caps, and placed

into a two-inch inner diameter PVC container (including PVC end caps) for transport and storage.

For sample locations that were inaccessible to the mounted direct push rigs, soil cores were collected using a manual direct push method. Two-foot cores approximately one inch in diameter were collected using an electric powered hand-held vibratory hammer.

Prior to commencing intrusive sampling, underground utilities in the vicinity of the proposed boring locations were identified by reviewing PDI geophysical survey data, and by contacting the appropriate authorized parties (i.e., New Jersey One-Call System, and the property owner). In addition, a safe working distance from overhead utilities was maintained.

Sampling equipment (the rig, direct push soil probe casing and tools) was decontaminated prior to use and following each borehole installation using pressure or manual washing. Each soil probe hole was backfilled for the full length using Benseal[®] bentonite in accordance with project requirements. For areas covered by asphalt, cold patch was placed at the surface.

2.6.1 Downhole Gamma Logging

Measurements were taken with a Bicron[®] Model G1 1" x 1" NaI gamma detector sealed in a waterproof stainless steel container. The instrument MDCs are approximately 3.6 pCi/g for Ra-226, 2.3 pCi/g for Th-232, and 92.0 pCi/g for U-238, which are approximately 75% of the surface MDCs listed in Section 2.4. This estimate assumes a geometry factor of 0.50, where a four pi geometry (i.e., a sphere) when scanning downhole is approximately half of a two pi geometry (i.e., a hemisphere) when scanning the ground surface. However, this reduction in the MDCs is modified by the 0.3-inch steel casing in the hole, which results in an approximate 33% reduction in the gammas seen by the detector as calculated by the computer code Microshield[™]. The correction factor is therefore calculated by dividing the geometry factor (0.50) by the steel casing reduction factor (0.66), yielding approximately 0.75. The NaI detector was connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector[™] multi-channel analyzer/amplifier/high voltage power supply. The system was controlled, and the data stored, via notebook computer. Ten-second integrated gross gamma measurements were recorded at each 6-inch depth increment in the cased soil probe holes and data entered onto the PDI Soil Probe Log Sheets (see [Appendix 12-B](#)). In areas where samples were collected using the manual direct push method, a Bicron[®] 3/8" x 3/8" NaI gamma detector coupled to a Ludlum Model 2221 scaler/ratemeter was used to take 30 to 60-second gross gamma measurements in uncased soil probe holes. The MDCs for this instrument are estimated to be approximately 1.9 pCi/g for Ra-226 and 2.3 pCi/g for Th-232, as provided by the vendor. There is no correction factor for these MDCs.

2.6.2 Direct Push Core Screening/Sample Collection

Sealed PVC containers collected from direct push mobile and manual rigs were transported to the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation added to the PDI Soil Probe Log Sheets (see [Appendix 12-B](#)) included soil column description and soil screening data. Field screening for radiological activity was performed on soil cores contained in the PVC/PET liner. A collimated Eberline

SPA-3 2" x 2" NaI detector (or Ludlum Model 44-10) coupled to a Ludlum Model 2221 scaler/ratemeter was used to measure gamma activity. The detector was positioned approximately 0.5 inch above the soil core, on a guide, to ensure that this distance was maintained over the entire length of each soil core. Continuous scanning of the soil core was performed at an approximate rate of three inches per second. The instrument MDC, taken from MARSSIM, is estimated to be 2.8 pCi/g for Ra-226, 1.8 pCi/g for Th-232, and 80 pCi/g for U-238 (MARSSIM, 1997). Although the MARSSIM MDC values are based upon an open area, it was assumed that the slower scan time compensated for the different geometry. An indelible marker was used to mark the liner where elevated readings were identified during scanning. Total integrated gross gamma counts were accumulated over a 30-second interval and recorded.

Soil cores were also screened for total volatile organic vapors using a PID. A series of small perforations were made along the PVC/PET liner at 12-inch increments to expose soil to the PID. Perforations were sealed with tape after PID screening. Screening results were recorded on the PDI Soil Probe Logs.

Prior to obtaining samples, each core was photographed using a digital camera. A brief soil field classification description of each core was entered onto the PDI Soil Probe Log Sheet.

Soil samples were selected from each direct push location for analysis of the ROC: Th-232, Ra-226, and U-238. Samples were selected based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample was taken at the highest reading location (suspected FUSRAP waste, if present, as defined in the Federal Facilities Agreement dated November, 1991; DOE and USEPA, 1991); a second soil sample was collected where the readings approached a constant value (suspected transition zone, if present); and a third soil sample was collected within the zone of constant readings (below suspected transition zone). When soil cores exhibited uniform count rates (i.e., elevated gamma measurements were not identified), three samples per soil probe location were collected.

Selected samples were obtained from each core sufficient to fill a 300-milliliter sample container. Samples were labeled and capped at either end with plastic caps. Caps were color-coded for 'top' and 'bottom' of the original hole. Each extracted section of the soil core was replaced with a wooden spacer to indicate what portion of the soil core was sampled. The spacer was labeled with the sample identification number of the soil removed for testing. After screening and sample extraction, remaining portions of each soil core were placed back into the appropriate PVC container, with the wooden spacer in its appropriate location, and stored on-site for future reference. The section of core tube containing the sample was then transferred to the MISS on-site laboratory for sample preparation and analysis.

Evaluation of all gamma log data led to the archiving of selected samples. That is, a number of the direct push soil probes exhibited 'constant' count rates over the depth interval. In these cases, rather than having all samples analyzed at this time, the deepest prepared sample was not counted but archived. By doing this, as laboratory results confirm that radiological contamination does not exist at that soil probe location, unnecessary analytical work is

prevented. Samples that were archived are noted on the PDI Soil Logs in [Appendix 12-B](#) and on [Table 12-4](#).

As described above, a collimated Eberline SPA-3 or Ludlum Model 44-10 2" x 2" NaI detector was used to measure gamma activity for the soil cores, while a Bicron[®] Model G1 1" x 1" NaI gamma detector was used for the downhole measurements. The 2" x 2" NaI detector (Eberline SPA-3 or Ludlum Model 44-10) provided confirmation of downhole measurements and greater sensitivity for sample selection than the 1" x 1" NaI gamma detector.

2.6.3 Sample Preparation

Soil samples were screened to remove small debris and oven-dried to obtain moisture content and to facilitate grinding. Grinding assured sample homogenization. Samples were then transferred to a 300-milliliter commercially supplied metal can. Lids were secured on cans, after which they were shelved for 21 days. The 21-day period was required to allow radon and its daughter products to in-grow and establish secular equilibrium between Ra-226, Radon-222 (Rn-222), and the gamma-emitting daughters.

2.6.4 Laboratory Data

Analysis for ROC on selected samples was performed at the MISS on-site field laboratory using a Canberra high-purity germanium detector. All testing in the MISS on-site field laboratory was completed in accordance with the procedures outlined in the CDQMP. MISS on-site field laboratory data have been entered onto the PDI Soil Probe Log sheets (see [Appendix 12-B](#)).

The Project Chemist evaluated 10% of the MISS on-site field laboratory radiological data packages; the evaluation is included in the PDI Quality Control Summary Report (QCSR; Stone & Webster, 2000c). The laboratory qualified the reported data when the germanium detector measurement system fell outside of one of the control limits during quality control check runs. Data qualification procedures are described in the PDI QCSR.

Ten percent of the samples analyzed by the MISS on-site field laboratory were sent to a USACE-approved off-site laboratory (ThermoRetec) for confirmatory analysis of the ROC. Following analysis, all soil samples were returned to the Maywood Site for storage and future reference. Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the off-site confirmatory radiological data. Radiological data were evaluated using the USACE's Radiological Data Quality Evaluation Guidance, as presented in the CDQMP. The data validation reports for the radiological confirmatory sample results are provided in the PDI QCSR.

2.7 Environmental Sampling

A limited number of soil samples were collected for environmental analyses in order to identify potential chemical contamination commingled with the radioactive waste. This information would aid in assessing waste classification (i.e., whether hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA), is commingled with radioactive waste) as well as provide data for worker health and safety. Samples for environmental analysis were

collected using direct push Macro-Core[®] methodology. Sampling depths were based on the anticipated depth of radiological contamination. Soils exhibiting the highest PID readings or visual contamination were collected and sent for laboratory analysis by a USACE and NJDEP certified laboratory (RECRA LabNet). Samples were analyzed for RCRA disposal characteristics (ignitability, reactivity, corrosivity, and toxicity characteristic leaching procedure TCLP), the Target Compound List (TCL) and the Target Analyte List (TAL) with chromium speciation.

During performance of environmental borings, environmental boring log sheets were completed for each boring. Copies of the completed log sheets are included in [Appendix 12-C](#).

Kestrel Environmental Technologies, Inc. performed data evaluation of 100% of the environmental data. Environmental data were evaluated using the USACE's Data Quality Evaluation Guidance, as presented in the CDQMP. In addition, the USEPA Region II SOP No. HW-24, Revision I, June 1999, was also applied. The data validation reports for the environmental sample results are provided in the PDI QCSR.

2.8 Geotechnical Sampling

Radiological cleanup criteria have yet to be finalized, therefore final assessment of the extent of radiological contamination cannot be made at this time. The geotechnical investigation program was therefore suspended from the PDI. Following approximate determination of limits of excavation during the design phase, existing geotechnical information will be evaluated for remedial design purposes. If it is decided that additional information is required, then the geotechnical program will be reinstated, as necessary.

2.9 Quality Assurance/Quality Control

Field and laboratory activities were completed in accordance with the CQCP and the CDQMP. Data reflecting adherence to the Quality Assurance / Quality Control (QA/QC) program was documented and presented in the PDI QCSR.

2.10 Health and Safety

All PDI investigation activities were conducted in compliance with the SSHP and associated protocols and directives. Field crews received daily briefings at 'Plan of the Day' meetings prior to any work activities. These meetings reviewed daily health and safety issues such as potential inclement weather, as well as reviews of general site health and safety directives.

3.0 CLUSTER DESCRIPTION AND PDI RESULTS

3.1 Cluster No. 12 Description

Cluster No. 12 consists of three properties in the Borough of Maywood and the Township of Rochelle Park:

- Property No. 12A – New York, Susquehanna & Western Railway
- Property No. 12B – 100 West Hunter Ave. (MISS)
- Property No. 12C – New Jersey Route 17

The paragraphs below provide detailed descriptions of each property.

3.1.1 Property No. 12A – New York, Susquehanna & Western Railway

Property No. 12A, the New York, Susquehanna and Western (NYS&W) Railway, occupies Block 124, Lot 55 in the Borough of Maywood, and Block 110, Lot 1 in the Township of Rochelle Park. This portion of the railroad is approximately 2,800 feet long and 100 feet wide. It forms the northern boundary for the Phase I Ballod Associates Property west of New Jersey (NJ) Route 17 (formerly part of the MCW property), the MISS (Property No. 12B), the Stepan Company property (Cluster No. 10) and portions of 61 West Hunter Ave. (Property No. 11B). Two sets of railroad tracks are contained within the right-of-way. The northern set of tracks has been upgraded and is the active track. The southern set of tracks has been abandoned and has not been functional for at least the past two decades.

In addition, there is an abandoned rail spur on the south side of the alignment that serviced the MCW. Another abandoned rail spur is located on the north side of the alignment, under the NJ Route 17 overpass.

3.1.2 Property No. 12B – 100 West Hunter Ave. (MISS)

Property No. 12B occupies Block 124, Lot 46 in the Borough of Maywood, and Block 20.01, Lot 1 in the Township of Rochelle Park. The property, located at 100 West Hunter Ave., is referred to as the MISS, comprises approximately 11.7 acres, and is bisected by the boundary between the Township of Rochelle Park and the Borough of Maywood. The property is bounded by the NYS&W (Property No. 12A) to the north, by the Stepan Company property (Cluster No. 10) to the south and east, and by NJ Route 17 (Property No. 12C) to the west. Most of the MISS is grass-covered and is surrounded by a 6- to 8- foot high chain link fence. Property No. 12B contains two buildings (Building 76 and a pumphouse), temporary office trailers, and a water reservoir. The water reservoir and pumphouse are currently used by the Stepan Company. Two railroad spurs traverse the central and southern portion of the site; one services the Stepan Company, and the other services the Sears Logistical Services (Cluster No. 9) adjacent to Stepan. Westerly Brook, which flows under the northern edge of the MISS via a concrete pipe, empties into the Saddle River, a tributary of the Passaic River. Surface topography at the MISS ranges in elevation from approximately 51 to 67 feet above mean sea level (MSL). The highest elevations

are in the northeastern portions of the site. Small mounds and ditches are the result of process waste that was stored by the former MCW. At least two partially buried structures (cisterns or cesspools) remain from these waste storage operations.

The MISS was established in 1984, when DOE negotiated an agreement with the Stepan Company for access to a portion of their property. The land was transferred to DOE ownership in September 1985 to provide an interim storage site for waste from DOE remediation activities until a permanent disposal site was found (BNI, 1992). Contaminated materials removed from the northeast corner of the Ballod Property (i.e., the area not addressed during the Phase I efforts) and from vicinity residential properties in Maywood and Rochelle Park were brought to the site from 1984 to 1986. This does not include the material from the southern diked area of the MCW (currently part of the Ballod Property) which was buried in the Stepan burial pits. Burial occurred following the purchase of MCW by the Stepan Company and enabled the Atomic Energy Commission to release the property for unrestricted use (e.g., sale; BNI, 1985). The contaminated materials from the 1984-1986 activities storage pile (primarily soils) covered approximately 1.5 acres in the north section of the property, was approximately 20 feet high, and contained approximately 34,900 cubic yards of low-level radioactive waste. A leachate collection system within the pile and a liner system beneath the pile intercepted any seepage. Removal of the soil pile was initiated in October 1994 by DOE, and completed in December 1996.

3.1.3 Property No. 12C – New Jersey Route 17

Property No. 12C, the NJ Route 17 (State Property), extends approximately 1200 feet along the eastern and western edge of NJ Route 17 from the intersection of the NYS&W south to Grove Avenue. The property borders the entire western boundary of the MISS (Property No. 12B) and crosses the Maywood railroad spur. The Ballod Property lies to the west of NJ Route 17. NJ Route 17 was constructed in 1932 over two areas previously used by the MCW as retention ponds to store process residues (BNI, 1986). No PDI activities were conducted at Property No. 12C since contaminated soils on the property are considered inaccessible.

Refer to [Figure 12-3](#) for more specific details of site features.

3.2 Radiological Data

3.2.1 Surface Gamma Survey

A surface gamma survey was performed at Cluster No. 12. Data, recorded using GPS, was entered into the Groundwater Modeling System (GMS) software package and contoured to a two-dimensional grid using the “Natural Neighbor” contouring protocol. “Natural Neighbor” interpolation is based on the Thiessen polygon network of the scatter point set. Data are interpolated based on distance as well as topological relationships (Boss International, Inc., 2000).

Results of the gamma scan survey for Cluster No. 12 are presented graphically on [Figure 12-4](#) and [Figure 12-A1](#) (Appendix 12-A). [Figure 12-4](#) presents surface gamma scan data in context of the Maywood Site: the upper limit of the contour range is the maximum gamma count

measurement detected at the Maywood Site, and the lower contour range represents 1.5 times the background gamma count rate for Cluster No. 12 (background is approximately 2,000 counts per minute for Cluster No. 12 using a 1" x 1" NaI detector). [Figure 12-A1](#) provides a more detailed, cluster-specific, presentation of the gamma scan data, with the contoured ranges corresponding to the actual minimum and maximum measured gross gamma counts recorded at Cluster No. 12.

3.2.2 *Surface ISOCS Measurements*

Surface ISOCS measurements were taken at 30 locations on Cluster No. 12; locations are shown on [Figure 12-3](#). The results of surface ISOCS measurements are tabulated on [Table 12-3](#).

3.2.3 *Direct Push Soil Probes*

One-hundred and twenty-seven (127) direct push soil probes were performed at Cluster No. 12 for radiological purposes. Soil probe locations are shown on [Figure 12-3](#).

3.2.3.1 Downhole Gamma Logging

Results from downhole gamma logging measurements taken at the soil probe locations are presented on the PDI Soil Probe Logs included in [Appendix 12-B](#).

3.2.3.2 Direct Push Core Screening/Sample Collection

Results of soil core screening activities performed at the MISS radiological screening laboratory are recorded on PDI Soil Probe Logs included in [Appendix 12-B](#).

3.2.3.3 MISS On-Site Field Laboratory Data and ThermoRetec Confirmatory Data

Three-hundred and eighty-five (385) soil samples were collected for laboratory analysis from the 127 soil probe locations at Cluster No. 12. Two-hundred and ninety-five (295) of the 385 samples were sent for analysis (including 19 duplicates); 90 were archived. Laboratory data consisting of soil concentrations of the ROC are presented on the soil probe logs in [Appendix 12-B](#), and summarized on [Table 12-4](#). Archived samples are also recorded on the logs and the table.

Forty of the soil samples analyzed by the MISS on-site field laboratory were sent to ThermoRetec for confirmatory analysis. Results of the confirmatory analyses performed by ThermoRetec are shown in [Table 12-4](#).

As part of the data quality objective process, a comparison study was performed between the MISS on-site field laboratory and the ThermoRetec laboratory data. The results of the comparison can be found under separate cover (Stone & Webster, 2000d).

3.3 Environmental Data

Seven (7) environmental borings were drilled at Cluster No. 12, and seven soil samples were collected for environmental analysis. A summary of the environmental analytical data is presented on [Table 12-5](#). [Figure 12-3](#) shows the locations of the borings. In addition, the environmental boring log sheets are included in [Appendix 12-C](#).

4.0 REFERENCES

Bechtel National, Inc. Post Remedial Action Report for the Ballod Associates Property, DOE/OR/20722-82, 1985.

Bechtel National, Inc. Radiological Characterization Report for New Jersey Route 17 in Rochelle Park, New Jersey, DE-AC05-81OR20722, December, 1986.

Bechtel National, Inc. Remedial Investigation Report for the Maywood Site, DOE/OR/21949-337; December 1992.

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Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM); EPA-402-R-97-016; NUREG-1575; December, 1997.

NAEVA Geophysics, Inc. Results of Subsurface Investigation for the FUSRAP Maywood Superfund Site; 2000.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Work Plan*, FUSRAP Maywood Superfund Site. Boston, MA; October 1999a.

Stone & Webster Environmental Technology & Services. *Final Contractor Quality Control Plan*, FUSRAP Maywood Superfund Site. Boston, MA; October 1999b.

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Stone & Webster Environmental Technology & Services. *Final General Environmental Protection Plan*, FUSRAP Maywood Superfund Site. Boston, MA; November 1999d.

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Stone & Webster Environmental Technology & Services. *Materials Handling/Transportation and Disposal Plan*, FUSRAP Maywood Superfund Site. Boston, MA; January 2000b.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Quality Control Summary Report*, FUSRAP Maywood Superfund Site. Boston, MA; March 2000c.

Stone & Webster Environmental Technology & Services. *Pre-Design Investigation Radiological Data Comparison Study*, FUSRAP Maywood Superfund Site. Boston, MA; December 2000d.

U.S. Department of Energy and U.S. Environmental Protection Agency. Federal Facility Agreement for the Maywood Interim Storage Site; November, 1991.

Table 12-1: Properties Comprising Each Cluster

Cluster No.	Property No.	Properties (occupant)	Township/Borough	Property Block & Lot
1	01A	72 Sidney St. (Vacant)	Lodi	Block 164, Lots 1 and 5
2	02A	100 Hancock Street (AT&T)	Lodi	Block 205.03, Lot 2.04
	02B	80 Hancock Street (Vacant)	Lodi	Block 205.03, Lot 2.03
	02C	80 Industrial Road (American Jewel Windows)	Lodi	Block 205.02, Lot 4.02
	02D	8 Mill St. (NJVIS)	Lodi	Block 205.02, Lot 1.05
3	03A	170 Gregg Street (Bergen Cable)	Lodi	Block 205, Lot 1.02
4	04A	160/174 Essex Street (Bank of New York)	Lodi	Block 186.01, Lot 1 and Block 174, Lot 1.02
	04B	I-80 Westbound Right-of-Way (NJDOT)	Lodi	Not Applicable
5	05A	99 Essex Street (Joseph Muscarelle, Inc.)	Maywood	Block 125, Lot 1
	05B	113 Essex Street (Bank of New York)	Maywood	Block 125, Lot 2
	05C	200 NJ Route 17 South (Sears Appliance Repair)	Maywood	Block 125, Lot 3
6	06A	85-101 NJ Route 17 North (Architectural Windows)	Maywood	Block 124, Lot 4
	06B	137 NJ Route 17 North (Ramsey Auto Group)	Maywood	Block 124, Lot 3
	06C	167 NJ Route 17 North (Sunoco Station - Inactive)	Maywood	Block 124, Lot 2
	06D	239 NJ Route 17 North (Gulf Station)	Maywood	Block 124, Lot 1
	06E	29 Essex Street (Federal Express Corporation)	Maywood	Block 124, Lot 5
7	07A	111 Essex Street (Scanel Company, Inc.)	Maywood	Block 131, Lots 1,2,3,4
	07B	New York, Susquehanna & Western Railway - Lodi Branch	Maywood	Block 131, Lot 8
8	08A	23 West Howcroft Road (Maywood Furniture, Inc.)	Maywood	Block 124, Lot 17
9	09A	149-151 Maywood Avenue (Sears Logistical Services)	Maywood; Rochelle Park	Block 124, Lot 30; Block 17.02, Lot 1
10	10A	100 West Hunter Avenue (Stepan Company)	Maywood; Rochelle Park	Block 124, Lot 10; Block 18.02, Lot 2
11	11A	205 Maywood Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
	11B	61 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 50
	11C	50 West Hunter Ave. (Myron Manufacturing)	Maywood	Block 124, Lot 35
12	12A	New York, Susquehanna & Western Railway	Maywood; Rochelle Park	Block 124, Lot 55 and Block 110, Lot 1
	12B	100 West Hunter Avenue (MISS)	Maywood; Rochelle Park	Block 124, Lot 46 and Block 20.01, Lot 1
	12C	New Jersey Route 17 (NJDOT)	Rochelle Park	Not Applicable

Table 12-2: Summary of PDI Intrusive Field Activities

Cluster No.	Property No.	Property Address	Occupant	Planned			Actual			Schedule (Year 2000)
				Probe Locations	Depth (ft)	Footage (ft)	Probe Locations	Depth (ft)	Footage (ft)	
1	01A	72 Sydney Street	Vacant	13	12	156	15	12	188	Jan. 11, 12, Mar. 31
2	02A	100 Hancock Street	AT&T	17	16	272	17	6 - 12	194	Jan. 27, Feb. 1, 2, Mar. 16
	02B	80 Hancock Street	Vacant	18	16	288	Pending Right of Entry Agreement			
	02C	80 Industrial Road	American Jewel Windows	23	16	368	20	12	272	Jan. 21, 24, 28, Feb. 1
	02D	8 Mill Street	NJVIS	38	16	608	44	12 - 16	593	Jan. 13, 14, 18, 19, 20, 21
3	03A	170 Gregg Street	Bergen Cable	10	8	80	10	8	62	Jan. 12, 13
4	04A	160/174 Essex Street	Bank of New York	25	12	300	23	4 - 12	427	Feb. 2, 3, 4
	04B	I-80 Right-of-Way	NJDOT	7	12	84	7	8 - 12	69	Feb. 2, 4, Mar. 31
5	05A	99 Essex Street	Joseph Muscarelle, Inc.	38	8	304	38	8	318	Feb. 23, 24, Mar. 17
	05B	113 Essex Street	Bank of New York	18	8	144	21	4 - 16	171	Feb. 8, 10, 16
	05C	200 NJ Route 17 South	Sears Appliance Repair	23	8	184	16	8 - 10	129	Feb. 15, 16, Mar. 2
6	06A	85-101 NJ Route 17 North	Architectural Windows	17	12	204	17	8 - 18	196	Feb. 9, 10, 16, Mar. 16
	06B	137 NJ Route 17 North	Ramsey Auto Group	15	12	190	13	10 - 12	145	Feb. 9, 16, 25
	06C	167 NJ Route 17 North	Sunoco Station - Inactive	27	12	324	19	3 - 14	239	Feb. 11, Mar. 8
	06D	239 NJ Route 17 North	Gulf Station	19	12	228	2	11 - 12	23	Feb. 16
	06E	29 Essex Street	Federal Express Corporation	7	12	84	9	7 - 12	95	Feb. 16, Mar. 31
7	07A	111 Essex Street	Scanel Company, Inc.	12	16	192	12	12 - 22	161	Feb. 21, 22, 23
	07B	NYS&W - Lodi Branch	NYS&W - Lodi Branch	16	16	256	11	6 - 16	115	Feb. 21, 22
8	08A	23 West Howcroft Street	Maywood Furniture, Inc.	26	16	416	25	7 - 16	321	Feb. 17, 21
9	09A	149-151 Maywood Avenue	Sears Logistical Services	131	16	2096	72	4 - 16	574	Mar. 2, 3, 6, 7, 8, 9, 15
10	10A	100 West Hunter Avenue	Stepan Company	106	24	2544	92	4 - 24	1076	Feb. 25, 28, 29, Mar. 1, 2, 6, 7, 9, 16, 30
11	11A	205 Maywood Avenue	Myron Manufacturing	5	8	40	5	8 - 12	44	Feb. 16
	11B	61 West Hunter Avenue	Myron Manufacturing	9	8	72	10	8 - 16	87	Feb. 15, 21
	11C	50 West Hunter Avenue	Myron Manufacturing	1	8	8	1	8	8	Feb. 15
12	12A	NYS&W	NYS&W	31	24	744	27	12 - 27	335	Feb. 18, 22, 24, Mar. 16, 30
	12B	100 West Hunter Avenue	MISS	120	24	2880	100	7 - 26	1769	Feb. 4, 7, 8, 10, 11, 14, 15, 18, 21, 22, 24, 25, 29, Mar. 1, 7, 8, 9
	12C	NJ Route 17	NJDOT	0	0	0	0	0	0	<i>No investigations planned.</i>
TOTALS:				772		13,066	626		7,611	

Table 12-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
12B-SI001-SS-0-1	6.86	10.0	2.72	43.72	6.0	0.55	< 31.00	-----	31.00
12B-SI002-SS-0-1	20.38	14.6	9.40	40.74	9.0	1.36	< 134.00	-----	134.00
12B-SI003-SS-0-1	0.50	19.6	0.24	1.35	15.0	0.10	< 4.85	-----	4.85
12B-SI004-SS-0-1	1.35	18.0	0.67	5.41	10.8	0.30	< 11.40	-----	11.40
12B-SI005-SS-0-1 (1)	12.14	9.8	4.26	225.60	5.0	1.30	< 55.10	-----	55.10
12B-SI005-SS-1-1 (1)	12.43	9.6	4.24	224.70	5.0	1.24	< 55.00	-----	55.00
12B-SI006-SS-0-1	570.80	10.3	112.00	5665.00	5.0	12.50	< 1510.00	-----	1510.00
12B-SI007-SS-0-1	1.18	13.0	0.36	5.30	8.5	0.09	< 6.19	-----	6.19
12B-SI008-SS-0-1	30.67	12.7	12.40	1304.00	5.0	3.57	< 180.00	-----	180.00
12B-SI009-SS-0-1	6.38	8.0	1.62	94.07	5.0	0.57	< 19.80	-----	19.80
12B-SI009A-SS-0-1	1.32	22.5	0.87	4.21	13.0	0.32	< 18.90	-----	18.90
12B-SI009B-SS-0-1	1.15	22.7	0.86	2.04	19.0	0.19	< 15.10	-----	15.10
12B-SI010-SS-0-1	1.46	20.5	1.16	5.46	11.8	0.18	< 17.30	-----	17.30
12B-SI011-SS-0-1	2.12	25.9	1.85	7.99	12.7	0.30	< 43.90	-----	43.90
12B-SI012-SS-0-1	1.85	13.6	0.59	10.42	7.8	0.19	< 12.80	-----	12.80
12B-SI013-SS-0-1	2.39	20.0	1.40	3.71	18.8	0.39	< 25.30	-----	25.30
12B-SI014-SS-0-1 (1)	5.58	10.5	1.26	58.78	6.0	0.46	< 21.80	-----	21.80
12B-SI014-SS-1-1 (1)	5.64	10.5	1.25	58.50	6.0	0.38	< 21.60	-----	21.60
12B-SI015-SS-0-1	8.13	7.0	1.50	74.92	5.0	0.46	< 18.00	-----	18.00
12B-SI016-SS-0-1	22.65	7.0	3.44	64.60	5.7	0.69	< 44.30	-----	44.30
12B-SI017-SS-0-1	3.34	12.0	0.89	35.13	6.0	0.33	< 17.40	-----	17.40
12B-SI018-SS-0-1	27.17	8.6	5.20	125.40	5.7	1.01	< 74.70	-----	74.70
12B-SI019-SS-0-1	0.58	23.6	0.39	3.75	10.6	0.16	< 8.61	-----	8.61
12B-SI020-SS-0-1	0.66	21.9	0.41	5.19	9.0	0.10	< 8.24	-----	8.24
12B-SI021-SS-0-1 (1)	2.03	18.0	0.17	12.34	8.2	0.14	< 11.60	-----	11.60
12B-SI021-SS-1-1 (1)	2.13	16.9	0.90	12.91	8.0	0.25	< 17.30	-----	17.30

Table 12-3: Surface ISOCS Measurements*

Sample Identification No.	Radium-226			Thorium-232			Uranium-238		
	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g	Activity pCi/g	Error %	MDA pCi/g
12B-SI022-SS-0-1	1.94	16.0	0.73	6.34	10.7	0.14	< 13.00	-----	13.00
12B-SI023-SS-0-1	0.84	18.0	0.49	4.75	9.6	0.08	< 7.13	-----	7.13
12B-SI024-SS-0-1	44.65	38.7	11.60	121.20	12.5	2.46	< 390.00	-----	390.00
12B-SI025-SS-0-1	0.60	21.0	0.36	5.00	9.0	0.01	< 7.07	-----	7.07
12B-SI026-SS-0-1	0.69	21.0	0.50	6.18	8.8	0.16	< 9.02	-----	9.02
12B-SI027-SS-0-1	0.51	24.0	0.40	5.34	9.0	0.14	< 7.19	-----	7.19
12B-SI028-SS-0-1	Surface ISOCS Measurement was not Collected								
12B-SI029-SS-0-1	< 0.70	-----	0.70	9.19	9.7	0.42	< 25.60	-----	25.60

* Reported data are taken from the Nuclide Identification Report.

MDA : Minimum Detectable Activity

Error: 2 sigma (95% confidence interval)

< : Nuclide unidentified or less than the MDA. The nuclide is assumed to be present at the MDA Value.

----- Not Applicable

(1) Sample (-0-1) and its duplicate (-1-1)

**Table 12-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
12A-001	1.50	12A10300		1.09	0.09	0.36	3.82	0.12	0.38	13.00	U	---	13.00		
12A-001	4.50	12A10301		1.87	0.11	0.27	1.56	0.08	0.19	7.63	U	---	7.63		
12A-001	6.00	12A10302		ARCHIVED											
12A-002	0.50	12A10303		6.86	0.43	2.50	261.72	3.04	1.80	216.04		20.47	72.70		
		<i>ThermoRetec</i> ⁽²⁾		7.19	1.15	1.61	253.00	9.60	2.49	181.60		29.88	27.76		
12A-002	1.50	12A10304		0.47	U	---	0.47	0.36	U	---	0.36	25.05	3.39	11.50	
12A-002	5.00	12A10305		ARCHIVED											
12A-003	0.50	12A10306		5.28	0.31	1.42	74.99	1.06	0.97	85.65		10.15	37.50		
12A-003	1.00	12A10307		0.59	U	---	0.59	5.21	0.17	0.44	20.11	5.04	15.60		
12A-003	5.00	12A10308		ARCHIVED											
12A-004	0.50	12A10309		1.02	0.09	0.27	2.72	0.11	0.30	8.19	U	---	8.19		
12A-004	1.00	12A10310		1.16	0.11	0.33	1.65	0.09	0.36	11.10	U	---	11.10		
12A-004	4.50	12A10311		0.63	0.07	0.17	0.62	0.05	0.20	5.14	U	---	5.14		
12A-004	4.50	12A10312	X	0.68	0.06	0.16	0.86	0.06	0.21	5.85	U	---	5.85		
12A-005	1.50	12A10313		0.54	0.07	0.20	1.32	0.07	0.25	8.61	U	---	8.61		
12A-005	4.50	12A10314		1.51	0.10	0.26	1.36	0.07	0.21	10.30	U	---	10.30		
12A-005	5.50	12A10315		ARCHIVED											
12A-006	1.50	12A10316		3.00	J	0.17	0.46	3.53	J	0.14	0.36	18.20	UJ	---	18.20
		<i>ThermoRetec</i> ⁽²⁾		2.08	0.31	0.26	2.90	0.27	0.39	10.55		3.25	4.06		
12A-006	1.50	12A10317	X	2.55	0.14	0.51	2.61	0.11	0.28	11.10	U	---	11.10		
12A-006	4.50	12A10318		0.71	U	---	0.71	0.49	U	---	0.49	6.50	J	3.14	10.10
12A-006	8.50	12A10319		ARCHIVED											
12A-007	9.50	12A10320		0.69	0.07	0.22	1.24	0.07	0.24	7.92	U	---	7.92		
12A-007	10.50	12A10321		0.78	0.06	0.19	1.24	0.06	0.22	7.29	U	---	7.29		
12A-007	12.50	12A10322		ARCHIVED											
12A-008	8.50	12A10323		0.44	0.06	0.19	0.61	0.05	0.17	4.28	U	---	4.28		
12A-008	11.00	12A10324		0.49	0.06	0.17	0.55	0.05	0.18	0.86	J	1.34	4.56		
12A-008	13.50	12A10325		ARCHIVED											
12A-009	6.00	12A10326		0.91	0.10	0.31	1.21	0.08	0.33	13.27		3.49	10.80		
12A-009	8.50	12A10327		0.62	0.07	0.19	0.70	0.05	0.20	0.09	J	1.30	4.49		
12A-009	9.50	12A10328		ARCHIVED											

**Table 12-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
12A-010	0.50	12A10329		13.81	0.58	1.93	49.98	1.00	1.41	72.10	U	---	72.10		
12A-010	1.00	12A10330		0.58	U	---	0.58	0.42	U	---	0.42	8.92	U	---	8.92
12A-010	6.50	12A10331		ARCHIVED											
12A-011	3.00	12A10332		4.15	0.17	0.57	14.23	0.28	0.40	21.50	U	---	21.50		
		<i>ThermoRetec</i> ⁽²⁾		3.18	0.34	0.35	12.33	0.67	0.54	3.90	J	3.22	4.87		
12A-011	4.50	12A10333		0.86	0.10	0.22	0.75	0.08	0.29	6.62	U	---	6.62		
12A-011	10.00	12A10334		0.38	0.06	0.18	0.48	0.05	0.19	6.55	U	---	6.55		
12A-012	1.50	12A10335		4.46	0.14	0.40	13.73	0.25	0.35	18.40	U	---	18.40		
12A-012	5.00	12A10336		2.64	0.14	0.47	5.19	0.16	0.31	12.90	U	---	12.90		
		<i>ThermoRetec</i> ⁽²⁾		2.44	0.29	0.30	5.05	0.36	0.47	7.26		3.68	4.63		
12A-012	7.50	12A10337		ARCHIVED											
12A-013	0.50	12A10338		492.88	7.05	9.41	1899.64	19.08	8.54	314.00	U	---	314.00		
		<i>ThermoRetec</i> ⁽²⁾		492.20	23.65	4.69	1981.00	70.83	7.04	96.38		40.19	61.50		
12A-013	10.50	12A10339		1.02	0.08	0.21	0.79	0.05	0.15	1.80	J	1.65	5.51		
12A-013	12.50	12A10340		ARCHIVED											
12A-014	7.50	12A10341		0.56	0.06	0.20	0.59	0.04	0.15	7.21	U	---	7.21		
12A-014	8.50	12A10342		0.50	0.07	0.18	0.71	0.06	0.21	1.61	J	1.87	4.92		
12A-014	10.00	12A10343		ARCHIVED											
12A-015	1.00	12A10344		1.46	0.09	0.28	1.99	0.09	0.23	14.79		3.71	11.50		
12A-015	5.50	12A10345		0.36	0.05	0.16	0.29	0.04	0.16	3.74	U	---	3.74		
12A-015	8.50	12A10346		ARCHIVED											
12A-016	0.50	12A10347		3.24	0.17	0.68	26.49	0.44	0.52	19.80	U	---	19.80		
12A-016	1.50	12A10348		0.20	0.05	0.17	0.39	0.04	0.17	5.77	U	---	5.77		
12A-016	1.50	12A10349	X	0.25	U	---	0.25	0.21	U	---	0.21	3.98	U	---	3.98
12A-016	5.50	12A10350		0.38	0.05	0.24	3.27	0.10	0.24	9.77	U	---	9.77		
12A-017	0.50	12A10351		38.84	0.88	3.00	386.54	4.30	2.28	119.00	U	---	119.00		
12A-017	2.00	12A10352		0.91	0.07	0.26	1.32	0.06	0.16	6.15	U	---	6.15		
12A-017	4.50	12A10353		ARCHIVED											
12A-018	0.50	12A10354		0.92	0.13	0.41	1.47	0.12	0.47	15.20	U	---	15.20		
12A-018	2.50	12A10355		0.92	0.07	0.23	1.13	0.06	0.17	2.93	J	1.77	5.80		
12A-019	1.00	12A10356		1.20	0.12	0.33	1.68	0.10	0.35	11.90	U	---	11.90		
12A-019	3.00	12A10357		0.56	0.06	0.19	0.75	0.05	0.17	4.80	U	---	4.80		
12A-019	5.00	12A10358		ARCHIVED											

**Table 12-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
12A-020	1.50	12A10359		1.51	0.11	0.32	2.71	0.11	0.38	12.60	U	---	12.60		
12A-020	2.50	12A10360		1.09	0.11	0.30	1.57	0.09	0.31	7.68	U	---	7.68		
12A-021	0.50	12A10361		6.32	0.23	0.89	30.60	0.51	0.58	32.60	U	---	32.60		
12A-022	1.00	12A10362		1.38	0.10	0.36	2.93	0.11	0.23	8.80	U	---	8.80		
12A-023	0.50	12A10363		0.60	0.11	0.35	1.12	0.09	0.36	12.40	U	---	12.40		
12A-023	3.00	12A10364		0.42	0.05	0.12	0.39	0.04	0.15	3.89	U	---	3.89		
12A-023	5.00	12A10365		0.62	0.10	0.35	0.88	0.09	0.38	11.60	U	---	11.60		
12A-024	0.50	12A10366		0.26	0.07	0.23	0.34	U	---	0.34	6.41	U	---	6.41	
12A-025	1.00	12A10367		1.20	0.08	0.34	3.92	0.12	0.25	12.00	U	---	12.00		
12A-026	0.50	12A10368		2.54	0.15	0.45	3.06	0.14	0.30	12.30	U	---	12.30		
12A-026	3.00	12A10369		1.08	0.10	0.28	1.47	0.09	0.31	10.70	U	---	10.70		
12A-026	5.00	12A10370		0.97	0.08	0.22	1.00	0.07	0.25	5.90	U	---	5.90		
12A-027	0.50	12A10371		0.99	0.09	0.32	2.21	0.11	0.35	11.80	U	---	11.80		
12B-001	2.00	12B10700		0.69	J	0.06	0.20	2.19	J	0.08	0.23	5.22	UJ	---	5.22
12B-001	3.00	12B10701		0.18	J	0.04	0.11	0.06	J	0.03	0.15	3.56	UJ	---	3.56
12B-001	6.00	12B10702		0.66	J	0.06	0.15	0.75	J	0.05	0.17	4.21	UJ	---	4.21
12B-002	1.50	12B10703		4.03	J	0.15	0.53	16.81	J	0.30	0.35	14.10	UJ	---	14.10
<i>ThermoRetec⁽²⁾</i>		<i>12B10703</i>		<i>3.78</i>		<i>0.33</i>	<i>0.32</i>	<i>18.34</i>		<i>0.84</i>	<i>0.45</i>	<i>5.12</i>		<i>3.67</i>	<i>5.10</i>
12B-002	4.50	12B10704		1.21	J	0.07	0.27	3.68	J	0.10	0.18	7.30	UJ	---	7.30
12B-002	6.50	12B10705		ARCHIVED											
12B-003	3.50	12B10706		28.81	0.57	1.43	145.60	1.68	1.03	39.90	U	---	39.90		
12B-003	5.00	12B10707		3.14	0.14	0.52	11.75	0.25	0.36	14.10	U	---	14.10		
<i>ThermoRetec⁽²⁾</i>		<i>12B10707</i>		<i>3.11</i>		<i>0.31</i>	<i>0.30</i>	<i>12.39</i>		<i>0.63</i>	<i>0.45</i>	<i>5.53</i>		<i>3.65</i>	<i>4.69</i>
12B-003	6.00	12B10708		0.35	0.08	0.22	0.26	U	---	0.26	6.33	U	---	6.33	
12B-004	3.50	12B10709		1.81	0.09	0.32	8.74	0.18	0.24	10.20	U	---	10.20		
12B-004	6.50	12B10710		0.96	0.08	0.20	1.45	0.08	0.26	6.45	U	---	6.45		
12B-004	10.00	12B10711		0.61	U	---	0.61	0.43	U	---	0.43	9.94	U	---	9.94
12B-005	3.50	12B10712		2.48	0.11	0.46	11.28	0.22	0.31	1.55		3.42	11.40		
12B-005	9.00	12B10713		0.92	0.11	0.24	1.32	0.10	0.34	8.51	U	---	8.51		
12B-005	10.50	12B10714		0.75	0.16	0.49	0.23	J	0.12	0.52	12.10	U	---	12.10	

**Table 12-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
12B-006	1.50	12B10715	X	0.86	0.08	0.23	1.24	0.07	0.24	5.93	U	---	5.93		
12B-006	1.50	12B10716		0.72	0.08	0.22	0.87	0.07	0.22	5.62	U	---	5.62		
12B-006	6.00	12B10717		ARCHIVED											
12B-006	10.50	12B10718		ARCHIVED											
12B-007	6.00	12B10719		22.79	J	0.47	1.20	69.31	J	0.90	0.80	32.00	UJ	---	32.00
12B-007	6.50	12B10720		1.53	0.17	0.35	0.58	U	---	0.58	11.50	U	---	11.50	
12B-007	8.50	12B10721		ARCHIVED											
12B-008	6.50	12B10722		206.92	J	3.10	4.58	1042.40	J	10.52	3.50	143.71	J	28.62	119.00
<i>ThermoRetec</i> ⁽²⁾		12B10722		207.50	10.41	2.63	1084.00	38.75	4.00	136.70	29.17	36.38			
12B-008	8.50	12B10723		0.88	U	---	0.88	3.43	0.18	0.37	13.60	U	---	13.60	
12B-008	11.00	12B10724		0.78	0.06	0.21	1.17	0.06	0.22	5.81	U	---	5.81		
12B-009	2.00	12B10725		9.04	0.24	0.73	34.12	0.51	0.54	20.60	U	---	20.60		
12B-009	5.00	12B10726		0.62	0.09	0.29	1.27	0.08	0.28	7.11	U	---	7.11		
12B-009	6.00	12B10727		0.38	0.07	0.24	0.44	0.07	0.24	5.61	U	---	5.61		
12B-010	4.50	12B10728		2.62	0.15	0.51	11.76	0.26	0.36	16.00	U	---	16.00		
12B-010	5.50	12B10729		1.11	J	0.13	0.35	0.43	UJ	---	0.43	8.80	UJ	---	8.80
12B-010	7.50	12B10730		0.55	0.07	0.22	0.69	0.06	0.23	5.69	U	---	5.69		
12B-011	2.50	12B10731	X	0.45	U	---	0.45	0.28	U	---	0.28	5.68	U	---	5.68
<i>ThermoRetec</i> ⁽²⁾		12B10731		0.26	J	0.13	0.27	0.13	U	0.18	0.33	2.08	J	1.80	2.23
12B-011	2.50	12B10732		0.42	U	---	0.42	0.27	U	---	0.27	6.00	U	---	6.00
<i>ThermoRetec</i> ⁽²⁾		12B10732		0.27	0.19	0.26	0.11	U	0.17	0.33	1.31	UJ	2.09	2.94	
12B-011	5.50	12B10733		0.49	U	---	0.49	0.27	U	---	0.27	6.73	U	---	6.73
12B-011	10.50	12B10734	ARCHIVED												
12B-012	4.50	12B10735		15.77	0.43	1.34	80.92	1.09	0.89	36.50	U	---	36.50		
12B-012	5.50	12B10736		1.08	0.13	0.35	2.28	0.13	0.41	9.19	U	---	9.19		
12B-012	8.50	12B10737		ARCHIVED											
12B-013	1.50	12B10739	X	1.24	0.11	0.29	2.18	0.10	0.33	8.32	U	---	8.32		
<i>ThermoRetec</i> ⁽²⁾		12B10739		0.90	0.17	0.19	2.02	0.27	0.31	0.58	UJ	2.46	2.93		
12B-013	1.50	12B10740		2.74	0.13	0.34	2.43	0.11	0.29	10.40	U	---	10.40		
12B-013	4.50	12B10741		1.04	0.16	0.54	1.30	0.12	0.45	10.40	U	---	10.40		
12B-013	8.50	12B10742		ARCHIVED											
12B-014	1.50	12B10743		0.85	0.07	0.26	1.28	0.07	0.26	6.10	U	---	6.10		
12B-014	2.50	12B10744		0.53	U	---	0.53	0.37	U	---	0.37	8.36	U	---	8.36
12B-014	6.50	12B10745		ARCHIVED											

**Table 12-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
12B-015	2.50	12B10746		5.79	0.21	0.58	16.93	0.33	0.46	18.00	U	---	18.00		
12B-015	3.00	12B10747		0.93	0.08	0.26	0.72	0.05	0.15	5.52	U	---	5.52		
12B-015	9.50	12B10748		ARCHIVED											
12B-016	4.50	12B10749		4.34	0.18	0.59	18.71	0.35	0.43	17.00	U	---	17.00		
<i>ThermoRetec</i> ⁽²⁾		<i>12B10749</i>		4.29	0.42	0.42	22.17	1.04	0.65	4.44	J	3.97	5.99		
12B-016	5.50	12B10750		0.99	U	---	0.99	0.68	U	---	0.68	14.00	U	---	14.00
12B-016	5.50	12B10751	X	0.88	U	---	0.88	-0.11	U	0.15	0.55	12.40	U	---	12.40
12B-016	8.50	12B10752		ARCHIVED											
12B-017	2.00	12B10753		0.86	0.08	0.24	1.16	0.07	0.25	5.80	U	---	5.80		
12B-017	5.00	12B10754		0.58	U	---	0.58	3.71	0.13	0.36	3.37		2.68	8.88	
12B-017	10.00	12B10755		ARCHIVED											
12B-018	3.00	12B10756		1.09	J	0.09	0.38	5.28	J	0.15	0.38	13.70	UJ	---	13.70
12B-018	4.50	12B10757		0.66	0.06	0.23	2.47	0.08	0.17	6.31	U	---	6.31		
12B-018	9.50	12B10758		ARCHIVED											
12B-019	5.00	12B10759		1.46	0.13	0.77	33.31	0.50	0.52	29.00	U	---	29.00		
12B-019	6.00	12B10760		0.95	0.07	0.25	2.44	0.10	0.20	5.08	J	2.54	8.26		
12B-019	11.50	12B10761		ARCHIVED											
12B-020	8.50	12B10762		12.37	0.36	0.96	21.59	0.43	0.66	34.70	U	---	34.70		
<i>ThermoRetec</i> ⁽²⁾		<i>12B10762</i>		10.02	0.78	0.49	19.11	0.98	0.72	9.71		6.77	7.69		
12B-020	10.00	12B10763		0.59	U	---	0.59	3.10	0.15	0.38	10.90	U	---	10.90	
12B-020	13.50	12B10764		ARCHIVED											
12B-021	12.00	12B10765		4.51	J	0.18	0.55	9.60	J	0.24	0.42	22.00	UJ	---	22.00
12B-021	12.50	12B10766		0.59	0.07	0.17	0.72	0.06	0.18	5.22	U	---	5.22		
12B-021	14.00	12B10767		ARCHIVED											
12B-022	2.00	12B10768		0.69	0.09	0.23	1.91	0.09	0.28	7.10	U	---	7.10		
<i>ThermoRetec</i> ⁽²⁾		<i>12B10768</i>		0.72	0.13	0.16	2.03	0.16	0.23	3.95		2.42	2.37		
12B-022	2.00	12B10769	X	0.83	J	0.08	0.25	2.17	J	0.09	0.23	10.40	UJ	---	10.40
<i>ThermoRetec</i> ⁽²⁾		<i>12B10769</i>		0.68	0.13	0.17	1.85	0.28	0.27	3.55		2.54	2.71		
12B-022	5.50	12B10770		0.70	0.07	0.22	2.39	0.09	0.29	10.30	U	---	10.30		
12B-022	9.00	12B10771		ARCHIVED											

**Table 12-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
12B-023	2.00	12B10772		3.09	0.15	0.51	10.53	0.23	0.34	14.70	U	---	14.70		
<i>ThermoRetec</i> ⁽²⁾		12B10772		3.01	0.34	0.30	10.86	0.58	0.43	6.95		3.48	4.50		
12B-023	3.00	12B10773		1.12	0.09	0.26	2.69	0.11	0.29	7.98	U	---	7.98		
12B-023	4.50	12B10774		0.91	0.09	0.26	1.73	0.09	0.28	7.10	U	---	7.10		
12B-023	17.50	12B10775		ARCHIVED											
12B-024	1.00	12B10776		2.92	J	0.14	0.40	6.83	J	0.19	0.39	19.20	UJ	---	19.20
12B-024	4.50	12B10777		0.81		0.06	0.20	1.83		0.07	0.17	6.24	U	---	6.24
12B-024	8.50	12B10778		ARCHIVED											
12B-025	3.50	12B10779		23.77	J	0.50	1.11	58.28	J	0.82	0.88	11.62	J	12.57	41.50
12B-025	8.50	12B10780		0.76		0.10	0.31	0.91		0.08	0.31	11.10	U	---	11.10
12B-025	12.50	12B10781		ARCHIVED											
12B-026	1.00	12B10782		3.35		0.14	0.42	7.28		0.18	0.34	17.40	U	---	17.40
12B-026	1.50	12B10783		1.55		0.11	0.35	3.95		0.13	0.38	9.53	U	---	9.53
12B-026	13.50	12B10784		0.81		0.07	0.17	0.94		0.05	0.15	5.10	U	---	5.10
12B-027	2.50	12B10785		1.37		0.08	0.34	4.47		0.12	0.23	12.00	U	---	12.00
12B-027	3.00	12B10786		0.90	J	0.08	0.25	1.92	J	0.09	0.31	11.10	UJ	---	11.10
12B-027	15.50	12B10787		ARCHIVED											
12B-028	2.50	12B10788		1.70		0.11	0.41	6.97		0.17	0.26	9.35	J	3.55	11.40
12B-028	3.50	12B10789		3.59		0.14	0.31	0.73		0.06	0.18	4.85	J	2.29	7.40
12B-028	15.00	12B10790		ARCHIVED											
12B-029	8.50	12B10791		1.42	J	0.14	0.34	3.96	J	0.14	0.45	15.00	UJ	---	15.00
12B-029	9.50	12B10792		0.51		0.11	0.34	0.60		0.09	0.37	12.40	U	---	12.40
12B-029	9.50	12B10793	X	0.64	U	---	0.64	0.40		0.10	0.35	9.13	U	---	9.13
12B-029	14.50	12B10794		ARCHIVED											
12B-030	8.50	12B10795		9.00	J	0.27	0.73	15.43	J	0.33	0.54	26.90	UJ	---	26.90
<i>ThermoRetec</i> ⁽²⁾		12B10795		7.68		0.63	0.41	14.56		0.75	0.63	7.93		5.68	6.49
12B-030	9.50	12B10796		1.18		0.08	0.22	0.93		0.06	0.14	5.84	U	---	5.84
12B-030	12.50	12B10797		ARCHIVED											
12B-031	2.50	12B10798		1.31	U	---	1.31	1.43		0.22	0.85	30.40	U	---	30.40
12B-031	3.00	12B10799		6.49		0.26	0.84	30.92		0.55	0.63	24.90	U	---	24.90
12B-031	7.50	12B10800		1.87		0.13	0.46	4.99		0.17	0.32	13.40	U	---	13.40

**Table 12-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
12B-032	10.50	12B10801		6.53	0.25	0.77	25.18	0.46	0.58	32.00	U	---	32.00		
12B-032	12.50	12B10802		0.52	0.07	0.20	1.05	0.07	0.21	5.74	U	---	5.74		
<i>ThermoRetec</i> ⁽²⁾		12B10802		0.78	0.12	0.12	1.08	0.11	0.20	1.03	UJ	1.82	2.02		
12B-032	12.50	12B10803	X	1.05	J	0.12	0.35	3.47	J	0.12	0.35	12.50	UJ	---	12.50
<i>ThermoRetec</i> ⁽²⁾		12B10803		1.10	0.24	0.19	2.74	0.23	0.34	2.85	UJ	2.88	3.48		
12B-032	16.50	12B10804		0.60	0.07	0.18	0.77	0.05	0.19	5.07	U	---	5.07		
12B-033	5.50	12B10805		17.55	0.46	1.26	60.44	0.89	0.86	34.70	U	---	34.70		
12B-033	8.50	12B10806		0.46	U	---	0.46	0.31	U	---	0.31	7.82	U	---	7.82
12B-033	12.50	12B10807		ARCHIVED											
12B-034	1.00	12B10808		10.59	0.30	0.90	35.35	0.55	0.66	33.90	U	---	33.90		
12B-034	2.00	12B10809		0.60	0.10	0.34	2.45	0.11	0.32	8.24	U	---	8.24		
12B-034	5.50	12B10810		ARCHIVED											
12B-035	1.50	12B10815		24.24	0.52	1.31	99.75	1.23	0.91	37.10	U	---	37.10		
12B-035	4.50	12B10816		4.15	J	0.18	0.55	11.24	J	0.26	0.43	22.80	UJ	---	22.80
12B-035	8.50	12B10817		1.37	0.13	0.38	2.18	0.12	0.37	10.40	U	---	10.40		
12B-036	1.50	12B10811		8.76	0.24	0.76	25.41	0.42	0.53	28.90	U	---	28.90		
<i>ThermoRetec</i> ⁽²⁾		12B10811		7.93	0.58	0.40	23.01	1.03	0.61	9.25		4.76	6.66		
12B-036	4.50	12B10812		0.71	0.07	0.21	0.99	0.05	0.14	5.64	U	---	5.64		
<i>ThermoRetec</i> ⁽²⁾		12B10812		0.70	0.13	0.14	1.04	0.12	0.22	1.32	UJ	1.47	2.02		
12B-036	4.50	12B10813	X	0.68	0.07	0.21	0.99	0.06	0.23	7.53	U	---	7.53		
12B-036	6.00	12B10814		ARCHIVED											
12B-037	9.50	12B10818		1.30	0.20	0.50	0.71	U	---	0.71	12.60	U	---	12.60	
12B-037	10.50	12B10819		5.05	0.32	1.53	69.36	1.06	1.05	57.00	U	---	57.00		
12B-037	12.50	12B10820		0.35	0.08	0.24	0.36	U	---	0.36	6.68	U	---	6.68	
12B-038	11.00	12B10821		2.16	J	0.11	0.42	8.69	J	0.19	0.32	17.10	UJ	---	17.10
12B-038	12.50	12B10822		0.25	U	---	0.25	0.32	0.04	0.15	3.97	U	---	3.97	
12B-038	13.50	12B10823		ARCHIVED											
12B-039	5.00	12B10824		13.38	J	0.47	1.93	171.06	J	2.07	1.46	75.80	UJ	---	75.80
12B-039	8.50	12B10825		0.50	U	---	0.50	0.71	0.08	0.24	6.88	U	---	6.88	
12B-039	10.00	12B10826		ARCHIVED											
12B-040	2.50	12B10827		344.34	J	4.85	6.91	1223.83	J	12.64	5.67	219.32	J	51.31	210.00
<i>ThermoRetec</i> ⁽²⁾		12B10827		287.10	14.21	3.75	1068.00	38.56	5.72	151.10		34.93	43.87		
12B-040	12.50	12B10828		2.08	0.09	0.24	3.72	0.10	0.21	11.40	U	---	11.40		
12B-040	13.50	12B10829		ARCHIVED											

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 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
12B-041	1.50	12B10830		47.86	0.82	1.87	213.26	2.38	1.34	50.50	U	---	50.50		
12B-041	6.00	12B10831		0.71	0.08	0.20	0.78	0.05	0.21	5.38	U	---	5.38		
12B-041	12.50	12B10832		ARCHIVED											
12B-042	1.00	12B10833		81.44	1.80	6.54	1054.92	11.26	5.05	244.00	U	---	244.00		
		<i>ThermoRetec</i> ⁽²⁾		61.92	4.30	3.24	764.60	28.15	4.98	41.40	U	27.50	41.40		
12B-042	5.50	12B10834		18.85	J	0.46	1.62	168.80	J	1.98	1.32	67.50	UJ	---	67.50
12B-042	8.50	12B10835		ARCHIVED											
12B-043	3.00	12B10836		2.07	0.12	0.40	6.52	0.17	0.30	11.80	U	---	11.80		
12B-043	4.50	12B10837		0.64	J	0.06	0.16	0.83	J	0.06	0.22	7.10	UJ	---	7.10
12B-043	14.50	12B10838		ARCHIVED											
12B-044	2.00	12B10839		3.10	0.13	0.54	18.42	0.31	0.39	14.70	U	---	14.70		
12B-044	5.00	12B10840		0.88	0.08	0.25	1.17	0.07	0.25	6.80	U	---	6.80		
12B-044	12.50	12B10841		ARCHIVED											
12B-045	9.50	12B10842		17.78	0.49	1.31	45.54	0.76	0.94	50.90	U	---	50.90		
12B-045	10.50	12B10843		0.59	U	---	0.59	0.24	J	0.17	0.42	14.00	U	---	14.00
12B-045	10.50	12B10844	X	0.49	U	---	0.49	0.34	U	---	0.34	8.62	U	---	8.62
12B-045	22.50	12B10845		0.60	0.07	0.17	0.89	0.06	0.21	5.24	U	---	5.24		
12B-046	1.50	12B10846		1.97	0.09	0.35	9.09	0.18	0.29	14.50	U	---	14.50		
12B-046	4.50	12B10847		0.83	J	0.08	0.31	3.90	J	0.13	0.34	12.80	UJ	---	12.80
12B-046	16.50	12B10848		ARCHIVED											
12B-047	1.50	12B10849		1.75	0.10	0.34	8.08	0.18	0.27	11.40	U	---	11.40		
12B-047	2.50	12B10850		0.42	0.06	0.19	0.50	0.05	0.18	4.66	U	---	4.66		
12B-047	12.50	12B10851		ARCHIVED											
12B-048	2.00	12B10852		3.59	0.16	0.63	26.77	0.42	0.52	27.20	U	---	27.20		
12B-048	6.00	12B10853		11.31	0.32	1.28	121.23	1.43	0.92	35.40	U	---	35.40		
12B-048	6.00	12B10854	X	1.11	0.18	0.50	3.21	0.17	0.60	19.50	U	---	19.50		
12B-048	8.50	12B10855		ARCHIVED											
12B-049	1.50	12B10856		1.65	0.12	0.31	3.28	0.12	0.32	7.90	U	---	7.90		
12B-049	4.50	12B10857		1.57	0.12	0.40	3.14	0.12	0.29	13.20	U	---	13.20		
12B-049	13.50	12B10858		ARCHIVED											
12B-050	5.50	12B10859		10.01	0.30	0.84	23.69	0.44	0.58	22.90	U	---	22.90		
12B-050	8.50	12B10860		2.12	0.11	0.28	3.41	0.12	0.27	14.10	U	---	14.10		

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 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
12B-051	1.00	12B10861		2.68	0.12	0.45	13.58	0.25	0.32	12.70	U	---	12.70
<i>ThermoRetec</i> ⁽²⁾		<i>12B10861</i>		2.55	0.27	0.26	14.35	0.67	0.39	4.14	J	2.53	4.27
12B-051	3.50	12B10862		3.21	0.16	0.43	3.58	0.13	0.33	16.80	U	---	16.80
12B-051	8.50	12B10863		ARCHIVED									
12B-052	2.00	12B10864		4.14	0.17	0.49	11.67	0.25	0.38	14.90	U	---	14.90
12B-052	5.00	12B10865		1.65	0.12	0.33	3.52	0.13	0.39	9.43	U	---	9.43
12B-052	8.50	12B10866		ARCHIVED									
12B-053	3.50	12B10867		109.86	1.61	2.55	395.93	4.20	2.15	95.40	U	---	95.40
<i>ThermoRetec</i> ⁽²⁾		<i>12B10867</i>		101.50	5.17	1.54	382.40	13.96	2.31		R		
12B-053	5.00	12B10868		0.79	0.08	0.21	1.08	0.06	0.21	5.71	U	---	5.71
<i>ThermoRetec</i> ⁽²⁾		<i>12B10868</i>		0.80	0.11	0.13	1.23	0.12	0.17	2.99		1.82	1.89
12B-053	5.00	12B10869	X	0.82	0.07	0.18	1.11	0.07	0.24	5.60	U	---	5.60
<i>ThermoRetec</i> ⁽²⁾		<i>12B10869</i>		0.85	0.15	0.15	1.30	0.13	0.25	2.60		1.82	2.46
12B-053	7.00	12B10870		3.17	0.16	0.45	3.64	0.13	0.34	16.80	U	---	16.80
12B-054	1.50	12B10871		3.16	0.13	0.44	14.88	0.27	0.37	20.00	U	---	20.00
<i>ThermoRetec</i> ⁽²⁾		<i>12B10871</i>		2.58	0.30	0.31	13.42	0.67	0.48	3.11	J	3.01	5.02
12B-054	5.00	12B10872		1.74	0.09	0.23	1.30	0.06	0.17	1.98	J	1.86	6.19
12B-054	6.50	12B10873		ARCHIVED									
12B-055	1.50	12B10875		2.98	0.13	0.44	6.41	0.16	0.29	15.90	U	---	15.90
12B-055	2.50	12B10876		0.74	0.08	0.22	1.33	0.07	0.21	5.61	U	---	5.61
12B-055	3.50	12B10877		ARCHIVED									
12B-056	2.00	12B10878		5.29	0.16	0.51	18.93	0.31	0.39	20.70	U	---	20.70
12B-056	3.50	12B10879		0.88	0.12	0.31	1.29	0.11	0.32	8.66	U	---	8.66
12B-056	11.00	12B10880		ARCHIVED									
12B-057	1.50	12B10881		2.50	0.11	0.45	13.77	0.24	0.34	17.70	U	---	17.70
<i>ThermoRetec</i> ⁽²⁾		<i>12B10881</i>		2.24	0.26	0.27	12.54	0.62	0.42	5.74		3.34	4.07
12B-057	5.00	12B10882		1.05	0.08	0.24	1.28	0.07	0.26	8.67	U	---	8.67
12B-057	7.00	12B10883		ARCHIVED									
12B-058	1.50	12B10884		15.58	0.36	1.14	93.39	1.13	0.82	31.70	U	---	31.70
12B-058	2.50	12B10885		1.46	U	---	5.43	0.32	1.05	3.77	U	---	3.77
12B-058	8.50	12B10886		ARCHIVED									

**Table 12-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results									
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
12B-059	2.00	12B10887		2.71	0.12	0.35	4.80	0.14	0.42	13.90	U	---	13.90
12B-059	3.50	12B10888		0.69	0.09	0.23	1.10	0.08	0.29	7.00	U	---	7.00
12B-059	4.50	12B10889		0.73	0.08	0.19	1.22	0.07	0.24	6.28	U	---	6.28
12B-060	3.00	12B10890		3.51	0.14	0.53	20.23	0.32	0.40	21.40	U	---	21.40
12B-060	5.50	12B10891		0.50	0.06	0.20	0.96	0.06	0.20	5.23	U	---	5.23
<i>ThermoRetec</i> ⁽²⁾		<i>12B10891</i>		<i>0.56</i>	<i>0.10</i>	<i>0.11</i>	<i>0.96</i>	<i>0.10</i>	<i>0.18</i>	<i>0.74</i>	<i>UJ</i>	<i>1.33</i>	<i>1.76</i>
12B-060	5.50	12B10892	X	0.55	0.08	0.23	1.03	0.07	0.23	5.57	U	---	5.57
12B-060	8.50	12B10893		ARCHIVED									
12B-061	1.00	12B10894		2.57	0.13	0.46	10.68	0.22	0.35	18.50	U	---	18.50
<i>ThermoRetec</i> ⁽²⁾		<i>12B10894</i>		<i>2.00</i>	<i>0.30</i>	<i>0.30</i>	<i>8.83</i>	<i>0.60</i>	<i>0.47</i>	<i>3.69</i>	<i>UJ</i>	<i>4.08</i>	<i>4.53</i>
12B-061	3.00	12B10895		1.98	0.10	0.33	1.86	0.09	0.28	11.70	U	---	11.70
12B-061	6.00	12B10896		ARCHIVED									
12B-062	2.00	12B10897		2.47	0.14	0.47	3.20	0.14	0.31	12.50	U	---	12.50
12B-062	4.50	12B10898		2.40	0.11	0.33	2.67	0.10	0.25	12.70	U	---	12.70
12B-062	6.50	12B10899		ARCHIVED									
12B-063	0.50	12B10900		1.97	0.11	0.25	4.34	0.13	0.39	9.57	U	---	9.57
12B-063	2.00	12B10901		1.98	0.11	0.34	2.24	0.11	0.38	13.00	U	---	13.00
12B-063	4.50	12B10902		2.10	0.14	0.43	2.90	0.14	0.29	11.20	U	---	11.20
12B-064	5.50	12B10903		23.33	0.48	1.19	105.99	1.29	0.92	36.20	U	---	36.20
12B-064	8.50	12B10904		1.04	0.10	0.34	2.69	0.13	0.43	13.70	U	---	13.70
12B-064	10.00	12B10905		ARCHIVED									
12B-065	9.00	12B10906		181.00	2.63	3.81	592.99	6.29	3.09	140.00	U	---	140.00
12B-065	12.50	12B10907		0.63	0.07	0.18	0.71	0.06	0.22	1.95	J	1.49	4.94
12B-065	14.00	12B10908		0.59	0.08	0.21	0.80	0.06	0.26	8.48	U	---	8.48
12B-066	1.50	12B10909		1.93	0.11	0.41	12.11	0.24	0.32	13.30	U	---	13.30
<i>ThermoRetec</i> ⁽²⁾		<i>12B10909</i>		<i>1.79</i>	<i>0.25</i>	<i>0.28</i>	<i>12.52</i>	<i>0.61</i>	<i>0.40</i>	<i>2.68</i>	<i>UJ</i>	<i>3.23</i>	<i>4.51</i>
12B-066	3.00	12B10910		1.30	0.13	0.31	1.34	0.10	0.42	14.30	U	---	14.30
<i>ThermoRetec</i> ⁽²⁾		<i>12B10910</i>		<i>0.98</i>	<i>0.18</i>	<i>0.17</i>	<i>1.31</i>	<i>0.16</i>	<i>0.29</i>	<i>2.83</i>	<i>U</i>	<i>1.57</i>	<i>2.83</i>
12B-066	3.00	12B10911	X	0.91	0.11	0.32	1.28	0.08	0.33	8.33	U	---	8.33
12B-066	8.50	12B10912		ARCHIVED									
12B-067	1.00	12B10913		2.40	0.11	0.33	6.32	0.16	0.26	10.40	U	---	10.40
12B-067	2.00	12B10914		1.15	0.10	0.31	1.73	0.08	0.30	9.15	U	---	9.15
12B-067	6.50	12B10915		ARCHIVED									

**Table 12-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
12B-068	2.00	12B10916		4.25	0.18	0.63	11.76	0.26	0.42	21.30	U	---	21.30		
12B-068	2.50	12B10917		0.81	0.08	0.24	1.05	0.07	0.25	6.10	U	---	6.10		
12B-069	1.00	12B10918		8.28	J	0.27	0.89	37.30	J	0.58	0.62	34.60	UJ	---	34.60
12B-069	5.50	12B10919		0.94	0.07	0.21	1.36	0.06	0.14	5.61	U	---	5.61		
12B-069	8.50	12B10920		ARCHIVED											
12B-070	2.50	12B10921		202.33	J	3.09	4.66	755.23	J	7.95	3.83	171.00	UJ	---	171.00
12B-070	7.00	12B10922		1.94	0.14	0.28	1.81	0.11	0.41	9.37	U	---	9.37		
12B-070	8.50	12B10923		ARCHIVED											
12B-071	1.50	12B10924		3.89	J	0.15	0.43	7.99	J	0.19	0.36	18.30	UJ	---	18.30
12B-071	2.50	12B10925		0.73	0.08	0.20	0.99	0.06	0.23	5.69	U	---	5.69		
12B-071	4.50	12B10926		ARCHIVED											
12B-072	9.50	12B10927		4.45	J	0.23	1.08	71.99	J	0.94	0.81	45.10	UJ	---	45.10
<i>ThermoRetec</i> ⁽²⁾		12B10927		3.59	0.54	0.71	64.77	2.71	1.03	24.22	8.10	11.29			
12B-072	10.50	12B10928		0.35	0.06	0.19	0.72	0.05	0.20	4.52	U	---	4.52		
12B-072	12.50	12B10929		ARCHIVED											
12B-073	0.50	12B10930		7.83	J	0.27	0.84	34.80	J	0.56	0.68	34.80	UJ	---	34.80
12B-073	6.50	12B10931		0.36	0.07	0.19	0.99	0.06	0.19	5.45	U	---	5.45		
12B-073	9.50	12B10932		ARCHIVED											
12B-074	0.50	12B10933		3.37	J	0.14	0.43	9.96	J	0.22	0.35	19.00	UJ	---	19.00
12B-074	2.00	12B10934		0.71	0.07	0.25	1.07	0.06	0.20	5.64	U	---	5.64		
12B-074	2.00	12B10935	X	0.68	0.07	0.20	0.89	0.06	0.23	5.57	U	---	5.57		
12B-074	4.50	12B10936		ARCHIVED											
12B-075	1.00	12B10937		2.08	J	0.11	0.32	2.26	J	0.10	0.25	12.50	UJ	---	12.50
12B-075	1.50	12B10938		0.72	J	0.07	0.22	0.94	J	0.05	0.16	7.83	UJ	---	7.83
12B-075	4.50	12B10939		ARCHIVED											
12B-076	1.00	12B10940		3.50	0.14	0.48	14.32	0.27	0.37	2.92	J	4.00	13.30		
12B-076	2.00	12B10941		0.72	0.07	0.18	1.11	0.07	0.23	8.20	U	---	8.20		
12B-076	4.50	12B10942		0.92	0.06	0.22	1.26	0.06	0.18	8.30	U	---	8.30		
12B-077	2.50	12B10943		2.84	0.12	0.37	5.72	0.15	0.27	15.40	U	---	15.40		
12B-077	3.50	12B10944		1.57	0.11	0.14	1.76	0.08	0.30	7.74	U	---	7.74		
12B-077	4.50	12B10945		ARCHIVED											

**Table 12-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
12B-078	2.50	12B10946		1.04	0.09	0.24	1.56	0.07	0.25	5.93	U	---	5.93		
12B-078	4.50	12B10947		0.85	0.07	0.19	1.27	0.06	0.16	8.46	U	---	8.46		
12B-078	6.00	12B10948		ARCHIVED											
12B-079	3.00	12B10949		6.11	0.19	0.44	8.72	0.21	0.35	13.50	U	---	13.50		
12B-079	4.50	12B10950		1.07	0.12	0.33	2.20	0.11	0.32	15.40	U	---	15.40		
12B-079	10.00	12B10951		ARCHIVED											
12B-080	1.00	12B10952		8.30	0.24	0.68	21.55	0.38	0.46	19.10	U	---	19.10		
12B-080	1.50	12B10953		0.42	U	---	0.42	0.34	U	---	0.34	10.70	U	---	10.70
12B-080	11.50	12B10954		ARCHIVED											
12B-081	8.50	12B10955		10.31	0.30	0.99	52.59	0.76	0.68	27.30	U	---	27.30		
12B-081	10.00	12B10956		1.10	0.08	0.24	1.06	0.06	0.20	9.24	U	---	9.24		
12B-081	15.00	12B10957		ARCHIVED											
12B-082	2.00	12B10958		1.58	0.09	0.36	6.24	0.15	0.25	9.86	U	---	9.86		
12B-082	4.50	12B10959		0.68	0.06	0.23	1.40	0.06	0.23	8.01	U	---	8.01		
12B-082	6.00	12B10960		ARCHIVED											
12B-083	3.00	12B10961		79.30	1.51	3.88	616.40	6.54	2.71	102.00	U	---	102.00		
12B-083	16.50	12B10962		0.45	0.06	0.18	0.69	0.05	0.17	4.56	U	---	4.56		
12B-083	18.50	12B10963		ARCHIVED											
12B-084	2.50	12B10964		136.48	2.25	5.28	925.53	9.61	4.41	188.00	U	---	188.00		
12B-084	7.50	12B10965		13.44	0.66	3.43	306.49	3.70	2.22	141.70		24.90	92.70		
12B-085	10.00	12B10966		75.75	1.29	2.34	200.27	2.43	1.76	94.40	U	---	94.40		
12B-085	11.50	12B10967		0.44	0.07	0.20	0.63	0.06	0.20	5.02	U	---	5.02		
12B-085	14.50	12B10968		ARCHIVED											
12B-086	10.50	12B10969		8.34	0.46	2.43	232.83	2.83	1.86	116.78		19.07	83.00		
12B-086	13.50	12B10970		0.30	0.05	0.15	0.47	0.05	0.17	4.38	U	---	4.38		
12B-086	16.50	12B10971		ARCHIVED											
12B-087	1.00	12B10972		38.67	0.85	2.74	358.91	4.01	2.11	-32.88	U	24.54	85.30		
12B-087	4.50	12B10973		1.12	0.11	0.32	4.48	0.13	0.22	9.18	U	---	9.18		
12B-087	9.50	12B10974		0.39	0.05	0.15	0.40	0.04	0.14	6.59	U	---	6.59		

**Table 12-4: Summary of Radiological Data
 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results										
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g				
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA		
12B-088	1.00	12B10975		1.71	0.11	0.43	15.27	0.27	0.34	14.40	U	---	14.40	
<i>ThermoRetec</i> ⁽²⁾		12B10975		1.35	0.23	0.28	15.42	0.72	0.44	4.59	J	3.20	4.64	
12B-088	4.50	12B10976		2.17	0.14	0.46	5.89	0.18	0.57	18.50	U	---	18.50	
<i>ThermoRetec</i> ⁽²⁾		12B10976		2.12	0.27	0.25	5.26	0.34	0.39	3.97	J	3.48	4.06	
12B-088	10.00	12B10977		ARCHIVED										
12B-089	1.50	12B10978		34.22	0.86	3.80	637.22	6.52	2.99	139.00	U	---	139.00	
12B-089	5.50	12B10979		0.43	U	---	0.43	0.06	J	0.08	0.31	11.10	U	---
12B-089	9.00	12B10980		ARCHIVED										
12B-090	0.50	12B10981		23.96	0.87	4.12	789.64	8.03	2.82	76.11	J	25.56	107.00	
12B-090	5.50	12B10982		0.75	0.12	0.38	0.59	0.09	0.35	11.20	U	---	11.20	
12B-090	9.50	12B10983		0.79	0.07	0.20	0.61	0.05	0.21	4.80	U	---	4.80	
12B-091	3.00	12B10984		24.56	0.66	2.96	460.56	4.92	2.37	65.34	J	21.68	98.70	
<i>ThermoRetec</i> ⁽²⁾		12B10984		21.47	1.83	1.95	426.60	15.62	2.97	73.59		23.86	27.52	
12B-091	5.50	12B10985		0.62	U	---	0.62	1.79	0.13	0.42	25.75		4.23	
12B-091	9.50	12B10986		ARCHIVED										
12B-092	2.00	12B10987		1.70	0.09	0.25	1.66	0.08	0.20	7.45	U	---	7.45	
12B-092	4.50	12B10988		0.64	0.07	0.18	1.01	0.07	0.25	7.87	U	---	7.87	
12B-092	6.50	12B10989		0.59	0.07	0.19	0.90	0.06	0.21	5.13	U	---	5.13	
12B-093	0.50	12B10990		4.13	0.21	0.85	38.77	0.62	0.64	37.20	U	---	37.20	
12B-093	1.50	12B10991		0.78	0.07	0.19	0.97	0.05	0.14	5.37	U	---	5.37	
12B-093	4.50	12B10992		ARCHIVED										
12B-094	0.50	12B10993		4.39	0.21	0.88	33.42	0.54	0.58	23.90	U	---	23.90	
12B-094	4.50	12B10994		0.98	J	0.08	0.32	3.62	J	0.12	0.32	11.80	UJ	---
12B-094	6.00	12B10995		ARCHIVED										
12B-095	0.50	12B10996		5.53	J	0.20	0.65	23.48	J	0.38	0.50	25.40	UJ	---
12B-095	7.00	12B10997		0.83	0.08	0.23	1.35	0.07	0.21	5.60	U	---	5.60	
<i>ThermoRetec</i> ⁽²⁾		12B10997		0.73	0.13	0.13	1.24	0.12	0.19	0.66	U	1.04	1.86	
12B-095	7.00	12B10998	X	0.89	J	0.08	0.22	1.30	J	0.07	0.25	7.91	UJ	---
<i>ThermoRetec</i> ⁽²⁾		12B10998		0.97	0.13	0.15	1.50	0.15	0.21	0.49	UJ	1.77	2.10	
12B-095	8.50	12B10999		ARCHIVED										
12B-096	1.00	12B11000		2.19	0.11	0.41	10.95	0.22	0.31	3.09	J	3.66	12.20	
12B-096	3.00	12B11001		0.39	J	0.05	0.15	0.49	J	0.05	0.19	5.35	UJ	---
12B-096	4.50	12B11002		ARCHIVED										

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 (MISS On-Site Field Laboratory)**

Soil Probe ID	Depth (feet)	Laboratory Sample ID	DUP (1)	Laboratory Results											
				Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
				Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
12B-097	1.00	12B11003		134.78	1.90	2.34	278.15	3.07	1.80	63.50	U	---	63.50		
<i>ThermoRetec⁽²⁾</i>		<i>12B11003</i>		<i>132.40</i>	<i>6.50</i>	<i>1.38</i>	<i>286.00</i>	<i>11.15</i>	<i>2.10</i>	<i>22.33</i>		<i>15.48</i>	<i>20.90</i>		
12B-097	4.50	12B11004		5.40	J	0.21	0.58	11.06	J	0.27	0.47	23.30	UJ	---	23.30
12B-097	9.00	12B11005		0.62		0.06	0.15	0.76		0.05	0.18	4.63	U	---	4.63
12B-098	9.00	12B11006		28.54		0.55	1.06	61.95		0.82	0.75	29.30	U	---	29.30
12B-098	10.50	12B11007		0.99	J	0.08	0.26	1.24	J	0.06	0.15	13.58	J	2.74	8.26
12B-099	2.50	12B11008		14.74		0.56	2.77	342.11		3.85	1.98	366.55		24.36	81.30
12B-099	10.50	12B11009		0.78	J	0.07	0.22	1.03	J	0.06	0.22	7.37	UJ	---	7.37
12B-099	10.50	12B11010	X	0.71		0.07	0.20	0.96		0.06	0.22	5.65	U	---	5.65
12B-099	12.50	12B11011		ARCHIVED											
12B-100	0.50	12B11012		4.88	J	0.20	0.65	19.34	J	0.36	0.48	26.80	UJ	---	26.80
12B-100	2.00	12B11013		0.56		0.07	0.18	0.65		0.06	0.21	5.00	U	---	5.00
12B-100	4.50	12B11014		ARCHIVED											

Error: 2 sigma (95% confidence interval)

- Not Applicable
- U Undetected or Negative Concentration Less Than the MDA
- J Estimated
- MDA Minimum Detectable Activity

- (1) The sample marked with an "X" for duplicate is a duplicate of the sample listed directly above it. Duplicate samples are prepared by homogenizing soil above and below the centerpoint and then separating for analysis. The depth listed is the centerpoint.
- (2) Approximately 10% of all radiological soil samples collected under the PDI Program were sent to ThermoRetec, an off-site laboratory, for confirmatory radiological analyses. Results from ThermoRetec are presented in this table in italicized font immediately below the MISS On-Site field laboratory result for that same sample.

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020598	12B-020600	12B-020602
	Sample Location	12B-001	12B-002	12B-003
	Sample Depth (feet)	16 - 20	7 - 10	8 - 12
	Sample Date	04/04/00	04/04/00	04/05/00
Units				
<i>Miscellaneous</i>				
Chromium VI	mg/kg	0.47U	0.49U	0.47U
Corrosivity by pH	Soil pH	8.6	7.6	7.6
Cyanide, Reactive	mg/kg	0.5U	0.5U	0.50U
Cyanide, Total	mg/kg	0.57U	0.57U	0.35U
Sulfide, Reactive	mg/kg	24.0U	24.0U	24.0U
<i>PCBs and Pesticides</i>				
4,4'-DDD	ug/kg	3.9U	4.1U	3.9U
4,4'-DDE	ug/kg	3.9U	4.1U	3.9U
4,4'-DDT	ug/kg	3.9U	4.1U	3.9U
Aldrin	ug/kg	2.0U	2.1U	2.0U
Alpha-BHC	ug/kg	2.0U	2.1U	2.0U
alpha-Chlordane	ug/kg	2.0U	2.1U	2.0U
Aroclor-1016	ug/kg	39U	41U	39U
Aroclor-1221	ug/kg	78U	82U	78U
Aroclor-1232	ug/kg	39U	41U	39U
Aroclor-1242	ug/kg	39U	41U	39U
Aroclor-1248	ug/kg	39U	41U	39U
Aroclor-1254	ug/kg	39U	41U	39U
Aroclor-1260	ug/kg	39U	41U	39U
Beta-BHC	ug/kg	2.0U	2.1U	2.0U
Delta-BHC	ug/kg	2.0U	2.1U	2.0U
Dieldrin	ug/kg	3.9U	4.1U	3.9U
Endosulfan I	ug/kg	2.0U	2.1U	2.0U
Endosulfan II	ug/kg	3.9U	4.1U	3.9U
Endosulfan sulfate	ug/kg	3.9U	4.1U	3.9U
Endrin	ug/kg	3.9U	4.1U	3.9U
Endrin aldehyde	ug/kg	3.9U	4.1U	3.9U
Endrin ketone	ug/kg	3.9U	4.1U	3.9U
gamma-BHC (Lindane)	ug/kg	2.0U	2.1U	2.0U
gamma-Chlordane	ug/kg	2.0U	2.1U	2.0U
Heptachlor	ug/kg	2.0U	2.1U	2.0U
Heptachlor epoxide	ug/kg	2.0U	2.1U	2.0U
Methoxychlor	ug/kg	20U	21U	20U
Toxaphene	ug/kg	200U	210U	200U

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020598	12B-020600	12B-020602
	Sample Location	12B-001	12B-002	12B-003
	Sample Depth (feet)	16 - 20	7 - 10	8 - 12
	Sample Date	04/04/00	04/04/00	04/05/00
Units				
<i>Rare Earth Metals</i>				
Cerium, Total	mg/kg	14.9	38.2	11.6
Dysprosium, Total	mg/kg	1.2	1.4	0.86
Lanthanum, Total	mg/kg	6.5	16.4	3.5U
Neodymium, Total	mg/kg	8.9	15.7	7.6
Yttrium, Total	mg/kg	4.9	5	4
<i>Semivolatile Organics</i>				
1,2,4-Trichlorobenzene	ug/kg	390U	410U	390U
1,2-Dichlorobenzene	ug/kg	390U	410U	390U
1,3-Dichlorobenzene	ug/kg	390U	410U	390U
1,4-Dichlorobenzene	ug/kg	390U	410U	390U
2,2'-oxybis(1-Chloropropane)	ug/kg	390U	410U	390U
2,4,5-Trichlorophenol	ug/kg	980U	1000U	980U
2,4,6-Trichlorophenol	ug/kg	390U	410U	390U
2,4-Dichlorophenol	ug/kg	390U	410U	390U
2,4-Dimethylphenol	ug/kg	390U	410U	390U
2,4-Dinitrophenol	ug/kg	980U	1000U	980U
2,4-Dinitrotoluene	ug/kg	390U	410U	390U
2,6-Dinitrotoluene	ug/kg	390U	410U	390U
2-Chloronaphthalene	ug/kg	390U	410U	390U
2-Chlorophenol	ug/kg	390U	410U	390U
2-Methylnaphthalene	ug/kg	390U	410U	390U
2-Methylphenol	ug/kg	390U	410U	390U
2-Nitroaniline	ug/kg	980U	1000U	980U
2-Nitrophenol	ug/kg	390U	410U	390U
3,3'-Dichlorobenzidine	ug/kg	390U	410U	390U
3-Nitroaniline	ug/kg	980U	1000U	980U
4,6-Dinitro-2-methylphenol	ug/kg	980U	1000U	980U
4-Bromophenyl-phenylether	ug/kg	390U	410U	390U
4-Chloro-3-methylphenol	ug/kg	390U	410U	390U
4-Chloroaniline	ug/kg	390U	410U	390U
4-Chlorophenyl-phenylether	ug/kg	390U	410U	390U
4-Methylphenol	ug/kg	390U	410U	390U
4-Nitroaniline	ug/kg	980U	1000U	980U
4-Nitrophenol	ug/kg	980U	1000U	980U
Acenaphthene	ug/kg	390U	410U	390U
Acenaphthylene	ug/kg	390U	410U	390U
Anthracene	ug/kg	390U	410U	390U
Benzo(a)anthracene	ug/kg	390U	410U	390U
Benzo(a)pyrene	ug/kg	390U	410U	390U
Benzo(b)fluoranthene	ug/kg	390U	410U	390U

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020598	12B-020600	12B-020602
	Sample Location	12B-001	12B-002	12B-003
	Sample Depth (feet)	16 - 20	7 - 10	8 - 12
	Sample Date	04/04/00	04/04/00	04/05/00
Units				
<i>Semivolatile Organics (continued)</i>				
Benzo(g,h,i)perylene	ug/kg	390U	410U	390U
Benzo(k)fluoranthene	ug/kg	390U	410U	390U
bis(2-Chloroethoxy)methane	ug/kg	390U	410U	390U
bis(2-Chloroethyl)ether	ug/kg	390U	410U	390U
bis(2-Ethylhexyl)phthalate	ug/kg	32JB	46JB	390U
Butylbenzylphthalate	ug/kg	390U	410U	390U
Carbazole	ug/kg	390U	410U	390U
Chrysene	ug/kg	390U	410U	390U
Di-n-Butylphthalate	ug/kg	28J	24J	390U
Di-n-Octyl phthalate	ug/kg	390U	410U	390U
Dibenz(a,h)anthracene	ug/kg	390U	410U	390U
Dibenzofuran	ug/kg	390U	410U	390U
Diethylphthalate	ug/kg	390U	410U	390U
Dimethylphthalate	ug/kg	390U	410U	390U
Fluoranthene	ug/kg	390U	410U	390U
Fluorene	ug/kg	390U	410U	390U
Hexachlorobenzene	ug/kg	390U	410U	390U
Hexachlorobutadiene	ug/kg	390U	410U	390U
Hexachlorocyclopentadiene	ug/kg	390U	410U	390U
Hexachloroethane	ug/kg	390U	410U	390U
Indeno(1,2,3-cd)pyrene	ug/kg	390U	410U	390U
Isophorone	ug/kg	390U	410U	390U
N-Nitroso-Di-n-propylamine	ug/kg	390U	410U	390U
N-Nitrosodiphenylamine (1)	ug/kg	390U	410U	390U
Naphthalene	ug/kg	390U	410U	390U
Nitrobenzene	ug/kg	390U	410U	390U
Pentachlorophenol	ug/kg	980U	1000U	980U
Phenanthrene	ug/kg	390U	410U	390U
Phenol	ug/kg	390U	410U	390U
Pyrene	ug/kg	390U	410U	390U
<i>Total Metals</i>				
Aluminum, Total	mg/kg	2250	16600	2780
Antimony, Total	mg/kg	0.19U	0.21U	0.18U
Arsenic, Total	mg/kg	6.6	172	2.3
Barium, Total	mg/kg	23.4	4	38.6
Beryllium, Total	mg/kg	0.2	0.57	0.33
Boron, Total	mg/kg	2.2	5.1	2.1
Cadmium, Total	mg/kg	0.03U	0.03U	0.03U
Calcium, Total	mg/kg	916	6010	1220
Chromium, Total	mg/kg	14.8	9.4	7.6

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020598	12B-020600	12B-020602
	Sample Location	12B-001	12B-002	12B-003
	Sample Depth (feet)	16 - 20	7 - 10	8 - 12
	Sample Date	04/04/00	04/04/00	04/05/00
Units				
<i>Total Metals (continued)</i>				
Cobalt, Total	mg/kg	1.8	2	8.4
Copper, Total	mg/kg	4.3	8.3	4.8
Iron, Total	mg/kg	5910	7170	6890
Lead, Total	mg/kg	2.1	11.4	5
Lithium, Total	mg/kg	9.9	173	14.9
Magnesium, Total	mg/kg	707	1220	555
Manganese, Total	mg/kg	51.7	56.8	33.1
Mercury, Total	mg/kg	0.02U	0.03	0.03
Nickel, Total	mg/kg	4.9	6.8	7.5
Potassium, Total	mg/kg	341	391	401
Selenium, Total	mg/kg	0.46U	0.5U	0.54
Silver, Total	mg/kg	0.09U	0.1U	0.09U
Sodium, Total	mg/kg	198	318	46.8
Thallium, Total	mg/kg	0.39U	0.42U	0.38U
Vanadium, Total	mg/kg	9.5	11.2	7.8
Zinc, Total	mg/kg	12.9	19.5	10.8
<i>Volatile Organics</i>				
1,1,1-Trichloroethane	ug/kg	910U	730U	580U
1,1,2,2-Tetrachloroethane	ug/kg	910U	730U	580U
1,1,2-Trichloroethane	ug/kg	910U	730U	580U
1,1-Dichloroethane	ug/kg	910U	730U	580U
1,1-Dichloroethene	ug/kg	910U	730U	580U
1,2-Dichloroethane	ug/kg	910U	730U	580U
1,2-Dichloroethene (total)	ug/kg	910U	730U	580U
1,2-Dichloropropane	ug/kg	910U	730U	580U
2-Butanone	ug/kg	1800U	1500U	1200U
2-Hexanone	ug/kg	1800U	1500U	1200U
4-Methyl-2-pentanone	ug/kg	1800U	1500U	1200U
Acetone	ug/kg	1800U	1500U	550BJ
Benzene	ug/kg	910U	730U	580U
Bromodichloromethane	ug/kg	910U	730U	580U
Bromoform	ug/kg	910U	730U	580U
Bromomethane	ug/kg	1800U	1500U	1200U
Carbon Disulfide	ug/kg	910U	730U	580U
Carbon Tetrachloride	ug/kg	910U	730U	580U
Chlorobenzene	ug/kg	910U	730U	580U
Chloroethane	ug/kg	1800U	1500U	1200U
Chloroform	ug/kg	910U	730U	580U

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020598	12B-020600	12B-020602
	Sample Location	12B-001	12B-002	12B-003
	Sample Depth (feet)	16 - 20	7 - 10	8 - 12
	Sample Date	04/04/00	04/04/00	04/05/00
Units				
<i>Volatile Organics (continued)</i>				
Chloromethane	ug/kg	1800U	1500U	1200U
cis-1,3-Dichloropropene	ug/kg	910U	730U	580U
Dibromochloromethane	ug/kg	910U	730U	580U
Ethylbenzene	ug/kg	910U	730U	580U
Methylene Chloride	ug/kg	910U	730U	580U
Styrene	ug/kg	910U	730U	580U
Tetrachloroethene	ug/kg	910U	730U	580U
Toluene	ug/kg	910U	730U	580U
Trans-1,3-Dichloropropene	ug/kg	910U	730U	580U
Trichloroethene	ug/kg	910U	730U	580U
Vinyl Chloride	ug/kg	1800U	1500U	1200U
Xylene (total)	ug/kg	910U	730U	580U
<i>TCLP Metals</i>				
Arsenic	ug/L	76.6U	474	22.9U
Barium	ug/L	270J	35J	624
Cadmium	ug/L	4.1U	4.1U	4.1U
Chromium	ug/L	4.2	3.4U	3.4U
Lead	ug/L	26.6U	26.6U	26.6U
Mercury	ug/L	0.1U	0.13	0.1U
Selenium	ug/L	49.7U	49.7U	50.7U
Silver	ug/L	3.7U	3.7U	3.7U
<i>TCLP Pesticides</i>				
Alpha-Chlordane	ug/L	0.5U	0.5U	0.5U
Endrin	ug/L	1U	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5U	0.5U	0.5U
Heptachlor	ug/L	0.5U	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5U	0.5U	0.5U
Methoxychlor	ug/L	5U	5U	5U
Toxaphene	ug/L	50U	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U	5U
2,4-D	ug/L	10U	10U	10U

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020598	12B-020600	12B-020602
	Sample Location	12B-001	12B-002	12B-003
	Sample Depth (feet)	16 - 20	7 - 10	8 - 12
	Sample Date	04/04/00	04/04/00	04/05/00
Units				
<i>TCLP Volatiles</i>				
1,1-Dichloroethene	mg/L	0.025U	0.025U	0.025U
1,2-Dichloroethane	mg/L	0.025U	0.025U	0.025U
2-Butanone	mg/L	0.05U	0.05U	0.05U
Benzene	mg/L	0.025U	0.025U	0.014J
Carbon tetrachloride	mg/L	0.025U	0.025U	0.025U
Chlorobenzene	mg/L	0.025U	0.025U	0.025U
Chloroform	mg/L	0.025U	0.025U	0.025U
Tetrachloroethene	mg/L	0.025U	0.025U	0.025U
Trichloroethene	mg/L	0.025U	0.025U	0.025U
Vinyl Chloride	mg/L	0.05U	0.05U	0.05U
<i>TCLP Semi-Volatiles</i>				
1,4-Dichlorobenzene	mg/L	0.05U	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U	0.05U

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020604	12B-020606	12B-020608
	Sample Location	12B-004	12B-005	12B-006
	Sample Depth (feet)	8 - 12	8 - 12	4 - 8
	Sample Date	04/05/00	04/05/00	04/05/00
Units				
<i>Miscellaneous</i>				
Chromium VI	mg/kg	0.55U	0.47U	0.45U
Corrosivity by pH	Soil pH	7.3	7.6	6.1
Cyanide, Reactive	mg/kg	0.50U	0.50U	0.50U
Cyanide, Total	mg/kg	0.35U	0.39U	0.37U
Sulfide, Reactive	mg/kg	24.0U	24.0U	24.0U
<i>PCBs and Pesticides</i>				
4,4'-DDD	ug/kg	4.5U	3.9U	3.7U
4,4'-DDE	ug/kg	4.5U	3.9U	3.7U
4,4'-DDT	ug/kg	4.5U	3.9U	3.7U
Aldrin	ug/kg	2.2U	2.0U	1.9U
Alpha-BHC	ug/kg	2.2U	2.0U	1.9U
alpha-Chlordane	ug/kg	2.2U	2.0U	1.9U
Aroclor-1016	ug/kg	45U	39U	37U
Aroclor-1221	ug/kg	91U	78U	74U
Aroclor-1232	ug/kg	45U	39U	37U
Aroclor-1242	ug/kg	45U	39U	37U
Aroclor-1248	ug/kg	45U	39U	37U
Aroclor-1254	ug/kg	45U	39U	37U
Aroclor-1260	ug/kg	45U	39U	37U
Beta-BHC	ug/kg	2.2U	2.0U	1.9U
Delta-BHC	ug/kg	2.2U	2.0U	1.9U
Dieldrin	ug/kg	4.5U	3.9U	3.7U
Endosulfan I	ug/kg	2.2U	2.0U	1.9U
Endosulfan II	ug/kg	4.5U	3.9U	3.7U
Endosulfan sulfate	ug/kg	4.5U	3.9U	3.7U
Endrin	ug/kg	4.5U	3.9U	3.7U
Endrin aldehyde	ug/kg	4.5U	3.9U	3.7U
Endrin ketone	ug/kg	4.5U	3.9U	3.7U
gamma-BHC (Lindane)	ug/kg	2.2U	2.0U	1.9U
gamma-Chlordane	ug/kg	2.2U	2.0U	1.9U
Heptachlor	ug/kg	2.2U	2.0U	1.9U
Heptachlor epoxide	ug/kg	2.2U	2.0U	1.9U
Methoxychlor	ug/kg	22U	20U	19U
Toxaphene	ug/kg	220U	200U	190U

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020604	12B-020606	12B-020608
	Sample Location	12B-004	12B-005	12B-006
	Sample Depth (feet)	8 - 12	8 - 12	4 - 8
	Sample Date	04/05/00	04/05/00	04/05/00
Units				
Rare Earth Metals				
Cerium, Total	mg/kg	298	17.9	16
Dysprosium, Total	mg/kg	3.4	1.1	1.6
Lanthanum, Total	mg/kg	130	8.2	8
Neodymium, Total	mg/kg	124	9.3	13.1
Yttrium, Total	mg/kg	8.7	4.8	6.8
Semivolatile Organics				
1,2,4-Trichlorobenzene	ug/kg	900U	390U	370U
1,2-Dichlorobenzene	ug/kg	900U	390U	370U
1,3-Dichlorobenzene	ug/kg	900U	390U	370U
1,4-Dichlorobenzene	ug/kg	900U	390U	370U
2,2'-oxybis(1-Chloropropane)	ug/kg	900U	390U	370U
2,4,5-Trichlorophenol	ug/kg	2200U	980U	920U
2,4,6-Trichlorophenol	ug/kg	900U	390U	370U
2,4-Dichlorophenol	ug/kg	900U	390U	370U
2,4-Dimethylphenol	ug/kg	900U	390U	370U
2,4-Dinitrophenol	ug/kg	2200U	980U	920U
2,4-Dinitrotoluene	ug/kg	900U	390U	370U
2,6-Dinitrotoluene	ug/kg	900U	390U	370U
2-Chloronaphthalene	ug/kg	900U	390U	370U
2-Chlorophenol	ug/kg	900U	390U	370U
2-Methylnaphthalene	ug/kg	900U	390U	370U
2-Methylphenol	ug/kg	900U	390U	370U
2-Nitroaniline	ug/kg	2200U	980U	920U
2-Nitrophenol	ug/kg	900U	390U	370U
3,3'-Dichlorobenzidine	ug/kg	900U	390U	370U
3-Nitroaniline	ug/kg	2200U	980U	920U
4,6-Dinitro-2-methylphenol	ug/kg	2200U	980U	920U
4-Bromophenyl-phenylether	ug/kg	900U	390U	370U
4-Chloro-3-methylphenol	ug/kg	900U	390U	370U
4-Chloroaniline	ug/kg	900U	390U	370U
4-Chlorophenyl-phenylether	ug/kg	900U	390U	370U
4-Methylphenol	ug/kg	900U	390U	370U
4-Nitroaniline	ug/kg	2200U	980U	920U
4-Nitrophenol	ug/kg	2200U	980U	920U
Acenaphthene	ug/kg	900U	390U	370U
Acenaphthylene	ug/kg	900U	390U	370U
Anthracene	ug/kg	900U	390U	370U
Benzo(a)anthracene	ug/kg	900U	390U	370U
Benzo(a)pyrene	ug/kg	900U	390U	370U
Benzo(b)fluoranthene	ug/kg	900U	390U	370U

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020604	12B-020606	12B-020608
	Sample Location	12B-004	12B-005	12B-006
	Sample Depth (feet)	8 - 12	8 - 12	4 - 8
	Sample Date	04/05/00	04/05/00	04/05/00
Units				
<i>Semivolatile Organics (continued)</i>				
Benzo(g,h,i)perylene	ug/kg	900U	390U	370U
Benzo(k)fluoranthene	ug/kg	900U	390U	370U
bis(2-Chloroethoxy)methane	ug/kg	900U	390U	370U
bis(2-Chloroethyl)ether	ug/kg	900U	390U	370U
bis(2-Ethylhexyl)phthalate	ug/kg	900U	390U	370U
Butylbenzylphthalate	ug/kg	900U	390U	370U
Carbazole	ug/kg	900U	390U	370U
Chrysene	ug/kg	51J	390U	370U
Di-n-Butylphthalate	ug/kg	900U	390U	370U
Di-n-Octyl phthalate	ug/kg	900U	390U	370U
Dibenz(a,h)anthracene	ug/kg	900U	390U	370U
Dibenzofuran	ug/kg	900U	390U	370U
Diethylphthalate	ug/kg	900U	390U	370U
Dimethylphthalate	ug/kg	900U	390U	370U
Fluoranthene	ug/kg	68J	390U	370U
Fluorene	ug/kg	900U	390U	370U
Hexachlorobenzene	ug/kg	900U	390U	370U
Hexachlorobutadiene	ug/kg	900U	390U	370U
Hexachlorocyclopentadiene	ug/kg	900U	390U	370U
Hexachloroethane	ug/kg	900U	390U	370U
Indeno(1,2,3-cd)pyrene	ug/kg	900U	390U	370U
Isophorone	ug/kg	900U	390U	370U
N-Nitroso-Di-n-propylamine	ug/kg	900U	390U	370U
N-Nitrosodiphenylamine (1)	ug/kg	900U	33J	370U
Naphthalene	ug/kg	900U	390U	370U
Nitrobenzene	ug/kg	900U	390U	370U
Pentachlorophenol	ug/kg	2200U	980U	920U
Phenanthrene	ug/kg	64J	390U	370U
Phenol	ug/kg	50J	390U	370U
Pyrene	ug/kg	60J	390U	370U
<i>Total Metals</i>				
Aluminum, Total	mg/kg	8690	3710	3450
Antimony, Total	mg/kg	0.23U	0.17U	0.59
Arsenic, Total	mg/kg	19.2	3.5	1.5
Barium, Total	mg/kg	63.9	29.8	21.8
Beryllium, Total	mg/kg	0.72	0.13	0.33
Boron, Total	mg/kg	6.5	1.2	0.8
Cadmium, Total	mg/kg	0.1	0.12	0.05
Calcium, Total	mg/kg	33200	2860	734
Chromium, Total	mg/kg	45.4	5.9	356

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020604	12B-020606	12B-020608
	Sample Location	12B-004	12B-005	12B-006
	Sample Depth (feet)	8 - 12	8 - 12	4 - 8
	Sample Date	04/05/00	04/05/00	04/05/00
	Units			
Total Metals (continued)				
Cobalt, Total	mg/kg	1.4	5.4	2.9
Copper, Total	mg/kg	63	14.3	6.8
Iron, Total	mg/kg	4820	6510	5690
Lead, Total	mg/kg	71.9	3.1	3.2
Lithium, Total	mg/kg	250	18.1	6
Magnesium, Total	mg/kg	1040	804	724
Manganese, Total	mg/kg	62.1	32.4	259
Mercury, Total	mg/kg	0.21	0.02U	0.04
Nickel, Total	mg/kg	10.9	198	6.2
Potassium, Total	mg/kg	471	209	249
Selenium, Total	mg/kg	0.56U	1.3	0.44U
Silver, Total	mg/kg	0.11U	0.08U	0.09U
Sodium, Total	mg/kg	3220	39.7	48.4
Thallium, Total	mg/kg	0.47U	0.34U	0.37U
Vanadium, Total	mg/kg	8.6	5.8	6.2
Zinc, Total	mg/kg	51.1	65.7	18.7
Volatile Organics				
1,1,1-Trichloroethane	ug/kg	990U	660U	640U
1,1,2,2-Tetrachloroethane	ug/kg	990U	660U	640U
1,1,2-Trichloroethane	ug/kg	990U	660U	640U
1,1-Dichloroethane	ug/kg	990U	660U	640U
1,1-Dichloroethene	ug/kg	990U	660U	640U
1,2-Dichloroethane	ug/kg	990U	660U	640U
1,2-Dichloroethene (total)	ug/kg	990U	660U	640U
1,2-Dichloropropane	ug/kg	990U	660U	640U
2-Butanone	ug/kg	2000U	1300U	1300U
2-Hexanone	ug/kg	2000U	1300U	1300U
4-Methyl-2-pentanone	ug/kg	2000U	1300U	1300U
Acetone	ug/kg	1200BJ	1300U	1300U
Benzene	ug/kg	990U	660U	640U
Bromodichloromethane	ug/kg	990U	660U	640U
Bromoform	ug/kg	990U	660U	640U
Bromomethane	ug/kg	2000U	1300U	1300U
Carbon Disulfide	ug/kg	990U	660U	640U
Carbon Tetrachloride	ug/kg	990U	660U	640U
Chlorobenzene	ug/kg	990U	660U	640U
Chloroethane	ug/kg	2000U	1300U	1300U
Chloroform	ug/kg	990U	660U	640U

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020604	12B-020606	12B-020608
	Sample Location	12B-004	12B-005	12B-006
	Sample Depth (feet)	8 - 12	8 - 12	4 - 8
	Sample Date	04/05/00	04/05/00	04/05/00
Units				
<i>Volatile Organics (continued)</i>				
Chloromethane	ug/kg	2000U	1300U	1300U
cis-1,3-Dichloropropene	ug/kg	990U	660U	640U
Dibromochloromethane	ug/kg	990U	660U	640U
Ethylbenzene	ug/kg	990U	660U	640U
Methylene Chloride	ug/kg	990U	660U	2400B
Styrene	ug/kg	990U	660U	640U
Tetrachloroethene	ug/kg	990U	660U	640U
Toluene	ug/kg	990U	660U	640U
Trans-1,3-Dichloropropene	ug/kg	990U	660U	640U
Trichloroethene	ug/kg	990U	660U	640U
Vinyl Chloride	ug/kg	2000U	1300U	1300U
Xylene (total)	ug/kg	990U	660U	640U
<i>TCLP Metals</i>				
Arsenic	ug/L	52	28.1	22.9U
Barium	ug/L	48.1	108	237
Cadmium	ug/L	4.1U	4.1U	4.1U
Chromium	ug/L	3.4U	3.4U	143
Lead	ug/L	26.6U	26.6U	26.6U
Mercury	ug/L	0.1U	0.1U	0.1U
Selenium	ug/L	49.7U	49.7U	49.7U
Silver	ug/L	3.7U	3.7U	3.7U
<i>TCLP Pesticides</i>				
Alpha-Chlordane	ug/L	0.5U	0.5U	0.5U
Endrin	ug/L	1U	1U	1U
Gamma-BHC (Lindane)	ug/L	0.5U	0.5U	0.5U
Gamma-Chlordane	ug/L	0.5U	0.5U	0.5U
Heptachlor	ug/L	0.5U	0.5U	0.5U
Heptachlor epoxide	ug/L	0.5U	0.5U	0.5U
Methoxychlor	ug/L	5U	5U	5U
Toxaphene	ug/L	50U	50U	50U
2,4,5-TP (Silvex)	ug/L	5U	5U	5U
2,4-D	ug/L	10U	10U	10U

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020604	12B-020606	12B-020608
	Sample Location	12B-004	12B-005	12B-006
	Sample Depth (feet)	8 - 12	8 - 12	4 - 8
	Sample Date	04/05/00	04/05/00	04/05/00
Units				
<i>TCLP Volatiles</i>				
1,1-Dichloroethene	mg/L	0.025U	0.025U	0.025UJ
1,2-Dichloroethane	mg/L	0.025U	0.025U	0.025UJ
2-Butanone	mg/L	0.05U	0.05UJ	0.05UJ
Benzene	mg/L	0.025U	0.025U	0.02J
Carbon tetrachloride	mg/L	0.025U	0.025U	0.025UJ
Chlorobenzene	mg/L	0.025U	0.025U	0.025UJ
Chloroform	mg/L	0.025U	0.025U	0.025UJ
Tetrachloroethene	mg/L	0.025U	0.025U	0.025UJ
Trichloroethene	mg/L	0.025U	0.025U	0.025UJ
Vinyl Chloride	mg/L	0.05U	0.05U	0.05UJ
<i>TCLP Semi-Volatiles</i>				
1,4-Dichlorobenzene	mg/L	0.05U	0.05U	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U	0.12U	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U	0.05U	0.05U
2,4-Dinitrotoluene	mg/L	0.05U	0.05U	0.05U
2-Methylphenol	mg/L	0.05U	0.05U	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U	0.05U	0.05U
Hexachlorobenzene	mg/L	0.05U	0.05U	0.05U
Hexachlorobutadiene	mg/L	0.05U	0.05U	0.05U
Hexachloroethane	mg/L	0.05U	0.05U	0.05U
Nitrobenzene	mg/L	0.05U	0.05U	0.05U
Pentachlorophenol	mg/L	0.12U	0.12U	0.12U
Pyridine	mg/L	0.05U	0.05U	0.05U

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID Sample Location Sample Depth (feet) Sample Date	12B-020610 12B-007 1 - 3.5 04/27/00
Units		
<i>Miscellaneous</i>		
Chromium VI	mg/kg	0.66U
Corrosivity by pH	Soil pH	6.6
Cyanide, Reactive	mg/kg	0.50U
Cyanide, Total	mg/kg	Not Analyzed
Sulfide, Reactive	mg/kg	24.0U
<i>PCBs and Pesticides</i>		
4,4'-DDD	ug/kg	5.5U
4,4'-DDE	ug/kg	5.5U
4,4'-DDT	ug/kg	5.5U
Aldrin	ug/kg	2.7U
Alpha-BHC	ug/kg	2.7U
alpha-Chlordane	ug/kg	2.7U
Aroclor-1016	ug/kg	55U
Aroclor-1221	ug/kg	110U
Aroclor-1232	ug/kg	55U
Aroclor-1242	ug/kg	55U
Aroclor-1248	ug/kg	55U
Aroclor-1254	ug/kg	55U
Aroclor-1260	ug/kg	55U
Beta-BHC	ug/kg	2.7U
Delta-BHC	ug/kg	2.7U
Dieldrin	ug/kg	5.5U
Endosulfan I	ug/kg	2.7U
Endosulfan II	ug/kg	5.5U
Endosulfan sulfate	ug/kg	5.5U
Endrin	ug/kg	5.5U
Endrin aldehyde	ug/kg	5.5U
Endrin ketone	ug/kg	5.5U
gamma-BHC (Lindane)	ug/kg	2.7U
gamma-Chlordane	ug/kg	2.7U
Heptachlor	ug/kg	2.7U
Heptachlor epoxide	ug/kg	2.7U
Methoxychlor	ug/kg	27U
Toxaphene	ug/kg	270U

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020610
	Sample Location	12B-007
	Sample Depth (feet)	1 - 3.5
	Sample Date	04/27/00
Units		
<i>Rare Earth Metals</i>		
Cerium, Total	mg/kg	5.7U
Dysprosium, Total	mg/kg	0.50U
Lanthanum, Total	mg/kg	5.5U
Neodymium, Total	mg/kg	5.9
Yttrium, Total	mg/kg	0.31U
<i>Semivolatile Organics</i>		
1,2,4-Trichlorobenzene	ug/kg	550U
1,2-Dichlorobenzene	ug/kg	550U
1,3-Dichlorobenzene	ug/kg	550U
1,4-Dichlorobenzene	ug/kg	550U
2,2'-oxybis(1-Chloropropane)	ug/kg	550U
2,4,5-Trichlorophenol	ug/kg	1400U
2,4,6-Trichlorophenol	ug/kg	550U
2,4-Dichlorophenol	ug/kg	550U
2,4-Dimethylphenol	ug/kg	550U
2,4-Dinitrophenol	ug/kg	1400U
2,4-Dinitrotoluene	ug/kg	550U
2,6-Dinitrotoluene	ug/kg	550U
2-Chloronaphthalene	ug/kg	550U
2-Chlorophenol	ug/kg	550U
2-Methylnaphthalene	ug/kg	550U
2-Methylphenol	ug/kg	550U
2-Nitroaniline	ug/kg	1400U
2-Nitrophenol	ug/kg	550U
3,3'-Dichlorobenzidine	ug/kg	550U
3-Nitroaniline	ug/kg	1400U
4,6-Dinitro-2-methylphenol	ug/kg	1400U
4-Bromophenyl-phenylether	ug/kg	550U
4-Chloro-3-methylphenol	ug/kg	550U
4-Chloroaniline	ug/kg	550U
4-Chlorophenyl-phenylether	ug/kg	550U
4-Methylphenol	ug/kg	550U
4-Nitroaniline	ug/kg	1400U
4-Nitrophenol	ug/kg	1400U
Acenaphthene	ug/kg	550U
Acenaphthylene	ug/kg	550U
Anthracene	ug/kg	550U
Benzo(a)anthracene	ug/kg	550U
Benzo(a)pyrene	ug/kg	550U
Benzo(b)fluoranthene	ug/kg	550U

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020610
	Sample Location	12B-007
	Sample Depth (feet)	1 - 3.5
	Sample Date	04/27/00
Units		
<i>Semivolatile Organics (continued)</i>		
Benzo(g,h,i)perylene	ug/kg	550U
Benzo(k)fluoranthene	ug/kg	550U
bis(2-Chloroethoxy)methane	ug/kg	550U
bis(2-Chloroethyl)ether	ug/kg	550U
bis(2-Ethylhexyl)phthalate	ug/kg	84BJ
Butylbenzylphthalate	ug/kg	550U
Carbazole	ug/kg	550U
Chrysene	ug/kg	550U
Di-n-Butylphthalate	ug/kg	39BJ
Di-n-Octyl phthalate	ug/kg	550U
Dibenz(a,h)anthracene	ug/kg	550U
Dibenzofuran	ug/kg	550U
Diethylphthalate	ug/kg	550U
Dimethylphthalate	ug/kg	550U
Fluoranthene	ug/kg	550U
Fluorene	ug/kg	550U
Hexachlorobenzene	ug/kg	550U
Hexachlorobutadiene	ug/kg	550U
Hexachlorocyclopentadiene	ug/kg	550U
Hexachloroethane	ug/kg	550U
Indeno(1,2,3-cd)pyrene	ug/kg	550U
Isophorone	ug/kg	550U
N-Nitroso-Di-n-propylamine	ug/kg	550U
N-Nitrosodiphenylamine (1)	ug/kg	550U
Naphthalene	ug/kg	550U
Nitrobenzene	ug/kg	550U
Pentachlorophenol	ug/kg	1400U
Phenanthrene	ug/kg	550U
Phenol	ug/kg	550U
Pyrene	ug/kg	550U
<i>Total Metals</i>		
Aluminum, Total	mg/kg	11900
Antimony, Total	mg/kg	0.36
Arsenic, Total	mg/kg	3.8
Barium, Total	mg/kg	26.5
Beryllium, Total	mg/kg	2
Boron, Total	mg/kg	13
Cadmium, Total	mg/kg	0.06
Calcium, Total	mg/kg	81100
Chromium, Total	mg/kg	5.2

Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020610
	Sample Location	12B-007
	Sample Depth (feet)	1 - 3.5
	Sample Date	04/27/00
Units		
Total Metals (continued)		
Cobalt, Total	mg/kg	0.22
Copper, Total	mg/kg	37.7
Iron, Total	mg/kg	1800
Lead, Total	mg/kg	6.8
Lithium, Total	mg/kg	773
Magnesium, Total	mg/kg	1410
Manganese, Total	mg/kg	132
Mercury, Total	mg/kg	0.04
Nickel, Total	mg/kg	32.4
Potassium, Total	mg/kg	426
Selenium, Total	mg/kg	0.72U
Silver, Total	mg/kg	0.15U
Sodium, Total	mg/kg	12100
Thallium, Total	mg/kg	0.60U
Vanadium, Total	mg/kg	2.7
Zinc, Total	mg/kg	21.2
Volatile Organics		
1,1,1-Trichloroethane	ug/kg	1500U
1,1,2,2-Tetrachloroethane	ug/kg	1500U
1,1,2-Trichloroethane	ug/kg	1500U
1,1-Dichloroethane	ug/kg	1500U
1,1-Dichloroethene	ug/kg	1500U
1,2-Dichloroethane	ug/kg	1500U
1,2-Dichloroethene (total)	ug/kg	1500U
1,2-Dichloropropane	ug/kg	1500U
2-Butanone	ug/kg	2900U
2-Hexanone	ug/kg	2900U
4-Methyl-2-pentanone	ug/kg	2900U
Acetone	ug/kg	610BJ
Benzene	ug/kg	1500U
Bromodichloromethane	ug/kg	1500U
Bromoform	ug/kg	1500U
Bromomethane	ug/kg	2900U
Carbon Disulfide	ug/kg	1500U
Carbon Tetrachloride	ug/kg	1500U
Chlorobenzene	ug/kg	1500U
Chloroethane	ug/kg	2900U
Chloroform	ug/kg	1500U

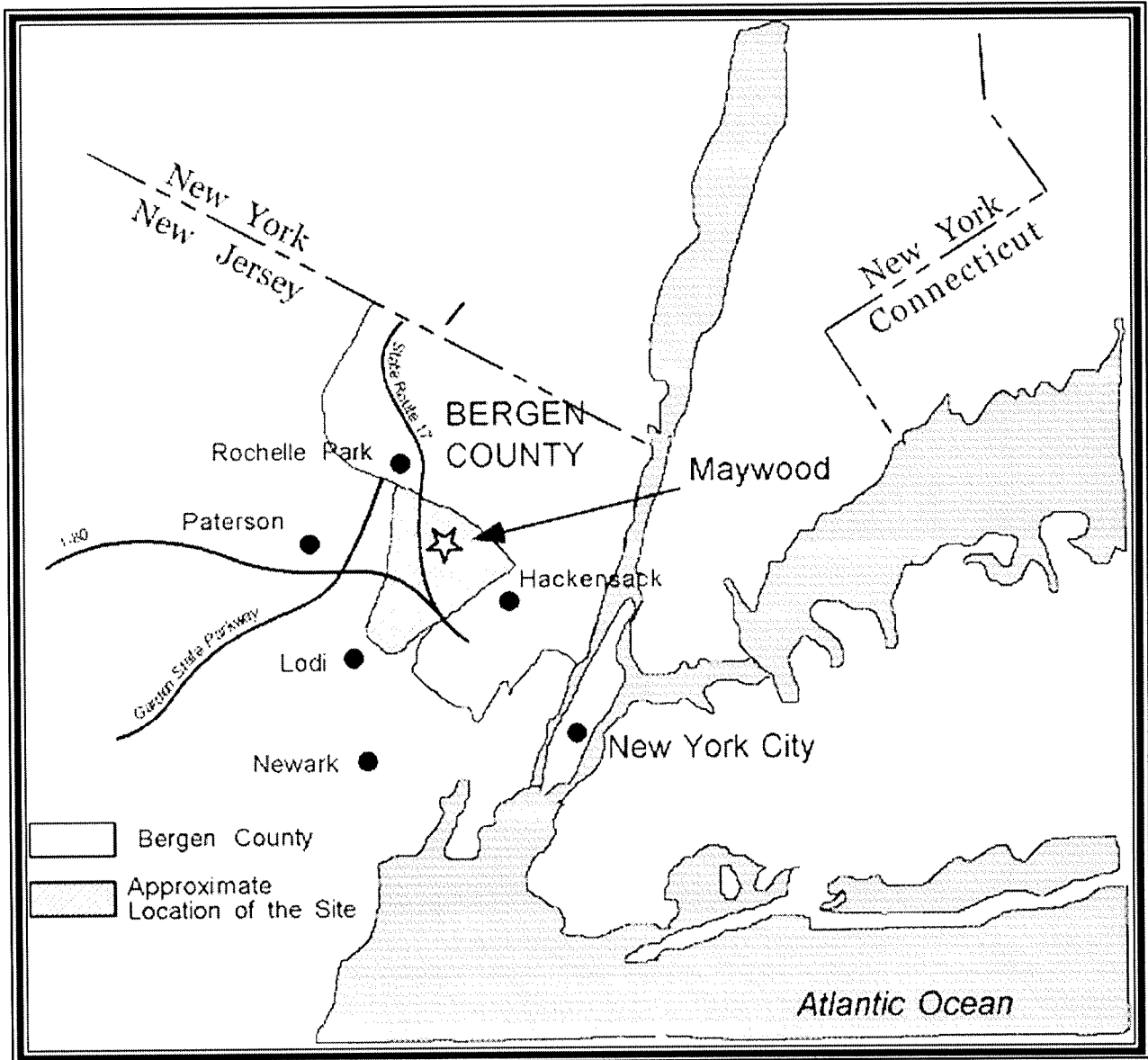
Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020610
	Sample Location	12B-007
	Sample Depth (feet)	1 - 3.5
	Sample Date	04/27/00
Units		
<i>Volatile Organics (continued)</i>		
Chloromethane	ug/kg	960BJ
cis-1,3-Dichloropropene	ug/kg	1500U
Dibromochloromethane	ug/kg	1500U
Ethylbenzene	ug/kg	1500U
Methylene Chloride	ug/kg	1500U
Styrene	ug/kg	1500U
Tetrachloroethene	ug/kg	1500U
Toluene	ug/kg	1500U
Trans-1,3-Dichloropropene	ug/kg	1500U
Trichloroethene	ug/kg	1500U
Vinyl Chloride	ug/kg	2900U
Xylene (total)	ug/kg	1500U
<i>TCLP Metals</i>		
Arsenic	ug/L	22.9U
Barium	ug/L	29U
Cadmium	ug/L	4.1U
Chromium	ug/L	11.8U
Lead	ug/L	42.8
Mercury	ug/L	0.1U
Selenium	ug/L	49.7U
Silver	ug/L	3.7U
<i>TCLP Pesticides</i>		
Alpha-Chlordane	ug/L	0.5U
Endrin	ug/L	1U
Gamma-BHC (Lindane)	ug/L	0.5U
Gamma-Chlordane	ug/L	0.5U
Heptachlor	ug/L	0.5U
Heptachlor epoxide	ug/L	0.5U
Methoxychlor	ug/L	5U
Toxaphene	ug/L	50U
2,4,5-TP (Silvex)	ug/L	5U
2,4-D	ug/L	10U


Table 12-5: Summary of Environmental Analytical Data

Parameter	Sample ID	12B-020610
	Sample Location	12B-007
	Sample Depth (feet)	1 - 3.5
	Sample Date	04/27/00
	Units	
<i>TCLP Volatiles</i>		
1,1-Dichloroethene	mg/L	0.025U
1,2-Dichloroethane	mg/L	0.025U
2-Butanone	mg/L	0.05U
Benzene	mg/L	0.025U
Carbon tetrachloride	mg/L	0.025U
Chlorobenzene	mg/L	0.025U
Chloroform	mg/L	0.025U
Tetrachloroethene	mg/L	0.025U
Trichloroethene	mg/L	0.025U
Vinyl Chloride	mg/L	0.05U
<i>TCLP Semi-Volatiles</i>		
1,4-Dichlorobenzene	mg/L	0.05U
2,4,5-Trichlorophenol	mg/L	0.12U
2,4,6-Trichlorophenol	mg/L	0.05U
2,4-Dinitrotoluene	mg/L	0.05U
2-Methylphenol	mg/L	0.05U
3- and/or 4-Methylphenol	mg/L	0.05U
Hexachlorobenzene	mg/L	0.05U
Hexachlorobutadiene	mg/L	0.05U
Hexachloroethane	mg/L	0.05U
Nitrobenzene	mg/L	0.05U
Pentachlorophenol	mg/L	R
Pyridine	mg/L	0.05U

B (inorganics) Value Between Method Detection Limit and Reporting Limit
 B (organics) Found in Associated Blank
 U Undetected Values
 J Estimated Value
 BJ Found in Blank; is an Estimated Value



NOT TO SCALE

<p>U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS NEW YORK DISTRICT</p> <p>US ARMY CORPS OF ENGINEERS FUSRAP FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM</p>	<p> STONE & WEBSTER, INC.</p> <p>Prepared by: MALCOLM PIRNE</p> <p>File Name: MPI-CH12</p>
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**LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY**

PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

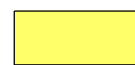
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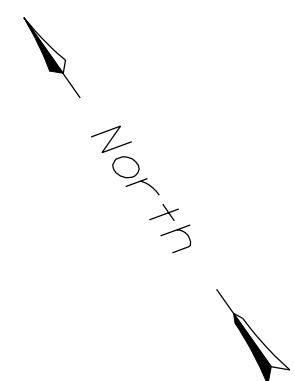
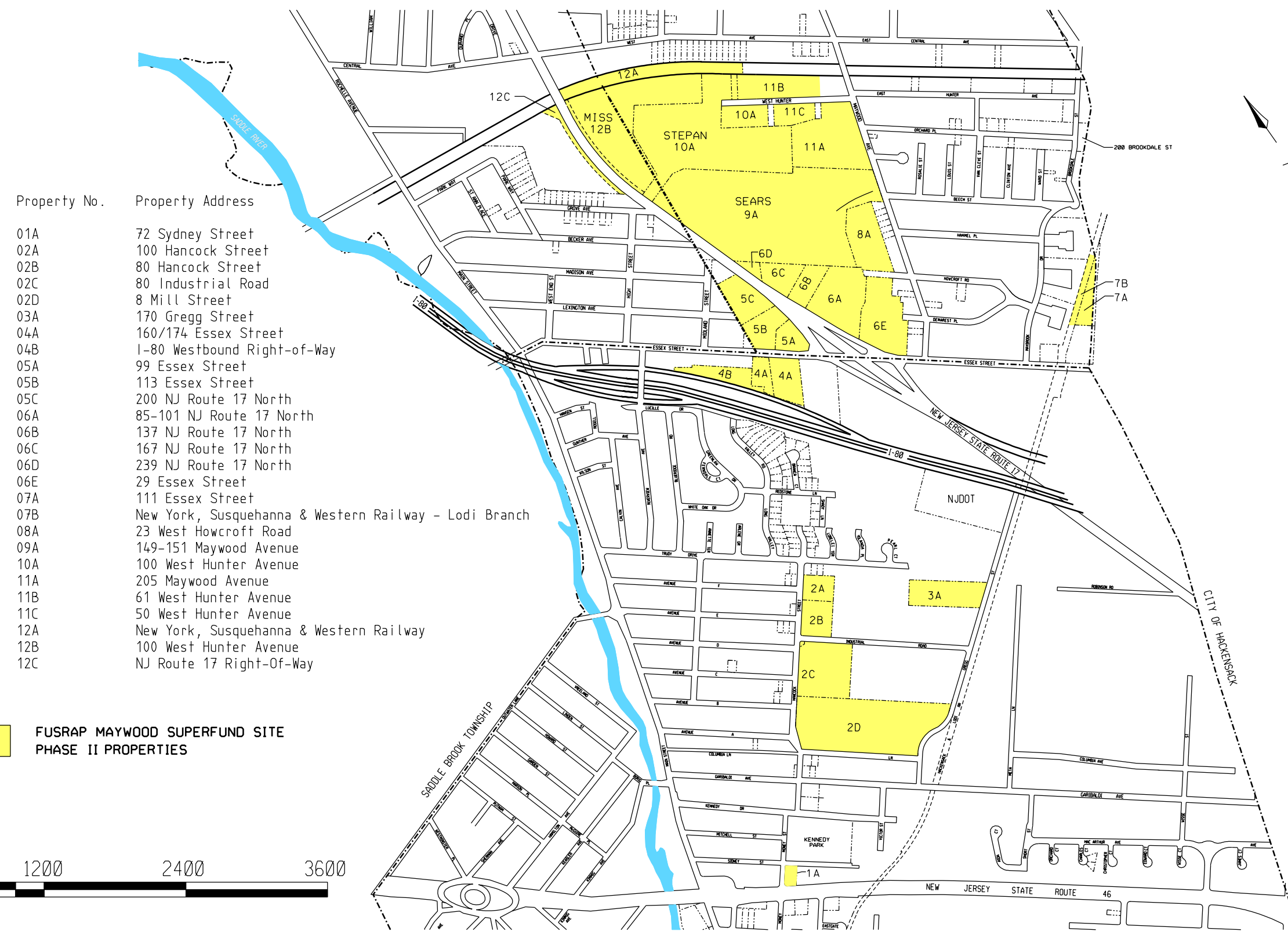
Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 12-1

Cluster No.	Property No.	Property Address
1	01A	72 Sydney Street
2	02A	100 Hancock Street
	02B	80 Hancock Street
	02C	80 Industrial Road
	02D	8 Mill Street
3	03A	170 Gregg Street
4	04A	160/174 Essex Street
5	04B	1-80 Westbound Right-of-Way
	05A	99 Essex Street
6	05B	113 Essex Street
	05C	200 NJ Route 17 North
	06A	85-101 NJ Route 17 North
	06B	137 NJ Route 17 North
	06C	167 NJ Route 17 North
	06D	239 NJ Route 17 North
7	06E	29 Essex Street
	07A	111 Essex Street
8	07B	New York, Susquehanna & Western Railway - Lodi Branch
	08A	23 West Howcroft Road
9	09A	149-151 Maywood Avenue
10	10A	100 West Hunter Avenue
11	11A	205 Maywood Avenue
	11B	61 West Hunter Avenue
	11C	50 West Hunter Avenue
12	12A	New York, Susquehanna & Western Railway
	12B	100 West Hunter Avenue
	12C	NJ Route 17 Right-Of-Way

 FUSRAP MAYWOOD SUPERFUND SITE
PHASE II PROPERTIES




U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT



US ARMY CORPS OF ENGINEERS
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

STONE & WEBSTER, INC.



Prepared by:
**MALCOLM
PIRNIE**

File Name:
\\MAYWOOD\TASK0318\CLUSTER REPORT\REV 1\FIGURE12-2.DGN

LOCATION OF MAYWOOD SITE
BERGEN COUNTY, NEW JERSEY

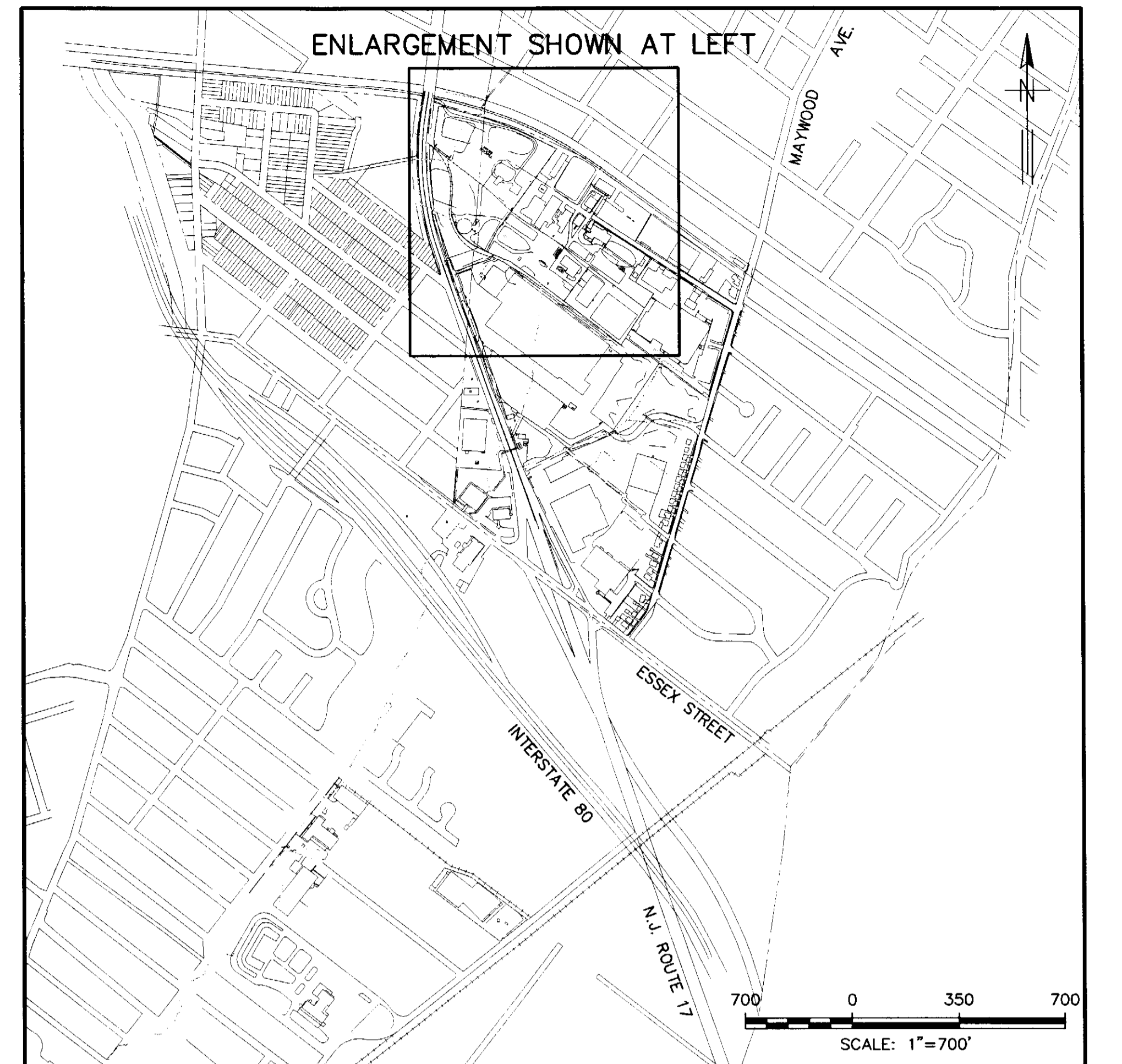
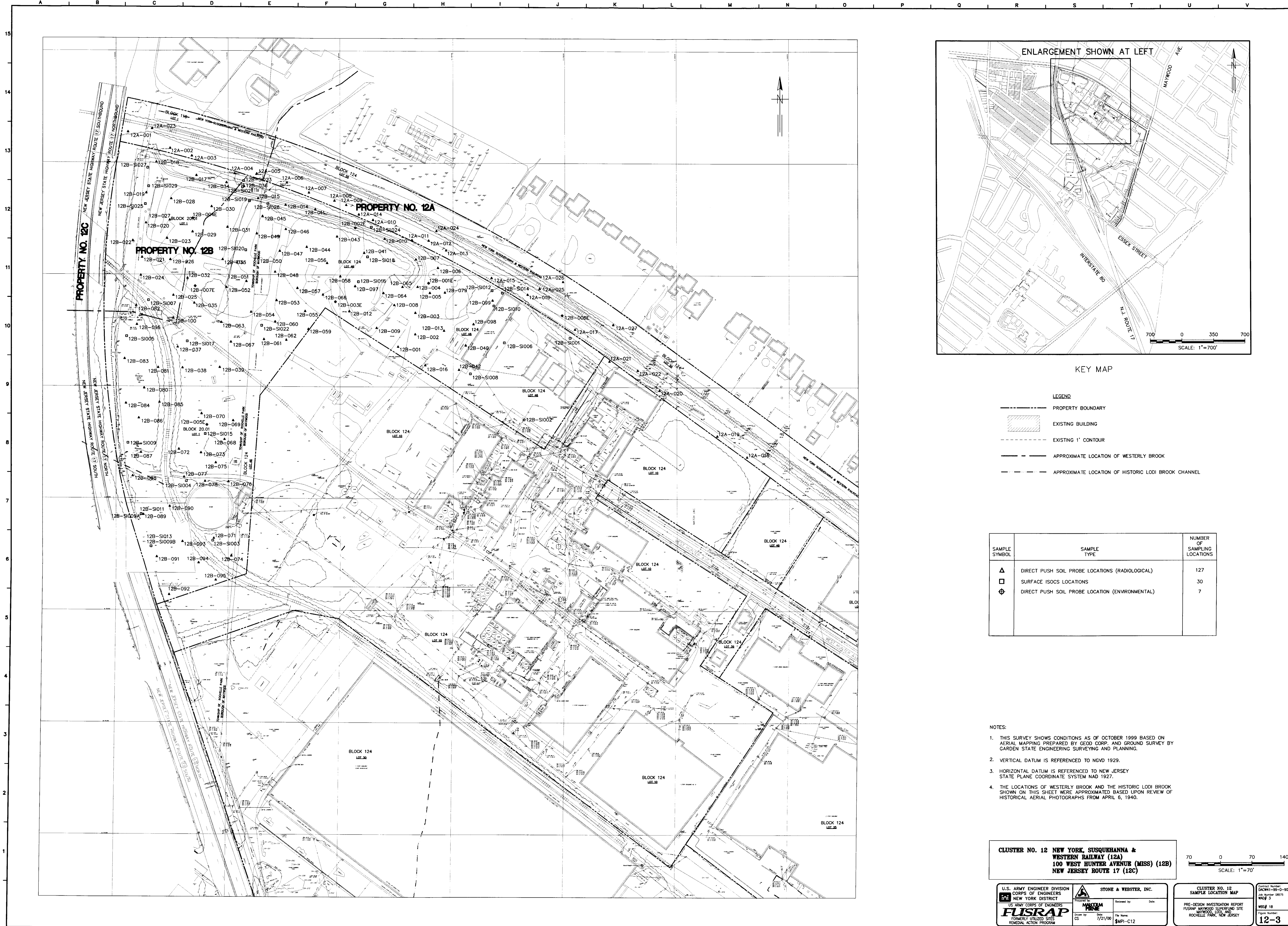
PDI REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND
ROCHELLE PARK, NEW JERSEY

Contract Number:
DACW41-99-D-9001

Job Number 08575
WAD# 3

WBS# 18

Figure Number:
FIGURE 12-2



KEY MAP

LEGEND

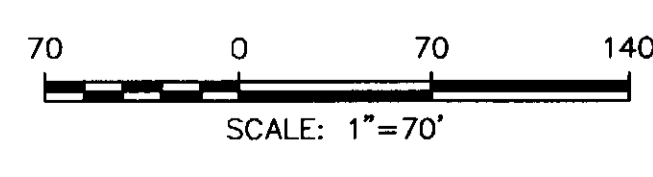
	PROPERTY BOUNDARY
	EXISTING BUILDING
	EXISTING 1' CONTOUR
	APPROXIMATE LOCATION OF WESTERLY BROOK
	APPROXIMATE LOCATION OF HISTORIC LODI BROOK CHANNEL

SAMPLE SYMBOL	SAMPLE TYPE	NUMBER OF SAMPLING LOCATIONS
▲	DIRECT PUSH SOIL PROBE LOCATIONS (RADIOLOGICAL)	127
□	SURFACE ISOCs LOCATIONS	30
⊕	DIRECT PUSH SOIL PROBE LOCATION (ENVIRONMENTAL)	7

NOTES:

- THIS SURVEY SHOWS CONDITIONS AS OF OCTOBER 1999 BASED ON AERIAL MAPPING PREPARED BY GEOD CORP. AND GROUND SURVEY BY GARDEN STATE ENGINEERING SURVEYING AND PLANNING.
- VERTICAL DATUM IS REFERENCED TO NGVD 1929.
- HORIZONTAL DATUM IS REFERENCED TO NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 1927.
- THE LOCATIONS OF WESTERLY BROOK AND THE HISTORIC LODI BROOK SHOWN ON THIS SHEET WERE APPROXIMATED BASED UPON REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS FROM APRIL 6, 1940.

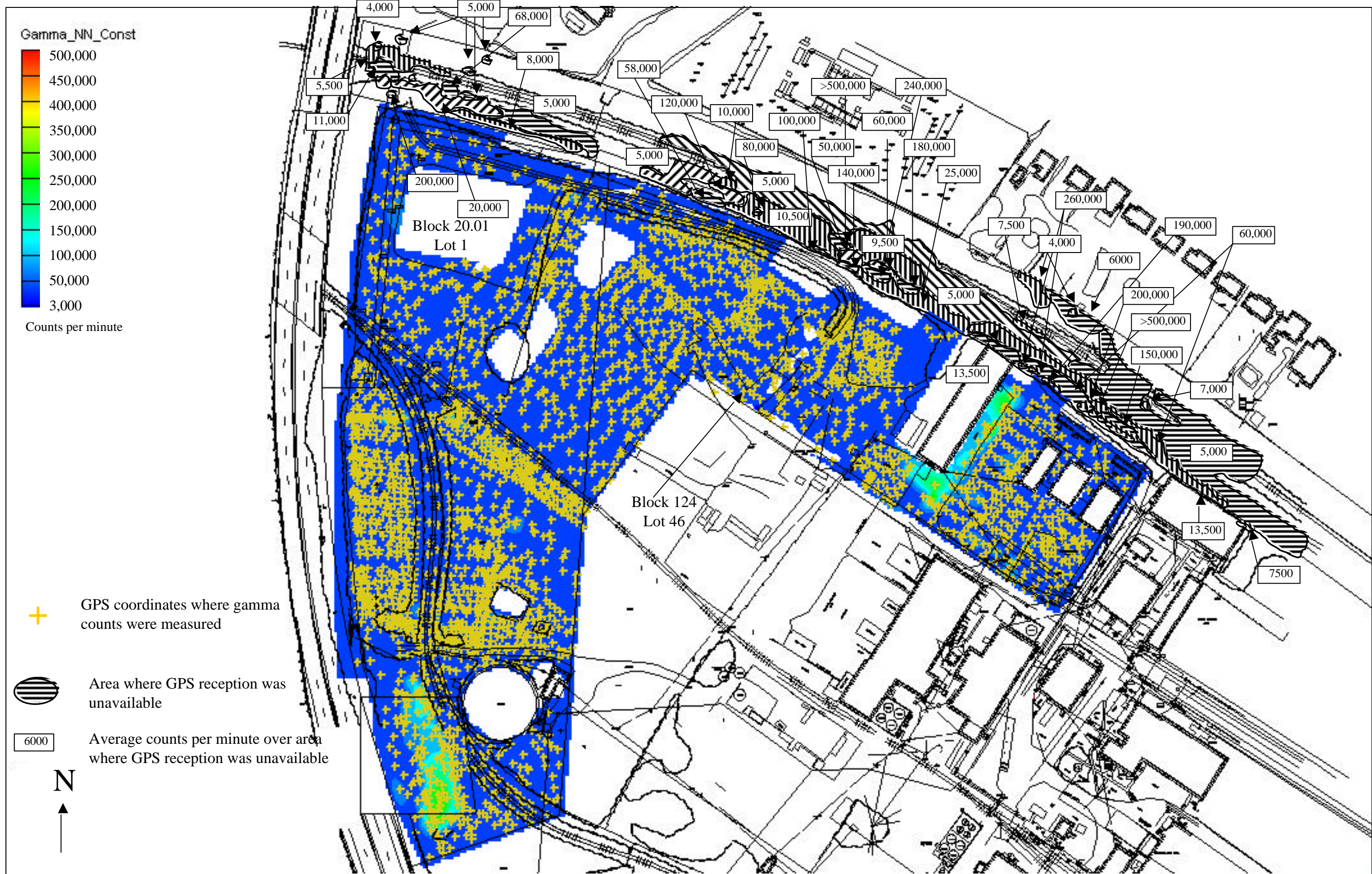
CLUSTER NO. 12 NEW YORK, SUSQUEHANNA & WESTERN RAILWAY (12A) 100 WEST HUNTER AVENUE (MSS) (12B) NEW JERSEY ROUTE 17 (12C)



U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
NEW YORK DISTRICT
FUSRAP
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

STONE & WEBSTER, INC.
Prepared by: [Blank] Date: [Blank]
Reviewed by: [Blank] Date: [Blank]
Drawn by: [Blank] Date: 7/21/00
CS: [Blank] File Name: [Blank] MPI-C12

CLUSTER NO. 12
SAMPLE LOCATION MAP
PRE-DESIGN INVESTIGATION REPORT
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, COOK AND
ROCHELLE PARK, NEW JERSEY
Contract Number: DCMH-99-G-9001
Job Number: 0615
WAGJ 3
WBS# 18
Figure Number:
12-3



Lower Contour Limit = 1.5 X Background = 1.5 X 2000 = 3000 counts per minute
Upper Contour Limit = Highest measurement across entire Maywood Site: approx. 500,000 counts per minute

Property Cluster No. 12: New York, Susquehanna & Western Railway
100 West Hunter Ave. (MISS)
Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 12-4

APPENDIX 12-A

Variations from the PDI Work Plan

**Letters Informing EPA and NJDEP of Use of Geoprobes⁰
In Lieu of Downhole ISOCS**



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF

December 8, 1999

Programs and Project Management Division

Ms. Angela Carpenter
Remedial Project Manager
Federal Facilities Section
U.S. Environmental Protection Agency, Region II
290 Broadway
New York, NY 10007-1866

Dear Ms. Carpenter:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in your December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

2. Down-hole gamma logging will be accomplished by suspending a Bicron 3/8-inch x 3/8-inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. During extraction of the outer casing, 30-second gamma counts will be collected at 6-inch increments allowing for measurements in uncased probe holes.
3. Each soil probe hole will be backfilled for the full length using grout.

The sealed PVC containers will be transported to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. Sample documentation will also include the preparation of a soil probe log including:

- all pertinent field documentation
- soil probe identification number
- soil probe location
- soil column classification
- photographic documentation.

The field screening for radiological activity will be performed on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of the soil core.

In addition, the soil cores will be screened for total organic vapors using a photo-ionization detector (PID). A series of small perforations will be made through the acetate liner at 12-inch increments. Prior to storage, these perforations will be sealed with tape.

5. A **minimum** of three separate soil samples based on field radiological screening will be selected for analysis of the radionuclides of concern (ROC) Thorium-232, Radium-226, and Uranium-238. One soil sample will be taken at the highest gamma log measurement location (suspected FUSRAP waste); a second soil sample where the gamma log measurements approach a constant value (suspected transition zone); and a third soil sample within the zone of constant gamma log measurements (below suspected transition zone). **Additional samples may be taken as required.**
6. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
7. Each soil core will be placed into the PVC containers, labeled and stored in Building 76 for storage and future reference.

8. Analysis for ROC will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
9. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a certified off-site laboratory for confirmatory ROC analysis.
10. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.

We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Donna Gaffigan, NJDEP



DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

December 8, 1999

REPLY TO
ATTENTION OF

Programs and Project Management Division

Ms. Donna Gaffigan
Case Manager
Bureau of Case Management
New Jersey Department of Environmental Protection
401 E State St
Trenton, NJ 08625-0600

Dear Ms. Gaffigan:

This letter serves to inform you of our desire to modify the field portion of our Pre-Design Investigation Work Plan (PDIWP), dated October 22, 1999, for the Maywood FUSRAP Superfund Site. This modification is based on recent discussions between the New Jersey Department of Environmental Protection (NJDEP), U.S Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (USACE) concerning the use of downhole gamma spectrometry utilizing the In Situ Operating Counting System (ISOCS). *Conventional soil sampling, field screening, and laboratory analytical techniques are hereby proposed as the option, and probable methodology, to delineate the subsurface limits of FUSRAP waste.* The revised approach is detailed in Stone & Webster Standard Operating Procedure (SOP) number SW-MWD-509-0 entitled "*Soil Probe Investigation.*" This SOP will be added to Appendix A in the Field Sampling Plan of the Chemical Data Quality Management Plan (CDQMP) and is attached as Enclosure 1. USACE still intends to use the surface ISOCS unit to fill data gaps from previous sampling at the site for surface soils. USACE will address USEPA concerns in USEPA's December 1, 1999, letter under separate cover.

The conventional method proposed for subsurface characterization is for use at both the 1-inch diameter borehole and 4-inch diameter push pipe locations given in the PDIWP. The investigations at the 1-inch borehole locations were originally proposed to extend to a maximum

depth of five feet. Further review of historic investigations indicate that a number of these locations may require deeper radiological investigation. A revised version of Table 5-1, from the PDIWP entitled "Summary of PDI Soil Samples and Analyses," reflecting the new approach is attached as Enclosure 2. Included in Table 5-1 are the anticipated depths for all soil probe investigations.

It should be noted that all other radiological (including surface exposure rate scan, surface ISOCS measurement), geotechnical, and environmental procedures discussed in the PDIWP are not affected by this modification.

The following outlines *the proposed conventional method of radiological investigation*:

1. The 137 designated 1 one-inch diameter borehole locations with downhole gamma counting and the 636 4-inch diameter push-pipe locations with downhole ISOCS measurements will be designated as simply "soil probes." A total of 773 soil probes will be advanced using the direct-push method.

Each soil probe will be advanced using the direct-push method with probe rods as outer casing (i.e., Geoprobe® with Dual Tube Soil Sampler).

Each 4-foot soil core sample will remain in the acetate liner and marked with the appropriate field identification number, sealed with rubber end caps, and placed into a designated (two-inch ID) PVC container for storage. Pertinent sample data will also be marked on the PVC container. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.

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We believe from our past discussions that this approach is acceptable. As such, we plan to proceed with the conventional option on or about January 5, 2000.

If you have any questions, please call me at 212-264-0120 or call my Design Manager, Glen Shonkwiler, at 816-983-3561.

ALLEN D. ROOS
Project Manager

Enclosures:

1. Soil Probe Investigation SOP
2. Revised PDIWP Table 5-1

CF: Angela Carpenter, EPA

Revisions to Standard Operating Procedure No. SW-MWD-509-0



**STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION**

TITLE:

Soil Probe Investigation

NO.:

SW-MWD-509-0

PAGE

1 of 8 plus Attachment 1

DATE:

February 2000

APPROVED:

Prepared by:

Project Chemist

Reviewed by:

PDI Task Manager

Richard Skyness 2/29/00
Project Engineer

[Signature] 2/29/00
Project Manager

1.0 PURPOSE

This Stone & Webster Standard Operating Procedure (SOP), **Soil Probe Investigation** shall be employed when collecting subsurface soil samples using the direct push soil probe method at the FUSRAP Maywood Superfund Site (hereafter referred to as the Maywood Site) properties with known or suspected soil and/or groundwater contamination.

2.0 SCOPE

This procedure details the materials, equipment, and methods common to soil probe investigation activities. Consult the site-specific project plans and work plans for proposed soil probe locations. Always consult site-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Task Manager prior to implementation and shall be documented in project field logbooks.**

3.0 REFERENCES

Stone & Webster Maywood SOP 102 - Downhole Gamma Radiation Logging

Stone & Webster Maywood SOP 307 - Surface and Shallow Subsurface Soil Sampling

Stone & Webster Maywood SOP 308 - Soil Borings and Sampling

Stone & Webster Maywood SOP 401 - Photoionization Detector (PID)

Stone & Webster Maywood SOP 504 - Labeling, Packaging, and Shipping Environmental Samples

Stone & Webster Maywood SOP 505 - Cuttings and Fluids Management

Stone & Webster Maywood SOP 506 - Decontamination

Stone & Webster Maywood SOP 507 - Field Notebook Content and Control

U.S.E.P.A., A Compendium of Superfund Field Operation Methods, Document EPA/540/P-87/001, December, 1987.

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	2 of 8

DEFINITIONS

Stone & Webster Team – personnel of the Stone & Webster Team that includes for this SOP: Stone & Webster, Malcolm Pirnie, Franklin Environmental Services, Inc., Safety & Ecology Corporation (SEC), and Garden State Surveying, Engineering and Planning, Inc. The Stone & Webster Team shall perform soil probe investigation activities, except those activities specified as performed by the Subcontractor.

Subcontractor – personnel of the direct push soil probe firm.

Direct Push Soil Probe – generic name for advancing media sampling piping/tubes with only direct mechanical force. They are typically hollow steel rods advanced using a percussive force (powered hammer) and driven directly into unconsolidated soil. There are two types of direct push soil probes. One is a single rod system (i.e., macrocore) and the other is a dual tube or cased system. The latter, which will be the method of choice for most Maywood Site investigations, utilizes two sections, an outer drive rod and an inner sampling tube. Depending upon the sampling objectives, the inner sampling tube can be inserted into the drive rods during driving or inserted through the entire length of the drive rods after the desired sample depth has been reached. Drive rods used with the cased system are usually made from a high-grade steel alloy and are retracted after sampling.

4.0 RESPONSIBILITIES

5.1 Project Manager - Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 Project Environmental Engineer - Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for direct push soil probe activities.

5.3 Project Superintendent - Designated by the Project Manager to supervise investigative activities by Stone & Webster Team and Subcontractor personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in monitoring soil probe investigation activities in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each workday. The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil probe investigation activities and deviations from this SOP.

5.4 Site Personnel (including the data logger) - Required to read and sign the Maywood Site Safety and Health Plan (SSHP), have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil probe investigation activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

5.5 Site Safety & Health Officer - Responsible for ensuring that all site workers (Stone & Webster and Subcontractor) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.6 Task Manager – Responsible to plan, implement, and closeout field work requiring direct push technology.

TITLE: Soil Probe Investigation	NO.: SW-MWD- 509-0
	PAGE 3 of 8

5.7 Subcontractor - Required to read and sign the SSHP, have current HAZWOPER and Radiation Worker training, and to follow the procedures in this SOP, unless superseded by project-specific requirements. Subcontractors shall report directly to the Task Manager or his designee.

6.0 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS FOR SOIL PROBE INVESTIGATION

The following is a list of equipment and material that is commonly used on all projects when the direct push probe technique is performed in the unconsolidated soils. Refer also to related SOP equipment and material requirements to ensure completeness.

Items required by Subcontractor:

- Direct push probe equipment - of appropriate size and direct push probe and sampling capabilities; vehicle mounted; direct push probe sampling tools used to advance boring (i.e., direct push small diameter rods; and augers, if required) equipment, labor, and supplies to maintain optimal efficiency
- Environmentally-safe lubricants
- Backfill material for probe holes, as required
- Soil sample collection and logging supplies – **See Stone & Webster Maywood SOP 308, Soil Borings and Sampling**
- Decontamination supplies - **See Stone & Webster Maywood SOP 506, Decontamination**

Items carried by Stone & Webster Team on-site personnel

- **SSHP To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Clipboard
- Pencils
- Six-foot-ruler
- Pocket knife
- Camera (optional), check with Project Manager if required
- Volatile organic compound vapor meter equipped with photoionization detector (PID) and other air surveillance monitoring equipment, as required by the SSHP
- Radiation meter
- Site boring logs
- Blank soil probe logs
- Weighted measuring tape
- Water level measuring device - **See Stone & Webster Maywood SOP 410, Groundwater Level Measurement**, Interface probe, if needed
- Paper towels
- Chain of Custody forms

7.0 DIRECT PUSH PROBE ACTIVITIES

7.1 General Considerations

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		PAGE	4 of 8

Prior to selecting the direct push probe method for a specific property, the objectives of the field investigation must be established. These property-specific objectives shall include one or more of the following Maywood Pre-Design Investigation (PDI) program objectives:

- Soil classification/evaluation - the direct push soil probe technique will be able to accommodate the collection of soils for characterization purposes.
- Characterization of hydrogeologic conditions - the direct push soil probe technique shall allow for the characterization of each stratigraphic zone, and water level measurements.
- Evaluation of soil contamination - the direct push soil probe technique shall provide the appropriate sample collection methods, must not introduce contaminants into the probe hole or otherwise alter the existing soil or groundwater chemistry, and should not result in subsurface cross contamination during or after installation of direct push probe.

7.2 Direct Push Probe Activities

Prior to commencing direct push soil probe fieldwork, several activities should be performed. These activities, which include both pre-mobilization office tasks and pre-installation field tasks, are discussed below. Once the pre-installation activities are completed, direct push soil probe installation may commence.

7.2.1 Pre-Mobilization Tasks

1. The Stone & Webster Team and Subcontractor shall acquire as much geologic and hydrogeologic information about the site as possible. This information may include possible soil and groundwater contamination present, groundwater table depths and fluctuations, surficial and bedrock geology, approximate thickness of the unconsolidated zone, depth to top of weathered rock, depth to competent rock, and site access.
2. Soil probe locations shall be marked in the field by the Stone & Webster Team with either paint or flags/stakes during pre-mobilization tasks, and surveyed using a global positioning system (GPS). The Stone & Webster Team shall check and verify that the soil probe location corresponds to the location on the project plans. The Stone & Webster Team and Subcontractor shall check to see if visible structures will prevent the completion of proposed soil probes at specific locations.
3. The Stone & Webster Team shall communicate with the Subcontractor regarding the requirements of the direct push soil probe program and required geologic and environmental information. Inform the Subcontractor of the environmental sampling program that the project shall follow. This information includes sampling frequency, sampling depths, type of sample required (soil or groundwater), the length of casing, direct push soil probe method (i.e., macrocore, dual tube, etc.), number and type of soil samplers required, and special sampling techniques. Ensure that probe hole backfill is selected in accordance with the project specifications.
4. The Subcontractor shall ensure that all utilities in the vicinity of the proposed boring(s) have been cleared by the appropriate authorized parties (e.g., New Jersey One-Call System at 1-800-272-1000, owner, etc.) or, if utilities exist, are visibly marked on the ground surface in the area of the proposed boring. In addition, keep a safe working distance (pursuant to OSHA) from overhead utilities. **NOTE: The party responsible for having utilities cleared shall be identified. If the responsible party is not clearly identified then the Task Manager shall establish the responsible party. Ensure that utilities have been cleared prior to installation of soil probe.**

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		PAGE	5 of 8

7.2.2 Pre-Installation Field Tasks

Sampling equipment shall be decontaminated prior to use, using pressure or manual washing of the rig, direct push soil probe, and tools, as required to prevent introducing off-site contamination. The direct push soil probe related equipment shall be decontaminated on site prior to direct push soil probe activities. Refer to **Stone & Webster Maywood SOP 506, Decontamination** for specific instructions.

7.3 General Direct Push Soil Probe Method Procedures

The following sections outline general direct push soil probe procedures used in unconsolidated soil materials.

1. Assuming a vertical soil probe, the Subcontractor shall set the direct push rig over the proposed soil probe location. Level the direct push rig and ensure that the direct push rods used to advance the soil probe are in a vertical position directly above the hole.
2. The inspecting Stone & Webster Team shall obtain and record measurements of tools to be used for direct push probe operations. Down-hole measurements taken by the Subcontractors shall be to the nearest 0.1 foot.
3. The Subcontractor shall begin sampling or advancement of soil probe to the desired depth utilizing the direct push method described below. Samples shall be taken using the steps described in Section 8.1.1.
4. When the direct push advancement tools are lowered into the probe hole, the Stone & Webster Team shall keep track of tool lengths to check Subcontractor's stated depth of soil probe.
5. The Stone & Webster Team shall make certain that the Subcontractor is performing depth measurements with a ruler and known tool lengths and not visually judging ("eyeballing") casing and tool projections above the ground. The Stone & Webster Team shall maintain a mental note of depth to bottom of soil probe by keeping track of the linear feet of tools in and above the ground. By mentally subtracting the "stick-up" above the ground, the Stone & Webster Team can maintain a constant approximate check on the soil probe depth and Subcontractor's indicated depths.
6. The breathing zone shall be screened by a designee of the Stone & Webster Team Site Safety and Health Officer for total volatile organic vapors using an organic vapor analyzer as outlined in the SSHP. A lower explosive limit meter (LEL) shall be employed if required in SSHP. Record the measured readings at the depth and time of reading on the boring log.
7. During direct push probe activities, both the Stone & Webster Team and Subcontractor shall record production, mechanical and/or sampling difficulties and the sequence of activities. Also record rig mobilization time, rig set-up time, and probe commencement and completion times. This information should be recorded in a field log book. The Stone & Webster Team shall also record pertinent details on the soil probe log (See Attachment A for blank soil probe log).
8. Refusal of direct push probe advancement tools (i.e., casing refusal) is defined as when the probe hole cannot be advanced using regular advancement methods. Generally, refusal can be identified by the following characteristics:
 - Advancement of probe hole is not noticeable or is very slow
 - A change in the frequency/pitch of the direct push probe equipment
 - The direct push probe downpressure may be significantly higher than under "normal" conditions. The direct push rig may be lifted off the ground surface.
9. If refusal is encountered in the soil probe, refer to **Stone & Webster Maywood SOP 308, Soil Borings and Sampling** for specific instructions. If the probe hole cannot be advanced, relocate the probe hole within approximately 5 feet distant from the original location and start with the

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	6 of 8

work in Section Paragraph 7.2.1. Measure the distance and direction from the original location, and record this information in the field logbook. The actual distance of movement necessary may be greater depending on the site conditions. If the required movement is greater than 5 feet, contact the Task Manager for direction.

10. Downhole gamma radiation logging will be performed, *where feasible* by the Stone & Webster Team as described in Section 8.1.1 below (**See Stone & Webster Maywood SOP 102, Downhole Gamma Radiation Logging**).
11. When the probe hole is completed and the area is cleaned up, all contaminated equipment, including down-hole tools, hand tools, and direct push rig shall be decontaminated by the Subcontractor (**See Stone & Webster Maywood SOP 506, Decontamination**) and as directed by the Radiation Safety Officer (RSO).
12. The Stone & Webster Team shall record the soil probe location on the project drawings.

8.0 METHOD-SPECIFIC SOIL SCREENING AND SAMPLING

In this section, the soil screening and sampling procedure for the direct push soil probe method is described.

8.1 Direct Push Probe Services

The direct push probe rig is a hydraulically powered percussion/direct push machine used for small diameter subsurface investigations. It can obtain continuous soil cores, discreet soil samples, groundwater samples and vapor samples along with installation of permanent sparge points.

8.1.1 Procedures for Screening and Sampling Direct Push Probe Soil Samples

Following is the procedure to be used at the Maywood Site for screening and sampling direct push probe soil cores.

1. Each 4-foot soil core sample will remain in the polyvinyl chloride/polyethylene terephthalate (PVC/PETG) liner and marked with the appropriate field identification number, sealed with rubber end caps for liners, and placed into a designated (2 inch ID) PVC container (including PVC end caps) supplied by the Subcontractor for storage. Pertinent sample data will also be marked on the PVC container.
2. Downhole gamma logging will be accomplished, *where feasible* by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.
3. Each soil probe hole will be backfilled for the full length, in accordance with project requirements.
4. The sealed PVC containers will be transported by the Stone & Webster Team to a dedicated location in Building 76 at the Maywood Interim Storage Site (MISS) for sample documentation, field screening, and sampling. All Building 76 sample documentation, field screening, and sampling tasks shall be performed by the Stone & Webster Team. Sample documentation will include the preparation of a soil probe log containing the following pertinent field documentation: soil probe identification number and location; soil column description; soil screening data, and photo-documentation. **Stone & Webster Maywood SOP 507, Field Notebook Content and Control**, shall be followed. Sample documentation information shall be recorded electronically.
5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each

TITLE:	Soil Probe Investigation	NO.:	SW-MWD-509-0
		PAGE	7 of 8

soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integration taken at each marked location and recorded.

6. The soil cores will then be screened for total volatile organic vapors using a PID (see **Stone & Webster Maywood SOP 401, Photoionization Detector (PID)**). A series of small perforations will be made through the liner at 12-inch increments.
7. The soil cores will be described generally in accordance with the Unified Soil Classification system, based on visual observations through the liners and soil extracted from the small perforations. Prior to storage, these perforations will be sealed with tape. The soil descriptions developed will be marked with an "FC" note to define the description as a field classification.
8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.
9. Each extracted section of the soil core will be replaced with a spacer to preserve the integrity of the soil core. The spacer will be labeled with the sample identification number of the soil removed for testing.
10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.
11. Extracted samples shall be prepared in accordance with the Safety and Ecology Corporation (SEC) on-site field laboratory soil preparation practice/SOP.
12. Analysis for ROC on extracted sections of the soil core will be performed by the existing on-site field laboratory, using a Canberra high purity germanium detector, or equivalent. All testing in the on-site field laboratory will be completed in accordance with the procedures outlined in the CDQMP.
13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.
14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.
15. Sampling tools will be decontaminated before each boring, after collecting each soil sample, and after each boring.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term "blind duplicates"), thus eliminating potential bias in the test measurement.

TITLE: Soil Probe Investigation	NO.: SW-MWD-509-0
	PAGE 8 of 8

If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.

ATTACHMENT 1

PDI SOIL PROBE LOG SHEET				
FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator		XXX		
Activity Designator		AAA		PDI
Field Measurement/Sample Collection Designator		VV		SP
Station Number		N N N		
Media		m m		SB
Sample Type		n		
Sequential Sample Number		# # # # #		(see Below)
		Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location				
		Gamma Logging		Photoionization Detector (PID) Logging
		Down Hole	Core	
Date				Date
Time				Time
Logger				Logger
Detector Model #			SPA-3	PID Model #
Detector Serial #			CENAN 33401	PID Serial #
Scaler Model #			2224	
Scaler Serial #			132842	
Comments: 1. MPI No. _____. 2. Direct-push location grouted with BenSeal.				
<div style="display: flex; justify-content: space-between; align-items: center; margin-top: 100px;"> <div style="width: 40%; text-align: center;"> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> Signature (Down Hole Gamma Logging) </div> <div style="width: 20%; text-align: center;"> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> Date </div> </div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 20px;"> <div style="width: 40%; text-align: center;"> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> Signature (Core Gamma Logging) </div> <div style="width: 20%; text-align: center;"> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> Date </div> </div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 20px;"> <div style="width: 40%; text-align: center;"> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> Signature (PID Logging) </div> <div style="width: 20%; text-align: center;"> <hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> Date </div> </div>				

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)									
					X	X	X	#	#	#	#	#	#	
0.0														
0.5														
1.0														
1.5														
2.0														
2.5														
3.0														
3.5														
4.0														
4.5														
5.0														
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23.5														
24.0														

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 G:\3674009\PDI Report\AppdxA\SOP509FINAL.doc

TABLE 1-A: REVISIONS TO SOP SW-MWD-509-0

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>Section 8.1.1 Procedures for Screening and Sampling Direct Push Soil Samples 2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a Bicon 3/8- inch x 3/8- inch sodium iodide gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler down the cased soil probe hole. The detector shall be positioned below the bottom of the casing to allow gamma log readings in the uncased portion of the probe hole. The casing shall be extracted at 6-inch increments and a 30-second count reading shall be taken at each increment.</p>	<p>2. Downhole gamma logging will be accomplished, <i>where feasible</i> by suspending a 1-inch x 1-inch sodium iodide gamma detector (sealed in a waterproof stainless steel container) down the cased soil probe hole. The sodium iodide detector preamplifier is connected via a cable to a signal splitter, through a preamplifier, and ultimately to a Canberra Industries Inspector™ multi-channel analyzer/amplifier/high voltage power supply. The system is controlled, and the data stored, via a notebook computer. Gross gamma measurements shall be recorded at each 6-inch increments in the cased soil probe hole.</p>	<p>Cabrera Services, Inc. developed this procedure as a cost effective site characterization method. Better sensitivity of the 1-inch x 1-inch detector used by Cabrera Services, Inc. allows gross gamma measurements through the soil probe casings, thereby increasing soil probe production rates.</p>	<p>January 11, 2000, without waterproof container. Sealed solid casing installed following extraction of MacroCore or Dual Tube system. January 28, 2000, with waterproof container. Eliminated need of sealed solid casing.</p>
<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the acetate liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The acetate liner shall be marked off at 6-inch intervals. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Readings shall consist of 10-second integrations taken every six inches and recorded.</p>	<p>5. The field screening for radiological activity will be performed by the Stone & Webster Team on the soil core contained in the PVC/PET liner. A collimated Ludlum 4410, 2-inch x 2-inch sodium iodide detector will be used to screen the samples. The detector will be positioned approximately one half inch above the soil core, on a guide, to ensure that this distance is maintained over the entire length of each soil core. Continuous scanning of the soil core will be performed at an approximate rate of 3 inches per second. The liner will be marked using an indelible markers at elevated readings. Readings shall consist of 30-second integrations taken at the marked locations and recorded.</p>	<p>Continuous scanning of the soil core provides complete coverage, longer counting time at the regions of interest, and minimizes redundancy of the downhole gamma measurements.</p>	<p>January 11, 2000</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>8. A minimum of three soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238 based on field radiological screening and gamma logging values. At a minimum, one soil sample will be taken at the highest reading location (suspected FUSRAP waste); a second soil sample shall be collected where the readings approach a constant value (suspected transition zone); and a third soil sample shall be collected within the zone of constant readings (below suspected transition zone). Additional samples may be taken based on the Task Manager's direction.</p>	<p>8. Soil samples will be selected from each direct push location, for analysis of the radionuclides of concern (ROC), Thorium-232, Radium-226, and Uranium-238, based on previous characterization data, soil description, and evaluation of downhole and core sample radiological gamma logging values. One soil sample shall be collected at the highest reading location (suspected FUSRAP waste, if present); one soil sample shall be collected where the readings approach a constant value (suspected transition zone, if present); and one soil sample shall be collected within the zone of constant readings (below suspected transition zone/native soil). Elimination of samples, archiving samples collected in native soil for future analysis, and collection of additional samples will be based on the Task Manager's direction.</p>	<p>Suspected FUSRAP waste and suspected transition zones may not be present in each direct push location.</p>	<p>Selection of archived samples began February 21, 2000.</p>
<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored in Building 76 for future reference.</p>	<p>10. After screening and sampling, each soil core will be placed back into the appropriate PVC container and stored for future reference.</p>	<p>Based on laboratory analysis there may be the need to collect additional samples from the stored soil cores.</p>	<p>January 11, 2000</p>
<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to a USACE-certified off-site laboratory, for confirmatory ROC analysis. Soil samples shall be placed in labeled containers provided by the laboratory, then placed in coolers maintained at 4°C. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>13. Ten percent of the samples analyzed by the on-site field laboratory will be sent to an USACE-certified off-site laboratory, for confirmatory ROC analysis. Sampling, labeling, and shipping will be completed in accordance with the procedures outlined in the CDQMP.</p>	<p>Samples will be sealed in containers provided by the SEC on-site field laboratory.</p> <p>Preservation (i.e., 4°C) is not required for ROC analysis.</p>	<p>February 28, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
<p>14. Following analysis by the on-site and off-site laboratories, all soil samples will be returned to Building 76 for storage and future reference.</p>	<p>14. Following analysis by the on-site and off-site laboratories, soil samples will be returned to the FUSRAP Maywood Superfund Site for storage and future reference.</p>	<p>Sample storage will be returned to the FUSRAP Maywood Superfund Site for future disposition.</p>	<p>January 11, 2000</p>
<p>9.0 QUALITY ASSURANCE/QUALITY CONTROL Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment rinsate blanks and duplicates. Equipment rinsate blanks must be collected each day that sampling occurs or each decontamination event, whichever is less, per matrix per parameter per field crew, per equipment type (assuming reusable sampling equipment is used). This QA/QC requirement may be modified based on conversations with USACE, USEPA, and NJDEP. Field duplicate samples must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement. Field duplicate samples must represent no less than 10 % of the total number of samples per matrix per parameter per area of study. Field duplicate gamma radiation readings shall also be recorded at a frequency of 10% of the total gamma radiation readings.</p> <p>Matrix spike/matrix duplicate (MS/MD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat</p>	<p>Quality control guidelines described in Section 1.0 of the Maywood Field Sampling Plan (part of the CDQMP) shall be followed. Field QC sample types include equipment blanks and duplicates. Equipment blanks consist of swipe samples collected from dedicated and/or decontaminated equipment. One swipe sample per day will be collected during the first five days of operation. The swipes will be analyzed for loose surface alpha radioactivity at the on-site field laboratory. Field duplicate samples will be collected at a frequency of 5%. Field duplicate gamma radiation readings shall also be recorded at a frequency of 5% of the total gamma radiation readings. Field duplicate samples sent to the off-site laboratory must be identified or numbered so that the laboratory does not know the samples are duplicates (thus the term “blind duplicates”), thus eliminating potential bias in the test measurement.</p> <p>If applicable, matrix spike/matrix spike duplicate (MS/MSD) for radionuclides are laboratory QC samples that will be collected in the field. The laboratory shall treat no less than 5% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given</p>	<p>Swipe sample is a more representative QC check of loose surface alpha radioactivity than aqueous rinsate sample.</p> <p>Reduction from 10% to 5% duplicate samples based on large number of soil samples proposed for PDI. In addition, 5% is consistent with NJDEP Field Sampling Procedures Manual for field duplicates and EPA guidelines for MS/MSD analysis. Electronic mail sent to EPA and NJDEP regarding reduction in duplicate percentage on January 28, 2000.</p>	<p>Equipment blank revision implemented on January 11, 2000.</p> <p>Reduction from 10% to 5% duplicate samples implemented week of February 7, 2000.</p>

SOP SW-MWD-509-0	SOP SW-MWD-509-0 REVISION	RATIONALE	DATE IMPLEMENTED
no less than 10% of all samples (per matrix) as MS/MD pairs, analyze at least one blank spike (or LCS) for a given method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.	method per matrix per sample batch (a sample batch contains a maximum of 20 environmental samples), and analyze method blanks every 12 hours of analysis time or every batch, whichever is more frequent.		

Revised PDI Work Plan Table 5-1

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

PROPERTY CLUSTER NUMBER ⁽⁸⁾	NUMBER OF SAMPLING LOCATIONS						NUMBER OF SAMPLES FOR ANALYSIS BY PARAMETER ⁽⁶⁾								
	RADIOLOGICAL SURVEY				GEOTECH	ENVIR	GEOTECHNICAL					CHEMICAL ANALYSES			
	SOIL PROBES ⁽¹⁾	SOIL PROBE DEPTHS (FT) (ESTIMATED)	SOIL PROBE RADIOLOGICAL ANALYSES ⁽²⁾	SURFACE SOIL RADIOLOGICAL ANALYSES ⁽³⁾	SOIL BORINGS ⁽⁴⁾	SOIL BORINGS ^(4,5)	SPECIFIC GRAVITY	ATTERBERG LIMITS	GRAIN SIZE	TRIAXIAL TESTS ⁽⁷⁾	CONSOLID. TESTS ⁽⁷⁾	WATER CONTENT	CHROMIUM SPECIATION	TCL/TAL	FULL RCRA CHAR.
1	13	12	39	5	3	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
2	96	16	288	50	22	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
3	10	8	30	5	2	1	TBD	TBD	TBD	TBD	TBD	TBD	1	1	1
4	32	12	96	15	4	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
5	79	8	237	40	8	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
6	85	16	255	40	12	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
7	28	16	84	15	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
8	26	16	78	15	6	3	TBD	TBD	TBD	TBD	TBD	TBD	3	3	3
9	131	16	393	65	17	5	TBD	TBD	TBD	TBD	TBD	TBD	5	5	5
10	106	24	318	55	16	6	TBD	TBD	TBD	TBD	TBD	TBD	6	6	6
11	16	8	48	10	4	2	TBD	TBD	TBD	TBD	TBD	TBD	2	2	2
12	151	24	453	75	17	8	TBD	TBD	TBD	TBD	TBD	TBD	8	8	8
TOTALS	773	N/A	2319	390	115	47	---	---	---	---	---	---	47	47	47

NOTES:

- 1 Soil probes installed using direct-push method, to the depth shown or refusal.
- 2 At a minimum, three separate soil samples (one soil sample from within the suspected FUSRAP waste, one in transition zone, and one below the transition zone) will be selected for analysis of the ROC by the on-site field laboratory. A total of 2319 subsurface soil samples (i.e., 3 X 773) will be selected for ROC analysis by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 3 Five surface soil samples will be randomly collected from up to 10% of the 773 soil probe locations for radiological analyses and comparative evaluation of surface ISOCs measurement. A total of 390 surface soil samples (i.e., 5 X 78) will be selected for ROC analyses by the on-site field laboratory. Ten percent analyzed by the certified off-site laboratory for confirmatory ROC analysis.
- 4 Depths and quantities to be determined in field based on radiological data, structure foundations depths, etc.
- 5 Advanced to depth of radiological contamination.
- 6 Sample Analyses Rationale:
 - 6a Chromium Speciation - Speciation of trivalent and hexavalent chromium for health and safety purposes.
 - 6b TCL/TAL - Detection of organic and inorganic constituents to assess the potential for the presence of commingled radiological and chemical contamination.

**PDI WORK PLAN
MAYWOOD SITE**

TABLE 5-1: SUMMARY OF PDI SOIL SAMPLES AND ANALYSES

6c	RCRA Characteristics - To support transportation & disposal activities
6d	Geotechnical Parameters (Specific Gravity, Atterberg Limits, Grain Size, Water Content) - To characterize physical properties of soil for excavation and remediation.
7	Triaxial tests and consolidation tests will be performed on undisturbed tube samples to determine strength and consolidation parameters of fine-grained materials, where present. These parameters will be used to perform bearing capacity and settlement analyses where excavations are adjacent to structures.
8	Property Clusters are defined as follows: <i>PROPERTY CLUSTER NO. 1: 72 SIDNEY ST. (A.K.A 88 MONEY ST.)</i> <i>PROPERTY CLUSTER NO. 2: 100, 80 HANCOCK ST., 80 INDUSTRIAL RD., AND NJVIS</i> <i>PROPERTY CLUSTER NO. 3: 170 GREGG ST.</i> <i>PROPERTY CLUSTER NO. 4: 160/174 ESSEX ST., I-80 RIGHT-OF-WAY</i> <i>PROPERTY CLUSTER NO. 5: 99 ESSEX ST, 113 ESSEX ST., 200 ROUTE 17 SOUTH</i> <i>PROPERTY CLUSTER NO. 6: 29 ESSEX ST., 85-101 ROUTE 17 NORTH, 137 ROUTE 17 NORTH, 167 ROUTE 17 NORTH, 239 ROUTE 17 NORTH</i> <i>PROPERTY CLUSTER NO. 7: 111 ESSEX ST. - SCANEL/HACKENSACK AND LODI RAILROAD</i> <i>PROPERTY CLUSTER NO. 8: 23 WEST HOWCROFT RD.</i> <i>PROPERTY CLUSTER NO.9: 149-151 MAYWOOD AVE.</i> <i>PROPERTY CLUSTER NO.10: 100 W. HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.11: 205 MAYWOOD AVENUE AND 50 & 61 WEST HUNTER AVE.</i> <i>PROPERTY CLUSTER NO.12: 100 W. HUNTER AVE., NY, SUSQUEHANNA AND WESTERN RAILROAD, AND NJ ROUTE 17</i>

Rationale of Intrusive Sample Location Relocations

PDI Soil Probe Variance Log

Cluster No.: 12

Property Addresses: Property No. 12A – New York, Susquehanna & Western Railway (NYS&W)
Property No. 12B – Maywood Interim Storage Site (MISS)
Property No. 12C – New Jersey (NJ) Route 17

Sample Location Map: Figure 12-3

Number of Revised Soil Probe Locations: 44

Rationale for Revisions

Geoprobe locations on the Cluster No. 12 properties were extensively field-revised for several reasons. There is a ditch with steep side slopes north of the NYS&W Railway extending east from NJ Route 17 to approximately 136 Central Avenue (across from Stepan Building 76). From this point (i.e., across from Building 76) and extending further east, a mound with steep side slopes forms the northern boundary, continuing to the eastern edge of the property. Both the ditch and the mound are inaccessible due to the steep slopes. Based on field checks with a portable gamma meter, sample points were relocated to accessible areas with locally elevated gamma counts. Specific revisions to sample locations are as follows:

- 12A-001 – Moved from north side of tracks (inaccessible ditch) to an elevated gamma count area on the south side
- 12A-002 – Moved about 25 feet northeast to an area exhibiting elevated gamma counts
- 12A-003 – Moved about 15 feet northeast to an area exhibiting elevated gamma counts
- 12A-009 – Moved south about 25 feet to an area exhibiting elevated gamma counts
- 12A-013 – Moved south about 10 feet to an area exhibiting elevated gamma counts
- 12A-014 – Moved north about 15 feet to an area exhibiting elevated gamma counts
- 12A-015 – Moved from south side of tracks (close to rail line) to an area exhibiting elevated gamma counts slightly west of Building 76
- 12A-016 – Moved from north side of tracks to an area exhibiting elevated gamma counts slightly east of Building 76
- 12A-017 – Moved slightly southeast, approximately 100 feet, to an area exhibiting elevated gamma counts behind trailers
- 12A-018 – Moved from north side of tracks (off steep mound) to an area exhibiting elevated gamma counts on south side of tracks
- 12A-019 – Moved from north side of tracks (off steep mound) to an area exhibiting elevated gamma counts on south side of tracks

- 12A-020 – Moved slightly west to an area exhibiting elevated gamma counts
- 12A-021 – Moved slightly east to an area exhibiting elevated gamma counts
- 12B-010 – Moved off building rubble and debris pile
- 12B-019 – Moved east slightly away from gas line
- 12B-022 – Moved east slightly away from gas line
- 12B-023 – Moved about 200 feet northwest from inaccessible area (under tree) to area with sparse coverage
- 12B-034 – Moved north about 20 feet to an area exhibiting elevated gamma counts
- 12B-041 – Moved about 15 feet west to an area exhibiting elevated gamma counts
- 12B-065 – Moved about 15 feet south off debris pile
- 12B-082 – Moved about 50 feet east off gas line and away from drain pipe
- 12B-097 – Moved southwest about 20 feet to an area exhibiting elevated gamma counts
- Locations 12012, 12013, 12043, 12052, 12053, 12056, 12057, 12058, 12075, 12160, 12163, 12165, 12166, 12168, 12171 originally proposed in the PDIWP were deleted from Property No. 12A because they were either inaccessible due to the ditch or mound, or because they became redundant given the relocation of other geoprobes
- Locations 12118, 12119, 12120, 12127, and 12134 originally proposed in the PDIWP were deleted from Property No. 12B because they became redundant given the relocation of other geoprobes
- Locations 12048 and 12085 originally proposed in the PDIWP were deleted from Property No. 12B because they are within the limits of the subsurface liner (i.e., within the trailer area)

Notes:

1. This list provides specific rationale for the relocation/deletion/addition of intrusive radiological sampling locations due to revised understanding of anticipated radiological contamination. This revised understanding was based on further review of previous data collected by others, and review of surface gamma survey and ISOCS data collected by the Team under this PDI program.
2. Base mapping used in the PDIWP (Stone & Webster, 1999a) has been revised by the Team. Accordingly, a number of intrusive sample locations needed to be relocated due to previously unforeseen physical restrictions (i.e., presence of underground utilities, unacceptable proximity to buildings/roadways, revisions to previously mapped property limits). This table is not intended to provide detailed rationale for points moved due to new mapping.

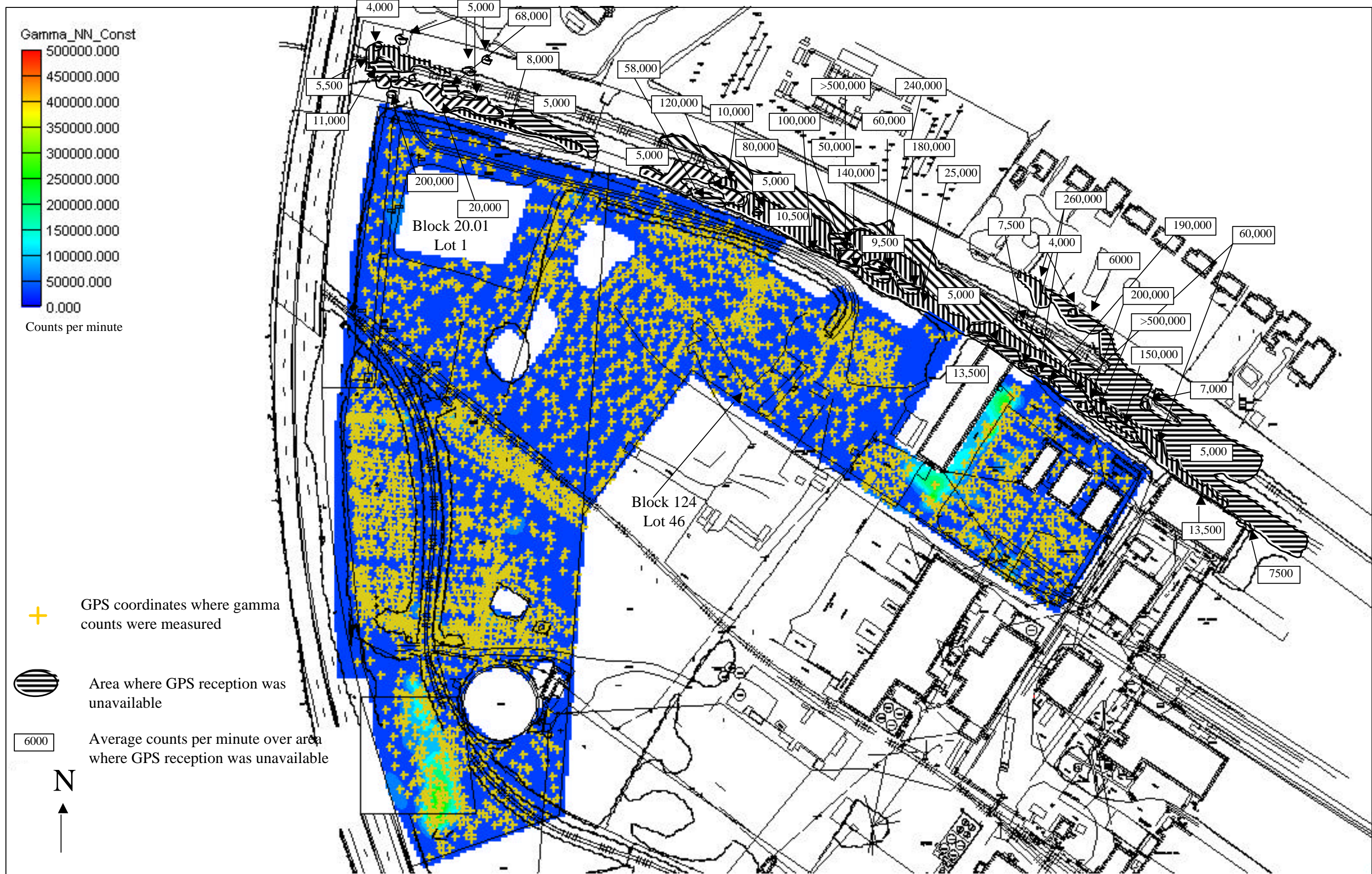
Outlier Protocol (Gamma Scan Anomalies)

Protocol for Addressing Gamma Scan Anomalies (Outliers)

Maywood FUSRAP Superfund Site

Pre-Design Investigation

1. Anomalous surface gamma scan measurements **greater than 2500 cpm for shielded areas (e.g. asphalt covered surfaces), or 3500 cpm for unshielded areas (e.g. bare soil) but, less than 6,000 cpm (1" x 1" NaI detector)** will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL. Note, these count rates are approximately one and one-half times background on shielded and unshielded surfaces.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization (i.e., eliminates the potential for elevated levels of radiological contamination at depth or provides adequate information on the existence of radiological contamination with depth) **will not be further investigated during the PDI.**
 - C. Anomalous areas that do not have previous data that are adequate for characterization **will only be investigated during the PDI if proposed soil probe locations can be moved to these locations without compromising the quality of the data from the proposed locations.** Additional soil probe locations **will not be added** to the program.
 - D. Anomalous areas where additional PDI investigations (based on 1.C) will be performed but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
2. Anomalous areas exhibiting a surface gamma count rate **greater than or equal to 6,000 cpm** (based on a 1" x 1" NaI detector) will be reviewed and compared with data collected during previous investigations performed by Bechtel and ORNL.
 - A. Anomalous areas will be categorized based on existence of data collected by Bechtel or ORNL. The two categories will be as follows: 1) Anomalous Areas With Previous Data, and 2) Anomalous Areas Without Previous Data.
 - B. Anomalous areas with previous data that are adequate for characterization **will not be further investigated during the PDI.**
 - C. Anomalous areas with previous data that are not adequate for characterization **will be investigated further during the PDI.** Proposed soil probe locations **will be moved** to these locations if possible, or additional soil probe locations **will be added** to the PDI program. These additional soil probes will be used to define the nature and extent of contamination within these previously unidentified areas; the quantity of additional borings is to be determined on a site-by-site basis.
 - D. Anomalous areas that require additional PDI investigations (based on 2.C) but are **located within 5 feet of existing buildings, roadways, structures** will be investigated using appropriate methods (direct push, hand augering, checking "shine" and building material, etc.).
3. All anomalous areas and their dispositions will be documented in the PDI.



**Property Cluster No. 12: New York, Susquehanna & Western Railway
100 West Hunter Ave. (MISS)**

Surface Gamma Scan Using a 1" by 1" NaI Detector (counts per minute)

Figure 12-A1

Reduction in Field Duplicate and MS/MSD Frequency

Navon, Daria

Subject: FW: Reduction in field duplicate and MS/MSD frequency request

----- Forwarded by David Doyle/Environmental/SWEC on 01/28/2000
02:54 PM -----

"Shonkwiler, Glen D NWK" <Glen.D.Shonkwiler@nwk02.usace.army.mil> on 01/28/2000
02:00:15 PM

To: "carpenter.angela@epamail.epa.gov" <carpenter.angela@epamail.epa.gov>, "dgaffica@dep.state.nj.us" <dgaffica@dep.state.nj.us>
cc: "Roos, Allen D NAN02" <Allen.D.Roos@nan02.usace.army.mil>, "Medary, Richard T NWK" <Richard.T.Medary@nwk02.usace.army.mil>, "Mellema, Doug W NWK" <Doug.W.Mellema@nwk02.usace.army.mil>, "Speckin, Paul D NWK" <Paul.D.Speckin@nwk02.usace.army.mil> (bcc: David Doyle/Environmental/SWEC)

Subject: Reduction in field duplicate and MS/MSD frequency request

Angela/Donna, with this email, USACE is notifying EPA and NJDEP of our intent to reduce the number of field duplicates and MS/MSD samples required in the Maywood Chemical Site CDQMP for the PDI sampling from 10% to 5%. The 10% frequency is a USACE-internal QC standard which USACE plans to reduce based on the large number of soil samples collected during the Pre-Design Investigation (PDI). The reduction in frequency would affect field duplicate samples collected for radionuclides of concern (ROC) and analysis by the on-site field laboratory; field duplicate gamma radiation readings (both downhole and core sample); photoionization detector (PID) or flame ionization (FID) readings; and MS/MSD samples analyzed by the off-site laboratory. It is anticipated that greater than 2000 soil samples will be analyzed by the on-site field laboratory and gamma radiation and PID readings will exceed 10,000 measurements.

Five percent is consistent with the NJDEP Field Sampling Procedures Manual guideline for field duplicate samples and EPA guidelines for MS/MSD analysis. EPA Region II does not have a specific QA/QC guideline for field duplicate samples. The guideline is therefore on a case-by-case basis, in accordance with the site-specific project plans.

Please note that the 10 percent of the samples analyzed by the on-site field laboratory will still be sent to a certified off-site laboratory for confirmatory ROC analysis.

We will continue to adhere to the current 10 percent until EPA and NJ notifies USACE of its concurrence with this deviation from the CDQMP (for the PDI only). Your attention to this matter is greatly appreciated, since reduction of this QA/QC guideline will help to increase production during the Pre-Design Investigation without, in the opinion of USACE, impacting

quality and usability of the data.

Thanks,
Glen Shonkwiler
Remedial Investigations & Remedial Design Manager
Hazardous, Toxic, & Radioactive Waste Branch
U. S. Army Corps of Engineers
CENWK-EC-EA RM 610
601 E 12th St
Kansas City, MO 64106
(816) 983-3561
(816) 426-5550/5949 (fax)
glen.d.shonkwiler@usace.army.mil

APPENDIX 12-B

**PDI Soil Probe Log Sheets
(Radiological Data)**

PDI Soil Probe Log Sheet
LEGEND

List of Abbreviations:

--- = not applicable	lt = light
blk = black	MDA = minimum detectable activity
bn = brown	med = medium
cl = clay	n/r = no recovery
cnts = counts	pCi/g = picoCuries per gram
Conc. = concentration	ppm = parts per million
dk = dark	SAA = same as above
DUP = duplicate	sc = clayey sand
f = fine	sec = seconds
gm = silty gravel	sm = silty sand
gp = poorly-graded gravel	sp = poorly-graded sand
gw = well-graded gravel	sw = well-graded sand
gy = gray	tr = trace
J = estimated	U = unidentified or negative conc. less than MDA
lg = large	wht = white

List of General Comments:

- 4x4 truck-mounted model 5400 and track-mounted model 54DT Geoprobe[®] were used to collect samples. Manual direct push methodology required in areas inaccessible to truck-mounted or track-mounted direct push mobile rigs.
- Holes were grouted with BenSeal[®]
- Gamma measurements were taken at center point
- Duplicate samples marked with an "X" for duplicate were prepared by homogenizing soil above and below the center point and then separating for analysis.
- The depth listed is the center point
- Error: 2 sigma (95% confidence interval)

Tube Types

1-inch diameter = Dual Tube (actual 1.3-inch diameter)

2-inch diameter = Macro-Core[®] (actual 1.7-inch diameter)

Sample Intervals

Dual Tube – 13 inches

Macro-Core[®] – 8 inches

Manual Direct Push – 24 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607			Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Tel: (201) 226-6600 FAX: (201) 226-6660				
Site Designator	X X X		12A	
Activity Designator	A A A		PDI	
Field Measurement / Sample Collection Designator	V V		SP	
Station Number	N N N		001	
Media	m m		SB	
Sample Type	n		0	
Sequential Sample Number	#####		(See Below)	
Location		Northing (NAD 1927)	Easting (NAD 1927)	
		753068	2164027	
		Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core		
Date	02/18/2000	02/29/2000	Date	02/29/2000
Time	8:34	7:45	Time	14:50
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		
Comments: <div style="display: flex; justify-content: space-between; margin-left: 20px;"> <div> 0 to 4 feet = 2-inch diameter 4 to 8 feet = 1-inch diameter 8 to 12 feet = 1-inch diameter 12 to 16 feet = 1-inch diameter </div> <div> native at 4.5 </div> </div>				
<div style="text-align: center;"> <i>Field Original Signed</i> <hr style="width: 60%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging) </div>			<div style="text-align: center;"> <hr style="width: 20%; margin: 0 auto;"/> 02/18/2000 Date </div>	
<div style="text-align: center;"> <i>Field Original Signed</i> <hr style="width: 60%; margin: 0 auto;"/> Signature (Core Gamma Logging) </div>			<div style="text-align: center;"> <hr style="width: 20%; margin: 0 auto;"/> 02/29/2000 Date </div>	
<div style="text-align: center;"> <i>Field Original Signed</i> <hr style="width: 60%; margin: 0 auto;"/> Signature (PID Logging) </div>			<div style="text-align: center;"> <hr style="width: 20%; margin: 0 auto;"/> 02/29/2000 Date </div>	

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	753032	2164121	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/18/2000	02/29/2000	03/01/2000	
Time	9:01	8:05	7:50	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.1
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/01/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	753015	2164169	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/18/2000	02/29/2000	03/01/2000	
Time	9:29	8:30	8:40	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.5
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/01/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.0	0.0-0.5: blk sm w/gp														
0.5	5426		2208			0.5-3.1: wht silt	1	2	A	0	1	0	3	0	6					
1.0	2495		488	487	0.0		1	2	A	0	1	0	3	0	7					
1.5	751																			
2.0	236				0.0															
2.5	112	102																		
3.0	72				0.0	3.1-4.0: no recovery														
3.5	65																			
4.0	115				0.0	4.0-5.1: bn sm w/sc														
4.5	158																			
5.0	149		448		0.0	5.1-7.4: bn sm	1	2	A	0	1	0	3	0	8					
5.5	143																			
6.0	187				0.0															
6.5	186	170																		
7.0	204				0.0															
7.5	187					7.4-8.0: no recovery														
8.0	184				0.5	8.0-8.7: red/bn sm w/gp														
8.5	196					8.7-9.5: bn sm w/gp														
9.0	173				0.0															
9.5	214					9.5-10.8: red bn sm w/gp														
10.0	219				0.0															
10.5	190					10.8-12.0: no recovery														
11.0					n/r															
11.5																				
12.0					0.0	12.0-13.8: SAA (9.5-10.8)														
12.5			453																	
13.0			443		0.0															
13.5			434			13.8-16.0: no recovery														
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
16.5																				
17.0																				
17.5																				
18.0																				
18.5																				
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5																				
22.0						Recovery														
22.5						0-4 feet: 37 inches														
23.0						4-8 feet: 41 inches														
23.5						8-12 feet: 34 inches														
24.0						12-16 feet: 22 inches														

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5	1	2	A	0	1	0	3	0	6		5.28	0.31	1.42	74.99	1.06	0.97	85.65	10.15	37.50
1.0	1	2	A	0	1	0	3	0	7		0.59	U	---	0.59	5.21	0.17	0.44	20.11	5.04
1.5																			
2.0																			
2.5																			
3.0																			
3.5																			
4.0																			
4.5																			
5.0	1	2	A	0	1	0	3	0	8		ARCHIVED								
5.5																			
6.0																			
6.5																			
7.0																			
7.5																			
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23.5																			
24.0																			

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
Stone & Webster Environmental Technology & Services
100 West Hunter Avenue
Maywood, New Jersey 07607

Tel: (201) 226-6600
FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
Job Number: 085750316
Activity: Direct-Push Sampling

Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	752976	2164264

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Date
Date	02/18/2000	02/29/2000	Date	03/01/2000
Time	11:03	8:50	Time	9:10
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:
0 to 4 feet = 2-inch diameter native at 5.0
4 to 8 feet = 2-inch diameter
8 to 12 feet = 2-inch diameter
12 to 16 feet = 2-inch diameter
16 to 20 feet = 2-inch diameter

Field Original Signed _____ 02/18/2000
Signature (Down Hole Gamma Logging) Date

Field Original Signed _____ 02/29/2000
Signature (Core Gamma Logging) Date

Field Original Signed _____ 03/01/2000
Signature (PID Logging) Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.0	0.0-0.4: lt bn gp w/sm														
0.5	424		638			0.4-1.8: bn/dk bn sm w/sc	1	2	A	0	1	0	3	0	9					
1.0	471		488	410	0.0		1	2	A	0	1	0	3	1	0					
1.5	312					1.8-4.0: no recovery														
2.0	234				n/r															
2.5	193																			
3.0	185	207			n/r															
3.5	203																			
4.0	203				0.0	4.0-6.5: bn/gy sm														
4.5	146		462				1	2	A	0	1	0	3	1	1					
5.0	136		403		0.0		1	2	A	0	1	0	3	1	2	X				
5.5	108		411																	
6.0	125				0.0															
6.5	140					6.5-7.2: blk sm														
7.0	126				0.0	7.2-7.6: bn sm														
7.5	153					7.6-8.0: no recovery														
8.0	118	165			3.0	8.0-10.1: bn gy sw tr sm														
8.5	136																			
9.0	131				0.2															
9.5	151																			
10.0	156				0.0	10.1-11.0: blk sw tr sm														
10.5	144																			
11.0	146				n/r	11.0-12.0: no recovery														
11.5	111																			
12.0	142				0.0	12.0-12.6: gy/bn sw tr sm														
12.5	176					12.6-14.0: blk sw														
13.0	143				0.0															
13.5	177																			
14.0	137	119			0.0	14.0-14.9: bn sw														
14.5	106																			
15.0	85				n/r	14.9-16.0: no recovery														
15.5	77																			
16.0	86				0.0	16.0-16.8: blk sw														
16.5	86					16.8-18.2: red/bn sm w/gp														
17.0	133				0.0															
17.5	198																			
18.0	208		540		0.0															
18.5	227																			
19.0	242																			
19.5	237																			
20.0																				
20.5																				
21.0																				
21.5						Recovery														
22.0						0-4 feet: 22 inches														
22.5						4-8 feet: 43 inches														
23.0						8-12 feet: 36 inches														
23.5						12-16 feet: 35 inches														
24.0						12-20 feet: 26 inches														

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752975	2164313	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/18/2000	02/29/2000	03/01/2000	
Time	11:44	9:15	10:10	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 5.0
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 14.0 feet
12 to 16 feet = 1-inch diameter	
16 to 20 feet = 1-inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/01/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752956	2164381	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	02/29/2000	03/01/2000	
Time	7:33	10:45	11:05	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 7.0
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 17.4 feet
12 to 16 feet = 1-inch diameter	
16 to 20 feet = 1-inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/01/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752934	2164430	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/08/2000	03/08/2000	
Time	8:36	8:45	13:55	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 6.0
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752916	2164488	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/08/2000	03/08/2000	
Time	9:03	9:05	14:35	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 7.0
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752906	2164514	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/08/2000	Date	03/08/2000
Time	9:26	9:25	Time	15:00
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 6.0
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752873	2164573	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/08/2000	03/08/2000	
Time	9:51	10:15	15:17	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 5.3
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter

<i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	02/22/2000 Date
<i>Field Original Signed</i> Signature (Core Gamma Logging)	03/08/2000 Date
<i>Field Original Signed</i> Signature (PID Logging)	03/08/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				4.0	0.0-0.6: blk sm w/wood material														
0.5	1848		903	915		0.6-3.3: wht sm	1	2	A	0	1	0	3	2	9					
1.0	885		396		2.0		1	2	A	0	1	0	3	3	0					
1.5	409																			
2.0	253				0.2															
2.5	230																			
3.0	218				0.0	3.3-4.0: no recovery														
3.5	107																			
4.0	131				0.1	4.0-4.5: wht sm														
4.5	154					4.5-6.8: bn sc w/sm														
5.0	167				0.1															
5.5	193																			
6.0	201	215			0.0															
6.5	215		427				1	2	A	0	1	0	3	3	1					
7.0	217		473		0.0	6.8-7.6: bn/red sm w/gp														
7.5	240					7.6-8.0: no recovery														
8.0	262				0.4	8.0-11.0: bn/red sm tr gp														
8.5	240																			
9.0	233				2.5															
9.5	239		435																	
10.0	241				0.7															
10.5	231																			
11.0						11.0-12.0: no recovery														
11.5																				
12.0																				
12.5																				
13.0																				
13.5																				
14.0																				
14.5																				
15.0																				
15.5																				
16.0																				
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17.0																				
17.5																				
18.0																				
18.5																				
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5						Recovery														
22.0						0-4 feet: 39 inches														
22.5						4-8 feet: 44 inches														
23.0						8-12 feet: 36 inches														
23.5																				
24.0																				

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752828	2164658	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/08/2000	03/08/2000	
Time	11:08	10:40	15:32	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752827	2164695	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/08/2000	03/09/2000	
Time	11:47	10:11	7:40	
Logger	C. Hales	S. Ng	M. Brown	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

Depth to groundwater at 18.5 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ Signature (PID Logging)	_____ Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752805	2164734	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/08/2000	03/09/2000	
Time	12:17	11:25	8:03	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter 4 to 8 feet = 1-inch diameter 8 to 12 feet = 1-inch diameter 12 to 16 feet = 1-inch diameter	Depth to groundwater at 9.2 feet
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<i>Field Original Signed</i>	02/22/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/08/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/09/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	014
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752885	2164542	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/22/2000	03/08/2000	03/09/2000	
Time	13:36	14:05	8:20	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/22/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	015
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752744	2164836	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/24/2000	03/08/2000	03/09/2000	
Time	9:00	14:30	8:37	
Logger	E. Babour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	016
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752706	2164917	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/24/2000	03/08/2000	03/09/2000	
Time	9:30	14:45	8:55	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	017
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752628	2165022	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/24/2000	03/08/2000	03/09/2000	
Time	10:00	15:05	9:12	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:
 0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	2	A	0	1	0	3	5	1		38.84	0.88	3.00	386.54	4.30	2.28	119.00	U	---	119.00
1.0																				
1.5																				
2.0	1	2	A	0	1	0	3	5	2		0.91	0.07	0.26	1.32	0.06	0.16	6.15	U	---	6.15
2.5																				
3.0																				
3.5																				
4.0																				
4.5	1	2	A	0	1	0	3	5	3		ARCHIVED									
5.0																				
5.5																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	018
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752344	2165405	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		03/17/2000	03/17/2000	
Time		8:30	14:15	
Logger		S. Ng	J. Dekoskie	
Detector Model #		SPA-3	PID Model #	Multi-RAE
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 2 feet = 3/4-inch diameter
 2 to 4 feet = 3/4-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/17/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)												
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP			
0.0					0.0	0.0-1.3: bn sm													
0.5			425	385			1	2	A	0	1	0	3	5	4				
1.0			392		0.0	1.3-2.0: no recovery													
1.5																			
2.0					0.0	2.0-3.5: bn sm													
2.5			440				1	2	A	0	1	0	3	5	5				
3.0			389		0.0														
3.5			430																
4.0					0.0														
4.5																			
5.0																			
5.5																			
6.0																			
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7.0																			
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23.5																			
24.0																			

Recovery

0-2 feet: 16 inches

2-4 feet: 18 inches

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	2	A	0	1	0	3	5	4		0.92	0.13	0.41	1.47	0.12	0.47	15.20	U	---	15.20
1.0																				
1.5																				
2.0																				
2.5	1	2	A	0	1	0	3	5	5		0.92	0.07	0.23	1.13	0.06	0.17	2.93	J	1.77	5.80
3.0																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	019
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752391	2165339	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		03/17/2000	03/17/2000	
Time		8:40	14:22	
Logger		S. Ng	J. Dekoskie	
Detector Model #		SPA-3	PID Model #	Multi-RAE
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 2 feet = 3/4-inch diameter native at 5.0

2 to 4 feet = 3/4-inch diameter

4 to 6 feet = 3/4-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	020
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752492.69	2165211.47	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		03/17/2000	03/17/2000	
Time		8:55	14:33	
Logger		S. Ng	J. Dekoskie	
Detector Model #		SPA-3	PID Model #	Multi-RAE
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 2 feet = 3/4-inch diameter
 2 to 3 feet = 3/4-inch diameter

_____ Signature (Down Hole Gamma Logging)	_____ Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	021
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752558	2165099	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		03/17/2000	03/17/2000	
Time		9:15	14:44	
Logger		S. Ng	J. Dekoskie	
Detector Model #		SPA-3	PID Model #	Multi-RAE
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 2 feet = 3/4-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	022
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752537	2165163	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date		03/17/2000	03/17/2000	
Time		9:20		
Logger		S. Ng	Logger	J. Dekoskie
Detector Model #		SPA-3	PID Model #	Multi-RAE
Detector Serial #		CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #		2224		
Scaler Serial #		132842		

Comments:

0 to 2 feet = 3/4-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/16/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/17/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)														
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP					
0.0						0.0-1.4: red bn sm w/gp															
0.5																					
1.0			436	424				1	2	A	0	1	0	3	6	2					
1.5			419	433																	
2.0																					
2.5																					
3.0																					
3.5																					
4.0																					
4.5																					
5.0																					
5.5																					
6.0																					
6.5																					
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19.0																					
19.5																					
20.0																					
20.5																					
21.0																					
21.5																					
22.0																					
22.5																					
23.0																					
23.5																					
24.0																					

Recovery

0-2 feet: 16 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	023
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	753076	2164081	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/30/2000	04/03/2000	04/04/2000	
Time	13:23	16:45	15:05	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	N/A	44-10	PID Model #	Multi-RAE
Detector Serial #	N/A	21779	PID Serial #	CENAN 21811
Scaler Model #	2221	2224		
Scaler Serial #	132841	132842		

Comments:

- 0 to 2 feet = 3/4-inch diameter
- 2 to 4 feet = 3/4-inch diameter
- 4 to 5 feet = 3/4-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/30/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 04/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 04/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	024
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752849	2164713	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/30/2000	04/03/2000	04/04/2000	13:15
Time		17:00	04/04/2000	13:15
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	N/A	44-10	Multi-RAE	
Detector Serial #	N/A	21779	CENAN 21811	
Scaler Model #	2221	2224		
Scaler Serial #	132841	132842		

Comments:

0 to 2 feet = 3/4-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/30/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 04/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 04/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	025
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752720	2164944	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/30/2000	04/03/2000	04/04/2000	
Time	13:45	17:05	15:20	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	N/A	44-10	PID Model #	Multi-RAE
Detector Serial #	N/A	21779	PID Serial #	CENAN 21811
Scaler Model #	2221	2224		
Scaler Serial #	132841	132842		

Comments:

0 to 2 feet = 3/4-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/30/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 04/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 04/04/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	026
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752735	2164996	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/30/2000	04/03/2000	04/04/2000	
Time	14:05	17:15	15:25	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	N/A	44-10	PID Model #	Multi-RAE
Detector Serial #	N/A	21779	PID Serial #	CENAN 21811
Scaler Model #	2221	2224		
Scaler Serial #	132841	132842		

Comments:

0 to 2 feet = 3/4-inch diameter native at 4.5

2 to 4 feet = 3/4-inch diameter

4 to 6 feet = 3/4-inch diameter

<i>Field Original Signed</i>	03/30/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	04/03/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	04/04/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12A
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	027
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752639	2165108	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/30/2000	04/03/2000	04/04/2000	
Time	14:40	17:30	15:30	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	N/A	44-10	PID Model #	Multi-RAE
Detector Serial #	N/A	21779	PID Serial #	CENAN 21811
Scaler Model #	2221	2224		
Scaler Serial #	132841	132842		

Comments:

0 to 2 feet = 3/4-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/30/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 04/03/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 04/04/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0					0.0	0.0-0.8: blk gp														
0.5			474	444		0.8-1.4: red sp	1	2	A	0	1	0	3	7	1					
1.0			451	431	0.0															
1.5																				
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
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23.0																				
23.5																				
24.0																				

Recovery

0-2 feet: 17 inches

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	001
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752590	2164627	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/04/2000	02/07/2000	Date	02/07/2000
Time	14:40	14:15	Time	15:45
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	002
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752618	2164665	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/04/2000	02/07/2000	02/07/2000	16:05
Time	15:15	14:50	16:05	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/04/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	003
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752666	2164666	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/08/2000	02/08/2000	8:00
Time	8:53	7:45	8:00	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	004
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752724	2164671	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/08/2000	02/08/2000	8:40
Time	9:00	8:05	8:40	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752710	2164698	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/08/2000	02/08/2000	9:15
Time	10:15	8:20	02/08/2000	9:15
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752766	2164716	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/08/2000	Date	02/08/2000
Time	10:05	9:10	Time	10:45
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 20 feet = 1-inch diameter
- 20 to 24 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	007
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752785	2164667	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/08/2000	02/08/2000	11:35
Time	11:37	9:45	11:35	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	008
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752683	2164619	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/08/2000	02/08/2000	
Time	11:25	11:15	14:35	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	009
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752632	2164581	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/08/2000	02/08/2000	
Time	12:20	11:40	15:05	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	010
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752831	2164598	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/08/2000	Date	02/08/2000
Time	12:26	13:20	Time	15:25
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	011
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752896	2164445	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/08/2000	02/09/2000	
Time	14:33	14:55	8:25	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 2-inch diameter
- 8 to 12 feet = 2-inch diameter
- 12 to 16 feet = 2-inch diameter
- 16 to 20 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	012
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752669	2164521	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/08/2000	02/09/2000	
Time	13:00	15:30	9:20	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	013
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752626	2164729	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/09/2000	02/09/2000	10:00
Time	14:30	8:55	J. Dekoskie	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	014
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752906	2164378	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/09/2000	Date	02/09/2000
Time	14:51	9:15	Time	11:05
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/07/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: Phase II PDI Implementation
 Job Number: 085750316
 Activity: Direct-Push Sampling

Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	015
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)
	752920	2164316

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/09/2000	02/09/2000	11:40
Time	15:30	9:30		
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:
 0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter
 16 to 20 feet = 1-inch diameter

Field Original Signed

 Signature (Down Hole Gamma Logging)

 Date

Field Original Signed

 Signature (Core Gamma Logging)

02/09/2000

 Date

Field Original Signed

 Signature (PID Logging)

02/09/2000

 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	016
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752549	2164687	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/07/2000	02/09/2000	02/09/2000	
Time	15:10	10:25	14:20	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
4 to 8 feet = 2-inch diameter
8 to 12 feet = 2-inch diameter
12 to 15 feet = no recovery
15 to 19 feet = 2-inch diameter

Field Original Signed
Signature (Down Hole Gamma Logging) 02/07/2000
Date

Field Original Signed
Signature (Core Gamma Logging) 02/09/2000
Date

Field Original Signed
Signature (PID Logging) 02/09/2000
Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	017
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752971	2164179	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/09/2000	Date	02/09/2000
Time	8:10	11:15	Time	15:15
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 2-inch diameter
- 8 to 12 feet = 2-inch diameter
- 12 to 16 feet = 2-inch diameter
- 16 to 20 feet = 2-inch diameter
- 20 to 24 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	018
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	753001	2164090	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/10/2000	02/10/2000	
Time	9:10	13:35	14:35	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/10/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	019
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752932	2164068	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/10/2000	02/10/2000	15:00
Time	10:10	14:10	15:00	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 11.0
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter
 16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/10/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	020
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752865	2164067	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/10/2000	Date	02/10/2000
Time	11:00	14:35	Time	15:30
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
4 to 8 feet = 1-inch diameter
8 to 12 feet = 1-inch diameter
12 to 16 feet = 1-inch diameter
16 to 20 feet = 1-inch diameter

Field Original Signed 02/08/2000
Signature (Down Hole Gamma Logging) Date

Field Original Signed 02/10/2000
Signature (Core Gamma Logging) Date

Field Original Signed 02/10/2000
Signature (PID Logging) Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	021
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752788	2164058	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/10/2000	02/11/2000	
Time	11:55	15:15	7:35	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 13.0-14.0

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/11/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	022
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752826	2164038	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/10/2000	02/11/2000	
Time	13:20	15:35	8:25	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 8.0

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

12 to 16 feet = 1-inch diameter

16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/11/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	023
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752831	2164114	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/11/2000	02/11/2000	9:05
Time	13:55	7:50	02/11/2000	9:05
Logger	E. Barbour	S. Ng	J. Dekoskie	J. Dekoskie
Detector Model #	G1	SPA-3	Multi-RAE	Multi-RAE
Detector Serial #	C442E	CENAN 33401	CENAN 21811	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/11/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	024
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752748	2164056	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/11/2000	02/11/2000	10:35
Time	14:50	8:25	10:35	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 10.0

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/11/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	025
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752704	2164128	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/08/2000	02/11/2000	Date	02/11/2000
Time	15:40	8:55	Time	11:15
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 12.0
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/11/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	026
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752783	2164121	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/15/2000	02/16/2000	8:20
Time	10:20	10:05	J. Dekoskie	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---					0.0-1.5: bn/wht sm some gravel														
0.5	552				0.0															
1.0	810		653	658			1	2	B	0	1	0	7	8	2					
1.5	510		482		0.0	1.5-3.4: wht/bn sm	1	2	B	0	1	0	7	8	3					
2.0	186		330																	
2.5	119				0.0															
3.0	52		387		0.0															
3.5	42				n/r	3.4-4.0: no recovery														
4.0	43					4.0-4.7: bn sm														
4.5	40				0.0	4.7-6.4: wht sm														
5.0	32																			
5.5	33		425		0.0															
6.0	31	29																		
6.5	23				0.0	6.4-8.0: no recovery														
7.0	22				n/r															
7.5	17																			
8.0	19					8.0-9.2: wht sm														
8.5	38				0.0															
9.0	48					9.2-10.4: blk/gy/wht sm some gravel														
9.5	73				0.0															
10.0	181		327																	
10.5	550		367		0.0	10.4-12.0: wht sm														
11.0	1878		386																	
11.5	1662		405		0.0															
12.0	955					12.0-13.5: gy bn sm														
12.5	340		477		0.0															
13.0	250																			
13.5	223		390		0.0	13.5-15.0: blk organic material	1	2	B	0	1	0	7	8	4					
14.0	219																			
14.5	197				0.0															
15.0	196					15.0-15.8: bn/red sm														
15.5	185				0.0	15.8-16.0: no recovery														
16.0	247	200				16.0-19.2: red sm														
16.5	204				0.0															
17.0	185																			
17.5	210				0.0															
18.0	196																			
18.5	185				0.0															
19.0	218				n/r	19.2-20.0: no recovery														
19.5	203																			
20.0	231					20.0-20.7: red sm														
20.5			391		0.0	20.7-24.0: no recovery														
21.0						Recovery														
21.5					n/r	0-4 feet: 41 inches														
22.0						4-8 feet: 29 inches														
22.5						8-12 feet: 48 inches														
23.0						12-16 feet: 46 inches														
23.5						16-20 feet: 35 inches														
24.0						20-24 feet: 8 inches														

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	027
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752872	2164120	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/15/2000	02/16/2000	9:00
Time	10:28	11:05	J. Lincoln	Multi-RAE
Logger	C. Hales	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C436E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	028
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752919	2164124	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/15/2000	02/16/2000	
Time	11:10	13:15	9:15	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	029
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752846	2164171	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/15/2000	02/16/2000	
Time	12:09	13:55	10:05	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 12.0
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter
 12 to 16 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	030
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752902	2164213	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/16/2000	02/16/2000	10:30
Time	12:00	7:40	J. Lincoln	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 20 feet = 1-inch diameter
- 20 to 24 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	031
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752856	2164248	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/16/2000	Date	02/16/2000
Time	13:40	8:15	Time	10:50
Logger	E. Barbour	S. Ng	Logger	J. Lincoln
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	032
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752742	2164159	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/16/2000	02/16/2000	11:20
Time	14:30	8:40	J. Lincoln	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 2-inch diameter
- 8 to 12 feet = 2-inch diameter
- 12 to 16 feet = 2-inch diameter
- 16 to 20 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	033
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752784	2164238	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/16/2000	02/16/2000	11:35
Time	13:48	9:00	J. Lincoln	Multi-RAE
Logger	C. Hales	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C436E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 20 feet = 1-inch diameter
- 20 to 24 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	034
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752956	2164246	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/16/2000	02/16/2000	
Time	15:08	10:15	13:30	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	035
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752686	2164174	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/10/2000	02/16/2000	Date	02/16/2000
Time	15:20	11:00	Time	14:30
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 8.0

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/10/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	036
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752947	2164286	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/11/2000	02/16/2000	Date	02/16/2000
Time	7:40	10:35	Time	13:40
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 2-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/16/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/16/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	037
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752588	2164138	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/11/2000	02/17/2000	Date	02/17/2000
Time	15:17	8:15	Time	12:00
Logger	C. Hales	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter 4 to 8 feet = 1-inch diameter 8 to 12 feet = 1-inch diameter 12 to 16 feet = 1-inch diameter 16 to 20 feet = 1-inch diameter 20 to 24 feet = 1-inch diameter	native at 12.0-16.0 ? Depth to groundwater at 20.6 feet
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_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	038
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752541	2164149	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/11/2000	02/17/2000	Date	02/17/2000
Time	15:30	8:40	Time	12:40
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 11.0
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter
 16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/11/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/17/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/17/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	039
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752543	2164231	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/11/2000	02/17/2000	Date	02/17/2000
Time	16:20	9:00	Time	13:39
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 13.0
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 16.9 feet
12 to 16 feet = 1-inch diameter	
16 to 20 feet = 1-inch diameter	

<i>Field Original Signed</i>	02/11/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/17/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/17/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	040
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752593	2164778	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/18/2000	02/18/2000	
Time	9:10	8:05	10:40	
Logger	D. Watters	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 6.0
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/18/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	041
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752799	2164554	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/18/2000	02/18/2000	12:30
Time	9:45	8:25		
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 24 feet = 1-inch diameter

native at 12.0-14.0

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/18/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	042
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752538	2164763	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/18/2000	Date	02/18/2000
Time	9:45	8:45	Time	14:10
Logger	D. Watters	S. Ng	Logger	J. Lincoln
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 10.0 ?
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/18/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	043
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752836	2164493	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/18/2000	Date	02/18/2000
Time	10:58	9:00	Time	14:30
Logger	C. Hales	S. Ng	Logger	J. Lincoln
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 14.0
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 19.8 feet
12 to 16 feet = 1-inch diameter	
16 to 20 feet = 1-inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/18/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	044
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752812	2164425	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/18/2000	Date	02/18/2000
Time	12:53	9:20	Time	15:00
Logger	C. Hales	S. Ng	Logger	J. Lincoln
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 11.0
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/18/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	045
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752881	2164326	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/18/2000	Date	02/18/2000
Time	13:45	11:05	Time	15:25
Logger	C. Hales	S. Ng	Logger	J. Lincoln
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 15.0
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter
 12 to 16 feet = 2-inch diameter
 16 to 20 feet = 2-inch diameter
 20 to 24 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/18/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	046
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752852	2164378	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/18/2000	02/21/2000	
Time	14:45	12:10	8:25	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 12.0
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 19.4 feet
12 to 16 feet = 1-inch diameter	
16 to 20 feet = 1-inch diameter	

<i>Field Original Signed</i>	02/14/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/18/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/21/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	047
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752803	2164365	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/18/2000	02/21/2000	
Time	15:46	12:25	8:55	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 10.5

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

<i>Field Original Signed</i>	02/14/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/18/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/21/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	048
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752756	2164354	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/14/2000	02/18/2000	02/21/2000	
Time	16:20	14:10	9:15	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 10.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/14/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	049
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752842	2164313	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/21/2000	02/21/2000	13:30
Time	9:00	11:10	J. Lincoln	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter 4 to 8 feet = 1-inch diameter 8 to 12 feet = 1-inch diameter 12 to 16 feet = 1-inch diameter 16 to 20 feet = 1-inch diameter	native at 12.0-13.0 Depth to groundwater at 19.8 feet
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_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	050
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752786	2164317	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/21/2000	02/21/2000	13:50
Time	11:00	11:30	13:50	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	051
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752735	2164291	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/21/2000	02/21/2000	14:10
Time	11:25	11:50	J. Lincoln	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 6.0
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 17.6 feet
12 to 16 feet = 1-inch diameter	
16 to 20 feet = 1-inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	052
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752722	2164246	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/21/2000	02/21/2000	14:35
Time	12:00	13:40	14:35	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 10.0
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 15.6 feet
12 to 16 feet = 1-inch diameter	

<i>Field Original Signed</i>	02/15/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	02/21/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	02/21/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	053
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752693	2164357	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/21/2000	Date	02/21/2000
Time	13:50	13:55	Time	14:55
Logger	E. Barbour	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 8.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	054
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752667	2164301	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/15/2000	02/21/2000	02/21/2000	15:20
Time	14:45	14:15	15:20	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 10.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

12 to 16 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/15/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 02/21/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	055
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752669	2164422	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/18/2000	03/07/2000	03/07/2000	
Time	8:10	10:05	13:50	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.0

4 to 8 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/07/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0																				
1.5	1	2	B	0	1	0	8	7	5		2.98	0.13	0.44	6.41	0.16	0.29	15.90	U	---	15.90
2.0																				
2.5	1	2	B	0	1	0	8	7	6		0.74	0.08	0.22	1.33	0.07	0.21	5.61	U	---	5.61
3.0																				
3.5	1	2	B	0	1	0	8	7	7		ARCHIVED									
4.0																				
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	056
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752776	2164471	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/18/2000	03/07/2000	03/07/2000	
Time	8:45	10:40	14:05	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 14.0
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter
 16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	057
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752720	2164404	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/18/2000	03/07/2000	03/07/2000	
Time	8:30	11:00	14:30	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 5.0

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/07/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	058
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752747	2164500	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/18/2000	03/07/2000	03/08/2000	
Time	9:25	11:15	7:55	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 8.0

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter Depth to groundwater at 12.0 feet

12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	059
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752629	2164429	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/18/2000	03/07/2000	03/08/2000	
Time	9:45	11:35	8:30	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 5.0

4 to 8 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	060
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752645	2164354	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/18/2000	03/07/2000	03/08/2000	
Time	10:40	13:30	8:55	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	061
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752606	2164329	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/18/2000	03/07/2000	03/08/2000	
Time	11:10	13:50	9:17	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 6.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

12 to 16 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/08/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5																				
1.0	1	2	B	0	1	0	8	9	4		2.57	0.13	0.46	10.68	0.22	0.35	18.50	U	---	18.50
1.5																				
2.0																				
2.5																				
3.0	1	2	B	0	1	0	8	9	5		1.98	0.10	0.33	1.86	0.09	0.28	11.70	U	---	11.70
3.5																				
4.0																				
4.5																				
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5.5																				
6.0	1	2	B	0	1	0	8	9	6		ARCHIVED									
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	062
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752604	2164379	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/18/2000	03/07/2000	03/08/2000	
Time	11:35	14:25	9:50	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 5.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	063
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752643	2164234	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/18/2000	03/07/2000	03/08/2000	
Time	12:00	14:45	10:12	
Logger	E. Barbour	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 8.0
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 10.1 feet
12 to 16 feet = 1-inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/18/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/08/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	2	B	0	1	0	9	0	0		1.97	0.11	0.25	4.34	0.13	0.39	9.57	U	---	9.57
1.0																				
1.5																				
2.0	1	2	B	0	1	0	9	0	1		1.98	0.11	0.34	2.24	0.11	0.38	13.00	U	---	13.00
2.5																				
3.0																				
3.5																				
4.0																				
4.5	1	2	B	0	1	0	9	0	2		2.10	0.14	0.43	2.90	0.14	0.29	11.20	U	---	11.20
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	064
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752710	2164596	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	03/07/2000	03/08/2000	
Time	14:30	17:10	10:35	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C436E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 9.0
4 to 8 feet = 2-inch diameter	
8 to 12 feet = 2-inch diameter	Depth to groundwater at 15.5 feet
12 to 16 feet = 2-inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/07/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	065
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752723	2164637	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	03/07/2000	03/08/2000	
Time	14:56	17:30	10:58	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 10.5

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

12 to 16 feet = 2-inch diameter

16 to 20 feet = 2-inch diameter

<i>Field Original Signed</i>	02/21/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/07/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/08/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	066
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752706	2164462	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/21/2000	03/08/2000	03/08/2000	
Time	15:28	8:05	11:25	
Logger	C. Hales	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 8.0
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/21/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/08/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	067
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752600	2164256	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/24/2000	03/08/2000	03/09/2000	
Time	13:50	15:20	9:20	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter
 16 to 20 feet = 1-inch diameter

Depth to groundwater at 17.9 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	068
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752382	2164242	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/24/2000	03/08/2000	03/09/2000	
Time	14:20	16:20	10:36	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	069
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752424	2164261	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/24/2000	03/08/2000	03/09/2000	
Time	14:40	16:30	10:44	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	070
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752439	2164191	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/24/2000	03/08/2000	03/09/2000	
Time	15:15	16:55	10:56	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

Depth to groundwater at 10.0 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/24/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	071
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752161	2164218	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/09/2000	03/09/2000	
Time	8:16	8:15	11:40	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	072
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752360	2164140	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/09/2000	03/09/2000	13:30
Time	8:20	8:35	J. Lincoln	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	073
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752352	2164190	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/09/2000	03/09/2000	13:46
Time	8:40	9:00	J. Lincoln	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results											
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	1	2	B	0	1	0	9	3	0		7.83	J	0.27	0.84	34.80	J	0.56	0.68	34.80	UJ	---	34.80
1.0																						
1.5																						
2.0																						
2.5																						
3.0																						
3.5																						
4.0																						
4.5																						
5.0																						
5.5																						
6.0																						
6.5	1	2	B	0	1	0	9	3	1		0.36		0.07	0.19	0.99		0.06	0.19	5.45	U	---	5.45
7.0																						
7.5																						
8.0																						
8.5																						
9.0																						
9.5	1	2	B	0	1	0	9	3	2		ARCHIVED											
10.0																						
10.5																						
11.0																						
11.5																						
12.0																						
12.5																						
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	074
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752121	2164256	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/09/2000	03/09/2000	14:05
Time	8:43	9:12	J. Lincoln	Multi-RAE
Logger	C. Hales	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C436E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results											
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	1	2	B	0	1	0	9	3	3		3.37	J	0.14	0.43	9.96	J	0.22	0.35	19.00	UJ	---	19.00
1.0																						
1.5																						
2.0	1	2	B	0	1	0	9	3	4		0.71		0.07	0.25	1.07		0.06	0.20	5.64	U	---	5.64
2.5	1	2	B	0	1	0	9	3	5	X	0.68		0.07	0.20	0.89		0.06	0.23	5.57	U	---	5.57
3.0																						
3.5																						
4.0																						
4.5	1	2	B	0	1	0	9	3	6		ARCHIVED											
5.0																						
5.5																						
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23.0																						
23.5																						
24.0																						

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	075
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752329	2164222	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/09/2000	03/09/2000	14:40
Time	9:25	9:25	J. Lincoln	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

Depth (Feet)	Down Hole Gamma Reading (cnts/10sec)		Core Gamma Reading (cnts/30sec)		PID Reading (ppm)	Sample Description	Laboratory Sample ID (Laboratory Designation)													
		DUP		DUP			X	X	X	#	#	#	#	#	#	DUP				
0.0	---				0.0	0.0-1.5: blk gp														
0.5	399		536	532																
1.0	363		598		0.0		1	2	B	0	1	0	9	3	7					
1.5	273		497			1.5-3.4: bn sw	1	2	B	0	1	0	9	3	8					
2.0	204				0.0															
2.5	217																			
3.0	187				0.1															
3.5	173				n/r	3.4-4.0: no recovery														
4.0	175	179			0.1	4.0-7.0: bn sw														
4.5	186		430				1	2	B	0	1	0	9	3	9					
5.0	169				0.0															
5.5	162																			
6.0	157				0.1															
6.5	171				n/r															
7.0	175					7.0-8.0: no recovery														
7.5	160																			
8.0	213				0.7	8.0-8.8: red gp														
8.5	300		437			8.8-10.8: red gp														
9.0	229				0.2															
9.5	259																			
10.0	229	261			0.2															
10.5	242				n/r	10.8-12.0: no recovery														
11.0																				
11.5																				
12.0					0.9	12.0-16.0: red sw and weathered sandstone														
12.5			436																	
13.0					0.9															
13.5			485																	
14.0					0.8															
14.5			408																	
15.0					0.8															
15.5			454		n/r															
16.0					5.6	16.0-18.7: red weathered sandstone														
16.5			412																	
17.0					2.5															
17.5			437																	
18.0			475		2.9															
18.5					n/r	18.7-20.0: no recovery														
19.0																				
19.5																				
20.0																				
20.5																				
21.0																				
21.5						Recovery														
22.0						0-4 feet: 40 inches														
22.5						4-8 feet: 36 inches														
23.0						8-12 feet: 32 inches														
23.5						12-16 feet: 48 inches														
24.0						16-20 feet: 31 inches														

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	076
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752287	2164250	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/09/2000	03/09/2000	15:00
Time	9:55	11:50	J. Lincoln	Multi-RAE
Logger	E. Barbour	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	077
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752297	2164152	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/09/2000	03/10/2000	
Time	11:05	12:35	11:00	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.5
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	078
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752288	2164199	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/09/2000	03/10/2000	
Time	11:40	13:50	11:42	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 4.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	079
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752711	2164731	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/09/2000	03/10/2000	
Time	14:24	14:15	13:05	
Logger	C. Hales	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C436E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

- 0 to 4 feet = 2-inch diameter
- 4 to 8 feet = 1-inch diameter
- 8 to 12 feet = 1-inch diameter
- 12 to 16 feet = 1-inch diameter
- 16 to 20 feet = 1-inch diameter
- 20 to 24 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	080
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752496	2164063	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/09/2000	03/09/2000	
Time	9:15	14:35	13:40	
Logger	B. Bowers	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 10.0

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

12 to 16 feet = 1-inch diameter

16 to 20 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/25/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	081
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752542	2164094	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/09/2000	03/09/2000	
Time	10:15	15:00	14:05	
Logger	E. Barbour	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 10.0

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	082
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752681	2164046	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/09/2000	03/09/2000	
Time	10:35	15:25	14:25	
Logger	B. Bowers	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 6.0
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/09/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	083
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752562	2164020	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/10/2000	03/10/2000	
Time	11:20	11:35	14:40	
Logger	B. Bowers	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 10.0

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

12 to 16 feet = 1-inch diameter

16 to 20 feet = 1-inch diameter

<i>Field Original Signed</i>	02/29/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/10/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/10/2000
Signature (PID Logging)	Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	085
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752464	2164097	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/27/2000	03/10/2000	03/10/2000	
Time	12:15	12:15	15:15	
Logger	B. Bowers	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 11.5
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/10/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	086
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752429	2164051	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/10/2000	03/10/2000	
Time	14:45	12:35	15:32	
Logger	B. Bowers	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 8.0-9.0

4 to 8 feet = 1-inch diameter

8 to 12 feet = 1-inch diameter

12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/10/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	087
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752352	2164056	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/25/2000	03/10/2000	03/13/2000	
Time	15:20	13:30	8:00	
Logger	B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 9.0
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	088
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752300	2164038	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/10/2000	03/13/2000	
Time	15:40	13:45	11:10	
Logger	B. Bowers	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 8.0
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 15.3 feet
12 to 16 feet = 1-inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	089
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752213	2164062	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/10/2000	03/13/2000	
Time	8:35	14:00	11:30	
Logger	B. Bowers	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter 4 to 8 feet = 1-inch diameter 8 to 12 feet = 1-inch diameter 12 to 16 feet = 1-inch diameter 16 to 20 feet = 1-inch diameter	Depth to groundwater at 9.3 feet
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_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	090
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752232	2164120	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/10/2000	03/13/2000	
Time	9:40	14:30	12:50	
Logger	B. Bowers	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 9.5
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 13.9 feet
12 to 16 feet = 1-inch diameter	

<i>Field Original Signed</i>	03/01/2000
Signature (Down Hole Gamma Logging)	Date
<i>Field Original Signed</i>	03/10/2000
Signature (Core Gamma Logging)	Date
<i>Field Original Signed</i>	03/13/2000
Signature (PID Logging)	Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results									
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g			
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA	
0.0																				
0.5	1	2	B	0	1	0	9	8	1		23.96	0.87	4.12	789.64	8.03	2.82	76.11	J	25.56	107.00
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1.5																				
2.0																				
2.5																				
3.0																				
3.5																				
4.0																				
4.5																				
5.0																				
5.5	1	2	B	0	1	0	9	8	2		0.75	0.12	0.38	0.59	0.09	0.35	11.20	U	---	11.20
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9.5	1	2	B	0	1	0	9	8	3		0.79	0.07	0.20	0.61	0.05	0.21	4.80	U	---	4.80
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PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	091
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752119	2164091	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/10/2000	03/13/2000	
Time	10:30	15:00	13:15	
Logger	B. Bowers	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 7.5
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 11.2 feet
12-16 feet = 1-inch diameter	

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/10/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	092
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752034	2164119	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/13/2000	03/13/2000	13:37
Time	11:00	8:00	J. Lincoln	Multi-RAE
Logger	B. Bowers	S. Ng	PID Model #	CENAN 21811
Detector Model #	G1	SPA-3	PID Serial #	
Detector Serial #	C442E	CENAN 33401		
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 6.0
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 9.6 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
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Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	093
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752153	2164148	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/13/2000	03/13/2000	
Time	12:00	8:25	13:55	
Logger	B. Bowers	S. Ng	J. Lincoln	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter	native at 8.0
4 to 8 feet = 1-inch diameter	
8 to 12 feet = 1-inch diameter	Depth to groundwater at 10.6 feet

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/13/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5	1	2	B	0	1	0	9	9	0	4.13	0.21	0.85	38.77	0.62	0.64	37.20	U	---	37.20
1.0																			
1.5	1	2	B	0	1	0	9	9	1	0.78	0.07	0.19	0.97	0.05	0.14	5.37	U	---	5.37
2.0																			
2.5																			
3.0																			
3.5																			
4.0																			
4.5	1	2	B	0	1	0	9	9	2	ARCHIVED									
5.0																			
5.5																			
6.0																			
6.5																			
7.0																			
7.5																			
8.0																			
8.5																			
9.0																			
9.5																			
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12.0																			
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19.0																			
19.5																			
20.0																			
20.5																			
21.0																			
21.5																			
22.0																			
22.5																			
23.0																			
23.5																			
24.0																			

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660		Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling	
Site Designator	X X X	12B	
Activity Designator	A A A	PDI	
Field Measurement / Sample Collection Designator	V V	SP	
Station Number	N N N	094	
Media	m m	SB	
Sample Type	n	0	
Sequential Sample Number	# # # # #	(See Below)	
Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752105	2164184	
	Gamma Logging		Photoionization Detector (PID) Logging
	Down Hole	Core	
Date	03/01/2000	03/13/2000	Date 03/13/2000
Time	12:25	8:55	Time 14:05
Logger	B. Bowers	S. Ng	Logger J. Dekoskie
Detector Model #	G1	SPA-3	PID Model # Multi-RAE
Detector Serial #	C442E	CENAN 33401	PID Serial # CENAN 21811
Scaler Model #	N/A	2224	
Scaler Serial #	N/A	132842	
Comments: <div style="display: flex; justify-content: space-between; margin-left: 40px;"> <div style="width: 45%;"> 0 to 4 feet = 2-inch diameter 4 to 8 feet = 1-inch diameter 8 to 12 feet = 1-inch diameter 12 to 16 feet = 1-inch diameter </div> <div style="width: 45%;"> native at 4.5 </div> </div>			
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Down Hole Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/01/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (Core Gamma Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/13/2000 Date	
<i>Field Original Signed</i> <hr style="width: 80%; margin: 0 auto;"/> Signature (PID Logging)		<hr style="width: 80%; margin: 0 auto;"/> 03/13/2000 Date	

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results								
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g		
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA
0.0																			
0.5	1	2	B	0	1	0	9	9	3		4.39	0.21	0.88	33.42	0.54	0.58	23.90 U	---	23.90
1.0																			
1.5																			
2.0																			
2.5																			
3.0																			
3.5																			
4.0																			
4.5	1	2	B	0	1	0	9	9	4		0.98 J	0.08	0.32	3.62 J	0.12	0.32	11.80 UJ	---	11.80
5.0																			
5.5																			
6.0	1	2	B	0	1	0	9	9	5		ARCHIVED								
6.5																			
7.0																			
7.5																			
8.0																			
8.5																			
9.0																			
9.5																			
10.0																			
10.5																			
11.0																			
11.5																			
12.0																			
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19.5																			
20.0																			
20.5																			
21.0																			
21.5																			
22.0																			
22.5																			
23.0																			
23.5																			
24.0																			

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	095
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752067	2164222	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/01/2000	03/13/2000	03/13/2000	
Time	15:00	9:15	14:25	
Logger	B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 1.5

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

12 to 16 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/01/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	096
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752638	2164047	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	02/29/2000	03/13/2000	03/13/2000	
Time	8:20	10:05	14:50	
Logger	B. Bowers	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C442E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 2.0
 4 to 8 feet = 1-inch diameter
 8 to 12 feet = 1-inch diameter
 12 to 16 feet = 1-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 02/29/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	098
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752640	2164796	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/08/2000	03/13/2000	Date	03/13/2000
Time	14:45	10:40	Time	15:25
Logger	J. Marsh	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 7.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	099
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752693	2164839	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/08/2000	03/13/2000	Date	03/13/2000
Time	15:20	11:00	Time	15:40
Logger	J. Marsh	S. Ng	Logger	J. Dekoskie
Detector Model #	G1	SPA-3	PID Model #	Multi-RAE
Detector Serial #	C443E	CENAN 33401	PID Serial #	CENAN 21811
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 9.0
 4 to 8 feet = 2-inch diameter
 8 to 12 feet = 2-inch diameter
 12-16 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/08/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/13/2000 Date

PDI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: Phase II PDI Implementation Job Number: 085750316 Activity: Direct-Push Sampling
--	---

Site Designator	X X X	12B
Activity Designator	A A A	PDI
Field Measurement / Sample Collection Designator	V V	SP
Station Number	N N N	100
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	# # # # #	(See Below)

Location	Northing (NAD 1927)	Easting (NAD 1927)	
	752653	2164128	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core	Date	Time
Date	03/09/2000	03/13/2000	03/13/2000	16:05
Time	8:20	11:30	16:05	
Logger	J. Marsh	S. Ng	J. Dekoskie	
Detector Model #	G1	SPA-3	Multi-RAE	
Detector Serial #	C443E	CENAN 33401	CENAN 21811	
Scaler Model #	N/A	2224		
Scaler Serial #	N/A	132842		

Comments:

0 to 4 feet = 2-inch diameter native at 3.0

4 to 8 feet = 2-inch diameter

8 to 12 feet = 2-inch diameter

_____ <i>Field Original Signed</i> Signature (Down Hole Gamma Logging)	_____ 03/09/2000 Date
_____ <i>Field Original Signed</i> Signature (Core Gamma Logging)	_____ 03/13/2000 Date
_____ <i>Field Original Signed</i> Signature (PID Logging)	_____ 03/13/2000 Date

Depth (Feet)	Laboratory Sample ID (Laboratory Designation)										Laboratory Results											
											Radium-226 pCi/g			Thorium-232 pCi/g			Uranium-238 pCi/g					
	X	X	X	#	#	#	#	#	#	DUP	Conc.	Error	MDA	Conc.	Error	MDA	Conc.	Error	MDA			
0.0																						
0.5	1	2	B	0	1	1	0	1	2		4.88	J	0.20	0.65	19.34	J	0.36	0.48	26.80	UJ	---	26.80
1.0																						
1.5																						
2.0	1	2	B	0	1	1	0	1	3		0.56		0.07	0.18	0.65		0.06	0.21	5.00	U	---	5.00
2.5																						
3.0																						
3.5																						
4.0																						
4.5	1	2	B	0	1	1	0	1	4		ARCHIVED											
5.0																						
5.5																						
6.0																						
6.5																						
7.0																						
7.5																						
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8.5																						
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23.0																						
23.5																						
24.0																						

APPENDIX 12-C

Environmental Boring Log Sheets

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607	Task Description: GWRI Job Number: 085750503 Activity: Direct-Push Sampling
---	---

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	12B
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	001
Media	mm	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)
	Northing (NAD 1927)	Easting (NAD 1927) Elevation (NGVD 1929)

Location	752732.291	8164694.944
----------	------------	-------------

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		4/4	Date	4/4
Time		1115	Time	1115
Logger		G. MARKT	Logger	G. MARKT
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

1. MPI No ENV-12-12080
2. Direct-push location grouted with BenSeal.

1115 - 1200 - SOIL SAMPLE 16' ⇒ 20'

1300 - 1400 - H₂O SAMPLE

1400 - 1430 - STEAM CLEAN



 Signature (Core Gamma Logging)

4/4/2000

 Date



 Signature (Logging)

4/4/2000

 Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Ke/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)									
					X	X	X	#	#	#	#	#		
0.0				80% Recv. GM5YR25/1	1	ZB	020598							
0.5														
1.0														
1.5		0.0	0.0											
2.0														
2.5				PEAT										
3.0				@ 2.75 punched thru barrel										
3.5				GC5YR 4/4										
4.0				50% Recv.										
4.5														
5.0														
5.5		0.0	0.0											
6.0														
6.5														
7.0														
7.5														
8.0				NO RECOVERY										
8.5				RUNNING										
9.0				SAND										
9.5														
10.0														
10.5														
11.0														
11.5														
12.0				70% Recv. (strong organic odor) GC 2GLE4										
12.5		0.0		2.5/104										
13.0			0.0	SM 2GLE4 2.5/10B										
13.5		2												
14.0				SC 2GLE4 2.5/10B										
14.5				SC 5YR 2.5/2										
15.0														
15.5														
16.0		0.0		50% Recv. SM 5YR										
16.5				2.5/1										
17.0		3.0		(unable to extract acetate sleeve from barrel)										
17.5			0.0											
18.0		0.0												
18.5														
19.0														
19.5														
20.0				END OF BORING @ 20'										
20.5														
21.0														
21.5														
22.0														
22.5														
23.0														
23.5														
24.0														

#20 @ 6.65

NO RECOVERY RUNNING SAND

SEALED SAMPLER USED 12" → 16"

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
TONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
12B-020599
 Page _____ of _____

PROJECT: **FUSRAP MAYWOOD** SITE: **12B001**

Project No: **085750503** Client: **USACE**

Contractor: **TERRA PROBE INC.** SAMPLE DEPTH: **16' - 20'**

Start Date/Time: **4/4 1300** Completion Date/Time: **1400** Well Diameter:

Development Method/Equipment:

Logged by: **G. MARKT** Water Level (ft bgs): **6.65** Protection Level: **D**

Pre-development DTW (PVC) (ft): **6.65** DTB (PVC) (ft): **20'**

Post-development DTW (PVC) (ft):
 Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$
 (2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) =
 (2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) =
 Minimum Purge Volume (gal) (3 well volumes) =
 Development Purge/Discharge Rate (gpm):
 Maximum Drawdown During Purging (ft):
 Total Quantity Purged:
 Disposition of Purge Water:
 Hours of Development:
 Hours of Decon:
 Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1330	-	6.65	-	16.4	7.14	2.39	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

do = 8.95

flow rate = 2:55"/ea

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	12B
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	002
Media	mm	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)

	Northing (NAD 1927)	Easting (NAD 1927)	Elevation (NGVD 1929)
Location	752855.429	2164534.014	

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		4/4	Date	4/4
Time		1430	Time	1430
Logger		G. MARKT	Logger	G. MARKT
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

- MPI No. ENV-12-12060
- Direct-push location grouted with BenSeal.

1430 - 1445 - SOIL SAMPLE 7' => 10'
 1445 - 1600 - H₂O SAMPLE

George H. Markt
 Signature (Core Gamma Logging)

4/4/2000
 Date

George H. Markt
 Signature (Logging)

4/4/2000
 Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	50% REC. GM5YR	1	2	B	0	2	0	6	0	0
0.5				2.5/1									
1.0				6C5YR4/4									
1.5													
2.0		0.0	0.0										
2.5													
3.0													
3.5		↓	↓										
4.0		↑	↑										
4.5													
5.0				SC2GLE48/SB									
5.5		0.0	0.0										
6.0													
6.5													
7.0				SC2GLE42.5/SPB									
7.5				(trace gravel)									
8.0		0.0	↑										
8.5													
9.0													
9.5		0.0	0.0										
10.0													
10.5													
11.0													
11.5				GM2GLE42.5/SPB									
12.0													
12.5		0.0	0.0										
13.0													
13.5													
14.0				REFUSAL @ 14'									
14.5													
15.0													
15.5													
16.0													
16.5													
17.0													
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

H₂O @ 7.85'

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
12B020601
 Page _____ of _____

PROJECT: **RUSRAP MAYWOOD** SITE: **12B002**

Project No: **085750503** Client: **USACE**

Contractor: **TERRA PROBE INC.** SAMPLE DEPTH:

Start Date/Time: **4/4 1445** Completion Date/Time: **1600** Well Diameter:

Development Method/Equipment:

Logged by: **G. MARKT** Water Level (ft bgs): **7.85** Protection Level: **D**

Pre-development DTW (PVC) (ft): **7.85** DTB (PVC) (ft): **14'**

Post-development DTW (PVC) (ft):
 Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$
 (2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$
 (2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$
 Minimum Purge Volume (gal) (3 well volumes) =
 Development Purge/Discharge Rate (gpm):
 Maximum Drawdown During Purging (ft):
 Total Quantity Purged:
 Disposition of Purge Water:
 Hours of Development:
 Hours of Decon:
 Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1500		7.85		16.1	6.94	2.55	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

to 2.24

flow rate = 1:45/lt

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Tel: (201) 226-6600
 FAX: (201) 226-6660

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Site Designator		XXX	12B	
Activity Designator		AAA	GWR	
Field Measurement/Sample Collection Designator		VV	DP	
Station Number		NNN	003	
Media		m m	SB	
Sample Type		n	0	
Sequential Sample Number		#####	(see Below)	
Location		Northing (NAD 1927)	Easting (NAD 1927) Elevation (NGVD 1929)	
		Gamma Logging		
		Down Hole	Core	
Date		4/5	Date	4/5
Time		0815	Time	0815
Logger		ED WIEDERKEHR	Logger	ED WIEDERKEHR
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

1. MPI No. ENV-12-12051
2. Direct-push location grouted with BenSeal.

0815-0845-SOIL SAMPLE ~~8'~~ 8' ⇒ 12'
 0845-0945-H₂O SAMPLE

E.R. Wiederkehr
 Signature (Core Gamma Logging)

4/5/00
 Date

 Signature (Logging)

 Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)									
					X	X	X	#	#	#	#	#		
0.0		↑	↑	800% RECV										
0.5				GM	1	2	B	C	2	C	6	C	2	
1.0		0.0	0.0											
1.5														
2.0		↓		5 1/2" 5YR 8/4										
2.5		↓												
3.0		↓												
3.5		↓												
4.0		↑		800% RECV. GM mixing										
4.5		0.0		colors, woodchips 5YR										
5.0		↓		5/3 to 2.5/1										
5.5		↓	0.0											
6.0		↓												
6.5		0.0												
7.0														
7.5		↓												
8.0		↑		GM 2.5YR 3/4										
8.5		↑												
9.0														
9.5		0.0												
10.0			0.0											
10.5														
11.0														
11.5		↓												
12.0		↑												
12.5														
13.0		0.0												
13.5		↓	0.0											
14.0		↓												
14.5				REFUSAL @ 14.5'										
15.0														
15.5														
16.0														
16.5														
17.0														
17.5														
18.0														
18.5														
19.0														
19.5														
20.0														
20.5														
21.0														
21.5														
22.0														
22.5														
23.0														
23.5														
24.0														

H₂O @ 8.8'

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
12B020603
 Page _____ of _____

PROJECT: **FUSRAP MAYWOOD**

SITE: **12B003**

Project No: **085750503**

Client: **USACE**

Contractor: **TERRA PROBE INC -**

SAMPLE DEPTH: **6' - 10'**

Start Date/Time: **4/5 0845**

Completion Date/Time:

Well Diameter:

Development Method/Equipment:

Logged by: **ED WIEDEKEHR**

Water Level (ft bgs): **8.8**

Protection Level: **D**

Pre-development DTW (PVC) (ft): **8.8**

DTB (PVC) (ft): _____

Post-development DTW (PVC) (ft):
 Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$
 (2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) =
 (2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) =
 Minimum Purge Volume (gal) (3 well volumes) =
 Development Purge/Discharge Rate (gpm):
 Maximum Drawdown During Purging (ft):
 Total Quantity Purged:
 Disposition of Purge Water:
 Hours of Development:
 Hours of Decon:
 Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
0845		8.8	-	9.9	6.91	1174	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

do = 1.28

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660


Site Designator	XXX	12B
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	004
Media	m m	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)
Location	Northing (NAD 1927)	Easting (NAD 1927) Elevation (NGVD 1929)

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		4/5	Date	4/5
Time		0945	Time	0945
Logger		ED WEIDENKEL	Logger	ED WEIDENKEL
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:


- MPI No. ENV-12-12009
- Direct-push location grouted with BenSeal.

0945-1015 - SOIL SAMPLE 8' → 12'
 1015-1200 - H₂O SAMPLE
 1200-1215 - STEAM CLEAN

 _____ Signature (Core Gamma Logging)	4/5/00 _____ Date
_____ Signature (Logging)	_____ Date

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0				100% REV SM 5YR 4/2	1	2	3	0	2	0	6	0	4
0.5													
1.0													
1.5													
2.0		0.0	0.0										
2.5													
3.0				4/1									
3.5				SP 5YR 8/1									
4.0													
4.5				varies from silty sand									
5.0		0.0	0.0	white to gray with traces of organic material									
5.5													
6.0													
6.5		2.05											
7.0													
7.5													
8.0													
8.5				varies from 5YR 8/1 to a 5YR 2.5/1 SM									
9.0													
9.5		8.0	0.0										
10.0													
10.5													
11.0													
11.5													
12.0				SM 2.5Y 2.5/1									
12.5													
13.0													
13.5													
14.0		2.0	0.0	SM 5YR 3/4									
14.5													
15.0													
15.5				mottled material									
16.0													
16.5													
17.0													
17.5		0.0	0.0	SM 5YR 3/4									
18.0													
18.5													
19.0													
19.5				REFUSAL @ 19.5'									
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

H₂O @ 17.3'



¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 12B020605

Page 1 of 1

PROJECT: FUSRAP MAYWOOD
 Project No: 085750503

SITE: 12B004
 Client: USACE

Contractor: TERRA PROBE INC -

SAMPLE DEPTH: 16'-20'

Start Date/Time: 4/5/05

Completion Date/Time: 1200

Well Diameter:

Development Method/Equipment:

Logged by: ED WIEDEKERT

Water Level (ft bgs): 17.3

Protection Level: D

Pre-development DTW (PVC) (ft): 17.3

DTB (PVC) (ft): 19.8

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(ft)/4 \times \pi \times (DTB-DTW)(ft) \times 7.48 \text{ gal/ft}^3$

(2-inch well = $0.164 \times (DTB-DTW)(ft)$) =

(2.5-inch well = $0.255 \times (DTB-DTW)(ft)$) =

Minimum Purge Volume (gal) (3 well volumes) =

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

tal Quantity Purged:

Disposition of Purge Water:

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1015	-	17.3	-	11.2	6.78	2.50	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

do = 5.21

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site Stone & Webster Environmental Technology & Services 100 West Hunter Avenue Maywood, New Jersey 07607 Tel: (201) 226-6600 FAX: (201) 226-6660	Task Description: GWRI Job Number: 085750503 Activity: Direct-Push Sampling
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Site Designator	XXX	12B
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	005
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)
Location	Northing (NAD 1927)	Easting (NAD 1927) Elevation (NGVD 1929)

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		4/5	Date	4/5
Time		1315	Time	1315
Logger		ED WIEDERKER	Logger	ED WIEDERKER
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

- MPI No. ENV-12-12122
- Direct-push location grouted with BenSeal.

1315-1345 - SOIL SAMPLE 8' ⇒ 12'

1345-1430 - H₂O SAMPLE

_____ Signature (Core Gamma Logging)	_____ Date
_____ Signature (Logging)	_____ Date

RAD BACKGROUND = 40

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		↑	↑	90% RECV. TOP SOIL.	1	2	B	0	2	0	6	0	6
0.5		↑	↑										
1.0		0.0	·	White material (SM)									
1.5		↓	0.0										
2.0													
2.5		12 to	↓										
3.0		15	↓										
3.5		↓	↓										
4.0		↑	↑	50% RECV.									
4.5		2 to	↑										
5.0		5	0.0										
5.5		↓	↓										
6.0		↓	↓	2.5YR4/8, brick									
6.5		10	↓										
7.0		↓	↓	SM 7.5YR4/2									
7.5		↓	↓										
8.0		↑	↑	90% RECV. SP									
8.5		10	↓										
9.0		↓	↓										
9.5		↓	0.0										
10.0		↓	↓										
10.5		15	↓	SM 2.6Y5PB									
11.0		↓	↓										
11.5		↓	↓										
12.0													
12.5													
13.0													
13.5													
14.0													
14.5													
15.0													
15.5													
16.0				BOTTOM OF BORING									
16.5				@ 16.0'									
17.0													
17.5													
18.0													
18.5													
19.0													
19.5													
20.0													
20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

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¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
 STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
 12B020607

PROJECT: FUSRAP MAYWOOD SITE: 12B005 Page 1 of 1

Project No: 085750503 Client: USACE

Contractor: TERRA PROBE INC. SAMPLE DEPTH: 12' → 16'

Start Date/Time: 4/5 1345 Completion Date/Time: _____ Well Diameter: _____

Development Method/Equipment: _____

Logged by: ED WIEDERKEHR Water Level (ft bgs): 10.0' Protection Level: D

Pre-development DTW (PVC) (ft): 10.0 DTB (PVC) (ft): 16.

Post-development DTW (PVC) (ft): _____

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) = _____

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) = _____

Minimum Purge Volume (gal) (3 well volumes) = _____

Development Purge/Discharge Rate (gpm): _____

Maximum Drawdown During Purging (ft): _____

Total Quantity Purged: _____

Disposition of Purge Water: _____

Hours of Development: _____

Hours of Decon: _____

Hours of Standby: _____

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1345	-	10.0	-	11.1	7.07	3.38	999+	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

do = 0.37

A

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	12B
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	006
Media	m m	SB
Sample Type	n	0
Sequential Sample Number	#####	(see Below)
Location	Northing (NAD 1927)	Easting (NAD 1927) Elevation (NGVD 1929)

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		4/5	Date	4/5
Time		1445	Time	1445
Logger			Logger	
Detector Model #			PID Model #	Multi-RAE
Detector Serial #			PID Serial #	CENAN 21811
Scaler Model #				
Scaler Serial #				

Comments:

- MPI No. ENV-12-12162
- Direct-push location grouted with BenSeal.

1445 - 1500 - SOIL SAMPLE 4' => 8'
 1500 - 1600 - H₂O SAMPLE

ER. Weirick Jr
 Signature (Core Gamma Logging)

4/5/00
 Date


 Signature (Logging)

 Date

RAD BACKGROUND = 60 Kc/m

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)														
					X	X	X	#	#	#	#	#							
0.0				50% RECV.															
0.5				SM 5YR 3/3	1	2	3	0	2	0	6	0	8						
1.0																			
1.5		0.0	0.0																
2.0																			
2.5																			
3.0																			
3.5																			
4.0				90% RECV.															
4.5				GM 5YR 3/4															
5.0		RANGE 2-10																	
5.5			0.0																
6.0																			
6.5																			
7.0																			
7.5																			
8.0				25% RECV.															
8.5			0.0																
9.0				SP 5YR 3/4															
9.5																			
10.0				REFUSAL @ 9'															
10.5																			
11.0																			
11.5																			
12.0																			
12.5																			
13.0																			
13.5																			
14.0																			
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23.5																			
24.0																			

H₂O @ 5.4'



¹ Location of Core Gamma Reading Based on Initial Continuous Scan
 A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID:
12B020609

PROJECT: FUSRAP MAYWOOD	SITE: 12B006	Page <u>1</u> of <u>1</u>
Project No: 085750503	Client: USACE	
Contractor: TERRA PROBE INC.		SAMPLE DEPTH: 5'-9'
Start Date/Time: 4/5/500	Completion Date/Time: 1600	Well Diameter:
Development Method/Equipment:		
Logged by: ED WIEDERKEAR	Water Level (ft bgs): 5.4'	Protection Level: D
Pre-development DTW (PVC) (ft): <u>5.4'</u>	DTB (PVC) (ft): <u>9'</u>	

Post-development DTW (PVC) (ft):
 Standing Well Volume (gal) = $D^2(\text{ft})^4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$
 (2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft}) =$
 (2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft}) =$
 Minimum Purge Volume (gal) (3 well volumes) =
 Development Purge/Discharge Rate (gpm):
 Maximum Drawdown During Purging (ft):
 Total Quantity Purged:
 Disposition of Purge Water:
 Hours of Development:
 Hours of Decon:
 Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	Remarks
1500	-	5.4'	-	9.3	6.71	.081	966	

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute

RAD BACKGROUND = 60 Kc/m
to = 7.63

GWRI SOIL PROBE LOG SHEET

FUSRAP Maywood Superfund Site
 Stone & Webster Environmental Technology & Services
 100 West Hunter Avenue
 Maywood, New Jersey 07607

Task Description: GWRI
 Job Number: 085750503
 Activity: Direct-Push Sampling

Tel: (201) 226-6600
 FAX: (201) 226-6660

Site Designator	XXX	12B
Activity Designator	AAA	GWR
Field Measurement/Sample Collection Designator	VV	DP
Station Number	NNN	007
Media	mm	SB
Sample Type	n	
Sequential Sample Number	#####	(see Below)
Location	Northing (NAD 1927)	Easting (NAD 1927) Elevation (NGVD 1929)

	Gamma Logging		Photoionization Detector (PID) Logging	
	Down Hole	Core		
Date		4/6	Date	4/6
Time		0800	Time	0800
Logger		E. WIEDERKEHR	Logger	E. WIEDERKEHR
Detector Model #			PID Model #	Multi-RAE
Detector Serial #		159480	PID Serial #	CENAN 21811
Scaler Model #		2281		
Scaler Serial #				

Comments:

1. MPI No. ENV12-12046
2. Direct-push location grouted with BenSeal.

0800-0830 - SOIL SAMPLE
 NONE TAKEN - H₂O SAMPLE

0830 - Stuck by high LEL
 -7+100%
 0835 - CANCELLED SAMPLING
 DUE TO HIGH LEL PER SEC.
 0845 - MOVED TO NEW LOCATION
 HIGH LEL READINGS
 0850 - MOVED AGAIN DUE
 WEST - APPROX 20 FT
 HIGH LEL READINGS
 0900 - MOVED SOUTH FROM
 ORIGINAL APPROX 20 FT
 HIGH LEL READINGS

George H. Markert for
 Signature (Core Gamma Logging)
 Ed Wiederkehr

George H. Markert for
 Signature (Logging) Ed Wiederkehr
 Date 4/6/00

BACKGROUND = 17.6 Kc/m

Depth (Feet)	Down Hole Gamma Reading (c/10 sec)	Kc/m Core Gamma Reading ¹	PID Reading (ppm)	Sample Description (per Field Operations Manual)	Laboratory Sample ID (Laboratory Designation)								
					X	X	X	#	#	#	#	#	
0.0		2		40% Recv. Fill 5YR5/3	1	2	B	0	2	0	6	1	0
0.5		4		Sand, gravel and silt									
1.0		4											
1.5		4											
2.0		4											
2.5		4											
3.0		4											
3.5		2		white material									
4.0		4		50% Recv.									
4.5		4											
5.0		4											
5.5		2											
6.0		2		B/r. cinder material									
6.5		4											
7.0		4		5YR3/4 GM									
7.5		1		7									
8.0													
8.5													
9.0													
9.5													
10.0													
10.5													
11.0													
11.5													
12.0													
12.5													
13.0													
13.5													
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20.5													
21.0													
21.5													
22.0													
22.5													
23.0													
23.5													
24.0													

MOVED
NEED
TO
LOCATE
M
↙

¹ Location of Core Gamma Reading Based on Initial Continuous Scan
A:\GWRI Soil Probe Log Sheet.doc

WELL DEVELOPMENT LOG
STONE & WEBSTER ENGINEERING CORP.

SAMPLE ID.
12B020611

PROJECT: **FUSRAP MAYWOOD** SITE: **12B007** Page _____ of _____
 Project No: **085750503** Client: **USACE**

Contractor: **TERRA PROBE INC.** SAMPLE DEPTH:

Start Date/Time: Completion Date/Time: Well Diameter:

Development Method/Equipment:

Logged by: **ED WIEDERKEHR** Water Level (ft bgs): Protection Level: **D**

Pre-development DTW (PVC) (ft): _____ DTB (PVC) (ft): _____

Post-development DTW (PVC) (ft):

Standing Well Volume (gal) = $D^2(\text{ft})/4 \times \pi \times (\text{DTB}-\text{DTW})(\text{ft}) \times 7.48 \text{ gal/ft}^3$

(2-inch well = $0.164 \times (\text{DTB}-\text{DTW})(\text{ft})$) =

(2.5-inch well = $0.255 \times (\text{DTB}-\text{DTW})(\text{ft})$) =

Minimum Purge Volume (gal) (3 well volumes) =

Development Purge/Discharge Rate (gpm):

Maximum Drawdown During Purging (ft):

tal Quantity Purged:

Disposition of Purge Water:

Hours of Development:

Hours of Decon:

Hours of Standby:

Time	Volume Purged (gal)	DTW (ft) (PVC)	Clarity/Color	Temp. (°C)	pH	Conductivity (mS/cm)	Turbidity	EH	Remarks	DO

Notes: = be bgs = below ground surface D = well diameter D (2-inch well) = 0.167 feet
 PVC = below top of PVC DTB = depth to bottom of well D (2.5-inch well) = 0.208 feet
 DTW = depth to water gpm = gallons per minute