Formerly Utilized Sites Remedial
Action Program (FUSRAP)

Maywood Chemical Company Superfund Site

ADMINISTRATIVE RECORD

Document Number

MISS- 025.

US Army Corps
of Engineers®

046549

DOE/OR/20722-154

RADIOLOGICAL CHARACTERIZATION REPORT FOR THE FEDERAL EXPRESS PROPERTY MAYWOOD, NEW JERSEY

JULY 1987

Prepared for

UNITED STATES DEPARTMENT OF ENERGY
OAK RIDGE OPERATIONS OFFICE
Under Contract No. DE-AC05-81OR20722

By

N. C. Ring and S. K. Livesay
Bechtel National, Inc.
Oak Ridge, Tennessee

Bechtel Job No. 14501

046649

Bechtel National, Inc.
Engineers — Constructors

Jackson Plaza Tower
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830

Mail Address: P.O. Box 350, Oak Ridge, TN 37831-0350
Telex: 3785873

JUL 31 1987

U.S. Department of Energy
Oak Ridge Operations
Post Office Box E
Oak Ridge, Tennessee 37831

Attention: S. W. Ahrends, Director
Technical Services Division

Subject: Bechtel Job No. 14501, FUSRAP Project
DOE Contract No. DE-AC05-81OR20722
Publication of the Radiological Characterization Report for the Federal Express Property in Maywood, New Jersey
Code: 7310/WBS: 138

Dear Mr. Ahrends:

The following is the response to comments in Steve Oldham's letter (87-388) dated June 22 (our CCN 045685) and additional information exchanged during telephone conversations between Steve Oldham and Tom Dravecky on July 21 and 23. Enclosed are 25 copies of the subject report that incorporates these comments.

Also enclosed is a copy of CCN 35677, "Calibration and Functional Checks of Eberline Instrumentation," as requested by Steve Oldham. This item is the BNI trip report cited as reference in the Maywood and Lodi characterization reports.

Please contact Sherry Livesay (6-0454) if you need additional copies.

Very truly yours,

for J. R. Kannard
Project Manager - FUSRAP

JRK/skl

Enclosure: As stated

cc: J. F. Wing, w/o
R. G. Atkin, w/o
S. K. Oldham, w/o
B. A. Hughlett, w/o
J. D. Berger (ORAU), w/e
G. K. Hovey, w/o

CONCURRENCE

SKL				

TABLE OF CONTENTS

	Page
Abbreviations	v
1.0 Introduction and Summary	1
1.1 Introduction	1
1.2 Purpose and Objectives	1
1.3 Summary	2
2.0 Site Description and Background	3
3.0 Radiological Characterization	5
3.1 Remedial Action Guidelines	5
3.2 Surface Characterization	5
3.3 Subsurface Characterization	9
References	17
Appendix A Geologic Drill Logs for the Maywood Interim Storage Site - Federal Express	A-1

LIST OF FIGURES

Figure	Title	Page
2-1	Location of the Federal Express Property	4
3-1	Sampling Locations at the Federal Express Property	7
3-2	Area of Surface Contamination at the Federal Express Property	8
3-3	Area of Subsurface Contamination at the Federal Express Property	11

LIST OF TABLES

Table	Title	Page
3-1	Summary of Residual Contamination Guidelines for the Maywood Site	12
3-2	Downhole Gamma Logging Results for the Federal Express Property	14

ABBREVIATIONS

cm	centimeter
cm^2	square centimeter
cpm	counts per minute
dpm	disintegrations per minute
ft	foot
h	hour
in.	inch
l	liter
m	meter
m^2	square meter
μR/h	microroentgens per hour
mi	mile
mi^2	square mile
mrad/h	millirad per hour
mrem	millirem
mrem/yr	millirem per year
min	minute
ppb	parts per billion
ppm	parts per million
pCi/g	picocuries per gram
pCi/l	picocuries per liter
WL	working level

1.0 INTRODUCTION AND SUMMARY

1.1 INTRODUCTION

The 1984 Energy and Water Appropriations Act authorized the U.S. Department of Energy (DOE) to conduct a decontamination research and development project at four sites, including the site of the former Maywood Chemical Works (now owned by the Stepan Company) and its vicinity properties. The act was reauthorized in 1985. DOE has constructed the Maywood Interim Storage Site (MISS) on 11.7 acres of land west of the Stepan Company property. The Federal Express property is included as one of the MISS vicinity properties. The work is being administered by the Formerly Utilized Sites Remedial Action Program (FUSRAP), one of two remedial action programs under the direction of the DOE Division of Facility and Site Decommissioning Projects.

The U.S. Government initiated FUSRAP in 1974 to identify, clean up, or otherwise control sites where low-activity radioactive contamination (exceeding current guidelines) remains from the early years of the nation's atomic energy program or from commercial operations that resulted in conditions Congress has mandated DOE to remedy (Ref. 1).

FUSRAP is currently being managed by the DOE Oak Ridge Operations (ORO). As the Project Management Contractor (PMC) for FUSRAP, Bechtel National, Inc. (BNI) is responsible to DOE for planning, managing, and implementing FUSRAP.

1.2 PURPOSE AND OBJECTIVES

A radiological characterization of the Federal Express property has been conducted to establish the horizontal and vertical limits of radioactive contamination and to determine ranges of radionuclide concentrations. The information obtained from this characterization work will be used in planning any required remedial action. The

results will also be used to satisfy an important secondary objective, which is to provide data to aid in the identification and evaluation of pathways by which contamination might have migrated from the property.

1.3 SUMMARY

This report summarizes the procedures and results of the radiological characterization of the Federal Express property conducted in August and September 1986.

The radiological characterization confirmed that thorium-232 is the primary radioactive contaminant. A sediment sample showed the maximum concentration of thorium-232 to be 7.7 pCi/g above background, which is in excess of the DOE guideline of 5.0 pCi/g plus background for surface soil. The concentration of radium-226 was at the background level.

The results of downhole gamma logging indicated no subsurface contamination.

2.0 SITE DESCRIPTION AND BACKGROUND

The Federal Express property is in a highly developed area of the Borough of Maywood, County of Bergen, New Jersey. The population density of the area is approximately 10,000 people per square mile. It is located approximately 12 mi north-northwest of downtown Manhattan (New York City) and 13 mi northeast of Newark, New Jersey. The property is bounded by New Jersey Route 17 on the west and by other commercial properties on the north, east, and south. Figure 2-1 shows the location of the property.

The Federal Express property was shown to be radioactively contaminated during a radiological survey conducted in July 1983 by the NUS Corporation at the request of the U.S. Environmental Protection Agency (EPA) (Ref. 2). The contamination probably originated from the processing of monazite sand (thorium ore) by the Maywood Chemical Works from 1916 through 1956. During this time, slurry containing process wastes from the thorium operations was pumped to diked areas west of the plant. The area west of the plant was generally low and swampy at that time. In 1932, New Jersey Route 17 was built through this disposal area. Some of these process wastes were removed from the Maywood Chemical Works for use as mulch and fill on nearby properties, thereby contaminating them with radioactive thorium (Ref. 3). Additional waste apparently migrated off-site via the natural drainage provided by the former Lodi Brook.

In 1954, the Atomic Energy Commission (AEC) issued License R-103 to the Maywood Chemical Works allowing it to continue to ship, receive, possess, and process radioactive materials under the authority of the Atomic Energy Act of 1954. The Maywood Chemical Works stopped processing thorium in 1956 after approximately 40 years of production. The Maywood Chemical Works was sold to the Stepan Company in 1959 (Ref. 3).

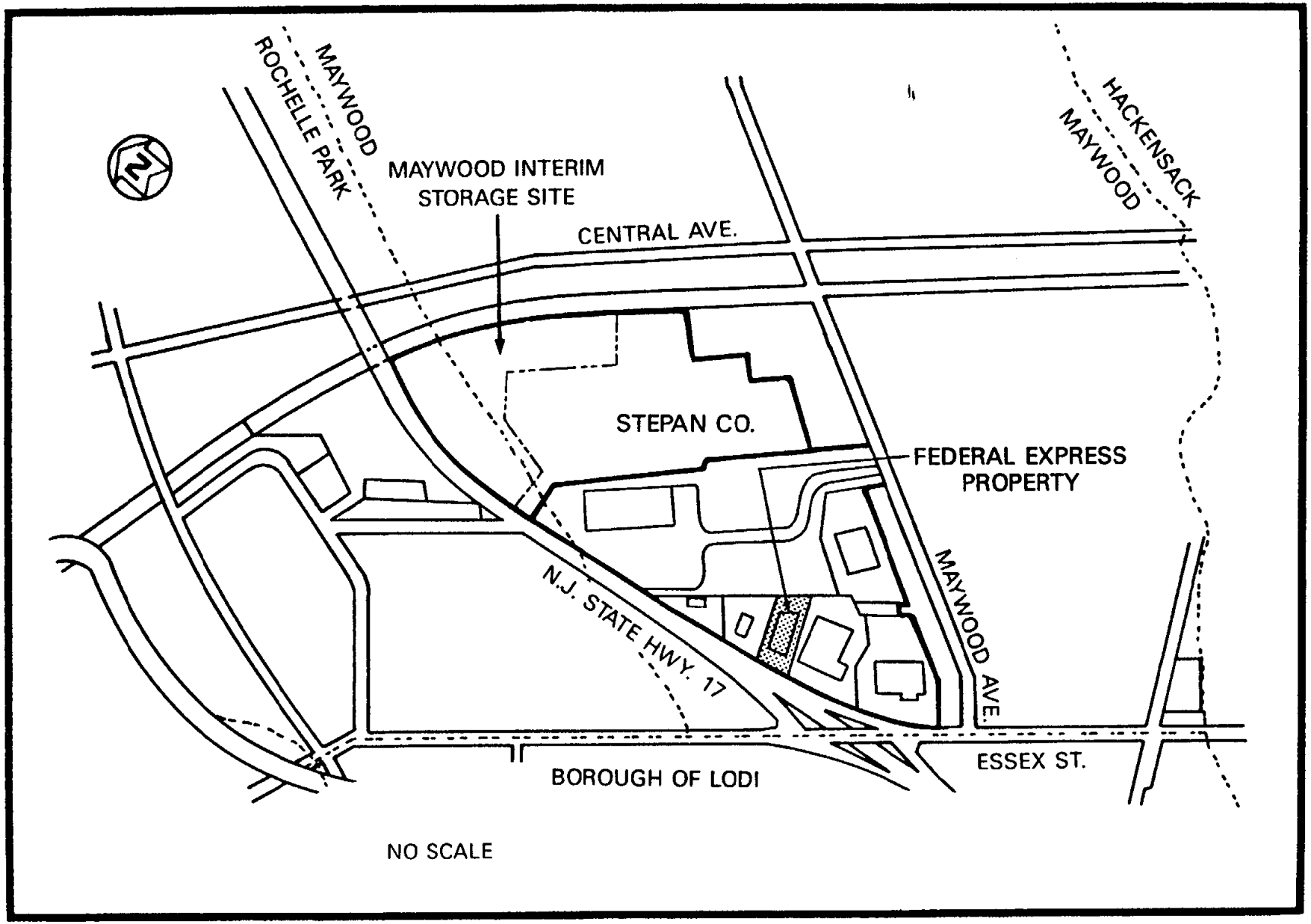

FIGURE 2-1 LOCATION OF THE FEDERAL EXPRESS PROPERTY

046649

3.0 RADIOLOGICAL CHARACTERIZATION

To provide sufficiently detailed information regarding the limits of radioactive contamination and to provide data for the development of cost-effective measures for any potential remedial action, both surface and subsurface investigations were performed.

To facilitate the collection of data in a systematic manner, a 50-ft grid was established across the area to be characterized. This grid was correlated with the New Jersey state grid system to ensure that it could be reestablished if remedial action is undertaken. All data correspond to coordinates on the characterization grid.

3.1 REMEDIAL ACTION GUIDELINES

Information collected during the radiological survey conducted by the NUS Corporation (Ref. 2) indicated that the radioactive contamination at the Federal Express property consists primarily of thorium-232, with typically much lower levels of radium-226 and uranium-238. Thorium is also known to be the primary contaminant at the Stepan property (Ref. 3). Table 3-1 lists the DOE residual contamination guidelines governing the release of formerly contaminated property for unrestricted use (Ref. 4).

3.2 SURFACE CHARACTERIZATION

Surface characterization was conducted with a shielded gamma scintillation detector. Near-surface gamma radiation measurements were taken 12 in. from the ground at the grid line intersections spaced 10 ft apart. The shielded detector was used to ensure that radiation detected by the probe originated from the ground directly beneath the unit. By shielding against lateral gamma flux, the shielded detector minimizes possible sources of error in the measurements. Furthermore, this detector was calibrated at the Technical Measurements Center (TMC) in Grand Junction, Colorado, to provide a correlation of counts per minute (cpm) to picocuries per

gram (pCi/g). On the basis of this relationship, locations with measurements of more than 11,000 cpm were noted as exceeding the DOE guideline of 5 pCi/g plus background for thorium-232 in surface soil/sediments. To better define the limits of contamination, a sediment sample location was chosen by evaluating locations with measurements of more than 11,000 cpm, locations with measurements at or near 11,000 cpm, and the potential for lateral gamma flux.

Near-surface gamma levels measured on the property are typically less than background level of 5,000 cpm. To identify surface areas where the level of contamination exceeds the guideline for thorium-232, areas having readings in excess of 11,000 cpm were plotted on a grid. In addition, near-surface gamma measurements indicate that contamination extends onto several properties contiguous with the Federal Express property.

A sediment sample taken from the ditch along the eastern boundary of the property [Coordinates N8410, E11312 (Figure 3-1)] was analyzed for uranium-238, thorium-232, and radium-226. The maximum thorium-232 concentration of 7.7 pCi/g in the sample exceeds the guideline for thorium-232 in surface soil/sediments. The maximum concentration of radium-226 is 1.3 pCi/g, which is less than the DOE guideline of 5 pCi/g plus background for surface soil/sediments. No uranium-238 concentration above laboratory detection limits was identified.

Since the thorium-232 concentration of the sediment sample exceeds the DOE guideline of 5 pCi/g above background, it has been demonstrated to be the site's primary radioactive contaminant.

Additional samples could not be collected because of heavy undergrowth in this section of the property. Figure 3-2 shows the area of surface contamination.

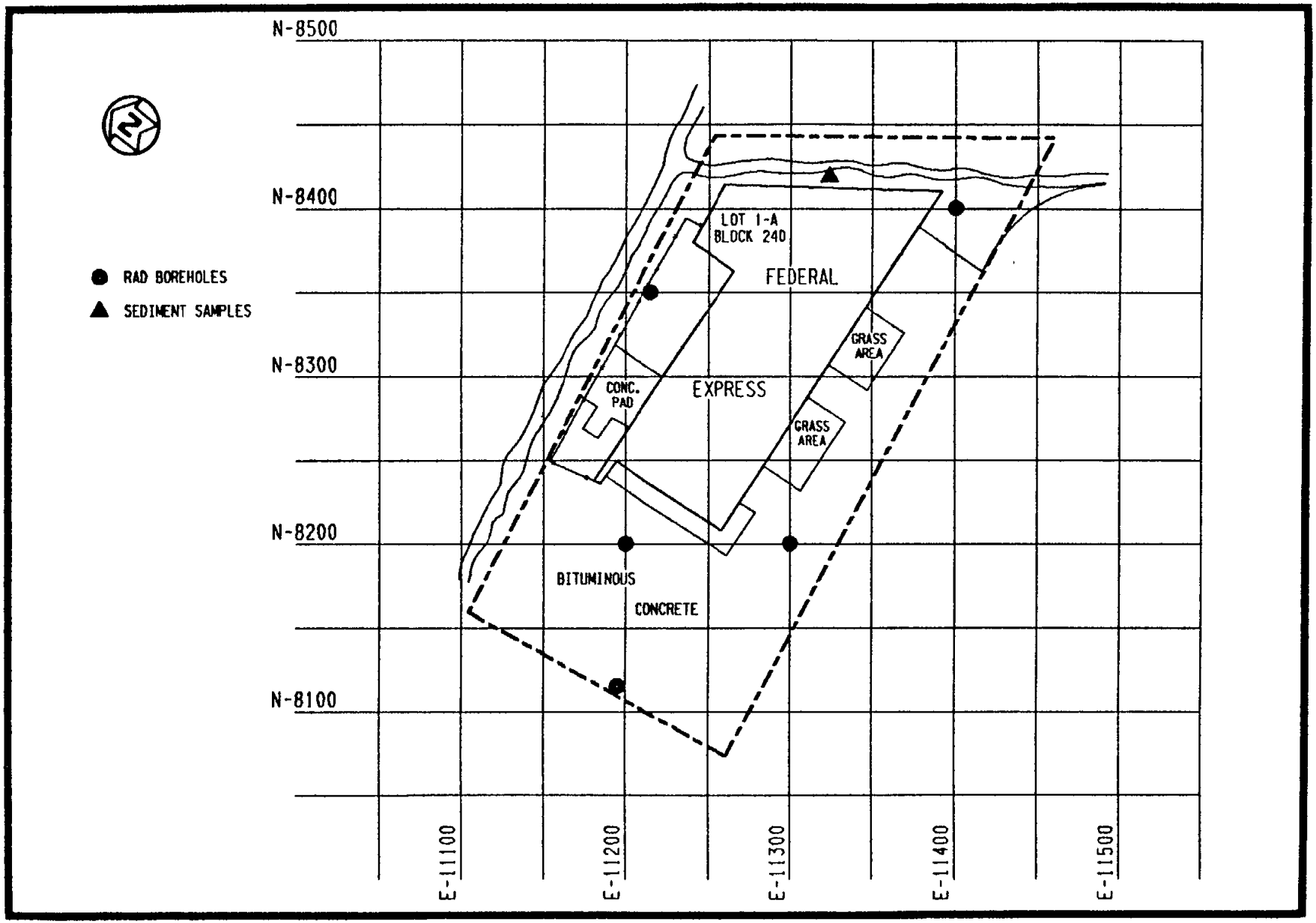

FIGURE 3-1 SAMPLING LOCATIONS AT THE FEDERAL EXPRESS PROPERTY

049649

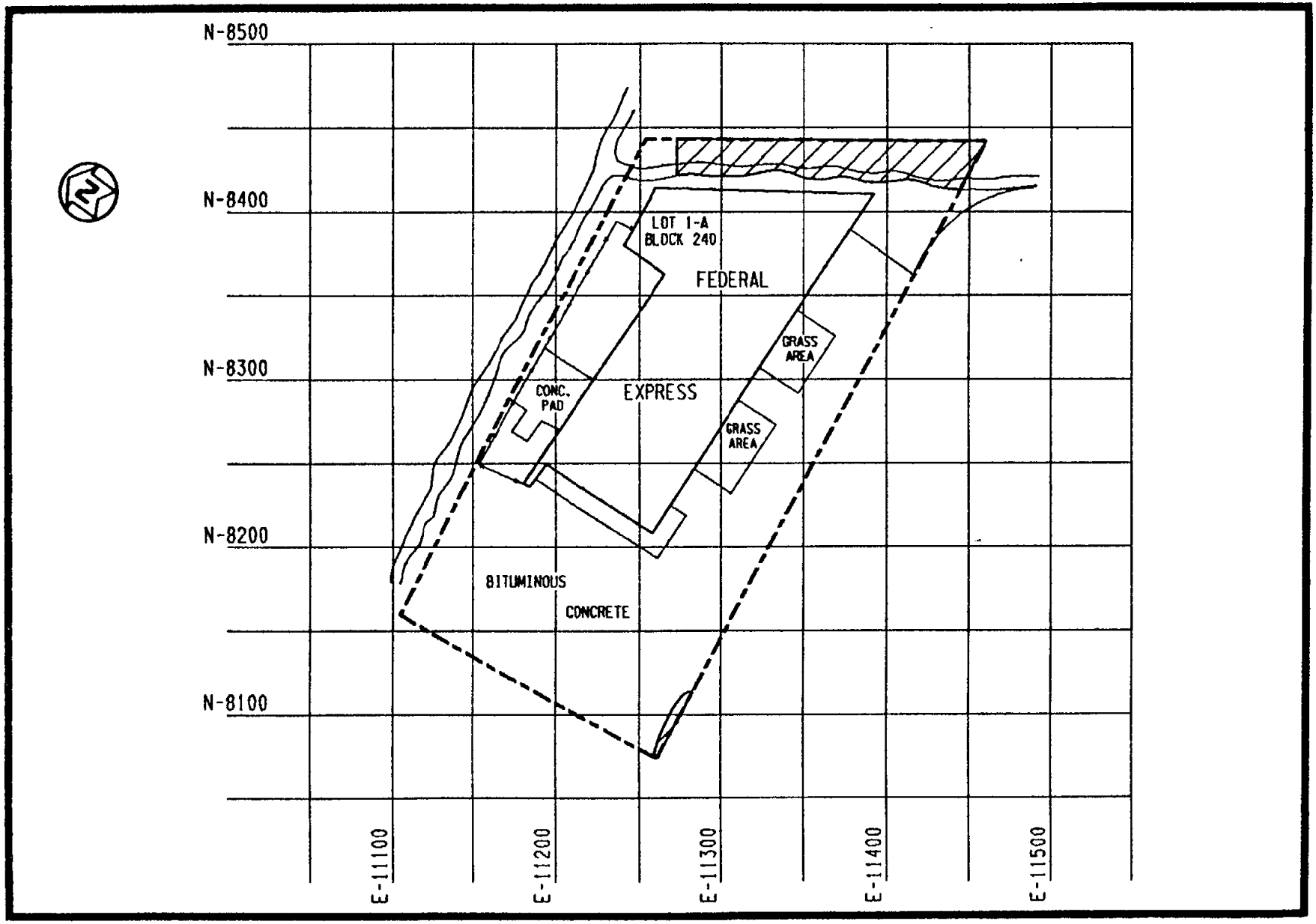

FIGURE 3-2 AREA OF SURFACE CONTAMINATION AT THE FEDERAL EXPRESS PROPERTY

3.3 SUBSURFACE CHARACTERIZATION

After surface characterization was completed, a subsurface investigation was conducted to determine the depth of previously identified surface contamination and to locate subsurface contamination with no surface manifestation. The subsurface investigation was conducted using downhole gamma logging of the drill holes. This technique is significantly more cost-effective than soil sampling, because the procedure can be completed more quickly and eliminates the need for laboratory analysis.

A 2-in. by 2-in. sodium iodide gamma scintillation detector was used to perform the downhole logging. The instrument was calibrated at TMC, where it was determined that a count rate of approximately 40,000 cpm corresponds to the 15-pCi/g guideline for thorium-232 in subsurface soil. This relationship has been corroborated in results from previous characterizations where thorium-232 was found (Ref. 5).

During the course of the subsurface investigation, five radiological boreholes were drilled and gamma logged to determine the depths and concentrations of radioactive contamination. The borehole logs were reviewed to identify trends, regardless of whether concentrations exceeded the guideline. Borehole locations are shown in Figure 3-1. Detailed gamma logging data are presented in Table 3-2. On the basis of the evaluation of the vertical gamma logging data, no instrument readings indicate the presence of soil in which contamination exceeds 15 pCi/g.

The ditch located along the eastern boundary of the property was found to contain stream sediments with contamination in excess of the guideline for surface soil. Heavy undergrowth throughout the ditch prohibited drilling in this area. The ditch appears to be a barrier to the contamination. Information obtained during the characterization of the adjacent property to the north and east indicates that contamination immediately adjacent to this area is as deep as 5 ft. Therefore, the potential exists for contamination to

exist to the same depth in this ditch. The area of subsurface contamination is shown in Figure 3-3.

On the basis of geological information gained as a result of this characterization, it was determined that the site is relatively flat (total measured relief of 2.0 ft) with the lowest elevation in the southwest (44.2 ft m.s.l.) and the highest in the northeast (maximum elevation of 46.2 ft m.s.l.).

Geological evidence indicates that the current drainage ditch for southward moving groundwater is man-made and the original channel existed farther east in the Federal Express property. A cumulose soil consisting of black organic silt is the characteristic marker bed of this former stream channel and wetland environment. During development of the site, the soil was mechanically disturbed, leaving thick accumulations near the present man-made channel and exposing underlying Brunswick sandstone in other areas. The entire property was then covered with fill to bring the surface up to the present grade, resulting in the current flatness of the site. The site is bordered on the north and east by man-made drainage ditches.

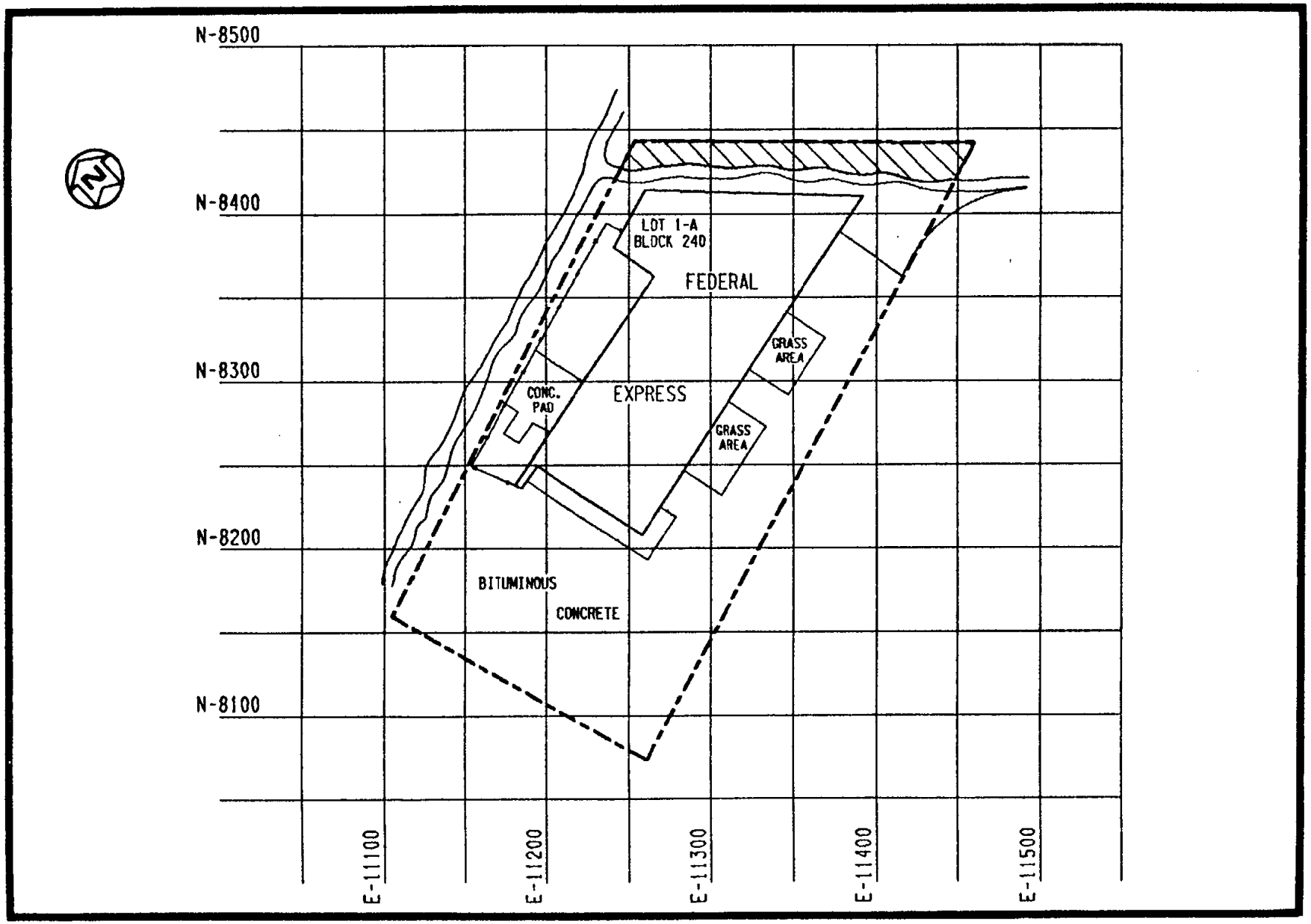

FIGURE 3-3 AREA OF SUBSURFACE CONTAMINATION AT THE FEDERAL EXPRESS PROPERTY

TABLE 3-1

SUMMARY OF RESIDUAL CONTAMINATION GUIDELINES FOR THE MAYWOOD SITE

BASIC DOSE LIMITS

The basic limit for the annual radiation dose received by an individual member of the general public is 100 mrem/yr.

SOIL (LAND) GUIDELINES (MAXIMUM LIMITS FOR UNRESTRICTED USE)

Radionuclide	Soil Concentration (pCi/g) above background[a,b,c]
Radium-226 Radium-228 Thorium-230 Thorium-232	5 pCi/g, averaged over the first 15 cm of soil below the surface; 15 pCi/g when averaged over any 15-cm-thick soil layer below the surface layer.
Other radionuclides	Soil guidelines will be calculated on a site-specific basis using the DOE manual developed for this use.

STRUCTURE GUIDELINES (MAXIMUM LIMITS FOR UNRESTRICTED USE)

Airborne Radon Decay Products

Generic guidelines for concentrations of airborne radon decay products shall apply to existing occupied or habitable structures on private property that are intended for unrestricted use; structures that will be demolished or buried are excluded. The applicable generic guideline (40 CFR 192) is: In any occupied or habitable building, the objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL.[d] In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL. Remedial actions are not required in order to comply with this guideline when there is reasonable assurance that residual radioactive materials are not the cause.

External Gamma Radiation

The average level of gamma radiation inside a building or habitable structure on a site to be released for unrestricted use shall not exceed the background level by more than 20 μ R/h.

Indoor/Outdoor Structure Surface Contamination

	Allowable Residual Surface Contamination[e] (dpm/100 cm^2)		
Radionuclide[f]	Average[g,h]	Maximum[h,i]	Removable[h,j]
Transuranics, Ra-226, Ra-228, Th-230, Th-228 Pa-231, Ac-227, I-125, I-129	100	300	20
Th-Natural, Th-232, Sr-90, Ra-223, Ra-224 U-232, I-126, I-131, I-133	1,000	3,000	200

TABLE 3-1

(continued)

Indoor/Outdoor Structure Surface Contamination (continued)

Radionuclide[f]	Allowable Residual Surface Contamination[e] (dpm/100 cm^2) Average[g,h]	Maximum[h,i]	Removable[h,j]
U-Natural, U-235, U-238, and associated decay products	5,000 α	15,000 α	1,000 α
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5,000 β-γ	15,000 β-γ	1,000 β-γ

[a]These guidelines take into account ingrowth of radium-226 from thorium-230 and of radium-228 from thorium-232, and assume secular equilibrium. If either thorium-230 and radium-226 or thorium-232 and radium-228 are both present, not in secular equilibrium, the guidelines apply to the higher concentration. If other mixtures of radionuclides occur, the concentrations of individual radionuclides shall be reduced so that the dose for the mixtures will not exceed the basic dose limit.

[b]These guidelines represent unrestricted-use residual concentrations above background averaged across any 15-cm-thick layer to any depth and over any contiguous 100-m^2 surface area.

[c]Localized concentrations in excess of these limits are allowable provided that the average concentration over a 100-m^2 area does not exceed these limits.

[d]A working level (WL) is any combination of short-lived radon decay products in 1 liter of air that will result in the ultimate emission of 1.3×10^5 MeV of potential alpha energy.

[e]As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[f]Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

[g]Measurements of average contamination should not be averaged over more than 1 m^2. For objects of less surface area, the average shall be derived for each such object.

[h]The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.

[i]The maximum contamination level applies to an area of not more than 100 cm^2.

[j]The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. The numbers in this column are maximum amounts.

TABLE 3-2

DOWNHOLE GAMMA LOGGING RESULTS
FOR THE FEDERAL EXPRESS PROPERTY

Page 1 of 3

Coordinates East	Coordinates North	Depth (a) (ft)	Counts per Minute
11195	8115	0.5	10000
11195	8115	1.0	12000
11195	8115	1.5	13000
11195	8115	2.0	14000
11195	8115	2.5	13000
11195	8115	3.0	13000
11195	8115	3.5	11000
11195	8115	4.0	11000
11195	8115	4.5	10000
11195	8115	5.0	9000
11195	8115	5.5	10000
11195	8115	6.0	9000
11195	8115	6.5	9000
11195	8115	7.0	9000
11195	8115	7.5	10000
11195	8115	8.0	10000
11195	8115	8.5	12000
11195	8115	9.0	15000
11195	8115	9.5	18000
11200	8200	0.5	8000
11200	8200	1.0	14000
11200	8200	1.5	20000
11200	8200	2.0	17000
11200	8200	2.5	14000
11200	8200	3.0	11000
11200	8200	3.5	10000
11200	8200	4.0	9000
11200	8200	4.5	10000
11200	8200	5.0	10000
11200	8200	5.5	11000
11200	8200	6.0	9000
11200	8200	6.5	8000
11200	8200	7.0	8000
11200	8200	7.5	8000
11215	8350	0.5	8000
11215	8350	1.0	9000
11215	8350	1.5	12000
11215	8350	2.0	15000
11215	8350	2.5	16000
11215	8350	3.0	15000

TABLE 3-2

(continued)

Page 2 of 3

Coordinates East	Coordinates North	Depth (a) (ft)	Counts per Minute
11215	8350	3.5	13000
11215	8350	4.0	12000
11215	8350	4.5	12000
11215	8350	5.0	12000
11215	8350	5.5	12000
11215	8350	6.0	10000
11215	8350	6.5	9000
11215	8350	7.0	9000
11215	8350	7.5	9000
11215	8350	8.0	9000
11215	8350	8.5	8000
11215	8350	9.0	7000
11300	8200	0.5	7000
11300	8200	1.0	9000
11300	8200	1.5	9000
11300	8200	2.0	10000
11300	8200	2.5	11000
11300	8200	3.0	12000
11300	8200	3.5	11000
11300	8200	4.0	10000
11300	8200	4.5	10000
11300	8200	5.0	10000
11300	8200	5.5	11000
11300	8200	6.0	10000
11300	8200	6.5	9000
11300	8200	7.0	9000
11300	8200	7.5	11000
11300	8200	8.0	12000
11300	8200	8.5	11000
11300	8200	9.0	11000
11300	8200	9.5	11000
11400	8400	0.5	8000
11400	8400	1.0	9000
11400	8400	1.5	14000
11400	8400	2.0	17000
11400	8400	2.5	16000
11400	8400	3.0	16000
11400	8400	3.5	15000
11400	8400	4.0	15000
11400	8400	4.5	15000

TABLE 3-2

(continued)

Page 3 of 3

Coordinates East	Coordinates North	Depth (a) (ft)	Counts per Minute
11400	8400	5.0	13000
11400	8400	5.5	10000
11400	8400	6.0	9000
11400	8400	6.5	9000
11400	8400	7.0	9000
11400	8400	7.5	9000
11400	8400	8.0	9000
11400	8400	8.5	8000
11400	8400	9.0	8000
11400	8400	9.5	9000
11400	8400	10.0	8000
11400	8400	10.5	9000
11400	8400	11.0	8000

(a) The variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

REFERENCES

1. U.S. Department of Energy. Description of the Formerly Utilized Sites Remedial Action Program, ORO-777, Oak Ridge, TN, September 1980 (as modified by DOE in October 1983).

2. NUS Corporation, Radiological Study of Maywood Chemical, Maywood, New Jersey, R-584-11-83-1, November 1983.

3. Morton, Henry W., Natural Thorium in Maywood, New Jersey, Nuclear Safety Associates, Inc., Potomac, MD, September 29, 1982.

4. U.S. Department of Energy. "U.S. Department of Energy Guidelines for Residual Radioactivity at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites," Rev. 1, July 1985.

5. Trip Report, C. P. Leichtweis, Bechtel National, Inc., to File. "Calibration and Functional Checks of Eberline Instrumentation," CCN 35677, March 25, 1986.

APPENDIX A

GEOLOGIC DRILL LOGS FOR THE

MAYWOOD INTERIM STORAGE SITE - FEDERAL EXPRESS

046649

GEOLOGIC DRILL LOG

PROJECT: FUSRAP	JOB NO.: 14501-138	SHEET NO.: 1 OF 1	HOLE NO.: MISS-123R		
SITE: MAYWOOD INTERIM STORAGE SITE-FEDERAL EXPRESS	COORDINATES: N8400,E11400	ANGLE FROM HORIZ.: 90°	BEARING: N/A		
BEGUN: 6/20/86	COMPLETED: 6/20/86	DRILLER: MORETRENCH ENVIRONMENTAL SERVICES	DRILL MAKE AND MODEL: MOBILE B-33	HOLE SIZE: 6"	OVERBURDEN (FT.): 10.0'
ROCK (FT.): 1.5'	TOTAL DEPTH: 11.5'				
CORE RECOVERY/FT./%: N/A	CORE BARREL: N/A	SAMPLES: N/A	EL. TOP OF CASING: N/A	GROUND EL.: 45.3'	DEPTH/EL. GROUND WATER: 6.0'/39.3'
DEPTH/EL. TOP OF ROCK: 10.0'/35.3'					
SAMPLE HAMMER WEIGHT/FALL: N/A	CASING LEFT IN HOLE: DIA./LENGTH: N/A	LOGGED BY: P. YEH			

SAMPLE TYPE AND DIAMETER	SAMPLER ADVANCE/LENGTH CORE RUN	SAMPLE RECOVERY/CORE RECOVERY	SAMPLE BLOWS per PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN GPM/FT	WATER PRESSURE TESTS: PRESSURE PSI	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION*	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							45.3	0				
AUGER 6" THROUGHOUT							43.8	1.5			0.0-1.5': SILT AND CRUSHED ROCK; OIL-GAD; GRAYISH BROWN (5YR3/2).	SITE CHECKED FOR RADIOACTIVE CONTAMINATION BY EBERLINE ANALYTICAL CORPORATION.
											1.5-10.0': SAND (SC-SM), FINE-GRAINED, GENERALLY SILTY. 1.5-5.0': DUSKY RED (5R3/4), BRICK FRAGMENTS NOTED AT 4.0 FT. 5.0-6.0': DUSKY BROWN (5YR2/2). 7.0-9.0': YELLOWISH GRAY (5Y8/1). 9.0-10.0': BROWNISH BLACK (5YR2/1). LIGHT GRAY (TRACE) (NT), BECOMES MORE CLAYEY WITH LIGHT GRAY SPECKS.	▽ 6/20/86 EBERLINE ANALYTICAL CORPORATION PERFORMED GAMMA LOGGING.
							35.3	10				
							33.8	11.5			10.0-11.5': SANDSTONE: DUSKY RED (5R3/4), SOFT TO MODERATELY HARD, FINE-GRAINED, SILTY, WEATHERED, SATURATED.	
											BOTTOM OF HOLE AT 11.5 FT. HOLE BACKFILLED WITH CEMENT-BENTONITE GROUT, 6/20/86.	AUGER REFUSAL AT 11.5 FT.
												* DESCRIPTION AND CLASSIFICATION BY VISUAL EXAMINATION OF CUTTINGS.

SS=SPLIT SPOON; ST=SHELBY TUBE; D=DENNISON; P=PITCHER; O=OTHER

SITE: MAYWOOD INTERIM STORAGE SITE-FEDERAL EXPRESS

HOLE NO.: MISS-123R

GEOLOGIC DRILL LOG

PROJECT: FUSRAP	JOB NO.: 14501-138	SHEET NO.: 1 OF 1	HOLE NO.: MISS-126R		
SITE: MAYWOOD INTERIM STORAGE SITE-FEDERAL EXPRESS	COORDINATES: N8200,E11200	ANGLE FROM HORIZ.: 90°	BEARING: N/A		
BEGUN: 6/23/86	COMPLETED: 6/23/86	DRILLER: MORETRENCH ENVIRONMENTAL SERVICES	DRILL MAKE AND MODEL: MOBILE B-33	HOLE SIZE: 6"	OVERBURDEN (FT.): 6.0'
ROCK (FT.): 7.0'	TOTAL DEPTH: 13.0'				
CORE RECOVERY/FT./%: N/A	CORE BOXES: N/A	SAMPLES: N/A	EL. TOP OF CASING: N/A	GROUND EL.: 44.7'	DEPTH/EL. GROUND WATER: 5.0'/39.7'
DEPTH/EL. TOP OF ROCK: 6.0'/38.7'					
SAMPLE HAMMER WEIGHT/FALL: N/A	CASING LEFT IN HOLE; DIA./LENGTH: N/A	LOGGED BY: P. YEH			

SAMPLE TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLE RECOVERY CORE RECOVERY	SAMPLE BLOWS "N" PENETRATION CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN GPM	WATER PRESSURE TESTS: PRESSURE PSI	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION *	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
AUGER, 6", THROUGHOUT.							44.7	0				
							44.2	0.5			0.0-0.5': ASPHALT; GRAYISH BLACK (N2).	SITE CHECKED FOR RADIOACTIVE CONTAMINATION BY EBERLINE ANALYTICAL CORPORATION.
							43.7	1.0			0.5-1.0': CRUSHED ROCK; DARK GRAY (N3), BASALT, ANGULAR, 2" MINUS.	
											1.0-6.0': SAND (SC-SM); FINE-GRAINED, SILTY, DRY TO MOIST. 1.0-2.5': DUSKY RED (5R3/4). 2.5-4.0': GRAYISH BROWN (5YR3/2). 4.0-6.0': LIGHT OLIVE GRAY (5Y5/2), CLAYEY.	▽ 6/25/86
								5				
							38.7	6			6.0-13.0': SANDSTONE; PALE YELLOWISH BROWN (10YR6/2), SOFT, FINE-GRAINED, SILTY, WEATHERED, SATURATED (0.0-13.0 FT).	EBERLINE ANALYTICAL CORPORATION PERFORMED GAMMA LOGGING.
								10				
							31.7	13.0			BOTTOM OF HOLE AT 13.0 FT. HOLE BACKFILLED WITH CEMENT-BENTONITE GROUT, 6/25/86.	* DESCRIPTION AND CLASSIFICATION BY VISUAL EXAMINATION OF CUTTINGS.

SS=SPLIT SPOON; ST=SHELBY TUBE; D=DICKBSON; P=PITCHER; O=OTHER

SITE: MAYWOOD INTERIM STORAGE SITE-FEDERAL EXPRESS

HOLE NO.: MISS-126R

GEOLOGIC DRILL LOG

PROJECT: FUSRAP	JOB NO.: 14501-138	SHEET NO.: 1 OF 1	HOLE NO.: MISS-127R		
SITE: MAYWOOD INTERIM STORAGE SITE-FEDERAL EXPRESS	COORDINATES: N8200,E11300	ANGLE FROM HORIZ.: 90°	BEARING: N/A		
BEGUN: 6/23/86	COMPLETED: 6/23/86	DRILLER: MORETRENCH ENVIRONMENTAL SERVICES	DRILL MAKE AND MODEL: MOBILE B-33	HOLE SIZE: 6"	OVERBURDEN (FT.): 10.0'
ROCK (FT.): 0.0'	TOTAL DEPTH: 10.0'				
CORE RECOVERY/FT./%: N/A	CORE BOXES: N/A	SAMPLES: N/A	EL. TOP OF CASING: N/A	GROUND EL.: 45.6'	DEPTH/EL. GROUND WATER: 5.0'/40.6'
DEPTH/EL. TOP OF ROCK: N/A					
SAMPLE HAMMER WEIGHT/FALL: N/A	CASING LEFT IN HOLE DIA./LENGTH: N/A	LOGGED BY: P.YEH			

SAMPLE TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLE RECOVERY CORE RECOVERY	SAMPLE BLOWS "N" PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN GPM	WATER PRESSURE TESTS: PRESSURE P.S.I.	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION *	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							45.6	0				
AUGER, 6", THROUGHOUT.							45.1	0.5			0.0-0.5': ASPHALT; GRAYISH BLACK (N2).	SITE CHECKED FOR RADIOACTIVE CONTAMINATION BY EBERLINE ANALYTICAL CORPORATION.
							44.6	1.0			0.5-1.0': CRUSHED ROCK; DARK GRAY (N3). BASALT, ANGULAR, 2" MINUS.	
											1.0-10.0': SAND (SC-SM), FINE-GRAINED, SILTY, SLIGHTLY CLAYEY, MOIST TO SATURATED.	
											1.0-4.5': LIGHT BROWN (5YR6/4).	
								5			4.5-10.0': GREENISH GRAY (5GY6/1).	▽ 6/25/86
							35.6	10				EBERLINE ANALYTICAL CORPORATION PERFORMED GAMMA LOGGING.
											BOTTOM OF HOLE AT 10.0 FT.	
											HOLE BACKFILLED WITH CEMENT-BENTONITE GROUT, 6/25/86.	
												* DESCRIPTION AND CLASSIFICATION BY VISUAL EXAMINATION OF CUTTINGS.

SS=SPLIT SPOON; ST=SHELBY TUBE; D=DENISON; P=PITCHER; O=OTHER

SITE: MAYWOOD INTERIM STORAGE SITE-FEDERAL EXPRESS

HOLE NO.: MISS-127R

GEOLOGIC DRILL LOG

PROJECT: FUSRAP	JOB NO.: 14501-138	SHEET NO.: 1 OF 1	HOLE NO.: MISS-288R		
SITE: MAYWOOD INTERIM STORAGE SITE-FEDERAL EXPRESS	COORDINATES: N8115,E11195	ANGLE FROM HORIZ.: 90°	BEARING: N/A		
BEGUN: 8/5/86	COMPLETED: 8/5/86	DRILLER: MORE TRENCH ENVIRONMENTAL SERVICES	DRILL MAKE AND MODEL: MOBILE B-33	HOLE SIZE: 6"	OVERBURDEN (FT.): 10.0'
ROCK (FT.): 0.0	TOTAL DEPTH: 10.0'				
CORE RECOVERY/FT./%: N/A	CORE BARREL: N/A	SAMPLES: N/A	EL. TOP OF CASING: N/A	GROUND EL.: 44.2'	DEPTH/EL. GROUND WATER: 6.0'/38.2'
DEPTH/EL. TOP OF ROCK: N/A					
SAMPLE HAMMER WEIGHT/FALL: N/A	CASING LEFT IN HOLE: DIA./LENGTH: N/A	LOGGED BY: D. McGRANE			

SAMPLE TYPE AND DIAMETER	SAMPLER ADVANCE, LENGTH CORE RUN	SAMPLE RECOVERY, CORE RECOVERY	SAMPLE BLOWS per PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN GPM	WATER PRESSURE TESTS: PRESSURE PSI	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION *	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
AUGER, 6", THROUGHOUT.							44.2	0				
							43.9	0.3			0.0-0.3': ASPHALT. 0.3-10.0': SILTY SAND (SM-SC); COLOR STRATIFIED SOIL HORIZONS; FINE-TO MEDIUM-GRAINED; SOFT; POORLY CONSOLIDATED (LOOSE) WITH ONE CLAYEY DENSE LAYER 4.5-5.0 FT; NUMEROUS PIECES OF SANDSTONE GRAVEL. 0.3-1.0': MODERATE BROWN (5YR3/4). 1.0-4.5': DARK REDDISH BROWN (10R3/4). 4.5-5.0': CLAYEY LAYER; GRAY (N5). 5.0-10.0': DARK REDDISH BROWN; MANY FINES.	SITE CHECKED FOR RADIOACTIVE CONTAMINATION, AND HOLE GAMMA LOGGED, BY EBERLINE ANALYTICAL CORPORATION. ▽ 8/10/86 NIGHT DRILLING - COLORS MAY BE SLIGHTLY DIFFERENT.
							34.2	10			BOTTOM OF HOLE AT 10.0 FT. AUGER SPOILS WERE IMMEDIATELY REPLACED IN THE HOLE AND THE HOLE WAS RESEALED WITH ASPHALT.	*DESCRIPTION AND CLASSIFICATION BY VISUAL EXAMINATION OF CUTTINGS.

SS=SPLIT SPOON; ST=SHELBY TUBE; D=DIAMOND; P=PITCHER; O=OTHER

SITE: MAYWOOD INTERIM STORAGE SITE-FEDERAL EXPRESS

HOLE NO.: MISS-288R

GEOLOGIC DRILL LOG

PROJECT: FUSRAP	JOB NO.: 14501-138	SHEET NO.: 1 OF 1	HOLE NO.: MISS-403R		
SITE: MAYWOOD INTERIM STORAGE SITE-FEDERAL EXPRESS	COORDINATES: N8350,E11215	ANGLE FROM HORIZ.: 90°	BEARING: N/A		
BEGUN: 8/8/86	COMPLETED: 8/8/86	DRILLER: MORE TRENCH ENVIRONMENTAL SERVICES	DRILL MAKE AND MODEL: MOBILE B-33	HOLE SIZE: 6"	OVERBURDEN (FT.): 8.0'	ROCK (FT.): 0.5'	TOTAL DEPTH: 8.5'
CORE RECOVERY/FT./%: N/A	CORE BARREL: N/A	SAMPLES: N/A	EL. TOP OF CASING: N/A	GROUND EL.: 46.2'	DEPTH/EL. GROUND WATER: 4.0'/44.2'	DEPTH/EL. TOP OF ROCK: 8.0'/38.2'	
SAMPLE HAMMER WEIGHT/FALL: N/A	CASING LEFT IN HOLE: DIA./LENGTH: N/A	LOGGED BY: D McGRANE					

SAMPLE TYPE AND DIAMETER	SAMPLER ADVANCE/LENGTH CORE RUN	SAMPLE RECOVERY/CORE RECOVERY	SAMPLE BLOWS/FT. OR PERCENT CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN ft³/ft/MIN.	WATER PRESSURE TESTS: PRESSURE P.S.I.	WATER PRESSURE TESTS: TIME IN MINUTES	ELEVATION	DEPTH	GRAPHIC LOG	SAMPLE	DESCRIPTION AND CLASSIFICATION •	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							46.2	0				
6" AUGER THROUGHOUT.							45.9	0.3			0.0-0.3': ASPHALT.	SITE CHECKED FOR RADIOACTIVE CONTAMINATION AND HOLE GAMMA LOGGED BY EBERLINE ANALYTICAL CORPORATION. ▽ 8/10/86.
											0.3-8.0': SILTY SAND (SM-SC); COLOR STRATIFIED; FINE- TO MEDIUM-GRAINED; SOFT; POORLY CONSOLIDATED (LOOSE) WITH ONE DENSER CLAYEY ZONE (6.0-6.5 FT); MOIST TO SATURATED AT 4.0 FT.	
								5			0.3-2.0': MODERATE BROWN (5YR3/4) WITH NUMEROUS PIECES OF DARK REDDISH BROWN (10R3/4) SANDSTONE GRAVEL.	
											2.0-6.0': DARK YELLOWISH BROWN (10YR4/2) WITH A FEW PIECES OF A WHITE CLAYEY MATERIAL; CLAYEY; CONTAINS PIECES OF METAL (NAILS, SODA POP TOPS).	
							37.7	8.5			6.0-6.5': CLAYEY ZONE. PALE GREEN (5GY7/2).	
								10			6.5-8.0': DARK YELLOWISH BROWN (10YR4/2).	
											8.0-8.5': DECOMPOSED SANDSTONE; DARK REDDISH BROWN (10R3/4); FINE-GRAINED (ARGILLACEOUS); SOFT TO MODERATELY HARD; POORLY CONSOLIDATED (LOOSE); TOTALLY DECOMPOSED TO HIGHLY WEATHERED; AUGER SPOILS CONSIST OF SILTY SAND (SM) AND GRAVEL; SATURATED.	
								15			BOTTOM OF HOLE AT 8.5 FT.	
											HOLE BACKFILLED WITH CEMENT-BENTONITE GROUT, 8/10/86.	
								20				
								25				
								30				
								35				

• DESCRIPTION AND CLASSIFICATION BY VISUAL EXAMINATION OF CUTTINGS.

SS-SPLIT SPOON; ST-SHELBY TUBE; P-PITCHER; O-OTHER

SITE: MAYWOOD INTERIM STORAGE SITE-FEDERAL EXPRESS

HOLE NO.: MISS-403R

bcc: N. C. Ring (2)
R. M. Howard
C. P. Leichtweis
R. C. Robertson
W. C. Borden
J. A. Blanke (2)
S. G. Wilkinson
L. A. Johnson (2)
S. K. Livesay
TRG (6)
PDCC

This distribution closes out CCN 045685.