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CHARACTERIZATION REPORT AND PROPOSED MANAGEMENT ALTERNATIVE FOR THE SOIL & RUBBLE PILE NORTH OF THIRD STREET

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DOE-FN/EPA
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REPORT
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ATTACHMENT 1

CHARACTERIZATION REPORT AND PROPOSED MANAGEMENT ALTERNATIVE FOR THE SOIL & RUBBLE PILE NORTH OF THIRD STREET

1. INTRODUCTION

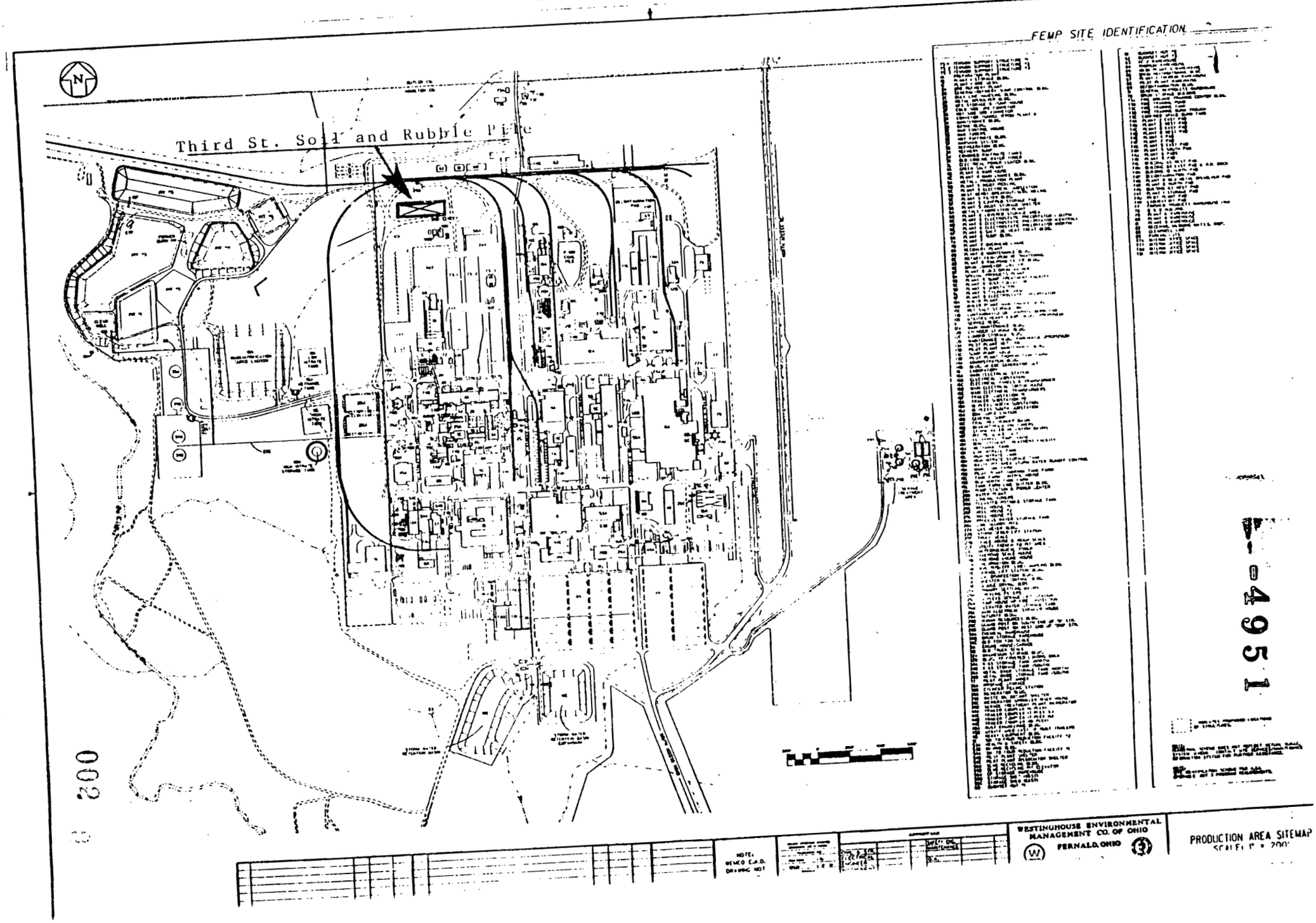
The subject soil and rubble pile is located in the northwest corner of the former production area north of third street at the Fernald Environmental Management Project (FEMP). The pile consist of 23,300 cubic yards of material, largely of soil and construction debris rubble, including large slabs and blocks of concrete, piping, and rock. Recent sampling and analysis of the pile was conducted to supplement the process knowledge to determine the nature and extent of the contamination contained within the pile. The goal of the FEMP site management is to implement interim management measures to mitigate the potential release of the contaminates from the pile while enhancing the efficient performance of final remediation activities to be described in the final Record of Decision (ROD) for OU-3 and OU-5. This report is being provided to present the facts and data available on this pile and propose the management alternative that will protect the health and safety of the worker and the public and provide adequate protection of the environment. A site map showing the location of the pile is presented in Figure 1.

2. BACKGROUND

The subject pile was established to provide a construction staging area for soils and rubble containing less than 150 parts per million (ppm) of Total Uranium. This 150 ppm limit was designated at that time in FMPC Site Policy and Procedures Manual #FMPC-720. The soils were staged for the potential reuse as backfill on construction projects in the production area. Interviews with former and current project oversight personnel and site history indicate that the pile served as a construction soil and rubble staging/stockpile area for several projects over the years, primarily from the following projects at the FEMP: Laboratory Upgrade, Rotary Kiln, Drum Reconditioner, Tank Farm, Derby Slag, and Plant 1 Pad extension. Soils and debris wastes generated from all of the above mentioned projects were declared RCRA non-hazardous according to the established procedures #FMPC 720 (since replaced by SSOP-0044, "Management of Soil, Debris, and Waste from a Project") and SSOP-0002, "Completing the Material Evaluation Form". These procedures were executed prior to or during construction activities. The stockpiled soil and rubble are stored as loose, uncompacted materials. Uncompacted soil is a large component of the material. The primary exposure pathways to be expected, therefore, would be the erosion of uncompacted soil at the surface by rain or migration of suspended soil particles through wind erosion.

A Removal Site Evaluation (RSE) was completed (dated June 18,1990) for this pile (referred to formally as the "Stockpile for Excavation/Demolition Soils & Rubble - North of Plant 1 Pad) and submitted to the DOE. The RSE was completed to evaluate whether the soil and rubble pile contained above *background* levels of total Uranium and to support the decision that the present conditions warrant a

Figure 1


FEMP SITE IDENTIFICATION
Third St. Soil and Rubble Pile
N
WESTINGHOUSE ENVIRONMENTAL MANAGEMENT CO. OF OHIO
FERNALD, OHIO
PRODUCTION AREA SITEMAP

Removal Action. Field investigations and soil sampling conducted as part of the RSE indicated that average concentrations of 155 ppm Uranium were present. At that time, these concentrations were believed to be in excess of the possible final remediation soil cleanup standards of the FMPC (now known as the FEMP) because the potential migration of these stockpiled materials to other areas could result in more extensive soils cleanup as part of remedial actions.

Pursuant to the RSE performed, the DOE issued an Action Memorandum (AM) proclaiming the need for a removal action for this pile and further requested that an evaluation be conducted in order to outline the proposed method of mitigating the potential release of contamination from the pile (DOE letter, DOE-1306-90, dated June 29, 1990). In response to the AM, Westinghouse Materials Company of Ohio (WMCO), former operating contractors of the FEMP, prepared an engineering evaluation of removal action alternatives for the soil/rubble pile (letter, WMCO P:90-334, dated July 13, 1990). The evaluation ranked all proposed methods based upon criteria for effectiveness, implementability, and cost. The results of that evaluation of several alternatives revealed that the most prudent alternative for the removal action would be to containerize and remove the exposed construction rubble, followed by covering the remainder of the pile with vegetation. This alternative was determined from this evaluation to involve no technical uncertainties and would mitigate the potential for fugitive emissions to the air as well as mitigate the potential for waterborne contamination of adjacent land. It was also determined that the selected alternative would not be cost prohibitive and could be accomplished rapidly. This alternative selection was accepted by the DOE in letter DOE-301-91, dated November 30, 1990.

Although the regrading and subsequent installation of a vegetative cover methodology was accepted by the DOE, WMCO determined that the work plan for this soil pile removal action should be integrated into the total scope of Removal Action 17 work plan as stipulated in the Amended Consent Agreement (September 1991). The approved RA 17 work plan, in consideration of the change in the overall FEMP site mission, proposed a Tension Support Structure (TSS) as the original RA 17 management strategy for the pile.

The pile was secured with a fence in October 1992 in order to discontinue acceptance of material and to control access to the pile. The conclusions for stabilizing this pile are detailed in Section 6 of this report.

3. SAMPLING AND ANALYSIS APPROACH

A project-specific sampling and analysis plan and program was developed in order to supplement previous Process Knowledge (PK) of this pile and provide the appropriate characterization of the subject pile. All field activities were performed in accordance with sampling and analysis plan SMS-92-211, "FEMP Stockpiled Materials - Third Street Pile" (provided as Attachment A to the referenced transmittal letter no. C:OP:93-0558, dated April 12, 1993). The analytical data was statistically analyzed in accordance with the sampling and analysis plan guidelines presented in the RA 17 Work Plan and the FEMP Sitewide CERCLA Quality Assurance Project Plan (SCQ). A 95 percent confidence level was used to determine whether the sample mean of each constituent exceeded the regulatory threshold or disposition limit. The FERMCO Summary Analytical Data of the sampling results was presented in a format to be in compliance with the following policies, statutes, and regulations:

1) Chapter 9 of the EPA SW-846, Methods for Evaluating Wastes
2) Chapter 3745-51 of Ohio Administrative Code
3) 40 CFR Part 261
4) FEMP Waste Determination Plan as listed in the FEMP Part B Application to the Ohio EPA (Stipulated Amendment to the Consent Decree)
5) FEMP Waste Characterization Plan (draft) provided with the FEMP's Generator Application to the Nevada Test Site (NTS)

The following subsections provide the sampling design and approach, a description of sample collection activities, and the quality assurance/quality control protocol.

Sampling Design and Approach

Chapter 7 of EPA 230/02-89-042, "Methods for Evaluating the Attainment of Clean-up Standards, Vol. I, Soils and Solid Media", in conjunction with Chapter 9 of EPA SW-846, "Methods for Evaluating Solid Wastes", was used to design the Third Street Stockpile sampling program. The number of required samples to characterize the Third Street Stockpile waste materials was determined using the Testing of Percentiles non-normalized equation as follows:

$$n_d = \left\{ \frac{z_{1-b}[P_1(1 - P_1)] + z_{1-a}[P_0(1 - P_0)]}{P_0 - P_1} \right\}^2$$

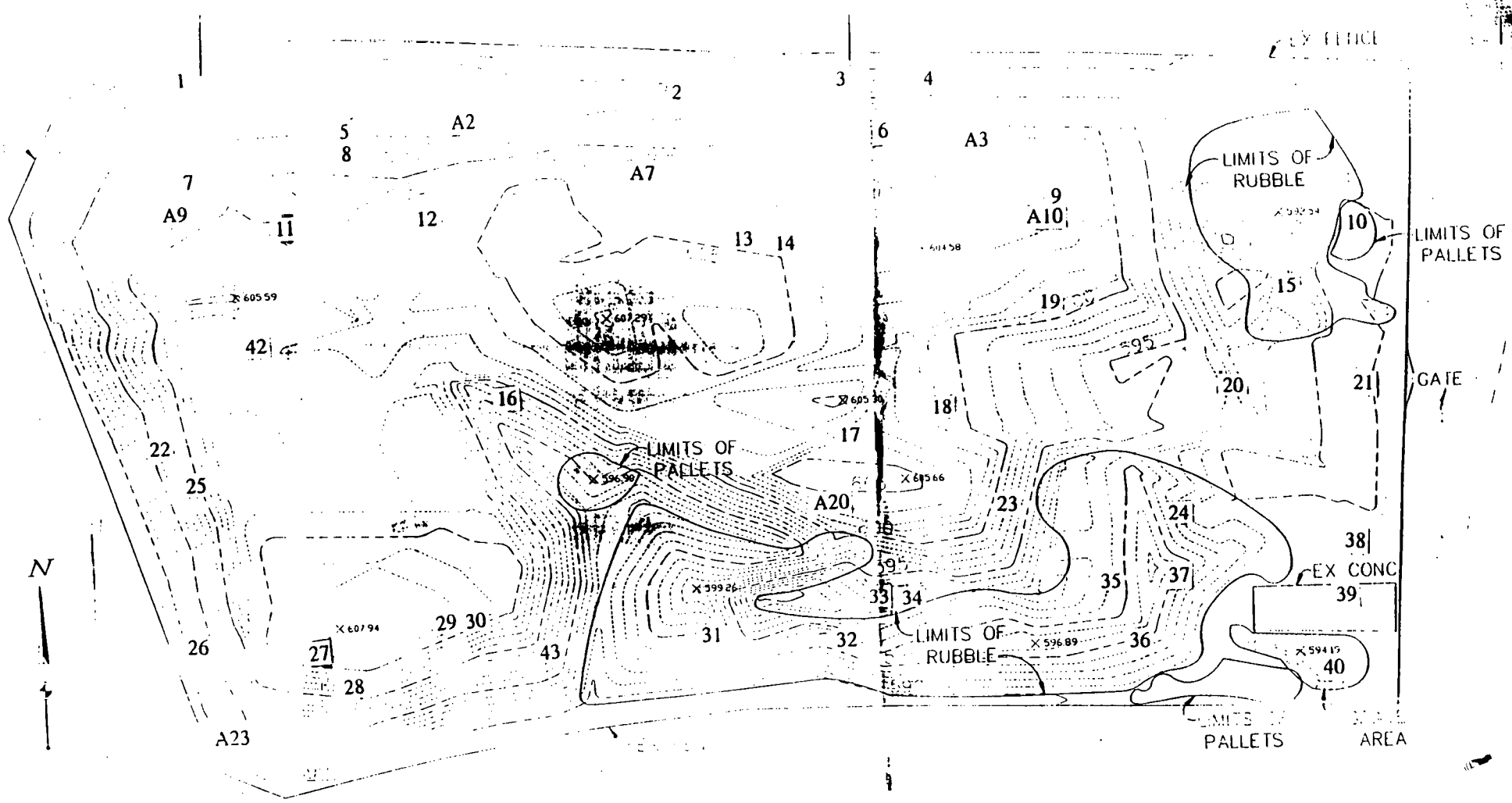
where,

n_d = number of required samples
z_{1-a} = z-value corresponding to 1 - alpha, the false positive rate, from Table A.2 of EPA 230/02-89-042 (1.645 for this investigation)
z_{1-b} = z-value corresponding to 1 - beta, the false negative rate, from Table A.2 of EPA 230/02-89-042 (0.842 for this investigation)
P_0 = the criterion for defining whether the sample area is clean or dirty, (0.1 for this investigation)
P_1 = the value less than P_0 that designates a very clean area that must, with great uncertainty, be designated clean by the statistical test (0.01 for this investigation)

In accordance with the non-normalized equation, the total number of required samples was calculated to be 42 samples.

Subsequent to calculation of the number of required samples, the Third Street Stockpile (approximately 410 feet long by 210 feet wide by 15 feet in depth) was divided into 861 grids of approximately 10 feet squared. Grid numbers between 1 and 861 were randomly chosen to select the appropriate sample point locations. In addition, sample depths were determined by selecting random numbers between 0 (surface) and 15. Sample point locations and depths are provided in Table 3.1. Please see the topographic map of the pile indicating the locations of each sample point and alternate point.

TOPOGRAPHIC SURVEY MAP
&
SAMPLE LOCATIONS



SOIL & RUBBLE PILE NORTH OF THIRD STREET

Table 3.1 Third Street Stockpile Sample Locations				
Note: * - X-coordinates represent the western-directional distance from the intersection of the eastern and northern perimeter fences. Y-coordinates represent the southern-directional distance from the intersection of the eastern and northern perimeter fences.				
Sample Point	X-Coordinate* (in feet)	Y-Coordinate* (in feet)	Depth (in feet)	Remarks
Original Sample Point Locations				
SP-1	393	13	0.5	
SP-2	235	12	0.5	
SP-3	180	4	0.5	
SP-4	155	7	0.5	
SP-5	338	36	2.0	
SP-6	170	24	4.0	
SP-7	390	44	1.0	
SP-8	338	35	3.0	
SP-9	116	45	10.0	
SP-10	18	48	0.0	
SP-11	360	57	NS	Not Sampled
SP-12	318	56	NS	Not Sampled
SP-13	214	56	NS	Not Sampled
SP-14	200	56	6.0	
SP-15	40	68	0.5	
SP-16	288	111	5.0	
SP-17	180	120	NS	Not Sampled
SP-18	148	111	3.0	
SP-19	116	80	NS	Not Sampled
SP-20	61	100	1.0	
SP-21	14	102	0.5	
SP-22	403	130	2.0	
SP-23	126	144	NS	Not Sampled
SP-24	73	144	1.0	
SP-25	393	160	3.0	
SP-26	392	192	1.0	
SP-27	353	193	6.0	
SP-28	342	204	4.0	
SP-29	313	184	9.0	
SP-30	303	182	NS	Not Sampled
SP-31	222	184	2.0	
SP-32	180	184	0.5	
SP-33	170	173	2.0	
SP-34	158	173	3.0	
SP-35	94	166	0.5	
SP-36	85	186	0.5	
SP-37	73	164	0.5	
SP-38	18	154	0.5	
SP-39	19	168	0.0	
SP-40	22	191	1.0	
SP-42	369	97	NS	Not Sampled
SP-43	278	190	2.0	

Table 3.1 Third Street Stockpile Sample Locations				
Note: * - X-coordinates represent the western-directional distance from the intersection of the eastern and northern perimeter fences. Y-coordinates represent the southern-directional distance from the intersection of the eastern and northern perimeter fences.				
Sample Point	X-Coordinate* (in feet)	Y-Coordinate* (in feet)	Depth (in feet)	Remarks
Alternate Sample Point Locations				
SP-A2	305	25	3.0	
SP-A3	140	26	6.0	
SP-A4			NS	Not Sampled
SP-A7	247	38	1.0	
SP-A9	396	53	3.0	
SP-A10	121	52	5.0	
SP-A20	189	142	10.0	
SP-A21			NS	Not Sampled
SP-A23	384	220	1.0	

Sample Collection Activities
Stockpile samples were collected, when feasible, at each sample point location presented in Table 3.1. In situations where stockpile samples could not be retrieved at the original sample point location, an alternate sample point and random depth was chosen.

A stainless-steel hand auger or hand driven split-spoon sampling device was used for soil sample recovery. The soil materials were then transferred from the hand auger or split-spoon to the appropriate sample container using a stainless steel scoop or spatula. For non-standard waste materials such as concrete and wood, a stainless steel hammer and chisel, and a rotary drill and stainless steel bit were used for sample recovery, respectively. Concrete chips and wood cuttings were collected in stainless steel pans and transferred to the appropriate sample containers using a stainless steel scoop or spatula.

Subsequent to each waste material sampling event, sample containers were labeled, sealed with custody tape, and placed in a cooler with ice. Upon completion of daily sample collection activities, the samples were transported with accompanying Chain-of-Custody/Analysis Request documentation to the FEMP laboratory facility for analysis or shipment to a FEMP-contracted laboratory for analysis, dependent upon analytical parameter.

Quality Assurance/Quality Control
Daily sampling activities were recorded in bound logbooks for each sampling event. The logbook entries were reviewed by the Site Media Sampling (SMS) lead technician and Sample Control Unit, prior to storage in the SMS project files with other field generated documents.

In accordance with the SCQ, a trip blank was retained on a daily basis with each cooler containing samples for Volatile Organics analyses. In addition, a total of field blanks, equipment rinsate blanks, and duplicate samples were collected at a frequency of one per every twenty samples, respectively. The field blanks and equipment rinsate blanks were preserved with nitric acid, labeled, sealed with custody tape, placed in a cooler with ice, and transported with the stockpile samples to the FEMP laboratory. Duplicate samples were containerized, labeled with an unique sample number, sealed with custody tape, placed in a cooler with ice, and transported with the stockpile material samples to the FEMP laboratory.

4. SAMPLING DATA & ANALYTICAL RESULTS

This section provides the results of Total Concentration (TC), Toxicity Characteristic Leachate Procedure (TCLP), and radiological analyses performed on waste material samples collected from the Third Street Stockpile. The following subsections provide non-radiological and radiological analytical data, respectively.

Non-Radiological Analyses
Soil samples collected from the Third Street Stockpile were submitted for quantification of metal constituent total concentrations using EPA SW-846-7000/6160. In situations where the analyte-specific TC result exceeded 20 times its respective TCLP regulatory threshold, the sample was subjected to TCLP analyses using EPA SW-846-1311. Table 4.1, in Appendix 1, provides TC and TCLP

Metals analytical data for the Third Street Soil Stockpile soil samples.

In addition, Third Street Soil Stockpile soil samples were submitted for quantification of TCLP Volatile Organic Compound (VOC) constituents using EPA SW-846-1311. Table 4.2 (in Appendix 1) provides TCLP VOC analytical data for the Third Street Soil Stockpile soil samples.

Radiological Analyses

Soil samples collected from the Third Street Soil Stockpile were submitted for quantification of alpha/beta activities, and total concentrations/isotopic activities for uranium, thorium, and radium constituents. Table 4.3 (in Appendix 1) provides radiological analytical data for the Third Street Soil Stockpile soil samples.

5. EVALUATION OF SAMPLING RESULTS

Statistical Analysis of Data

The inferential calculations used to form the upper limit of the 95% confidence interval are based on the assumption that the population is approximately normally distributed. In accordance with the FEMP Waste Determination Plan, a coefficient of variation (COV) value, based on $s\bar{x}/\bar{x}$, of less than 1.25 indicates that the data set is normally distributed. Based on data provided in Table 5.1, Column 9, each data set is considered to be normally distributed.

In accordance with Chapter 9 of EPA SW-846, two primary criteria for determining whether a population is normally distributed based on review of a sample set are:

1) Visual inspection of the data (i.e., a graph or plot of the data) and/or

2) Mathematical comparison of the values for the sample mean ($\bar{x}$) and the sample variance s^2

When the COV is greater than 1.00 (i.e., $\bar{x} \not> s^2$), the data may be assumed to be approximately normally distributed. If this test indicates that the data are not normally distributed, then the following steps should be taken in accordance with Chapter 9 of EPA SW-846:

1) Transform the analytical data by the square root transformation (SW-846 Equation 10) if $\bar{x}$ is nearly equal to s^2, or

2) Transform the analytical data by the arcsine transformation (SW-846 Equation 11) if $\bar{x}$ is less than s^2 and

3) Perform statistical analysis using transformed data.

Graphical Presentation of Data

Non-radiological analyte-specific distributions exhibiting COV values of nearly equal to or less than 1 were investigated to determine the root cause of the abnormality. Analyte-specific data were segregated into individual data ranges to determine the frequency of data points within each range. Table 5.2 in

Table 5.1 Statistical Summary of Data

Note: * - Regulatory Threshold Levels (RTLs) for non-radiological constituents were taken from Table 1 of Chapter 3745-51-24 of the Ohio Administrative Code (OAC). RTLs for radiological constituents were taken from Removal Action 17, Improved Storage of Soil and Debris

Analyte (Units)	RTL*	Number of Samples	Mean	Standard Deviation	Sample Variance	Standard Error	Upper Limit of CI (95%)	COV (s/x)	COV (x/s²)	# Required Samples
TCLP Metals - Actual + Derived										
Arsenic (mg/L)	5	41	0.1992	0.2300	0.0529	0.0359	0.2597	0.1803	3.7657	0
Barium (mg/L)	100	41	2.3364	1.8404	3.3869	0.2874	2.8204	0.1230	0.6898	0
Cadmium (mg/L)	1	41	0.0229	0.0157	0.0002	0.0024	0.0270	0.1069	93.2078	0
Chromium (mg/L)	5	41	0.4506	0.3467	0.1202	0.0541	0.5417	0.1202	3.7490	0
Lead (mg/L)	5	41	0.6392	1.0444	1.0908	0.1631	0.9138	0.2552	0.5860	0
Mercury (mg/L)	0.2	41	0.0066	0.0150	0.0002	0.0023	0.0106	0.3535	29.3955	0
Selenium (mg/L)	1	41	0.0923	0.1206	0.0146	0.0198	0.1240	0.2041	6.3412	0
Silver (mg/L)	5	41	0.0637	0.1028	0.0106	0.0161	0.0908	0.2520	6.0289	0
Transformed Actual + Derived										
Barium (mg/L) arcsine transformation	0.0001	41	1.992 E-7	6.03 E-8	3.634 E-15	9.4 E-9	2.151 E-7	0.04727	5.483 E7	0
Lead (mg/L) arcsine transformation	0.000005	41	6.392 E-7	7.11 E-8	5.06 E-15	1.11 E-8	6.579 E-7	0.017373	1.263 E8	0
Total Metals										
Arsenic (mg/kg)	100	31	5.1356	4.7476	22.5398	0.8527	6.5827	0.1660	0.2278	0
Barium (mg/kg)	2000	31	58.9561	34.0661	1160.4995	6.1185	69.3391	0.1038	0.0508	0
Cadmium (mg/kg)	20	31	0.5894	0.2401	0.0577	0.0431	0.6625	0.0732	10.2201	0
Chromium (mg/kg)	100	31	11.8863	5.3972	29.1297	0.9694	13.5313	0.0816	0.4080	0
Lead (mg/kg)	100	26	27.3296	40.0192	1601.5372	7.8484	40.7347	0.2872	0.0171	1
Mercury (mg/kg)	4	31	0.1748	0.3361	0.1130	0.0604	0.2773	0.3453	1.5478	0
Selenium (mg/kg)	20	31	7.0274	25.5078	650.6453	4.5813	14.8019	0.6519	0.0108	11
Silver (mg/kg)	100	31	1.0694	0.2690	0.0724	0.0483	1.1513	0.0452	14.7797	0
TCLP Metals - Actual Only										
Arsenic (mg/L)	5	10	0.0209	0.0236	0.0006	0.0075	0.0345	0.3575	37.5298	0
Barium (mg/L)	100	10	0.4402	0.3131	0.0980	0.0990	0.6217	0.2249	4.4916	0
Cadmium (mg/L)	1	10	0.0025	0.0000	0.0000	0.0000	0.0025	0.0000	ERR	0
Chromium (mg/L)	5	10	0.0053	0.0018	0.0000	0.0006	0.0063	0.1111	1542.8571	0
Lead (mg/L)	5	16	0.0045	0.0068	0.0000	0.0017	0.0075	0.3748	98.5502	0
Mercury (mg/L)	0.2	10	0.0001	0.0001	0.0000	0.0000	0.0002	0.1667	30000.000	0
Selenium (mg/L)	1	11	0.0074	0.0109	0.0001	0.0033	0.0134	0.4453	0	0
Silver (mg/L)	5	10	0.0055	0.0017	0.0000	0.0005	0.0065	0.0975	61.8823	0
									1899.8628	

Table 5.1 Statistical Summary of Data

Note: * - Regulatory Threshold Levels (RTLs) for non-radiological constituents were taken from Table 1 of Chapter 3745-51-24 of the Ohio Administrative Code (OAC). RTLs for radiological constituents were taken from Removal Action 17, Improved Storage of Soil and Debris

TCLP Volatile Organics										
MEK (mg/L)	200	41	0.1512	0.0412	0.0017	0.0064	0.1620	0.0426	89.0205	0
Tetrachloroethylene (mg/L)	0.7	41	0.0314	0.0130	0.0002	0.0020	0.0348	0.0648	185.1218	0
Radiological										
Total U (ppm dry)		39	43.2308	43.9091	1928.0108	7.0311	55.0894	0.1626	0.0244	0
Total U (pCi/g dry)	100	39	29.2100	29.6683	980.2092	4.7507	37.2226	0.1626	0.0332	0
U-234 (pCi/g dry)		38	14.3038	14.2849	204.0593	2.3173	18.2152	0.1620	0.0701	NA
U-235 (pCi/g dry)		38	0.7477	0.7119	0.5068	0.1155	0.9426	0.1545	1.4752	NA
U-236 (pCi/g dry)		39	0.2568	0.3631	0.1318	0.0581	0.3548	0.2264	1.9476	NA
U-238 (pCi/g dry)		39	17.5590	19.6003	384.1698	2.3186	22.8525	0.1787	0.0457	NA
Total Th (ppm dry)		39	11.4872	10.6891	114.2564	1.7116	14.3740	0.1490	0.1005	NA
Total Th (pCi/g dry)	50	41	5.4685	2.8711	8.2433	0.4484	6.2236	0.0820	0.6634	0
Th-228 (pCi/g dry)		41	1.5578	0.5058	0.2558	0.0790	1.6908	0.0507	6.0890	NA
Th-230 (pCi/g dry)		41	2.6939	2.7779	7.7169	0.4338	3.4245	0.1610	0.3491	NA
Th-232 (pCi/g dry)		40	1.2473	0.4566	0.2085	0.0722	1.3689	0.0579	5.9814	NA
Total Ra (pCi/g dry)	5	39	1.3897	0.8613	0.7418	0.1379	1.6224	0.0992	1.8734	0
Ra-226 (pCi/g dry)		39	0.9679	0.8655	0.7491	0.1386	1.2017	0.1432	1.2922	NA
Ra-228 (pCi/g dry)		39	0.4218	0.1872	0.0350	0.0300	0.4723	0.0711	12.0375	NA
Alpha Activity (pCi/g)		41	28.8207	28.6516	820.9150	4.4746	36.3560	0.1553	0.0351	NA
Beta Activity (pCi/g)		41	25.6829	26.2410	688.5876	4.0981	32.5842	0.1596	0.0373	NA

Appendix 2 provides the data ranges and frequencies for non-normal data distributions. In addition, TCLP Barium and Lead and Total Arsenic, Barium, Chromium, Lead, and Selenium distributions are graphically presented (as frequency plots) by Figures 5.1 through 5.7, respectively (Appendix 2). In general, the values presented along the "X-axis" of these frequency plots represent ranges for the analyte-specific data values. For example, an "X-axis" value of 1 represents the range of analytical data from 0.00 to 0.99; an "X-axis" value of 2 represents the range of analytical data values from 1.00 to 1.99; etc. The respective "X-axis" values for the Total Barium, Total Chromium, and Total Lead frequency plots required expanded data ranges due to the disparity of analytical data values.

Figures 5.1, 5.2, 5.4, 5.6, and 5.7 illustrate left-skewness of the data distributions. The skewness of these distributions is due to the predominance of extremely low concentrations of these analytes (as supported by statistical evaluation of actual laboratory-generated TCLP data in Table 5.1), which may be related to matrix effects, inherent errors in the sampling design (i.e, false negative errors), and/or statistical treatment of the data (i.e, assuming 1/2 of DL for analyte-specific concentrations reported as less than instrument detection levels, and/or assumption of 100% leachability for calculation of derived TCLP results). Clearly, the treatment of data is primarily responsible for the variability of these data sets as evidenced by the comparison of actual TCLP distributions with data distributions comprising a combination of actual and derived TCLP results. However, such treatment of data improved the normality of the combined actual and derived TCLP data distributions when compared to Total Concentration data distributions.

Transformation of Data

In accordance with EPA SW-846 criteria, TCLP Barium, TCLP Lead, Total Arsenic, Total Barium, Total Chromium, Total Lead, and Total Selenium distributions are considered to be non-normal. In order to accurately estimate the analyte-specific population mean and sample variance, TCLP Barium and TCLP Lead data were transformed by taking the arcsine of the reported analytical value. Based on data provided in Table 5.1, transformation of these data sets significantly improved the normality of these distributions. Transformation of the Total Concentration data sets was not warranted since TCLP data are more reliable estimates of the toxicity characteristics of the waste material.

Comparison of Sample Mean and Sample Variance

The assumptions about the normality of the data distributions are only valid if a sufficient number of samples have been collected. In order to determine if a sufficient number of samples have been collected, the sample mean and sample variance for each analyte were compared to its respective regulatory threshold limit (RTL) in accordance with EPA SW-846 Equation 8 as follows:

$$\text{Number of Required Samples} = \frac{t^2 * s^2}{d^2}$$

where,

t = respective student "t-value" for n-1 degrees of freedom from Table A.1 of EPA 230/02-89-042

s^2 = sample variance

d = regulatory threshold limit - sample mean

The regulatory threshold limit for each total metal constituent was assumed to be 20 times its respective TCLP regulatory threshold limit.

As indicated by Table 5.1, the number of samples collected were sufficient to provide an accurate estimate of the true mean for each metal constituent, with the exception of Total Selenium and Total Lead data sets. However, since TCLP Selenium and TCLP Lead results (either actual or actual + derived) are more representative and indicate that additional samples are not required, no further sampling or analysis for these constituents is warranted.

6. CONCLUSIONS

Based on data provided in Table 5.1, the following conclusions can be inferred:

1) The stockpile waste materials can be considered as RCRA "non-hazardous", based on statistical analysis and evaluation of TCLP and Total Concentration analytical data;

2) The levels of radiological activity concentrations for uranium, thorium, and radium are significantly below the prescribed regulatory threshold levels established as part of Removal Action 17, "Improved Storage of Soil and Debris"; and

3) Additional samples are not required (with the exception of Total Selenium and Total Lead data sets) per EPA SW-846 Equation 8. However, since TCLP data are more representative of the waste material characteristics, additional sampling and analysis is not warranted.

The analytical results of all samples taken were used to characterize the pile. (See the characterization report, "Exhibit A", performed by the FERMCO Waste Characterization department). The above conclusions are supported by the characterization report indicating that the pile does not contain a RCRA hazardous waste and the radiological activity concentration levels are below disposition limits of 100 pCi/g total Uranium, 5 pCi/g total radium, and 50 pCi/g total thorium.

These conclusions are also supported by FEMP Material Evaluation Forms (MEFs) 2503 and 2007, which have been verified for this pile and declare these wastes as RCRA Solid (i.e, RCRA "non-hazardous) Waste (Exhibit A).

7. TECHNICAL PLAN

The RA 17 work plan outlines three options for the disposition of soil and rubble piles at the FEMP: (1) pile contents may be dispositioned to a controlled stockpile if the radiological contamination is <u>below</u> the levels (total activity concentrations of 100 pCi/g for U, 50 pCi/g for Th, 5 pCi/g for Ra) and is Non-Hazardous; (2) if the pile does not meet the criteria for a controlled stockpile, the pile can be moved to an improved storage facility; and (3) if the pile requires improved storage but is too large to be relocated, an in-place containment structure (TSS, impermeable cover, etc.) may be placed over the pile.

<u>Original Plan</u>
As stated previously, originally, a Tension Support Structure (TSS) was

proposed as the management strategy for the pile north of third street This TSS was identified as the soil and rubble pile cover (SRPC) in the approved Revision 2 of the RA 17 work plan. This strategy was approved as submitted to the USEPA as part of the approved Removal Action #17 identified in section IX of the Amended Consent Agreement (1991) under CERCLA section 120 and 106(a). The TSS management selection was based on the assumption that portions of the pile were radiologically contaminated with activity concentration levels above the disposition levels established in the RA 17 work plan and intermittent access to portions of the pile would be necessary throughout the improved storage period (prior to the ROD for OU3 and OU5).

Addendum to Original Plan

The referenced letter addendum to the RA 17 work plan (dated April 12, 1993) proposed that the TSS would not be utilized and that the most prudent management option for the soil and rubble pile will be selected based on the analytical results from the sampling effort described above. Further, the letter addendum proposed that if the analytical results from sampling indicate that the pile contents do not exceed the radiological disposition levels and do not contain hazardous wastes above the regulatory limits, the DOE would propose that this pile be maintained as a controlled stockpile in accordance with the guidelines established in the approved RA 17 work plan.

If the analytical results from sampling indicated that the pile exceeds the radiological limits or exceeds the hazardous waste regulatory levels, improved storage would be required according to the RA 17 work plan. The letter addendum proposed in this case, that the DOE would select an engineered impermeable cover as the improved storage management alternative.

Recommended Management Alternative

Based on the sampling analysis results, the subject soil and rubble pile has been determined to contain no RCRA hazardous waste and is below the radiological disposition limits. Therefore, according to the RA 17 work plan, the subject pile satisfies the criteria of the controlled stockpile. Consequently, an engineered impermeable cover will not be required. Although the pile meets the criteria for a controlled stockpile according to the RA 17 work plan, FERMCO proposes that the pile not be utilized as a controlled soil stockpile. Instead, FERMCO proposes that the pile be regraded, removing accessible and exposed debris and rubble, and seeded to form a vegetative cover over the pile.

Prior to regrading of the pile, any readily accessible and surface exposed debris such as concrete rubble and wooden pallets may be removed and dispositioned or managed according to the attached waste characterization report (Exhibit A). During regrading of the pile, other similar debris may be buried below the final grading surface to ensure an appropriate seeding soil surface. The optimum configuration for the pile will be a 4H:1V slope with a 4% crowned top surface to allow access for maintenance activities (i.e, mowing). The pile will be seeded with grass to form a vegetative cover to prevent erosion due to stormwater and wind. Stormwater runoff from the pile will be collected and directed into the

FEMP site stormwater management system. An erosion control blanket may also be provided consisting of straw in a plastic netting. The vegetative cover shall be maintained until the soil and rubble contents of the pile are remediated in accordance with the Records of Decision for Operable Unit 5 and Operable Unit 3.

Justification for the Recommended Management Alternative

As noted in the evaluation section of the laboratory results of this report, the number of samples extracted, the quality of the data obtained from these samples, the sampling techniques utilized and analytical results obtained are in strict compliance with the sampling and analysis guidelines and reporting formats established by the EPA. Sampling and analysis results for the subject soil and rubble pile north of third street indicate that the pile is not contaminated with a RCRA hazardous waste nor does it exceed the radiological activity concentration levels established in the RA 17 work plan. Although, according to the RA 17 work plan concepts and the analytical results obtained, the pile satisfies the criteria for a controlled stockpile, a more conservative approach has been selected that proposes that the pile not be used as a soil stockpile and therefore its access be closed to all FEMP placement activities until the ROD for OU3 and OU5 have been established.

Furthermore, the proposed management option selected will meet the following objectives that are consistent with the overall FEMP site mission: 1) the regrading that will provide for stable slopes, in conjunction with the compaction that will occur during the regrading, and installation of the vegetative cover, will resist wind and water erosion of the pile; 2) the vegetative cover provides an appropriate barrier of protection between the pile and the surrounding environment relative to the minimal extent of the contamination found to be contained in the pile; 3) the vegetative cover minimizes the contact between the stormwater run-on/runoff and the surface soils and rubble in the pile; 4) the vegetative cover minimizes waste material generation that may result if other alternatives (i.e, impermeable cover materials, additional soils) would be selected and consequently, will not significantly increase a volume of waste requiring future remediation.

EXHIBIT A

-4951

Fernald Environmental

FERMCO

Restoration Management Corporation

INTEROFFICE MEMORANDUM

To:	Ken Belgrave	Date:	October 25, 1993
Location:	Fernald, MS 73	Reference:	Listed Below
From:	Jerry Erfman	FERMCO #:	M:ESH:EP:93-981
Location:	Fernald, MS 46	Client:	DOE DE-AC05-92OR21972
Extension:	6085	Subject:	THIRD STREET SOIL AND RUBBLE PILE, RA #17

c: File Record Storage Copy 106.4.9.2
James Clements MS 73
Matthew Frost MS 73
Sue Hoskins MS 30
Darryl Howe MS 30
Lori Hurst MS 63
Harold Knue MS 28
Dan Meyer MS 35
Glenn Rieman MS 46
Shane Stierhoff MS 66
Frank Thompson MS 31
Carolyn Waugh MS 46
RCRA Operating Record MS 30
WCS Files MS 46

This determination has been prepared to support the selection of the preferred option for the disposition of the 3rd Street Soil and Rubble Pile (Soil Pile). The Soil Pile was generated over the years by various construction projects on site. The specific citations listed below reflect the types of materials which are anticipated to be encountered during this project.

The soil, equal to or less than 100 pCi/g, is RCRA non-hazardous as specified in MEF Number 2503

The concrete rubble/concrete block, is RCRA non-hazardous (a.k.a. non-RCRA) as specified in MEF Number 2007

The protective clothing (anti C's, rubber gloves, etc.) is RCRA non-hazardous (a.k.a. non-RCRA), if it meets the conditions specified in MEF Number 1722, dated June 25, 1992.

WCS:93-411

Fernald Environmental
FERMCO
Restoration Management Corporation

INTEROFFICE MEMORANDUM

Using SOP-20-C-625 the following low level radioactive waste streams, if generated, can be evaluated using MEF's and checklists. Only trained personnel can be used for MEF's and checklists.

Scrap metal will be managed under MEF # 1088 and the metal checklist # FS-F-3464.

Scrap wood will be managed under MEF # 905 and the wood checklist # FS-F-3465.

Scrap plastic, rubber, paper, fiberglass, and rope will be managed under MEF # 1539 and checklist # FS-F-3580.

If any of the material fails the checklists, a new MEF must be generated and forwarded to Waste Characterization Section (WCS) or evaluation.

No materials have been identified that would cause the waste to meet any of the hazardous waste listings under OAC 3745-51-31 to 33 (in lieu of 40 CFR 261, Subpart D) or exhibit any of the hazardous waste characteristics under OAC 3745-51-21 to 23, (in lieu of 40 CFR 261.21 to 23) or the revised Toxicity Characteristic under 40 CFR 261.24.

SUMMARY

The waste materials which are contained in this soil pile have been determined to be RCRA non-hazardous (a.k.a non-RCRA) by process knowledge and project specific sampling.

It is WCS's intention to provide radiological characterizations and RCRA determinations of construction waste materials located in the Soil Pile. WCS believes that these determinations properly represent the waste or waste streams discussed herein.

If there are any questions, please call me at extension 6085 or C. S. Waugh at extension 6777.

JPE:DLM:tmk

-49-1

Fernald Environmental Management Project
MATERIAL EVALUATION FORM (MEF)

Verification Form

A. WASTE STREAM IDENTIFICATION

1. Requestor: KEN BELGRAVE
2. Phone: 738-8401
3. Serial Number: —
4. Generation Event: ☐ Original Generation XX Additional Generation ☐ Safe Shutdown Generation ☐ Other (Describe):
5. Date Submitted: (see instruction note!)
6. Material Description: **SOIL**
7. Process Description: ○ Documentation Attached
   THE THIRD STREET SOIL AND RUBBLE PILE WAS GENERATED OVER THE YEARS BY VARIOUS CONSTRUCTION PROJECTS ON SITE. REMOVAL ACTION 17 (RA17) WORK PLAN OUTLINES THREE OPTIONS FOR THE DISPOSITION OF SOIL AND RUBBLE PILES AT FEMP. THIS DOCUMENT ADDRESSES THE RCRA AND RADIOLOGICAL ISSUES ASSOCIATED WITH THIS MATERIAL TO SUPPORT THE SELECTION OF THE PREFERRED OPTION.
8. Generation Location:
   GENERATED FROM VARIOUS LOCATIONS ON THE FEMP SITE AND LOCATED NORTH OF 3RD STREET.

B. WASTE STREAM TO VERIFY AGAINST

1. MEF#: 2503
2. Material Description: **SOIL**
3. Determination Date: 09/23/93
4. Determination: RCRA NON-HAZARDOUS (a.k.a. non-RCRA)
5. Hazardous Waste No(s). NONE
6. Rationale: ○ Extra page(s) attached
   REVIEW OF THE SAMPLING DATA AND STATISTICAL ANALYSIS FOR THE THIRD STREET SOIL PILE REVEAL NO SIGNIFICANT CONTAMINATION CONCENTRATIONS FOR TOXICITY CHARACTERISTIC WASTES. THE RADIOLOGICAL LEVELS INDICATED IN THE DATA SUPPORT THE USE OF THIS MEF.

Evaluation Section

C. MATERIAL STATUS

1. Evaluator: DENNIS MORGAN
2. Date: OCTOBER 20, 1993
3. Summary

☐ Material is characterized by MEF # 2503. The total uranium activity concentration in the soil is less than or equal to 100 pCi/g, 5 pCi/g total radium, 50 pCi/g total thorium and will be managed under RA #17. Improved Storage of Soil and Debris.

Material Determination:

X RCRA Solid Waste (a.k.a Non-RCRA)

☐ RCRA Hazardous Waste

Hazardous Waste No(s).

☐ This material does not match the characterization of the referenced MEF. Submit a new MEF for this material immediately.

Rationale: BASED ON PROCESS KNOWLEDGE, THERE IS NO REASON TO SUSPECT THE WASTE TO MEET ANY OF THE DEFINITIONS OF THE HAZARDOUS WASTE LISTING UNDER OAC 3745-51-31 TO 33, (IN LIEU OF 40 CFR 261, SUBPART D), OR EXHIBIT ANY OF THE CHARACTERISTICS OF HAZARDOUS WASTE UNDER OAC 3745-51-21 TO 24, (IN LIEU OF 40 CFR 261, SUBPART C).

Waste Characterization Approval Signature: Jerome P. Eshman Date: 10-25-93

D. DISTRIBUTION

Requestor: KEN BELGRAVE, RSO

Waste Characterization Files: CONSTRUCTION FILES

Fernald Environmental Management Project
MATERIAL EVALUATION FORM (MEF)

4951

Verification Form

A. WASTE STREAM IDENTIFICATION

1. Requestor: KEN BELGRAVE	2. Phone: 738-8401	3. Serial Number:
4. Generation Event: ☐ Original Generation X Additional Generation ☐ Safe Shutdown Generation ☐ Other (Describe):		5. Date Submitted: (see instruction note!)

6. Material Description:
CONCRETE

7. Process Description: ○ Documentation Attached
THE THIRD STREET SOIL AND RUBBLE PILE WAS GENERATED OVER THE YEARS BY VARIOUS CONSTRUCTION PROJECTS ON THE SITE. REMOVAL ACTION #17 (RA17) WORK PLAN OUTLINES THREE OPTIONS FOR THE DISPOSITION OF SOIL AND RUBBLI PILES AT FEMP. THIS DOCUMENT ADDRESSES THE RCRA AND RADIOLOGICAL ISSUES ASSOCIATED WITH THIS MATERIAL.

8. Generation Location:
GENERATED FROM VARIOUS LOCATIONS ON THEFEMP SITE AND LOCATED NORTH OF 3RD STREET.

B. WASTE STREAM TO VERIFY AGAINST

1. MEF#: 2007	2. Material Description: CONCRETE	
3. Determination Date:	4. Determination: RCRA NON-HAZARDOUS (a.k.a. non-RCRA)	5. Hazardous Waste No(s). NONE

6. Rationale: ☐ Extra page(s) attached
PROCESS KNOWLEDGE INDICATES THAT NO HAZARDOUS MATERIALS WERE STORED IN THE AREAS OF THE PLANT WHICH GENERATED THE RUBBLE. A WALKDOWN OF THE RUBBLE PILE DID NOT REVEAL ANY SUSPICIOUS MATERIALS. REVIEW OF THE SPILL/RELEASE INCIDENT REPORT SHOWS NO SIGN OF SPILLS IN THE AREAS WHICH ORIGINATED THE RUBBLE MATERIALS. SINCE THE MATERIALS ARE LOCATED WITHIN THE CONTROL AREA, ANY CONCRETE DEBRIS WILL HAVE TO BE MONITORED BY RADIOLOGICAL SAFETY FOR PROPOER DISPOSITION. ALL INFORMATION OBTAINED SUPPORTS THE USE OF THIS MEF.

Evaluation Section

C. MATERIAL STATUS

1. Evaluator: DENNIS L. MORGAN	2. Date: OCTOBER 20, 1993
3. Summary ☐ Material is characterized by MEF # 2007	Material Determination: X RCRA Solid Waste (a.k.a Non-RCRA) ☐ RCRA Hazardous Waste Hazardous Waste No(s).

☐ This material does not match the characterization of the referenced MEF. Submit a new MEF for this material immediately.

Rationale: BASED ON PROCESS KNOWLEDGE, THERE IS NO REASON TO SUSPECT THE WASTE TO MEET ANY OF THE DEFINITIONS OF THE HAZARDOUS WASTE LISTING UNDER OAC 3745-51-31 TO 33, (IN LIEU OF 40 CFR 261, SUBPART D), OR EXHIBIT ANY OF THE CHARACTERISTICS OF HAZARDOUS WASTE UNDER OAC 3745-51-21 TO 24, (IN LIEU OF 40 CFR 261, SUBPART C).

Waste Characterization Approval Signature: Jerome P. Erlman Date: 10-25-93

D. DISTRIBUTION

020

Requestor: KEN BELGRAVE, RSO	Waste Characterization Files: CONSTRUCTION FILES

APPENDIX 1

TABLE 4.1.....RESULTS OF METALS ANALYSES

TABLE 4.2.....RESULTS OF VOLATILE ORGANICS ANALYSIS

TABLE 4.3.....RESULTS OF RADIOLOGICAL ANALYSIS

Table 4.1 Results of Metals Analyses

Note: @ - Calculated values in mg/L, assuming a factor of 1/20 of the reported total concentration value in mg/kg. See Section 5.1.3
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver	Analysis (Units)
SP-1 (0-6") 92-211-6019 930329-041 Soil	0.039	0.2585	<0.005	<0.010	<0.003	<0.0002	<0.005	<0.010	TCLP, (mg/L)
SP-2 (0-6") 92-211-6020 930329-042 Soil	0.05	0.4569	<0.005	0.010	<0.003	<0.0002	<0.005	<0.010	TCLP, (mg/L)
SP-A2 (3') 93-211-6192 930421-156 Soil	9.41 0.4705 @	81.2 4.0600 @	1.24 0.0620 @	19.2 0.9600 @	15.0 0.7500 @	<0.2 <0.0100 @	<1.0 <0.0500 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-3 (0-6") 92-211-6021 930329-043 Soil	<0.010	1.067	<0.005	<0.010	0.004	<0.0002	<0.005	<0.010	TCLP (mg/L)
SP-A3 93-211-6193 930422-036 Soil	12.01 0.6005 @	77.5 3.8750 @	<1.0 <0.0500 @	17.88 0.8940 @	14.9 0.7450 @	<0.2 <0.0100 @	<1.0 <0.0500 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-4 (0-6") 92-211-6022 930329-044 Soil	0.070	<0.2	<0.005	<0.010	<0.003	0.0003	<0.005	<0.010	TCLP (mg/L)
SP-A4 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	

Table 4.1 Results of Metals Analyses

Note: @ - Calculated values in mg/L, assuming a factor of 1/20 of the reported total concentration value in mg/kg. See Section 5.1.3
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver	Analysis (Units)
SP-5 (2') 92-211-6023 930330-058 Soil	<0.010	<0.200	<0.005	<0.005	<0.003	<0.0002	0.031	<0.010	TCLP (mg/L)
SP-6 (4') 93-211-6024 930406-025 Soil	12.52 0.6260 @	70.93 3.5465 @	<1.0 <0.0500 @	13.72 0.6860 @	14.59 0.7295 @	<0.2 <0.0100 @	<1.0 <0.0500 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-7 (1') 92-211-6025 930330-057 Soil	<0.010	0.7067	<0.005	<0.010	0.011	<0.0002	<0.005	<0.010	TCLP (mg/L)
SP-A7 (1') 93-211-6196 930420-079 Soil	5.27 0.2635 @	101.6 5.0800 @	<1.0 <0.0500 @	19.53 0.9765 @	<0.003	<0.2 <0.0100 @	<0.1 <0.0050 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L) TCLP (mg/L)
SP-8 (3') 93-211-6026 930401-104 Soil	<0.010	0.5087	<0.005	<0.010	<0.003	<0.0002	0.028	<0.010	TCLP (mg/L)
SP-9 (10') 93-211-6028 930407-055 Soil	5.5 0.2750 @	90.5 4.5250 @	<1.0 <0.0500 @	18.5 0.9250 @	35.0 1.7500 @	<0.2 <0.0100 @	<1.0 <0.0500 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-A9 (3') 93-211-6198 930420-080 Soil	4.37 0.2185 @	125.8 6.2900 @	<1.0 <0.0500 @	20.36 1.0180 @	<0.003	<0.2 <0.0100 @	<1.0 <0.0500 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L) TCLP (mg/L)

Table 4.1 Results of Metals Analyses

Note: @ - Calculated values in mg/L, assuming a factor of 1/20 of the reported total concentration value in mg/kg. See Section 5.1.3
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver	Analysis (Units)
SP-10 (Surface) 93-211-6029 930422-037 Wood	24.72 1.2360 @	174.4 8.7200 @	<1.0 <0.0500 @	<2.0 <0.1000 @	12.1 0.6050 @	<0.2 <0.0100 @	143.8 * <0.005	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L) TCLP (mg/L)
SP-A10 (5') 93-211-6199 930421-155 Soil	3.53 0.1765 @	99.6 4.9800 @	1.07 0.0535 @	18.7 0.9350 @	15.2 0.7600 @	<0.2 <0.0100 @	<1.0 <0.0500 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-11 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	
SP-12 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	
SP-13 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	
SP-14 (6') 93-211-6033 930407-054 Soil	9.27 0.4635 @	<70.5 <3.5250 @	<1.0 <0.0500 @	11.5 0.5750 @	13.3 0.6650 @	<0.2 <0.0100 @	<1.0 <0.0500 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-15 (0-6") 93-211-6034 930407-069 Soil	4.45 0.2225 @	52.4 2.6200 @	<1.0 <0.0500 @	11.5 0.5750 @	187.9 * 0.006	<0.2 <0.0100 @	<1.0 <0.0500 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L) TCLP (mg/L)

Table 4.1 Results of Metals Analyses

Note: @ - Calculated values in mg/L, assuming a factor of 1/20 of the reported total concentration value in mg/kg. See Section 5.1.3
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver	Analysis (Units)
SP-16 (5') 93-211-6035 930406-026 Soil	5.12 0.2560 @	63.08 3.1540 @	<1.0 <0.0500 @	10.32 0.5160 @	12.10 0.6050 @	<0.2 <0.0100 @	<1.0 <0.0500 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-17 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	
SP-18 (3') 92-211-6037 930330-056 Soil	<0.010	0.2836	<0.005	<0.010	0.028	<0.0002	<0.005	<0.010	TCLP (mg/L)
SP-19 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	
SP-20(1') 92-211-6039 930330-053 Soil	0.011	0.4357	<0.005	<0.010	0.007	<0.0002	<0.005	<0.010	TCLP (mg/L)
SP-41 (1') (dup SP-20) 93-211-6040 930330-054 Soil	0.012	0.9818	<0.005	<0.010	<0.003	<0.0002	<0.005	<0.010	TCLP (mg/L)
SP-A20 (10') 93-211-6209 930420-078 Soil	7.40 0.3700 @	65.33 3.2665 @	<1.0 <0.0500 @	20.07 1.0035 @	<0.003	<0.2 <0.0100 @	<1.0 <0.0500 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L) TCLP (mg/L)

Table 4.1 Results of Metals Analyses

Note: @ - Calculated values in mg/L, assuming a factor of 1/20 of the reported total concentration value in mg/kg. See Section 5.1.3
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver	Analysis (Units)
SP-21 (0-6") 92-211-6038 930330-055 Soil	0.013	0.212	<0.005	<0.010	0.004	<0.0002	<0.005	0.0104	TCLP (mg/L)
SP-A21 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	
SP-22 (2') 93-211-6041 930408-128 Soil	3.14 0.1570 @	45.4 2.2700 @	<1.0 <0.0500 @	9.24 0.4620 @	24.27 1.2135 @	<0.2 <0.0100 @	3.81 0.1905 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-23 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	
SP-A23 (1') 93-211-6212 930415-080 Soil	3.15 0.1575 @	72.7 3.6350 @	<1.0 <0.0500 @	17.49 0.8745 @	<0.003	<0.2 <0.0100 @	<1.0 <0.0500 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L) TCLP (mg/L)
SP-24 (1') 93-211-6044 930407-070 Soil	3.38 0.1690 @	57.0 2.8500 @	<1.0 <0.0500 @	10.94 0.5470 @	11.5 0.5750 @	<0.2 <0.0100 @	<1.0 <0.0500 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-25 (3') 93-211-6045 930408-131 Soil	4.20 0.2100 @	54.4 2.7200 @	<1.0 <0.0500 @	10.8 0.5400 @	12.24 0.6120 @	<0.2 <0.0100 @	1.32 0.0660 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)

Table 4.1 Results of Metals Analyses

Note: @ - Calculated values in mg/L, assuming a factor of 1/20 of the reported total concentration value in mg/kg. See Section 5.1.3
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver	Analysis (Units)
SP-26 (1') 93-211-6046 930408-129 Soil	3.89 0.1945 @	48.9 2.4450 @	<1.0 <0.0500 @	9.74 0.4870 @	21.37 1.0685 @	<0.2 <0.0100 @	1.44 0.0720 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-27 (6') 93-211-6047 930408-133 Soil	3.74 0.1870 @	40.6 2.0300 @	<1.0 <0.0500 @	9.39 0.4695 @	13.63 0.6815 @	1.92 0.0960 @	5.12 0.2560 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-28 (4') 93-211-6048 930408-132 Soil	3.33 0.1665 @	54.6 2.7300 @	<1.0 <0.0500 @	11.6 0.5800 @	12.79 0.6395 @	<0.2 <0.0100 @	1.79 0.0895 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-29 (9') 93-211-6098 930415-079 Soil	2.76 0.1380 @	66.6 3.337 @	1.37 0.0685 @	19.38 0.9690 @	<0.003	<0.2 <0.0100 @	<1.0 <0.0500 @	2.01 0.1005 @	TOTAL (mg/kg) Derived TCLP (mg/L) TCLP (mg/L)
SP-30 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	
SP-31 (2') 93-211-6100 930408-130 Soil	2.51 0.1255 @	<40.0 <2.0000 @	<1.0 <0.0500 @	8.73 0.4365 @	37.9 1.895 @	<0.2 <0.0100 @	7.82 0.3910 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-32 (0-6") 93-211-6105 930414-034 Soil	<2.0 <0.1000 @	41.9 2.0950 @	<1.0 <0.0500 @	12.57 0.6250 @	124.5 * 6.2250 @*	0.60 0.0300 @	6.86 0.3430 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)

Table 4.1 Results of Metals Analyses

Note: @ - Calculated values in mg/L, assuming a factor of 1/20 of the reported total concentration value in mg/kg. See Section 5.1.3
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver	Analysis (Units)
SP-33 (2') 93-211-6102 930414-040 Soil	<2.0 <0.1000 @	50.8 2.5400 @	<1.0 <0.0500 @	11.0 0.5500 @	27.3 1.3650 @	<0.2 <0.0100 @	5.99 0.2995 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-34 (3') 93-211-6103 930414-041 Soil	<2.0 <0.1000 @	<40.0 <2.0000 @	<1.0 <0.0500 @	6.01 0.3005 @	13.1 0.6550 @	<0.2 <0.0100 @	5.55 0.2775 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-35 (0-6") 93-211-6104 930414-035 Soil	3.03 0.1515 @	41.4 2.0700 @	<1.0 <0.0500 @	6.95 0.3475 @	22.30 1.1150 @	<0.2 <0.0100 @	6.01 0.3005 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-44 (0-6") (Dup. SP-35) 93-211-6097 930414-038 Soil	2.74 0.1370 @	51.1 2.5550 @	<1.0 <0.0500 @	9.52 0.4760 @	10.62 0.5310 @	<0.2 <0.0100 @	4.53 0.2265 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-36 (0-6") 93-211-6101 930414-036 Soil	<2.0 <0.1000 @	<40.0 <2.0000 @	<1.0 <0.0500 @	6.72 0.3360 @	4.64 0.2320 @	<0.2 <0.0100 @	5.70 0.2850 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-37 (0-6") 93-211-6160 930414-037 Soil	<2.0 <0.1000 @	43.5 2.1750 @	1.09 0.0545 @	11.4 0.5700 @	32.1 1.6050 @	<0.2 <0.0100 @	5.60 0.2800 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)

Table 4.1 Results of Metals Analyses

Note: @ - Calculated values in mg/L, assuming a factor of 1/20 of the reported total concentration value in mg/kg. See Section 5.1.3
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver	Analysis (Units)
SP-38 (0-6") 93-211-6161 930407-071 Soil	4.73 0.2365 @	<40.0 <2.0000 @	<1.0 <0.0500 @	6.11 0.3055 @	24.7 1.2350 @	<0.2 <0.0100 @	<1.0 <0.0500 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-39 (Surface) 93-211-6162 930414-039 Concrete	<2.0 <0.1000 @	<40.0 <2.0000 @	<1.0 <0.0500 @	2.44 0.1220 @	<1.0 <0.0500 @	<0.2 <0.0100 @	4.25 0.2125 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-40 (1') 93-211-6163 930407-072 Soil	4.20 0.2100 @	<40.0 <2.0000 @	<1.0 <0.0500 @	4.71 0.2355 @	4.37 0.2185 @	<0.2 <0.0100 @	<1.0 <0.0500 @	2.14 0.1070 @	TOTAL (mg/kg) Derived TCLP (mg/L)
SP-42 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	
SP-43 (2') 93-211-6165 930408-134 Soil	7.72 0.3860 @	47.4 2.3700 @	<1.0 <0.0500 @	9.69 0.4845 @	9.11 0.4555 @	<0.2 <0.0100 @	5.98 0.2990 @	<2.0 <0.1000 @	TOTAL (mg/kg) Derived TCLP (mg/L)

Table 4.2 Results of Volatile Organics Analyses

Note: NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Methyl Ethyl Ketone	Tetrachloroethylene	Analysis (Units)
SP-1 (0-6") 92-211-6019 930329-041 Soil	0.071	<0.025	TCLP (mg/L)
SP-2 (0-6") 92-211-6020 930329-042 Soil	0.072	<0.025	TCLP (mg/L)
SP-A2 (3') 93-211-6192 930421-156 Soil	<0.050	<0.025	TCLP (mg/L)
SP-3 (0-6") 92-211-6021 930329-043 Soil	0.072	<0.025	TCLP (mg/L)
SP-A3 93-211-6193 930422-036 Soil	<0.33	<0.08	TCLP (mg/L)
SP-4 (0-6") 92-211-6022 930329-044 Soil	0.080	<0.025	TCLP (mg/L)
SP-A4 NO SAMPLE - AUGER REFUSAL	NS	NS	
SP-5 (2') 92-211-6023 930330-058 Soil	<0.33	<0.08	TCLP (mg/L)
SP-6 (4') 93-211-6024 930406-025 Soil	0.160	0.043	TCLP (mg/L)
SP-7 (1') 92-211-6025 930330-057 Soil	<0.33	<0.08	TCLP (mg/L)
SP-A7 (1') 93-211-6196 930420-079 Soil	<0.33	<0.08	TCLP (mg/L)
SP-8 (3') 93-211-6026 930401-104 Soil	<0.33	<0.08	TCLP (mg/L)

Table 4.2 Results of Volatile Organics Analyses

Note: NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Methyl Ethyl Ketone	Tetrachloroethylene	Analysis (Units)
SP-9 (10') 93-211-6028 930407-055 Soil	0.160	<0.025	TCLP (mg/L)
SP-A9 (3') 93-211-6198 930420-080 Soil	<0.33	<0.08	TCLP (mg/L)
SP-10 (Surface) 93-211-6029 930422-037 Wood	<0.33	<0.08	TCLP (mg/L)
SP-A10 (5') 93-211-6199 930421-155 Soil	0.093	<0.025	TCLP (mg/L)
SP-11 NO SAMPLE - AUGER REFUSAL	NS	NS	
SP-12 NO SAMPLE - AUGER REFUSAL	NS	NS	
SP-13 NO SAMPLE - AUGER REFUSAL	NS	NS	
SP-14 (6') 93-211-6033 930407-054 Soil	0.170	<0.025	TCLP (mg/L)
SP-15 (0-6") 93-211-6034 930407-069 Soil	0.170	<0.025	TCLP (mg/L)
SP-16 (5') 93-211-6035 930406-026 Soil	0.250	<0.025	TCLP (mg/L)
SP-17 NO SAMPLE - AUGER REFUSAL	NS	NS	
SP-18 (3') 92-211-6037 930330-056 Soil	<0.33	<0.08	TCLP (mg/L)
SP-19 NO SAMPLE - AUGER REFUSAL	NS	NS	

Table 4.2 Results of Volatile Organics Analyses

Note: NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Methyl Ethyl Ketone	Tetrachloroethylene	Analysis (Units)
SP-20(1') 92-211-6039 930330-053 Soil	<0.33	<0.08	TCLP (mg/L)
SP-41 (1') (dup SP-20) 93-211-6040 930330-054 Soil	<0.33	<0.08	TCLP (mg/L)
SP-A20 (10') 93-211-6209 930420-078 Soil	<0.33	<0.08	TCLP (mg/L)
SP-21 (0-6") 92-211-6038 930330-055 Soil	<0.33	<0.08	TCLP (mg/L)
SP-A21 NO SAMPLE - AUGER REFUSAL	NS	NS	
SP-22 (2') 93-211-6041 930408-128 Soil	<0.33	<0.08	TCLP (mg/L)
SP-23 NO SAMPLE - AUGER REFUSAL	NS	NS	
SP-A23 (1') 93-211-6212 930415-080 Soil	<0.33	<0.08	TCLP (mg/L)
SP-24 (1') 93-211-6044 930407-070 Soil	0.150	<0.025	TCLP (mg/L)
SP-25 (3') 93-211-6045 930408-131 Soil	<0.33	<0.08	TCLP (mg/L)
SP-26 (1') 93-211-6046 930408-129 Soil	<0.33	<0.08	TCLP (mg/L)
SP-27 (6') 93-211-6047 930408-133 Soil	<0.33	<0.08	TCLP (mg/L)
SP-28 (4') 93-211-6048 930408-132 Soil	<0.33	<0.08	TCLP (mg/L)

Table 4.2 Results of Volatile Organics Analyses

Note: NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Methyl Ethyl Ketone	Tetrachloroethylene	Analysis (Units)
SP-29 (9') 93-211-6098 930415-079 Soil	<0.33	<0.08	TCLP (mg/L)
SP-30 NO SAMPLE - AUGER REFUSAL	NS	NS	
SP-31 (2') 93-211-6100 930408-130 Soil	<0.33	<0.08	TCLP (mg/L)
SP-32 (0-6") 93-211-6105 930414-034 Soil	<0.33	<0.08	TCLP (mg/L)
SP-33 (2') 93-211-6102 930414-040 Soil	<0.33	<0.08	TCLP (mg/L)
SP-34 (3') 93-211-6103 930414-041 Soil	<0.33	<0.08	TCLP (mg/L)
SP-35 (0-6") 93-211-6104 930414-035 Soil	<0.33	<0.08	(TCLP mg/L)
SP-44 (0-6")(Dup. SP-35) 93-211-6097 930414-038 Soil	<0.33	<0.08	TCLP (mg/L)
SP-36 (0-6") 93-211-6101 930414-036 Soil	<0.33	<0.08	TCLP (mg/L)
SP-37 (0-6") 93-211-6160 930414-037 Soil	<0.33	<0.08	TCLP (mg/L)
SP-38 (0-6") 93-211-6161 930407-071 Soil	0.200	<0.025	TCLP (mg/L)
SP-39 (Surface) 93-211-6162 930414-039 Concrete	<0.33	<0.08	TCLP (mg/L)

Table 4.2 Results of Volatile Organics Analyses

Note: NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Methyl Ethyl Ketone	Tetrachloroethylene	Analysis (Units)
SP-40 (1') 93-211-6163 930407-072 Soil	0.071	<0.025	TCLP (mg/L)
SP-42 NO SAMPLE - AUGER REFUSAL	NS	NS	
SP-43 (2') 93-211-6165 930408-134 Soil	<0.33	<0.08	TCLP (mg/L)

Table 4.3 Results of Radiological Analyses

Note: @ - Calculated values. For Uranium, the Total U value (in pmm) was divided by 1.48 to obtain Total U (in pCi/g). For Thorium and Radium, the total activity value (in pCi/g) is equal to the sum of the isotopic activities (in pCi/g).
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Total U (ppm dry) (pCi/g)@	U 234 (pCi/g dry)	U 235 (pCi/g dry)	U 236 (pCi/g dry)	U 238 (pCi/g dry)	Total Th (ppm dry) (pCi/g)@	Th 228 (pCi/g dry)	Th 230 (pCi/g dry)	Th 232 (pCi/g dry)	Total Ra (pCi/g)@	Ra 226 (pCi/g dry)	Ra 228 (pCi/g dry)	Alpha Beta Activity (pCi/g)
SP-1 (0-6") 92-211-6019 930329-041 Soil	<11 <7.4	<0.69	<0.18	<0.0071	<3.7	<18 4.2	1.5	1.4	1.3	1.3	0.93	0.37	12 <19
SP-2 (0-6") 92-211-6020 930329-042 Soil	16 10.8	5.1	0.26	0.073	5.3	<18 5.8	2.5	2.1	1.2	1.44	1.1	0.34	28 34
SP-A2 (3') 93-211-6192 930421-156 Soil	30 20.3	14	0.52	0.24	10	<18 7.7	1.6	4.7	1.4	1.49	1.1	0.39	43 27
SP-3 (0-6") 92-211-6021 930329-043 Soil	<11 7.4	<2.0	<0.71	<0.037	3.7	<18 3.25	1.1	1.2	0.95	0.71	0.47	0.24	10 <20
SP-A3 93-211-6193 930422-036 Soil	<11 <7.4	<3.7	<0.18	<0.042	<3.7	<18 4.2	1.6	1.4	1.2	1.84	1.6	0.24	19 <22
SP-4 (0-6") 92-211-6022 930329-044 Soil	55 37.2	16	0.78	0.21	18	<18 6.3	1.9	2.6	1.8	1.03	0.65	0.38	27 27

Table 4.3 Results of Radiological Analyses

Note: @ - Calculated values. For Uranium, the Total U value (in pmm) was divided by 1.48 to obtain Total U (in pCi/g). For Thorium and Radium, the total activity value (in pCi/g) is equal to the sum of the isotopic activities (in pCi/g).
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Total U (ppm dry) (pCi/g)@	U 234 (pCi/g dry)	U 235 (pCi/g dry)	U 236 (pCi/g dry)	U 238 (pCi/g dry)	Total Th (ppm dry) (pCi/g)@	Th 228 (pCi/g dry)	Th 230 (pCi/g dry)	Th 232 (pCi/g dry)	Total Ra (pCi/g)@	Ra 226 (pCi/g dry)	Ra 228 (pCi/g dry)	Alpha Beta Activity (pCi/g)
SP-A4 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS NS
SP-5 (2') 92-211-6023 930330-058 Soil	44 29.7	13	0.70	0.18	15	<18 4.1	1.7	1.5	0.90	0.85	0.61	0.24	16 <20
SP-6 (4') 93-211-6024 930406-025 Soil	15 10.1	3.1	0.2	0.044	5.0	<18 5.3	1.6	2.0	1.7	1.48	0.85	0.63	<16 <21
SP-7 (1') 92-211-6025 930330-057 Soil	<18 6.1	22	1.1	0.34	25	74 5.7	1.5	2.7	1.5	2.39	1.9	0.49	57 42
SP-A7 (1') 93-211-6196 930420-079 Soil	18 12.2	7.5	0.27	0.082	6.0	<18 4.2	1.2	1.8	1.2	1.31	1.0	0.31	17 <19
SP-8 (3') 93-211-6026 930401-104 Soil	58 39.2	22	0.99	0.41	19	<18 7.2	1.3	4.6	1.3	1.47	0.96	0.51	29 37

Table 4.3 Results of Radiological Analyses

Note: @ - Calculated values. For Uranium, the Total U value (in pmm) was divided by 1.48 to obtain Total U (in pCi/g). For Thorium and Radium, the total activity value (in pCi/g) is equal to the sum of the isotopic activities (in pCi/g).
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Total U (ppm dry) (pCi/g)@	U 234 (pCi/g dry)	U 235 (pCi/g dry)	U 236 (pCi/g dry)	U 238 (pCi/g dry)	Total Th (ppm dry) (pCi/g)@	Th 228 (pCi/g dry)	Th 230 (pCi/g dry)	Th 232 (pCi/g dry)	Total Ra (pCi/g)@	Ra 226 (pCi/g dry)	Ra 228 (pCi/g dry)	Alpha Beta Activity (pCi/g)
SP-9 (10') 93-211-6028 930407-055 Soil	18 12.2	NA	NA	0.089	6.0	<18 4.8	1.7	1.9	1.2	NA	NA	NA	24 21
SP-A9 (3') 93-211-6198 930420-080 Soil	70 47.3	29	1.1	0.42	23	<18 5.8	1.6	2.8	1.4	0.93	0.61	0.32	30 <19
SP-10 (Surf.) 93-211-6029 930422-037 Wood	NA	0.0049	0.582	0.0173	99.4	NA 2.34	0.80	0.72	0.82	1.04	<1.2	0.44	147 133
SP-A10 (5') 93-211-6199 930421-155 Soil	39 26.4	11	0.53	0.15	13	<18 5.4	1.4	2.5	1.5	1.77	0.91	0.86	23 <17
SP-11 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS NS
SP-12 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS NS

Table 4.3 Results of Radiological Analyses

Note: @ - Calculated values. For Uranium, the Total U value (in pmm) was divided by 1.48 to obtain Total U (in pCi/g). For Thorium and Radium, the total activity value (in pCi/g) is equal to the sum of the isotopic activities (in pCi/g).
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Total U (ppm dry) (pCi/g)@	U 234 (pCi/g dry)	U 235 (pCi/g dry)	U 236 (pCi/g dry)	U 238 (pCi/g dry)	Total Th (ppm dry) (pCi/g)@	Th 228 (pCi/g dry)	Th 230 (pCi/g dry)	Th 232 (pCi/g dry)	Total Ra (pCi/g)@	Ra 226 (pCi/g dry)	Ra 228 (pCi/g dry)	Alpha Beta Activity (pCi/g)
SP-13 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS NS
SP-14 (6') 93-211-6033 930407-054 Soil	112 75.7	37	1.9	0.34	37	<18 6.8	1.1	4.2	1.5	2.27	1.7	0.57	9.6 <21
SP-15 (0-6") 93-211-6034 930407-069 Soil	<11 <7.4	<4.0	<0.16	<0.035	<3.7	<18 3.19	1.0	1.4	0.79	1.02	0.51	0.51	9.6 <20
SP-16 (5') 93-211-6035 930406-026 Soil	<11 <7.4	<2.8	<0.15	<0.026	<3.7	<18 6.2	2.9	2.2	1.1	0.86	0.68	0.18	<16 <21
SP-17 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS NS
SP-18 (3') 92-211-6037 930330-056 Soil	109 73.6	26	1.6	0.22	36	<18 4.1	1.5	1.5	1.1	2.08	1.6	0.48	79 97

Table 4.3 Results of Radiological Analyses

Note: @ - Calculated values. For Uranium, the Total U value (in pmm) was divided by 1.48 to obtain Total U (in pCi/g). For Thorium and Radium, the total activity value (in pCi/g) is equal to the sum of the isotopic activities (in pCi/g).
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Total U (ppm dry) (pCi/g)@	U 234 (pCi/g dry)	U 235 (pCi/g dry)	U 236 (pCi/g dry)	U 238 (pCi/g dry)	Total Th (ppm dry) (pCi/g)@	Th 228 (pCi/g dry)	Th 230 (pCi/g dry)	Th 232 (pCi/g dry)	Total Ra (pCi/g)@	Ra 226 (pCi/g dry)	Ra 228 (pCi/g dry)	Alpha Beta Activity (pCi/g)
SP-19 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS NS
SP-20(1') 92-211-6039 930330-053 Soil	15 10.1	3.4	0.22	0.043	5.0	<18 5.1	2.2	1.7	1.2	0.76	0.33	0.43	15 <21
SP-41 (1') (dup SP-20) 93-211-6040 930330-054 Soil	27 18.25	9.5	0.41	0.13	9.0	<18 4.2	1.6	1.5	1.1	0.81	0.50	0.31	20 23
SP-A20 (10') 93-211-6209 930420-078 Soil	29 19.6	9.8	0.46	0.22	9.7	<18 3.8	1.1	1.6	1.1	1.21	0.86	0.35	10 <19
SP-21 (0-6") 92-211-6038 930330-055 Soil	23 15.5	7.0	0.33	0.10	7.7	<18 6.9	3.1	2.3	1.5	0.82	0.51	0.31	40 23
SP-A21 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS NS

Table 4.3 Results of Radiological Analyses

Note: @ - Calculated values. For Uranium, the Total U value (in pmm) was divided by 1.48 to obtain Total U (in pCi/g). For Thorium and Radium, the total activity value (in pCi/g) is equal to the sum of the isotopic activities (in pCi/g).
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Total U (ppm dry) (pCi/g)@	U 234 (pCi/g dry)	U 235 (pCi/g dry)	U 236 (pCi/g dry)	U 238 (pCi/g dry)	Total Th (ppm dry) (pCi/g)@	Th 228 (pCi/g dry)	Th 230 (pCi/g dry)	Th 232 (pCi/g dry)	Total Ra (pCi/g)@	Ra 226 (pCi/g dry)	Ra 228 (pCi/g dry)	Alpha Beta Activity (pCi/g)
SP-22 (2') 93-211-6041 930408-128 Soil	58 39.2	22	0.89	0.36	19	18 6.2	2.0	2.3	1.9	1.06	0.36	0.70	21 <19
SP-23 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS NS
SP-A23 (1') 93-211-6212 930415-080 Soil	54 36.5	24	0.85	0.52	18	<18 4.43	1.8	1.8	0.83	1.08	0.41	0.67	45 38
SP-24 (1') 93-211-6044 930407-070 Soil	NA	NA	NA	NA	NA	19.6	1.6	18	NA	NA	NA	NA	68 56
SP-25 (3') 93-211-6045 930408-131 Soil	31 20.9	7.0	0.47	0.12	10	<18 4.6	1.3	2.0	1.3	1.05	0.59	0.46	26 21
SP-26 (1') 93-211-6046 930408-129 Soil	34 23.0	11	0.59	0.27	11	<18 5.7	2.0	2.3	1.4	0.655	<0.27	0.52	14 25

Table 4.3 Results of Radiological Analyses

Note: @ - Calculated values. For Uranium, the Total U value (in pmm) was divided by 1.48 to obtain Total U (in pCi/g). For Thorium and Radium, the total activity value (in pCi/g) is equal to the sum of the isotopic activities (in pCi/g).
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Total U (ppm dry) (pCi/g)@	U 234 (pCi/g dry)	U 235 (pCi/g dry)	U 236 (pCi/g dry)	U 238 (pCi/g dry)	Total Th (ppm dry) (pCi/g)@	Th 228 (pCi/g dry)	Th 230 (pCi/g dry)	Th 232 (pCi/g dry)	Total Ra (pCi/g)@	Ra 226 (pCi/g dry)	Ra 228 (pCi/g dry)	Alpha Beta Activity (pCi/g)
SP-27 (6') 93-211-6047 930408-133 Soil	<11 <7.4	<4.3	<0.17	<0.074	<3.7	<18 3.38	1.2	1.3	0.88	2.18	1.9	0.28	16 23
SP-28 (4') 93-211-6048 930408-132 Soil	<11 <7.4	<3.3	<0.18	<0.055	<3.7	<18 5.4	2.0	1.7	1.7	2.32	1.5	0.82	24 19
SP-29 (9') 93-211-6098 930415-079 Soil	<11 <7.4	<3.9	<0.18	<0.072	<3.7	<18 5.0	1.3	2.6	1.1	1.46	1.1	0.36	11 <21
SP-30 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS NS
SP-31 (2') 93-211-6100 930408-130 Soil	180 * 121.6 *	51	3.0	1.2	60	23 11.8	1.9	7.2	2.7	0.97	0.40	0.57	97 90
SP-32 (0-6") 93-211-6105 930414-034 Soil	54 36.5	18	0.91	0.59	18	18 5.5	1.5	2.0	2.0	0.83	<0.34	0.66	<8.5 22

Table 4.3 Results of Radiological Analyses

Note: @ - Calculated values. For Uranium, the Total U value (in pmm) was divided by 1.48 to obtain Total U (in pCi/g). For Thorium and Radium, the total activity value (in pCi/g) is equal to the sum of the isotopic activities (in pCi/g).
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Total U (ppm dry) (pCi/g)@	U 234 (pCi/g dry)	U 235 (pCi/g dry)	U 236 (pCi/g dry)	U 238 (pCi/g dry)	Total Th (ppm dry) (pCi/g)@	Th 228 (pCi/g dry)	Th 230 (pCi/g dry)	Th 232 (pCi/g dry)	Total Ra (pCi/g)@	Ra 226 (pCi/g dry)	Ra 228 (pCi/g dry)	Alpha Beta Activity (pCi/g)
SP-33 (2') 93-211-6102 930414-040 Soil	148 * 100 *	54	2.6	1.9	49	<18 6.2	2.1	2.3	1.8	0.685	<0.33	0.52	23 28
SP-34 (3') 93-211-6103 930414-041 Soil	109 73.6	36	1.8	0.74	36	<18 5.4	1.6	2.4	1.4	1.3	1.1	0.20	39 33
SP-35 (0-6") 93-211-6104 930414-035 Soil	86 58.1	23	1.4	0.30	29	<18 6.1	1.8	2.6	1.7	1.02	0.40	0.62	<8.6 <17
SP-44 (0-6") (Dup. SP-35) 93-211-6097 930414-038 Soil	96 64.9	41	1.6	0.56	32	<18 3.78	1.0	1.8	0.98	1.41	0.85	0.56	30 32
SP-36 (0-6") 93-211-6101 930414-036 Soil	12 8.1	3.2	0.18	0.047	4.0	<18 1.45	0.63	0.53	0.29	1.555	1.5	<0.11	<8.7 <17
SP-37 (0-6") 93-211-6160 930414-037 Soil	99 66.9	34	1.4	0.28	33	<18 7.64	0.94	5.7	1.0	5.69 *	5.3	0.39	13 <18

Table 4.3 Results of Radiological Analyses

Note: @ - Calculated values. For Uranium, the Total U value (in pmm) was divided by 1.48 to obtain Total U (in pCi/g). For Thorium and Radium, the total activity value (in pCi/g) is equal to the sum of the isotopic activities (in pCi/g).
* - Individual data point exceeds its regulatory threshold limit. See Section 5.2
** - Reported detection level exceeds the analyte-specific regulatory threshold limit. See Section 5.1.1
NA - Data not available
NS - Not sampled

Field ID (Depth) Cust. No. AnaLIS No. Matrix	Total U (ppm dry) (pCi/g)@	U 234 (pCi/g dry)	U 235 (pCi/g dry)	U 236 (pCi/g dry)	U 238 (pCi/g dry)	Total Th (ppm dry) (pCi/g)@	Th 228 (pCi/g dry)	Th 230 (pCi/g dry)	Th 232 (pCi/g dry)	Total Ra (pCi/g)@	Ra 226 (pCi/g dry)	Ra 228 (pCi/g dry)	Alpha Beta Activity (pCi/g)
SP-38 (0-6") 93-211-6161 930407-071 Soil	83 56.1	16	1.2	<0.054	28	<18 5.19	1.1	3.3	0.79	0.86	0.60	0.26	71 36
SP-39 (0-6") 93-211-6162 930414-039 Concrete	<11 <7.4	2.3	0.14	0.071	3.7	<18 2.59	1.0	1.3	0.29	1.555	1.5	<0.11	8.7 <16
SP-40 (1') 93-211-6163 930407-072 Soil	<11 <7.4	<4.9	<0.20	<0.023	<3.7	<18 3.17	1.5	1.1	0.57	0.41	<0.30	0.026	9.5 <20
SP-42 NO SAMPLE - AUGER REFUSAL	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS NS
SP-43 (2') 93-211-6165 930408-134 Soil	12 8.1	3.6	0.19	0.051	4.0	<18 4.09	1.4	1.7	0.99	1.23	0.68	0.55	<12 19

APPENDIX 2 - HISTOGRAMS

FIGURE 5.1 THROUGH FIGURE 5.7

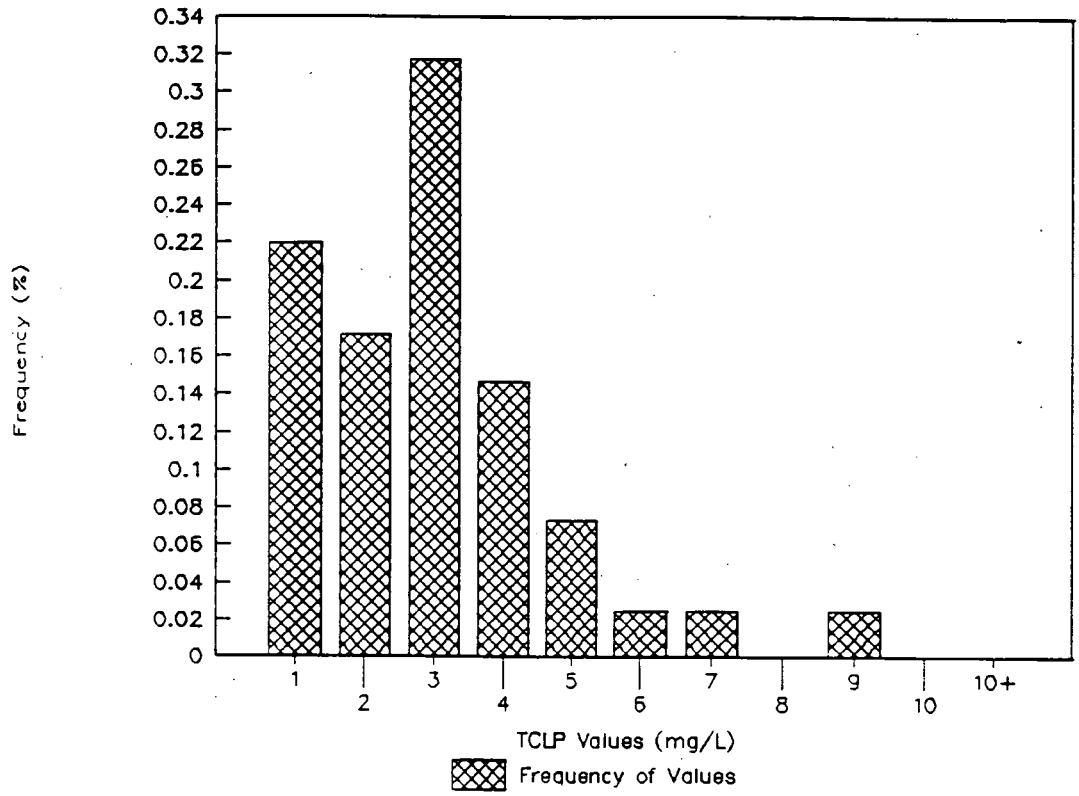


Figure 5.1 TCLP Barium Histogram

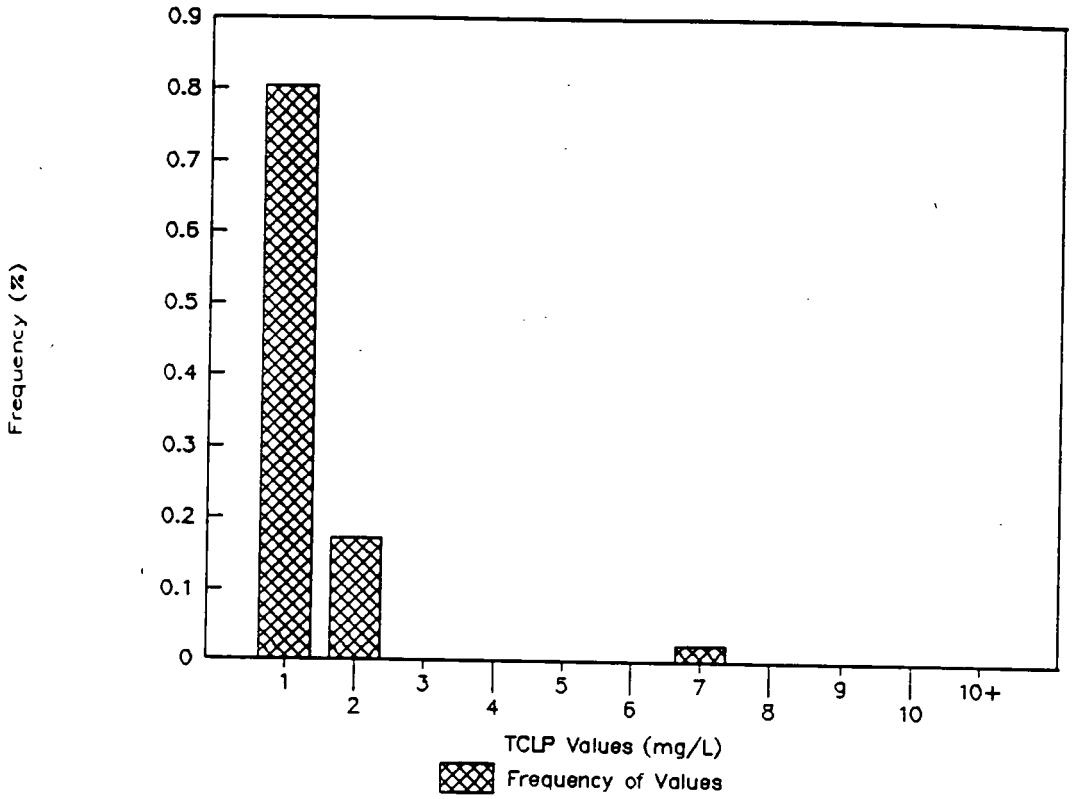


Figure 5.2 TCLP Lead Histogram

-4951

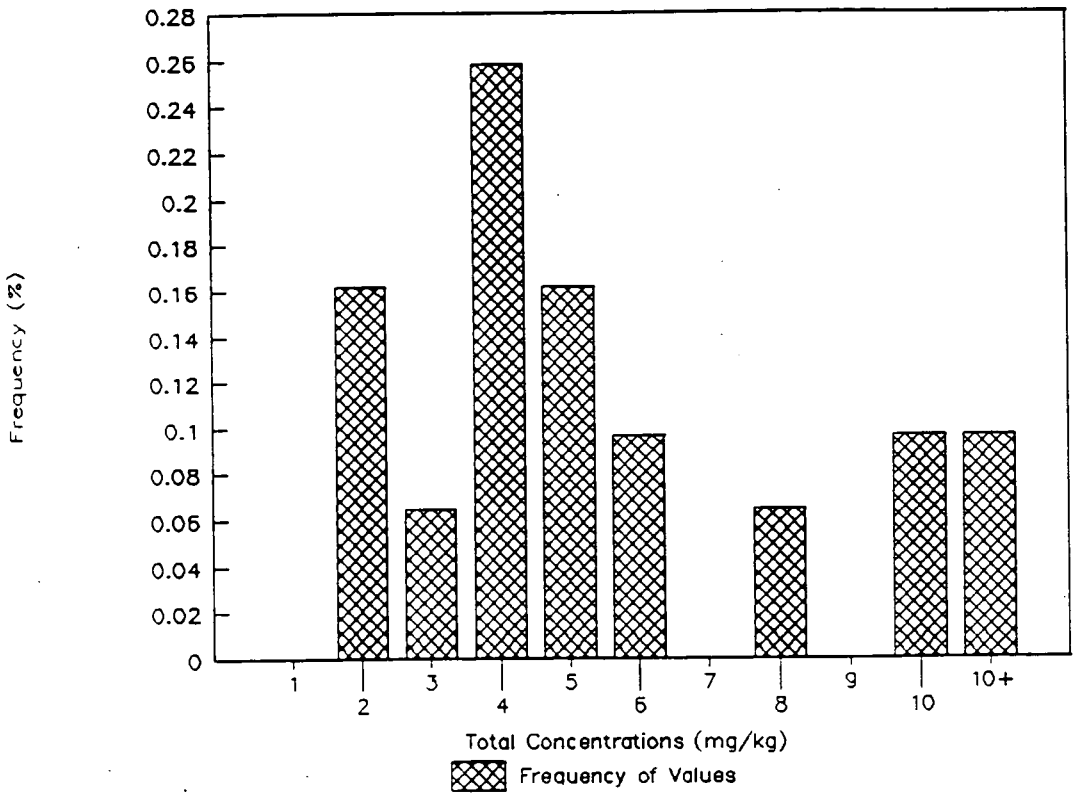


Figure 5.3 Total Arsenic Histogram

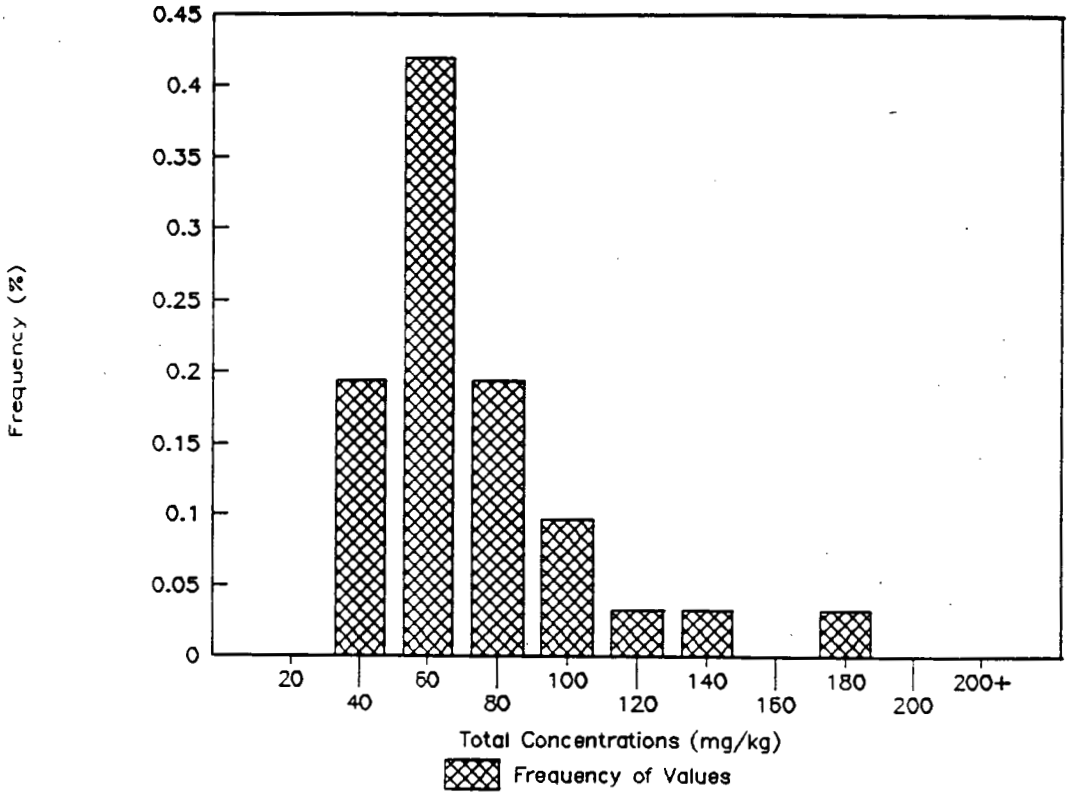


Figure 5.4 Total Barium Histogram

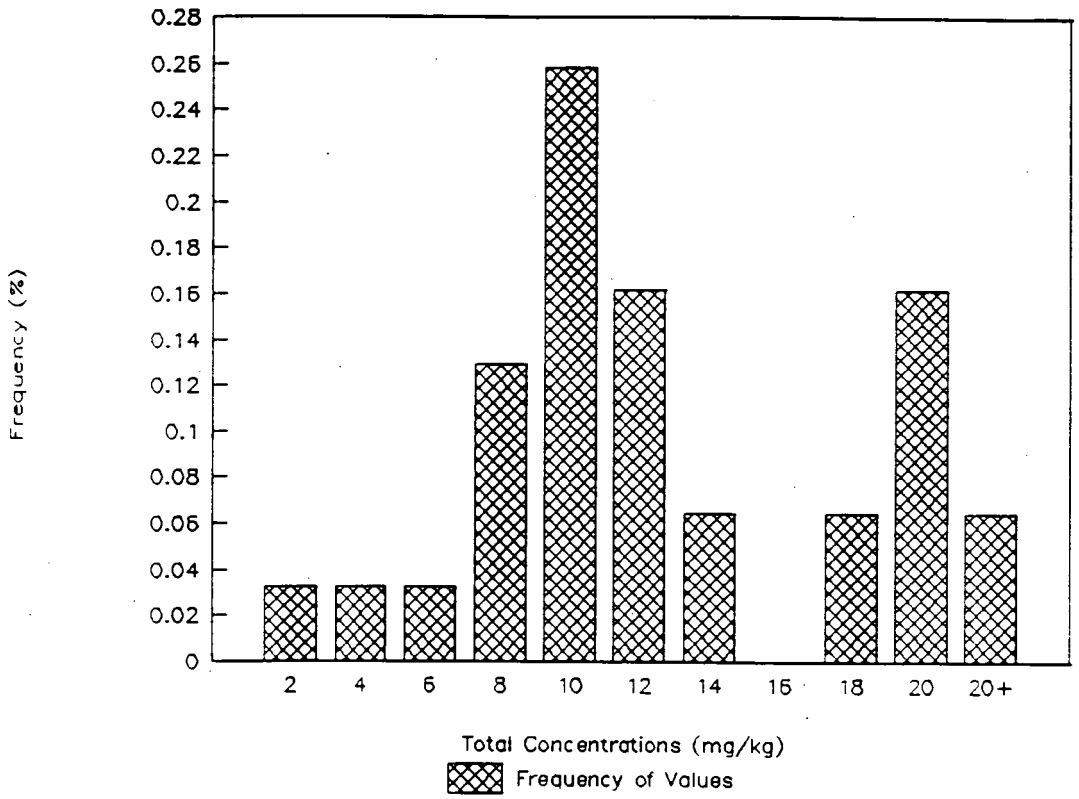


Figure 5.5 Total Chromium Histogram

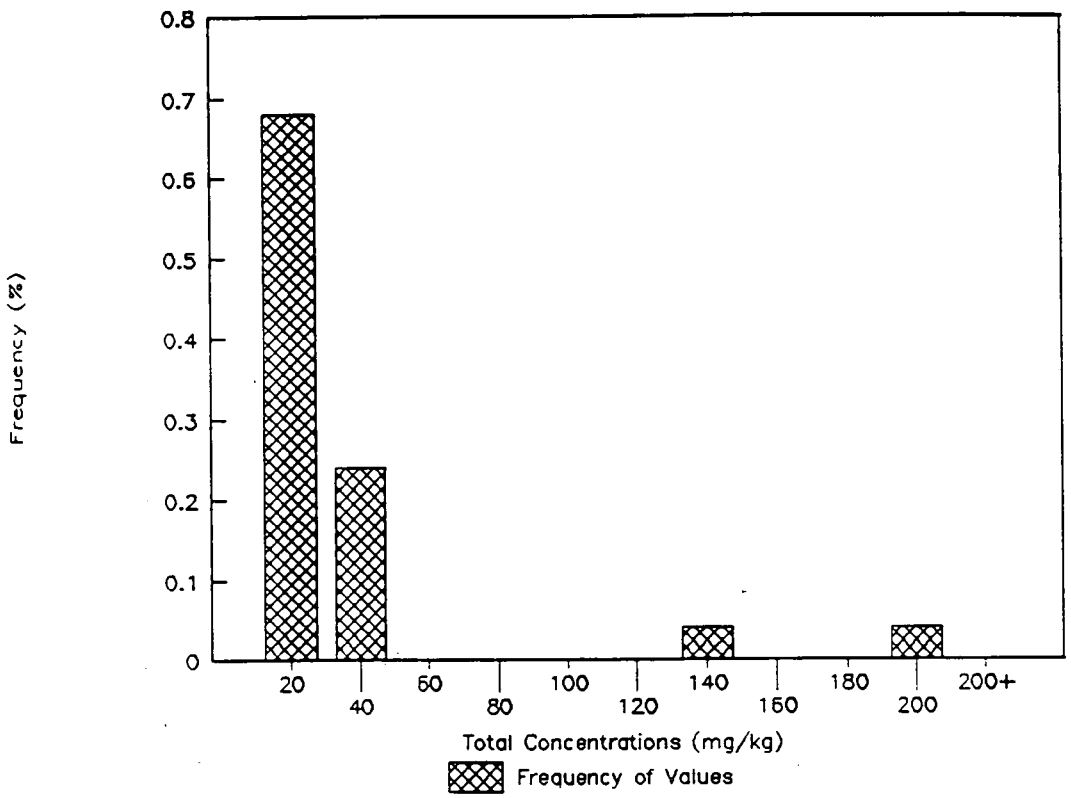


Figure 5.6 Total Lead Histogram

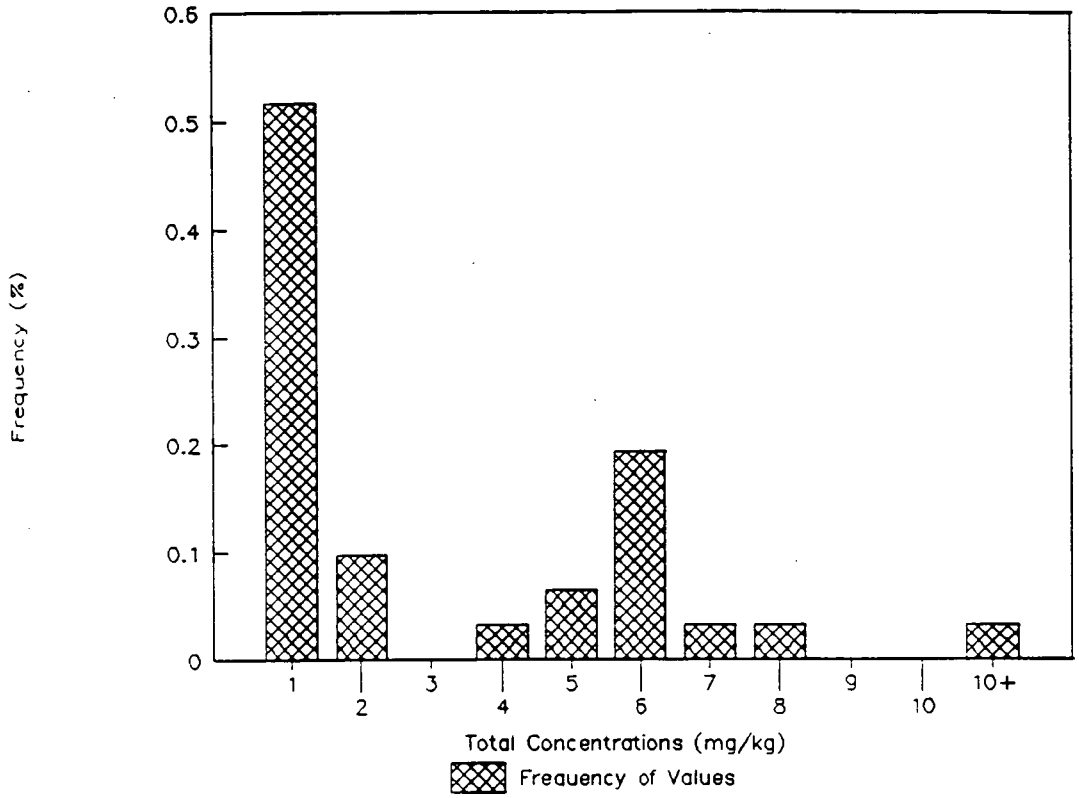


Figure 5.7 Total Selenium Histogram