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TREATABILITY STUDY REPORT FOR OPERABLE UNIT 4 DRAFT MARCH 31, 1993

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TREATABILITY STUDY REPORT
OPERABLE UNIT 4

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

REMEDIAL INVESTIGATION and FEASIBILITY STUDY

MARCH 31, 1993

U.S. DEPARTMENT OF ENERGY
FERNALD SITE OFFICE

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LIST OF ACRONYMS

ARARs	Applicable or relevant and appropriate requirements
ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeter
COD	chemical oxygen demand
DAA	detailed analysis of alternatives
DAF	dilution-attenuation factor
DCR	Document Change Request
DOE	U.S. Department of Energy
DT	detectable limit
DQO	data quality objectives
EDTA	ethylenediaminetetraacetic acid
Eh	redox potential
EPA	U.S. Environmental Protection Agency
ETDC	Environmental Technology Development Center
FEMP	Fernald Environmental Management Program
FFCA	Federal Facilities Compliance Agreement
FMPC	Feed Materials Production Center
FS	feasibility study
g	gram
HCI	hydrochloric acid
HI	hazard Index
HSL	Hazardous Substance List
IC	ion chromatography
ICP	Inductively Coupled Plasma
IT	International Technology Corporation
kg	kilogram
L	liter
LAL	proposed on-site disposal leachate action level
LCI	lower confidence interval
M	molar
MCLG	maximum contaminant level goal
MDC	minimum detectable concentration
mL	milliliter
mm	millimeter
MTCLP	Modified Toxicity Characteristic Leaching Procedure

LIST OF ACRONYMS
(continued)

NRC	U.S. Nuclear Regulatory Commission
OU4	Operable Unit 4
PCB	polychlorinated biphenyl
PCT	product consistency test
pH	hydrogen ion concentration
Po	polonium
ppm	parts per million
PRG	preliminary remediation goals
PRz	percent reduction for each zone
psi	pounds per square inch
QA/QC	quality assurance/quality control
QAO	Quality Assurance Officer
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RG	remediation goal
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
rpm	revolutions per minute
RSC	relative source contribution
SARA	Superfund Amendment and Reauthorization Act
SAS	Statistical Analysis Software
SOP	standard operating procedure
SQL	samples quantitation limit
TBC	to be considered
TC	toxicity characteristic
TCLP	Toxicity Characteristic Leaching Procedure
TDL	Technology Development Laboratory
THI	target hazard index
THQ	target hazard quotient
UCI	upper confidence interval
UCS	unconfined compressive strength
w/w	weight to weight

EXECUTIVE SUMMARY

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On July 18, 1986, the Fernald Environmental Management Project (FEMP) was placed on the National Priorities List (NPL) for investigation and remediation under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). IT Corporation (IT) was contracted in 1991 to conduct a treatability study on the FEMP Operating Unit 4 (OU4). The silos contained spent uranium tailings high in lead and radioactive elements including radium, uranium, and thorium.

As a CERCLA site, where treatment of the waste is indicated, treatability testing is mandatory to ascertain the optimum treatment available and one that can be demonstrated for the waste under remedial investigation. This treatability study is concerned with cement stabilization and chemical extraction of the silos' contents. During the preliminary phase of both stabilization and chemical extraction, 1990 archived Silos 1 and 2 samples were used. The archived 1989 Silo 3 samples were stabilized only.

The performance of these samples showed no problem in achieving moderate compressive strength. Silo 3 samples required higher reagent loadings than Silos 1 and 2 waste to achieve the 500 pounds per square inch (psi) goal. Stabilized samples of Silos 1 and 3 had significant failures for lead (Silo 1) and arsenic and chromium (Silo 3). The most promising stabilization formulations were carried into the Remedy Selection Phase of the program.

The Remedy Selection Phase incorporated bentonite in formulations except for Silo 3.

The Advanced Phase cement stabilization samples showed extreme heterogeneity from zone to zone, silo to silo. It was also established that the reagents themselves were contributing lead-210 (Pb-210) and beryllium in the leachates. Antimony, lead, and zinc had positive percent reductions. Barium, boron, selenium, vanadium, and particularly molybdenum had negative percent reductions (i.e., their concentrations increased in the Toxicity Leaching Characteristic Procedure [TCLP] leachate). However, Pb-210, Polonium-210 (Po-210), and total uranium had high percent reductions.

Various acids were investigated in the Stage I preliminary phase chemical extractions. Hydrochloric and nitric acids proved better at extracting uranium and lead than acetic acid, which was dropped from the program. Time, temperature, and dose rates (volume to solids ratio) were varied as well as extractant strength. During Stage II, ethylenediaminetetraacetic acid (EDTA) was introduced to improve the total radiological removal from the raffinate. EDTA proved significantly more efficient at lowering the gross alpha and beta activity than the acids previously investigated. It was also determined that multiple extractions would be required to get the best results. Multiple extractions were conducted with hydrochloric, nitric (HNO_3), EDTA, and potassium chloride (KCl) pretreatment

followed by EDTA. The two extraction systems showing the best results, KCl/EDTA and $EDTA/HNO_3$, were the candidates of choice for the Remedy Selection (advanced phase) extractions.

Remedy Selection (advanced phase) extractions were replicates of the Remedy Screening test, but on a larger scale. The raffinate from the KCl/EDTA extractions were below the 100 on Ci/g limit of 40CFR191 while the raffinate from the Silo 1 $EDTA/HNO_3$ extractions were not. All raffinates passed the TC regulatory levels of metals.

The time and temperature studies showed that lead extractions improved with higher temperatures and longer times, i.e., $80^{o}C$ for 7 hours was the best condition investigated. Thorium was relatively unaffected by increased time and/or temperatures while uranium favored higher temperatures and longer times.

Water washing of the raffinates showed generally increasing concentrations for lead and uranium falling off after the seventh extractions to lower levels. A pH effect was postulated as a reason for this trend.

Stage II precipitants were investigated for their ability to remove contaminants and provide low sludge volume. Sodium sulfide and Nalmet 8154 exhibited the best performance. Sulfide was dropped for toxicity considerations. Settleability was investigated at the same time using commercial polymers. No settling rate improvement was noticed.

Advanced Phase precipitates were also stabilized with cement. Again, excellent strength was observed and the only detectible Resource Conservation and Recovery Act (RCRA) metal was barium at a low level. Uranium was nondetectable.

Extracts were dried then vitrified using two approaches. First, spent nitric acid and EDTA/nitrate (from precipitation of the EDTA) were mixed with site soil then vitrified. Second, the extracts were combined, and the EDTA precipitated. The precipitate was calcined, blended with site flyash, then vitrified. Both samples vitrified with site flyash passed the modified toxicity characteristics leaching procedure (MTCLP) while the composite sample made with site soil failed on lead leachability.

Based on the foregoing results a proposed process and methods for optimization are presented.

1.0 INTRODUCTION

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The purpose of this report is to document the results of the treatability study conducted in accordance with the "Operable Unit 4 Treatability Study Work Plan" for cement stabilization and chemical extraction approved by the United States Environmental Protection Agency (EPA) in January 1992. This report was generated following the guidelines established by the EPA in the "Guide for Conducting Treatability Studies under CERCLA" dated October 1992.

On July 18, 1986, a Federal Facilities Compliance Agreement (FFCA) was jointly signed by the EPA and the United States Department of Energy (DOE) to ensure that environmental impacts associated with past and present activities at the Fernald Environmental Management Project (FEMP) are thoroughly investigated so that appropriate remedial actions can be assessed and implemented. A Remedial Investigation/Feasibility Study (RI/FS) has been initiated to develop these remedial actions. The FEMP has been segregated into five operable units. Operable Unit 4 (OU4) consists of four waste storage silos: Silos 1 and 2 (K-65 Silos), Silo 3 (metal oxide silo), the unused Silo 4, and their ancillary structures and the surrounding soils. OU4 is located at the western periphery of the site, southwest of the waste pit area.

The purpose of conducting treatability studies is to provide additional information for evaluating remedial process options. This document evaluates process options that include cement stabilization and chemical extraction followed by cement stabilization or vitrification. The comparisons of the remedial process options will be performed during the detailed analysis of alternatives stage of the Feasibility Study (FS) for OU4. The FS for OU4 is considering remedial actions for the silo structures; for materials stored in the silos; for contaminants in the surrounding soils and perched water; and other structures within the boundary.

1.1 SITE DESCRIPTION

1.1.1 Site Name and Location

The FEMP, formerly the Feed Materials Production Center (FMPC), is a contractor-managed federal facility once used for the production of purified uranium metal for the DOE. The FEMP is located on 1050 acres (425 hectares) in a rural area approximately 18 miles (32 kilometers) northwest of downtown Cincinnati, Ohio, and lies on the boundary between Hamilton and Butler counties. Production operations at the FEMP were limited to a fenced, 136-acre (55-hectare) tract of land located near the center of the site.

The waste storage silos were constructed to provide storage for the residues resulting from the processing of pitchblende ores and uranium raffinate. The silos are large concrete structures which were built in 1951 and 1952. Each of the four domed silos is 80 feet (24.4 meters) in diameter, 36 feet (11 meters) high to the center of the silo dome, and 26.75 feet (8.2 meters) tall to the top of the

vertical side walls. The side walls are eight-inch (20 centimeters [cm]) thick concrete wrapped with steel post-tensioning wires. The silo sides are covered with a 0.75 inch (1.9 cm) thick layer of gunite. The dome roofs are made of reinforced concrete and taper from eight inches (20 cm) thick at the silo walls to four inches (10 cm) thick at the dome's center.

1.1.2 History of Operations

Silos 1 and 2 were used for the storage of radium-bearing residues which are by-products of uranium ore processing. Silos 1 and 2 received approximately 8000 cubic yards (6117 cubic meters) of residues from 1952 to 1958. Raffinates (residues resulting from uranium solvent extraction) were pumped into the silos as a slurry where the solids would settle. The free liquid was decanted through a series of valves and piping placed at various levels along the height of the silo wall. This procedure, pumping of slurry, followed by the settling and decanting, continued until the waste material was approximately four feet (1.2 meters) below the top of the vertical wall. Historical analyses of the K-65 Silo residues indicate that approximately 24,500 pounds (11,200 kilograms [kg]) of uranium (0.71 percent U-235) are present in Silos 1 and 2. In addition, the estimated concentration of radium was between 0.13 to 0.21 parts per million (ppm) in the K-65 residues.

Radon and the elements resulting from its decay (referred to as progeny) are the nuclides of concern from a health and environmental perspective. Radon is known to be emanating from the silos via cracks and at structural joints. Radon and its progeny are relatively mobile and capable of migrating through air and water. Through the RI/FS characterization efforts, it was found that the berms and subsoils contain elevated levels of lead-210 (Pb-210) and polonium-210 (Po-210).

Silos 3 and 4 were constructed in 1952 in a manner similar to Silos 1 and 2; however, the silos were designed to receive dry materials only. Raffinated slurries from refinery operations were dewatered in an evaporator and spray-calcined to produce a dry waste for placement in Silo 3. The material was blown in under pressure to fill Silo 3. Silo 4 was never used and, except for rainwater infiltration, remains empty today.

Silo 3 contains approximately 5200 cubic yards (3900 cubic meters) of calcined residues consisting of silica, 39,500 pounds (18,000 kg) of uranium, and very small amounts of radium, thorium, and other metal oxides. Silo 3 is not a significant radon source because of the physical and chemical characteristics of its contents. Nevertheless, Silo 3 will be considered a potential hazard because its contents are radioactive and, in its dry powdery state, are susceptible to airborne dispersal if exposed to wind.

1.1.3 Prior Removal and Remediation Activities

As part of the Silos 1 and 2 Removal Action, Removal Action Number 4 per the Consent Agreement, a layer of BentoGrout was placed over the K-65 residues in Silos 1 and 2 to attenuate the radon releases to the environment and to reduce the risk of airborne contaminants in the case of a tornado. It is presupposed that the added BentoGrout will be remediated in the same manner as the K-65

material. Data was collected during the bench-scale vitrification Sequence B testing, as defined in the "Operable Unit 4 Treatability Study Work Plan for the Vitrification of Residues from Silos 1, 2, and 3", to provide information to evaluate the vitrification of the BentoGrout with the K-65 material.

1.2 WASTE STREAM DESCRIPTION

1.2.1 Silo Residue Characteristics

Several sampling attempts have been conducted that provided data on the waste material contained in Silos 1 and 2 (K-65 material) and Silo 3 (metal oxide). The results of several of these studies are summarized in Table 1-1 and Table 1-2 and, as can be seen, vary widely in the conclusions of total waste volume and radionuclide content. Further information on the characterization of the waste within the OU4 boundary can be found in the "Remedial Investigation Report for Operable Unit 4." Also, to verify the composition of the wastes to be vitrified as part of the treatability study, laboratory screening tests included performing chemical and radiochemical analyses on the material provided for the bench-scale vitrification tests. The results of these analyses are listed in Section 4.1 of this report.

1.2.2 Constituents of Concern for OU4

Chemicals and radionuclides of concern were identified by comparing available characterization data with background data. These chemicals and radionuclides of concern are illustrated in Table 1-3.

1.3 TREATMENT TECHNOLOGY DESCRIPTION

1.3.1 Cement Stabilization

The stabilization technology considered involves the use of portland cement, flyash, and other reagents to make a concrete-like material out of the waste. This technology was tested on waste from Silos 1, 2, and 3.

1.3.1.1 Treatment Process and Scale

Cement stabilization would probably be performed in a batch process. The waste and reagents would be fed to the mixer, mixed, and then poured into molds where the mix would cure. Commercial cement mixing equipment could be utilized. Almost any capacity could be provided. The limiting factors would be based on radiation and radon levels, and the rate at which the waste can be removed from the silos.

1.3.1.2 Operating Features - Stabilization

Waste could be fed as a solid or slurry. If fed as a slurry, control of the water content would be needed to ensure that the amount required in the formulation is not exceeded, since too much water could result in increased reagent requirements and/or less effective stabilization of the waste.

TABLE 1-1

SILO RESIDUE CHARACTERISTICS

	Silos 1 & 2					Silo 3
Characteristic	1952	1974	1980	1987b	1988	1987
Physical						
Dry weight (kg)	1.59×10^6	-	8.79×10^6	-	-	-
Volume (m^3)	3155	-	5522	5522	-	3902
Density (kg/m^3)	1179	-	-	-	-	-
Water Content (%)	30	-	-	-	-	-
Radiological (units)	(ppm)	(ppm)	(ppm)	(kg)	(ppm)	(kg)
Radium	0.3	0.28 - 0.36	0.2	0.753[a]	0.13 - 0.21	0.015[a]
Uranium	2110	1800 - 3200	600	11,200	1400 - 1800	18,000
Total thorium	-	-	-	-	301 - 322	-
Chemical						
Sulfates (%)	20	-	-	-	-	-
Quartz (%)	25	-	-	-	-	-
Musocive clay (%)	60	-	-	-	-	-
Silicates (%)	-	-	-	40	-	-
Lead (%)	-	-	-	5	-	-

[a]Assumes all radium in K-65 residues is Ra-226 with specific activity of 0.988 Ci/g.
- No data available.

TABLE 1-2

NONRADIOLOGICAL CONSTITUENTS OF SILO RESIDUES

Constituents	1952 (mg/kg)	1974 (mg/kg)	1980 (mg/kg)	1987 (mg/kg)	1988 (mg/kg)		1989 (mg/kg)	1989 (metric tons)
Aluminum (Al)	NA[a]	NA	NA	8750	37,000	26,000	NA	98.67
Antimony (Sb)	NA	NA	NA	ND[b]	<1000[c]	ND	NA	<0.53
Arsenic (As)	NA	NA	NA	300	NA	NA	NA	NA
Barium (Ba)	45,300	50,000	NA	700	20,000	21,000	NA	0.70
Boron (B)	NA	NA	NA	150	NA	21,000	0.76	0.70
Cadmium (Cd)	NA	NA	NA	ND	NA	NA	NA	NA
Calcium (Ca)	NA	NA	NA	38,900	40,000	132,000	820	144.48
Chlorine (Cl)	NA	NA	NA	NA	NA	NA	0.1	NA
Chromium (Cr)	NA	NA	NA	120	ND	4000	<0.2	1.76
Cobalt (Co)	NA	1600 - 2000	1500 - 2000	1750	6000	11,000	6.0	8.81
Copper (Cu)	NA	500 - 800	400 - 600	5000	2000	4000	1.0	8.81
Gold (Au)	NA	65 - 70	<40 - 60	<50	NA	NA	NA	<0.14
Iron (Fe)	NA	13 - 18,000	NA	12,000	83,000	98,000	NA	225.52
Lanthanum (La)	NA	NA	NA	890	2000	1000	NA	NA
Lead (Pb)	94,900	60 - 70,000	48 - 52,000	51,000	75,000	103,000	630.0	8.81
Magnesium (Mg)	NA	NA	NA	12,500	NA	NA	25.0	229.52
Manganese (Mn)	NA	NA	NA	200	NA	NA	1.4	17.27
Mercury (Hg)	NA	NA	NA	NA	NA	NA	<0.3	NA
Molybdenum (Mo)	NA	NA	NA	200	4000	<1000	NA	2.11
Nickel (Ni)	NA	2000 - 3000	2000 - 3000	2250	10,000	18,000	8.0	22.9

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TABLE 1-2
(Continued)

Constituents	1952 (mg/kg)	1974 (mg/kg)	1980 (mg/kg)	1987 (mg/kg)	1988 (mg/kg)		1989 (mg/kg)	1989 (metric tons)
Palladium (Pd)	NA	3500 - 3700	NA	NA	NA	NA	NA	NA
Platinum (Pt)	NA	13 - 18	NA	NA	NA	NA	NA	NA
Potassium (K)	NA	0.9 - 1.4	NA	NA	NA	NA	12.0	NA
Selenium (Se)	NA	NA	NA	NA	NA	NA	<0.1	NA
Silicon (Si)	NA	NA	NA	408,000	689,000	551,000	55.0	462
Silver (Ag)	NA	NA	20	20	NA	NA	<0.1	<0.07
Sodium (Na)	NA	18	NA	700	NA	NA	307	133
Strontium (Sr)	NA	NA	NA	NA	NA	NA	7.3	NA
Tin (Sn)	NA	NA	NA	80	NA	NA	NA	1.4
Titaniun (Ti)	NA	NA	NA	700	NA	NA	NA	2.11
Vanadium (V)	NA	NA	NA	210	NA	NA	NA	3.52
Zinc (Za)	NA	NA	NA	ND	<1000	<1000	NA	NA
Zirconium (Zr)	NA	NA	NA	200	1000	2000	NA	NA
Phosphate (PO_4)	NA	NA	NA	ND	NA	NA	NA	684
Sulfate (SO_4)	NA	NA	NA	NA	NA	NA	NA	692

[a]NA - Not analyzed
[b]ND - Not detected
[c] < - Not detected. Number represents detection limit.

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TABLE 1-3

CHEMICALS AND RADIONUCLIDES OF CONCERN FOR OU4

Radionuclides	Silos 1 and 2 Chemicals	
Actinium-227 (Ac-227)	2-Butanone	Dieldrin
Protactinium-231 (Pa-231)	2-Butanone, 3-methyl-	Diethyl phthalate
Lead-210 (Pb-210)	2-Hexanone	Dimethyl phthalate
Polonium-210 (Po-210)	4,4' DDE	Endosulfan II
Radium-226 (Ra-226)	4,4' DDT	Endosulfan I
Thorium-228 (Th-228)	4-Methyl-2-pentanone	Endrin
Thorium-230 (Th-230)	Acetone	Flouranthene
Thorium-232 (Th-232)	Aldrin	Heptachlorepoxide
Uranium-234 (U-234)	Antimony	Iron
Uranium-235/236 (U-235/236)	Aroclor-1254	Lead
Uranium-238 (U-238)	Aroclor-1260	Mercury
	Arsenic	Methylene chloride
	Barium	Molybdenum
	Benzoic Acid	Nickel
	Beryllium	N-nitroso-di-n-propylamine
	Bis(2 ethylhexyl) phthalate	Phenol
	Boron	Pyrene
	Butanic Acid, methylester	Selenium
	Cadmium	Silver
	Carbon Tetrachloride	Styrene
	Chlorform	Tetrachloroethene
	Chromium	Thallium
	Cobalt	Toluene
	Copper	Total Xylenes
	Cyanide	Tributylphosphate
	Di-n-octyl phthalate	Vanadium
		Zinc

TABLE 1-3
(Continued)

Silo 3	
Radionuclides	Chemicals
Actinium-227 (Ac-227)	Antimony
Protactinium-231 (Pa-231)	Arsenic
Lead-210 (Pb-210)	Barium
Radium-224 (Ra-224)	Beryllium
Radium-226 (Ra-226)	Cadmium
Radium-228 (Ra-228)	Chromium
Thorium-228 (Th-228)	Cobalt
Thorium-230 (Th-230)	Copper
Thorium-232 (Th-232)	Lead
Uranium-234 (U-234)	Manganese
Uranium-235/235 (U-235/236)	Mercury
Uranium-238 (U-238)	Nickel
	Selenium
	Silver
	Thallium
	Vanadium
	Zinc

1.3.2 Chemical Extraction

The chemical extraction technology was tested to determine how effectively metals and radionuclides could be extracted from the waste. The extraction process results in a small waste stream containing the bulk of the metals and radionuclides, and a much larger insoluble waste stream containing much lower concentrations.

1.3.2.1 Treatment Process and Scale

In the extraction process, waste and extractant are placed in a reaction vessel and stirred continuously for a specified time at a specified temperature. At the end of each extraction, solids/liquid separation is accomplished by filtration or processing in a centrifuge. The technology tested included multiple extractions and extractants on waste samples from Silos 1 and 2.

1.3.2.2 Operating Features - Chemical Extraction

The extraction system can be set up with any number of stages (extractions), using different extractants. The system can also be operated at any temperature ranging from ambient up to almost 100°C. The extraction vessels can be set up in a train so that waste and extractants flow through the system in a counter current process, maximizing extractant efficiency. Any desired capacity can be achieved by setting up the appropriate number of trains.

1.3.2.3 Treatment of Extract from Chemical Extraction Process

The extract from the chemical extraction process was combined with portland cement, flyash, and other reagents to produce a concrete-like material. The extract was also combined with glass-forming reagents and vitrified in a high temperature process for a glass-like product.

1.4 PREVIOUS TREATABILITY STUDIES AT THE SITE

1.4.1 Cement Stabilization

International Technology (IT) is not aware of any previous cement stabilization studies on the silo waste.

1.4.2 Chemical Extraction

Chemical extraction of K-65 material stored at Fernald and Niagara Falls has been investigated previously by others. A report containing a discussion and review of this previous work was prepared in 1981 for DOE by Dettore, et al.

1.4.3 Vitrification

A vitrification study was performed by Battelle at Pacific Northwest Labs. A report on this study will be released in 1993.

1.5 REPORT ORGANIZATION

1.5.1 Sections 1 through 4

Section 1.0 of the Treatability Study Report of OU4 gives a brief description and history of the FEMP, along with brief descriptions of the waste areas that comprise OU4. Section 2.0 presents the conclusions of this study and the resulting recommendations.

Section 3.0, Treatability Study Approach, includes discussions of test objectives and rationale, experimental design and procedures, equipment and materials, sampling and analysis, data management, and deviations from the Treatability Study Work Plan for OU4. Section 4.0 gives the results of the study and discusses data analysis and interpretations, data quality assurance/quality control (QA/QC), costs and schedule for performing the treatability study, and key contacts. The contents of Section 4.0 are discussed in greater detail at the beginning of that section.

1.5.2 Appendices

This treatability study contains nine appendices that provide additional information. Appendix A contains Toxicity Characteristic Leaching Procedures (TCLP) characterization of untreated waste for Silos 1, 2, and 3. Both chemical and radiological data are presented.

Appendix B presents the Clipper computer printout listing the formulations and results of various analyses. Clipper is a D-Base IV software package used to store and manipulate all the treatability study data and comments.

Appendix C gives the analytical results for each of the Remedy Selection (advanced phase) samples as reported by the analytical laboratory, including qualifiers.

Appendix D presents the analytical results adjusted for dilution by reagents.

Appendix E gives the results of the 5-day static leach tests.

Appendix F includes non-standard procedures that were not in the work plan.

Appendix G contains two reports on geotechnical tests performed on the silo waste.

Appendix H gives analytical results for reagent and sand samples (blanks).

Appendix I gives additional information on Remedy Screening (preliminary phase) testing.

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2.0 CONCLUSIONS AND RECOMMENDATIONS

The Remedy Screening (Preliminary) and Remedy Selection (Advanced) Phases of the treatability study to investigate cement stabilization and chemical extraction as potential remedial technologies for Operable Unit 4 wastes has been completed. The Remedy Selection (Optional) Phase of the treatability study program is currently in progress. The desired data described in the Treatability Study Work Plan were collected, analyzed, presented, during quarterly meetings, and conclusions determined. Data and results were transferred to the feasibility study team for input into their analyses.

During the Remedy Selections Phase of the stabilization study two formulations were investigated for each silo. One formulation consisted of cement, flyash, and blast furnace slag. The other one used cement, flyash, and adsorbents. All formulations exhibited exceedingly excellent compressive strength and permeability. Bulking factors were relatively high although not unacceptable. The cement, flyash, blast furnace slag formulations gave greater percentage reductions in leachability than the cement-flyash formulations. Blast furnace formulations also had lower bulking factors. All formulations had Toxicity Characteristic Leaching Procedure (TCLP) leachate parameters below the Toxicity Characteristic (TC) regulatory limits.

Because five constituents of concern exceeded the proposed on-property disposal leachate active levels (PODLAL) it is recommended that further work is done optimizing the cement/flyash/blast furnace slag formulations. Also, time did not allow the development of optimum moisture: density relationships and/or investigate the varying of the water content in the mixtures. This should be done in the interest of reducing the bulking factor and increasing the compressive strength by compactive or other measures in lieu of adding more reagent. The heat rise needs to be better controlled for Silo 3 stabilization. Either optimizing the addition of reagents over time or an increase use of a more inert reagent that could act as a heat risk should be investigated although this will increase the bulking factor for this site.

The fact that the molybdenum exceeded the LALs is disturbing. The formulations need a reagent that can produce an insoluble molybdenum compound such as phosphate. Formulations containing some pulverized phosphate rock (calcium phosphate) should be investigated.

Extreme heterogeneity in the silo materials caused problems in stabilization. Additional more formulations need to be tested to produce a stabilization blend that can overcome this heterogeneity.

In the chemical extraction program, Remedy Screening (preliminary phase) Stage I investigated the effectiveness of various acids for extracting metals and radionuclides from the Silo 1 and 2 materials. Hydrochloric and nitric acids proved better in extracting uranium and lead than acetic acid. For the acid concentrations investigated, uranium and lead were most effectively extracted using concentrated

hydrochloric or 30 percent nitric acids. Time, temperature, and dose rates (volume to solids ratio) were varied during this testing. A 4:1 dose rate and 80°C extraction temperature proved most effective in extracting uranium and lead in a single extraction step.

Remedy Screening (preliminary phase) Stage II continued testing acid extraction at several extraction times and through multiple extractions. Additionally, ethylene-diamine tetracetic acid chelant (EDTA) was introduced to improve the total radiological removal from the raffinate. This reagent proved significantly more effective than the acids previously investigated. Results of this testing indicated that a combination of acid and EDTA extractants, carried through multiple extractions proved most successful. KCl pretreatment, rinses, and pH adjustments were also incorporated. The best extraction systems were found to be KCl/EDTA and EDTA/HNO_3 and these were carried into the Remedy Selection (advanced phase) testing.

Advanced phase chemical extraction testing was carried out using larger sample aliquots than in the Remedy Screening phases. Two extraction systems, (1) pretreatment with KCl followed by six EDTA extractions, and (2) six EDTA extractions followed by a HNO_3 extraction, were tested on Silo 1 and 2 materials separately. The KCl/EDTA extraction raffinates for both Silos 1 and 2 were below the 100 nCi/g limit of 40CFR191 while the Silo 1 raffinate after EDTA/HNO_3 extractions did not. All raffinates passed TCLP criteria.

Extraction time and temperature studies in the Advanced Phase showed that extraction effectiveness for lead improved at higher temperatures and longer times, 80°C for 7 hours being best. Thorium removal appeared unaffected by time and temperature changes while uranium removal was enhanced at increased extraction time and temperature. Water washing of raffinates showed increasing concentrations of metals removal due most probably to pH effects. The remainder of Advanced Phase testing looked at vitrification, precipitation, and stabilization of chemical extract and liquids. Extracts were dried and vitrified directly after addition of soil, flyash, or underwent metals and EDTA precipitation through pH adjustment and/or Nalmet polymer addition and vitrified after ashing and soil/flyash addition. Both samples vitrified with site flyash passed the MTCLP while a composite sample vitrified with site soil failed. Precipitants were investigated to remove contaminants and produce low sludge volume. Sodium sulfide and Nalmet 8154 gave the best results. Settleability of precipitate was investigated through addition of commercial polymers but no improvement over the Nalmet was observed.

Finally, precipitate material from spent extractant liquids was stabilized with cement resulting in a product with UCS values from 372 to 1165 psi. MTCLP performance was also good, with only barium leaching at low ppm levels and uranium nondetectable.

From the above testing, an overall process can be defined. The purpose of this process would be to reduce the volume of material that must be disposed of as a mixed waste. This would be done by chemically extracting radioactive and hazardous constituents from the silo material with EDTA. The extracted solids would be rinsed with water and dewatered to produce a material suitable for disposal.

The combined extracts would be treated to recover EDTA and to remove the hazardous and radioactive constituents in two stages. First, the extract would be acidified to precipitate EDTA for reuse. Then, the extracted hazardous and radioactive constituents would be precipitated, dewatered, dried, and vitrified to give a resulting produce that would be approximately 10 percent of the weight of the original untreated silo material. The two solid residues from the process would be packaged for interim storage on site.

It is recommended that further Remedy Selection testing be conducted to improve the decontamination of spent extractant process. This may be accomplished by changing the extraction process such that most of the lead, uranium, and readily soluble iron are extracted from the waste before adding to EDTA. The recommended process is two extractions with HCl and HNO_3, followed by a rinse, and four EDTA extractions. The spent acid extract would be decontaminated by pH adjustment. The spent EDTA extract would still use Nalmet as in the Advanced Phase study. This process should greatly reduce Nalmet and EDTA costs.

3.0 TREATABILITY STUDY APPROACH

3.1 TEST OBJECTIVES AND RATIONALE

Under Section 121(b) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as amended by the Superfund Amendment and Reauthorization Act (SARA), the EPA is required to evaluate remedial actions that "permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants." To this end, treatability studies provide valuable site-specific data necessary to support CERCLA remedial activities when treatment is proposed as part of one or more remedial alternatives. Treatability studies serve two primary purposes: to aid in the selection of the remedy; and to aid in the implementation of the selected remedy.

This treatability study was designed to provide data for technologies that lower the leaching of contaminants from OU4 wastes by chemically fixing them in an altered matrix or by reducing their concentration in the original matrix. The results of this study will be a data set which will be compared to the Proposed On-Property Disposal Leachate Action Levels (LALs) and Toxicity Characteristics (TC) Regulatory Limits, to determine if attainment of any or all of these goals is feasible.

This study was composed of two technical approaches: 1) stabilization of the silo contents using various inorganic additives, including cement; and 2) chemical extraction of the silo contents with various acids and chelates to remove the metals, combined with precipitation, stabilization, or vitrification of the extracts. Each of these technical approaches consists of a Remedy Screening (preliminary phase) and a Remedy Selection (advanced phase). The data resulting from this treatability study will be used to support the FS by establishing or identifying the following:

- Confirmation of technology applicability to OU4 waste
- Compliance of technology with applicable or relevant and appropriate requirements (ARARs)
- Analytical results to be used for fate and transport modeling
- Leachability data to support residual risk calculations
- Refinement of process requirements for cost estimation purposes
- Initial database for use in subsequent remedy design studies

3.1.1 Remedial Action Objectives

Remedial Action Objectives (RAOs) are qualitative goals which define the extent of cleanup required to achieve a CERCLA response action. They include media-specific cleanup goals for protecting human health and the environment. RAOs address the contaminants of concern as well as exposure routes and receptors identified in the baseline risk assessment. The primary purpose of RAOs is to ensure site-wide compliance with:

- Chemical-specific ARARs and guidance to be considered (TBC)
- EPA guidance for risk to public health from hazardous substances
- Regulatory standards for control of radiation exposure and radioactive contamination in the environment

The RAOs for OU4 must cover all radiological and chemical constituents. Alternatives for remediation must meet airborne RAOs as well as drinking water RAOs. The RAOs presented in Figure 3-1 include the following:

- Waste
- Air
- Soil
- Sediment
- Surface water
- Groundwater

3.1.2 EPA Guidance

The EPA's "Guide for Conducting Treatability Studies Under CERCLA" (EPA 1988d) outlines a three-tiered approach to conducting treatability studies for a Superfund site. The original interpretation of the approach is illustrated in Figure 3-2. The remedy evaluation phase of the RI/FS, in accordance with the EPA guidance, may require three tiers of treatability testing:

- Remedy screening
- Remedy selection
- Remedy design

The three levels of treatability testing are divided into pre-Record of Decision (ROD) and post-ROD studies. The remedy screening and remedy selection testing are pre-ROD studies, and the remedy design studies are post-ROD. Figure 3-3 reflects an updated approach recommended by de Percin, Bates, and Smith of EPA in their article "Designing Treatability Studies for CERCLA Sites: Three Critical Issues," (de Percin et al. 1991). Figure 3-3 illustrates these three levels of treatability testing and how this treatability study compares with these requirements.

Pre-ROD treatability studies provide the critical performance data and the basis for developing necessary cost data needed to evaluate all potentially applicable treatment alternatives and select an alternative for remedial action. The detailed analysis of alternatives (DAA) phase of the FS follows the development and screening of alternatives and precedes the actual selection of a remedy in the ROD. During the detailed analysis, all remedial alternatives are evaluated based on the nine FS evaluation criteria. These criteria are as follows:

- Overall protection of human health and the environment
- Compliance with ARARs
- Long-term effectiveness and permanence

MEDIA		REMEDIAL ACTION OBJECTIVES
1. SILO CONTENTS		For Human Health:
	1-1	Prevent exposures to non-carcinogens which would result in a Hazard Index greater than or equal to unity (1), and/or combined risks from exposure to carcinogens greater than or equal to 1E-4, using 1E-6 as the point of departure.
	1-2	Prevent migration of contaminants which would result in groundwater concentrations greater than the MCLs or non-zero MCLGs, that would result in a Hazard Index greater than or equal to unity (1), and/or combined risks from exposure to carcinogens greater than or equal to 1E-4, using 1E-6 as the point of departure.
	1-3	Prevent current and future direct radiation doses from exceeding 100 mrem/yr.
		For Environmental Protection:
	1-4	Prevent migration of contaminants that would result in surface water levels greater than ambient water quality criteria.
	1-5	Prevent current and future direct radiation doses from causing detectable chronic effects.
2. AIR		For Human Health:
	2-1	Prevent inhalation of contaminants which would result in a Hazard Index greater than or equal to unity (1), and/or combined risks from exposure to carcinogens greater than or equal to 1E-4, using 1E-6 as the point of departure.
	2-2	Prevent doses from radionuclide emissions at the FEMP from exceeding 10 mrem/yr, and radon flux from exceeding 20 pCi/square meter-second.
		For Environmental Protection:
	2-3	Prevent current and future radiation emissions from causing detectable chronic effects.

FIGURE 3-1. REMEDIAL ACTION OBJECTIVES

FEMP/FL/OU4TR/FIG3-1a

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MEDIA		REMEDIAL ACTION OBJECTIVES
3. SOILS	3-1	For Human Health: Prevent inhalation of/ingestion of/direct contact with soils surrounding the silos which would result in a Hazard Index greater than or equal to unity (1), and/or combined risks from exposure to carcinogens greater than or equal to 1E-4, using 1E-6 as the point of departure.
	3-2	Prevent migration of contaminants which would result in groundwater concentrations greater than the MCLs or non-zero MCLGs, that would result in a Hazard Index greater than or equal to to unity (1), and/or combined risks from exposure to carcinogens greater than or equal to 1E-4, using 1E-6 as the point of departure.
	3-3	Prevent radium concentrations from exceeding 5 pCi/g in the first 15 cm of soil, and 15 pCi/g at lower depths. Prevent concentrations of other nuclides from exceeding levels that would result in doses greater than 100 mrem/yr.
	3-4	For Environmental Protection: Prevent migration of contaminants that would result in surface water contamination levels greater than ambient water quality criteria.
4. SEDIMENTS	4-1	For Human Health: Prevent ingestion of/direct contact with sediment contaminants which would result in a Hazard Index greater than or equal to to unity (1), and/or combined risks from exposure to carcinogens greater than or equal to 1E-4, using 1E-6 as the point of departure.
	4-2	For Environmental Protection: Prevent releases of contaminants from sediments that would result in surface water contamination levels greater than ambient water quality criteria.

FEMP/FLOU/TRFIG3-1b

FIGURE 3-1. (CONTINUED)

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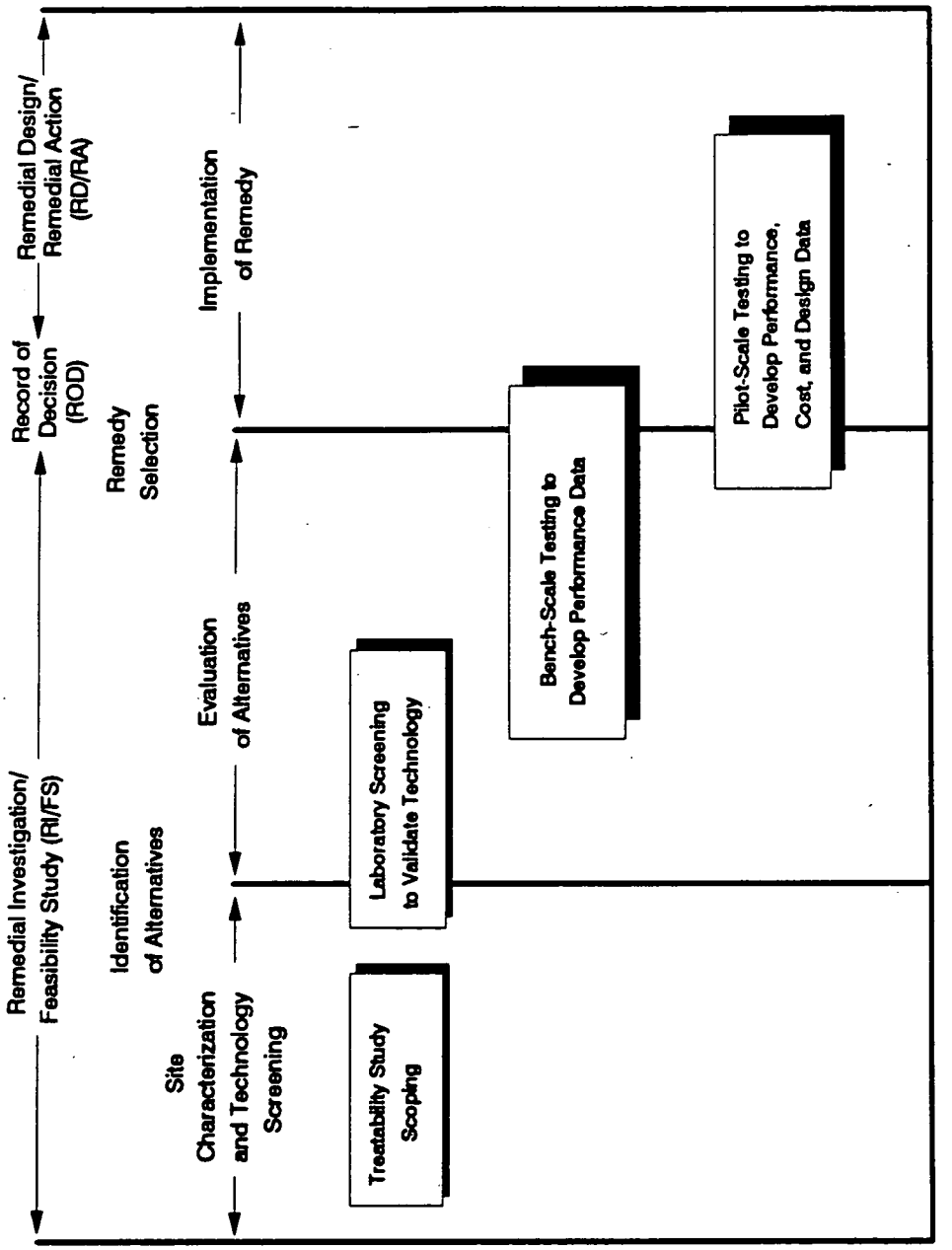
MEDIA		REMEDIAL ACTION OBJECTIVES
5. SURFACE WATER	5-1	For Human Health: Prevent leaching to surface water that would result in exposures to non-carcinogens which would result in a Hazard Index greater than or equal to 0.2 and/or combined risks from exposure to carcinogens greater than 1E-4, using 1E-6 as the point of departure.
	5-2	For Environmental Protection: Restore surface water to below ambient water quality criteria.
6. GROUNDWATER	6-1	For Human Health: Prevent leaching to groundwater that would result in contaminant levels greater than the MCLs, MCLGs, or TBCs, or which would result in a Hazard Index greater than or equal to 0.2, and/or combined risks from exposure to carcinogens greater than 1E-4, using 1E-6 as the point of departure.
	6-2	For Environmental Protection: Restore groundwater aquifer to contaminant concentrations below the MCLs.

FEMP/FLOW/TRFIG3-10

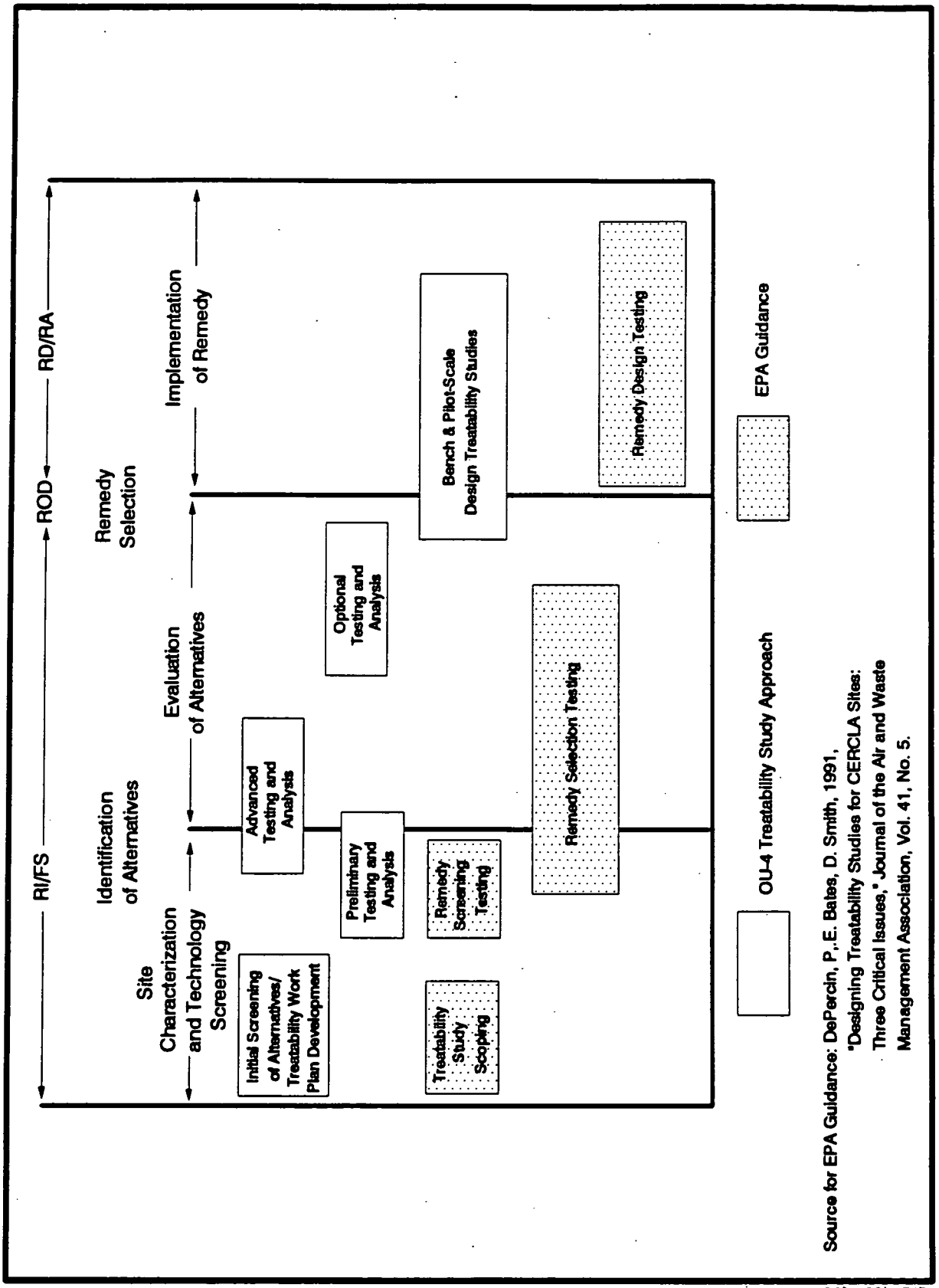
FIGURE 3-1. SITE WIDE REMEDIAL ACTION OBJECTIVES (continued)



Source: Guide for Conducting Treatability Studies Under CERCLA. Interim Final 12/89.

FIGURE 3-2. THE ROLE OF TREATABILITY STUDIES IN THE RI/FS AND RD/RA PROCESS

FL/FEMP/04TR/3-2



Source for EPA Guidance: DePercin, P.,E. Bates, D. Smith, 1991, "Designing Treatability Studies for CERCLA Sites: Three Critical Issues," Journal of the Air and Waste Management Association, Vol. 41, No. 5.

FIGURE 3-3. RELATIONSHIP OF THE OPERABLE UNIT 4 TREATABILITY STUDIES TO THE RI/FS PROCESS.

FL/FEMP/OU4TT/3-3

- Reduction of toxicity, mobility, or volume through treatment
- Short-term effectiveness
- Implementability
- Cost
- State acceptance
- Community acceptance

These criteria are described in detail in "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988).

Remedy screening is the first step in the tiered approach. Its purpose is to determine the feasibility of treatment alternatives for the contaminants/matrix of interest. Typically, these tests are conducted under conditions that are favorable to the technology. These small-scale studies are designed to provide a qualitative evaluation of the technology and are conducted with minimal levels of QA/QC. Tests conducted under this tier are generic in nature (not vendor specific). If the feasibility of the treatment cannot be demonstrated, the alternative generally should be eliminated at this time.

The remedy selection tier of the treatability study program is designed to determine whether a treatment alternative can meet the operable unit's cleanup criteria and at what cost. The purpose of this tier is to generate the performance data and basis for estimation of cost data necessary for remedy evaluation in the DAA phase of the FS. The data developed in this tier should support cost estimates of +50 percent to -30 percent accuracy. The FS cost estimates for OU4 will be based on the most effective processes determined from this study. The performance data will be used to determine whether this technology will meet ARARs and cleanup goals. Remedy selection studies are typically small scale, incorporating generic tests using bench- or pilot-scale equipment in either the laboratory or the field. The study costs are higher than those encountered in the remedy screening tier and require longer durations to complete. The levels of QA/QC are moderate to high, because the data from these studies will be used to support the ROD.

In the post-ROD remedy design tier, detailed scale-up design, performance, and cost data are generated to implement and optimize the selected remedy. Remedy design studies are performed after the ROD, usually as part of the remedy implementation. These studies are performed on full-scale or near full-scale equipment for the purpose of generating detailed scale-up design and cost data. Remedy design studies require moderate to high QA/QC and are typically vendor specific. Remedy design studies should focus on optimizing process parameters and are not a part of this treatability study.

This report covers the remedy screening and remedy selection tiers of the treatability studies as described in the EPA guidance. The remedy screening is performed in the Remedy Screening (preliminary phase), and the remedy selection is performed in the Remedy Selection (advanced and optional phases) of the treatability study.

3.1.3 Treatability Study Description

A general description of the cement stabilization and chemical extraction testing is given in this section, in addition to a definition of the performance criteria that were used to evaluate results of individual tests. An explanation of how these criteria will support the FS is also given. Figure 3-4 schematically presents the approach followed in this treatability study.

3.1.3.1 Stabilization of Untreated Silo Material

The main effects of various inorganic stabilization reagents were investigated. The results of the Remedy Screening (preliminary phase) tests were assessed to determine the best stabilization material to be used in the Remedy Selection (advanced phase) tests. Figure 3-5 illustrates the phases and stages of testing that were performed.

Figure 3-5 also shows that both zone and composite samples were used for Silos 1 and 2. For Silo 3, only composite samples were used.

During sampling of Silos 1 and 2, each Silo was divided into three equal vertical zones. The top third of the waste was zone 1, the middle third was zone 2, and the bottom third was zone 3.

Samples used during treatability were collected through three manways on each silo. Zone composite samples were created by combining sample material that was collected from the same zone through different manways. Silo composites were created by combining sample material from difficult zones and manways.

The reagents tested included portland cement Type II, site and Type F flyash, blast furnace slag, sodium silicate, attapulgite, clinoptilolite, ferrous chloride, and water. Blast furnace slag and portland cement were added to solidify the waste, to add silicates to react with the metals, and to maintain the treated waste in an alkaline form in order to decrease the leachability of the metals of concern. Type II portland cement was chosen because of the expected high levels of sulfate in the waste. Type II portland cement is moderately sulfate resistant as compared to Type I. The materials that were processed to produce the silo wastes included pitchblende, ore concentrates, and raffinate. Pitchblendes contain varying amounts of sulfate. Ore concentrates resulted from processing the ore with acid, which frequently was sulfuric acid. Raffinate was typically treated with barium sulfate to precipitate the radium.

Flyash was used in conjunction with cement, since it acts to increase the strength of the treated waste. The flyash also may decrease the effect of certain inhibitors, e.g., sulfates and oil, on the cement setting and strength formation reactions. Sodium silicate was added to react with the metals and lower their solubilities. Silicate additives may also increase the treated waste bearing strength, decrease the bulking factor, and lower the effect of inhibitors, e.g., sulfate for a given cement/flyash additive

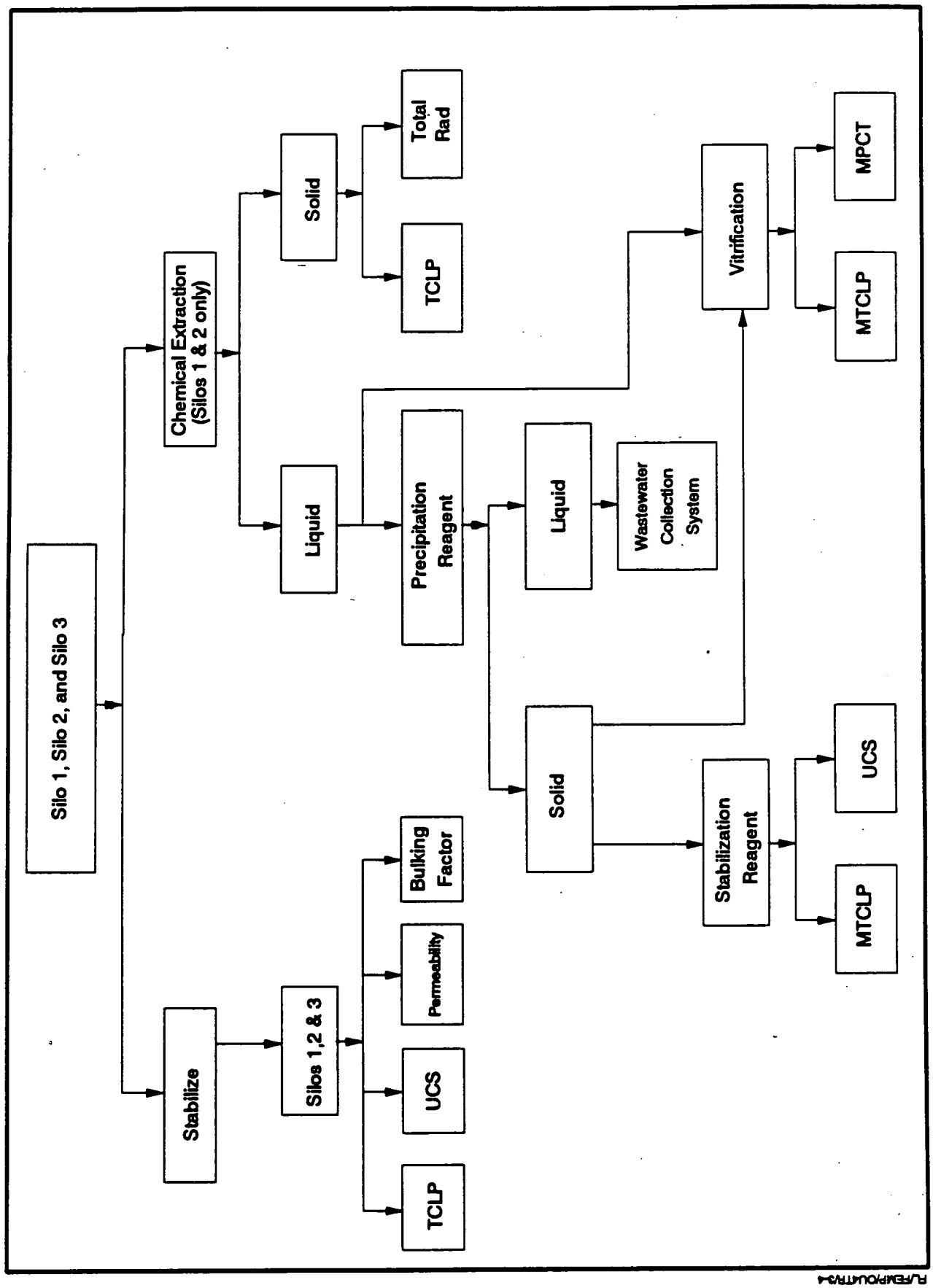


FIGURE 3-4. TREATABILITY FLOWSHEET

FL/FEMP/OU4TR/3-4

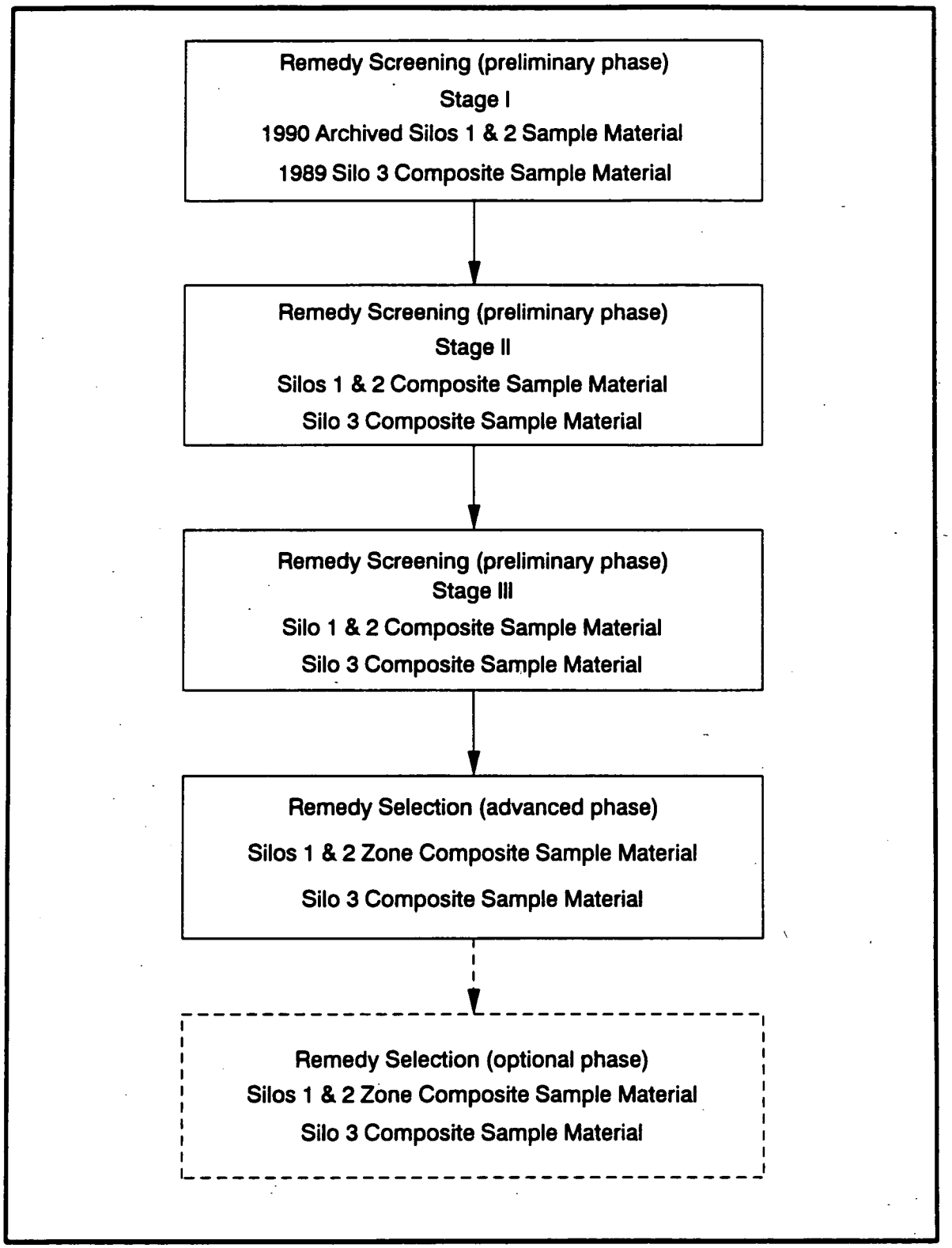


FIGURE 3-5. CEMENT STABILIZATION TREATABILITY PROGRAM FOR UNTREATED WASTE (SILOS 1, 2, AND 3)

loading. Attapulgite and clinoptilolite were added to adsorb metals, (in particular cesium), and to decrease the leaching of the treated waste. Ferrous chloride was added as a reducing agent for the hexavalent chromium in Silo 3.

Due to the anticipated problems resulting from inorganic inhibitors and the potential organic constituents, a wide range of cement and flyash concentrations were investigated in the Remedy Screening (preliminary phase). The experiments were statistically designed such that trends could be identified and utilized in the Remedy Selection (advanced phase) experiments. The general procedure utilized in this study was an iterative process wherein the results from one set of experiments were used to determine the course of the next set of experiments.

Analytical tests used to determine whether a waste/additive formula was acceptable were unconfined compressive strength (UCS) and Modified Toxicity Characteristic Leaching Procedure (MTCLP) in the Remedy Screening (preliminary phase), and UCS and Toxicity Characteristic Leaching Procedure (TCLP) in the Remedy Selection (advanced phase). MTCLP is a modified version of the TCLP and is described in Appendix C of the Work Plan. The radiological and chemical constituents analyzed for in Remedy Screening (preliminary phases) are listed in Table 3-1; those for Remedy Selection (advanced phase) are in Table 3-2.

3.1.3.2 Chemical Extraction/Precipitation/Stabilization/Vitrification

Figure 3-6 illustrates the phases and stages of testing performed to evaluate chemical extraction technology. Various chemical extraction techniques were tested on waste from Silos 1 and 2 only. The samples were subjected to this screening process to determine the extractability of the silo material to various acid and chelate leaching solution schemes.

Hydrochloric and nitric acids were selected as a result of their use in the uranium mining industry and because most metal chloride and nitrate salts are soluble. Nitric acid has the additional benefit of being able to oxidize uranium dioxide (UO_2) to a more soluble hexavalent uranium complex. Acetic acid was selected due to its mild complexing ability that might enhance the metal solubilities. The effectiveness of the various preliminary tests were determined by analyzing the leachate for lead and uranium ethylenediaminetetraacetic acid (EDTA) was also selected because of its wide use for decontamination in the nuclear industry.

The most promising extraction methods determined in the Remedy Screening (preliminary phase) were applied in the Remedy Selection (advanced phase). The Remedy Selection (advanced phase) consisted of multiple extractions on the waste, followed by TCLP analysis of the residue for metals and radionuclides, plus radiological analysis of the solid residue.

TABLE 3-1

CHEMICAL AND RADIOLOGICAL INFORMATION
REMEDY SCREENING (PRELIMINARY PHASE)

Modified TCLP List for Vitrification		PCT List for Vitrification		Modified TCLP List for Cement Stabilization	
Metals	Radionuclides	Metals	Radionuclides	Metals	Radionuclides
Arsenic (As)	Uranium by IC	Aluminum (Al)	Uranium by IC	Arsenic (As)	Uranium by IC
Barium (Ba)	Gross alpha	Boron (B)	Gross alpha	Barium (Ba)	Gross alpha
Cadmium (Cd)	Gross beta	Calcium (Ca)	Gross beta	Cadmium (Cd)	Gross beta
Chromium (Cr)		Iron (Fe)		Chromium (Cr)	
Lead (Pb)		Lithium (Li)		Lead (Pb)	
Selenium (Se)		Magnesium (Mg)		Selenium (Se)	
Silver (Ag)		Potassium (K)		Silver (Ag)	
		Silicon (Si)			
		Sodium (Na)			
		Thorium (Th)			
		Uranium (U)			
		General chemistry			
		Chloride			
		Nitrate			
		Sulfate			
Physical parameters				Physical parameters	
Bulking factor				Bulking factor	
Temperature of oven				Temperature rise	
Time of sample heating				Unconfined compressive strength	
				Shear strength	

TABLE 3-2

REMEDY SELECTION (ADVANCED PHASE)[a]

TCLP Organic List[c]	Five-Day Static Leach Test, PCT, and TCLP Inorganic List			
	Metals[b]		Radionuclides	General Chemistry
TCL[d] Volatiles	Aluminum (Al)	Magnesium (Mg)	Ra-total	chloride
TCL Semivolatiles	Antimony (Sb)	Manganese (Mn)	Th-total	reactivity[e]
TCL Pesticides/PCBs	Arsenic (As)	Mercury (Hg)	U-total	fluoride
	Barium (Ba)	Molybdenum (Mo)	Pb-210	ammonia
	Beryllium (Be)	Potassium (K)	Ac-227	nitrate
	Boron (B)	Nickel (Ni)	Pa-231	pH
	Calcium (Ca)	Selenium (Se)	Po-210	phosphorus
	Cadmium (Cd)	Silicon (Si)		sulfate
	Chromium (Cr)	Silver (Ag)		
	Cobalt (Co)	Sodium (Na)		
	Copper (Cu)	Thallium (Tl)		
	Cyanide (CN)	Vanadium (V)		
	Lead (Pb)	Zinc (Zn)		
	Lithium (Li)			

Physical Parameters :
Bulking factor
Temperature rise (cement only)
Shear strength (cement only)
Unconfined compressive strength (cement only)
Permeability (cement only)
Temperature of oven (vitrification only)
Time of sample heating (vitrification only)

[a]Optional phase information to be acquired may consist of some of these analytes.
[b]Metals will not be analyzed for if they are not found in the characterization study portions of the Work Plan (Section 6.0).
[c]TCLP organics will not be analyzed if the compounds are not found in the characterization study portion of the Work Plan (Section 6.0).
[d]Target Compound List (TCL)
[e]Only for samples with pH > 7.0

The treatability study also investigated vitrification of the leachate, leaching kinetics, solids washing, solid/liquid separation, precipitation of metals in the leachate solution, stabilization of the material precipitated from the leachate, and vitrification of the material precipitated from the leachate. The leachate was vitrified by first removing the liquid by evaporation followed by heating the dried waste combined with glass former/modifiers at 1250°C. The glass former/modifiers tested in this study were alumina-silicates (soil and flyash) and sodium hydroxide and sodium carbonate.

The precipitation of the leachate experiments were Remedy Screening (preliminary phase) tests to determine which type(s) of precipitation reagents will remove the majority of the hazardous and radioactive metals from the leachate. The testing also includes cement stabilization and vitrification of the precipitate. Analytical tests performed on the treated chemical extraction leachate samples are given in Table 3-1.

3.1.3.3 General Selection Criteria

Treatability

General selection criteria were established to evaluate the performance of the various stabilization mixtures in the areas of leachability, UCS, and final waste form volume. These objectives were used to determine whether a particular reagent mixture produced an acceptable waste form. The most promising formulas for cement stabilization will have minimum UCS values of approximately 500 pounds per square inch (psi) after a 28-day curing period, relatively low permeability, and minimal volume increase (bulking factor) relative to the other formulations investigated in the study. The 28-day curing period is based on standard concrete industry design and construction practices (Troxell et al. 1968). The curing period is also specified in the United States Nuclear Regulatory Commission (NRC) Technical Paper on Waste Form (NRC 1991).

The most promising formulations for chemical extraction remove the most metals and radionuclides from the waste. In addition, vitrification or stabilization would successfully treat the extract to meet TC regulatory limits and acceptable risk levels.

Feasibility Study

The best technology will be determined by comparing multiple criteria during the detailed analysis of alternatives. The relationship between the data generated during treatability studies and the FS evaluation criteria is shown in Table 3-3 and discussed below:

- Data generated under this study will be used for evaluating overall protection of human health and the environment and compliance with ARARs in the FS.

- Treatability testing that relates to a technology's long-term effectiveness and permanence includes its UCS for handling and disposal purposes; its leachability as measured by TCLP; and the extent to which it transmits water, based on permeability. The waste

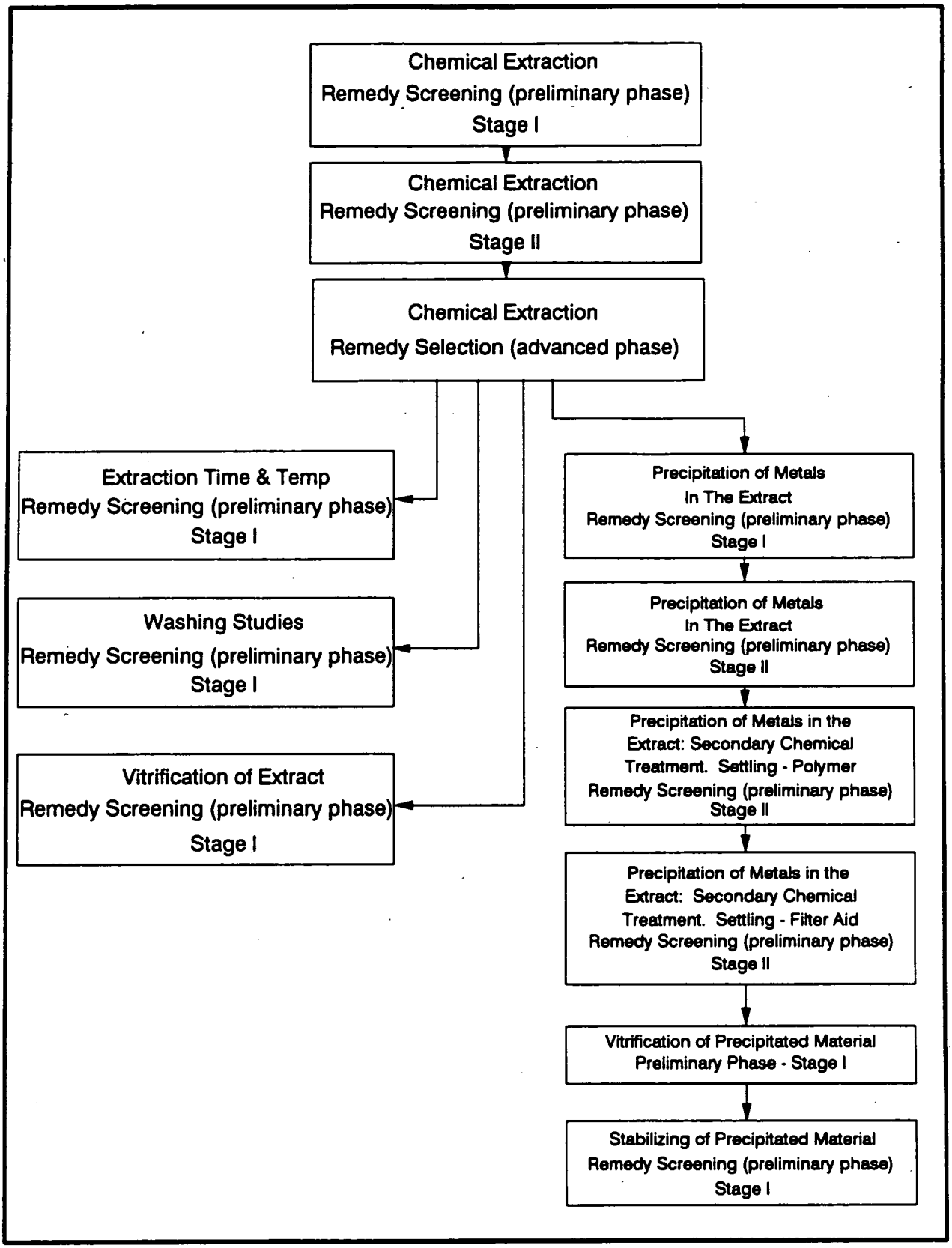


FIGURE 3-6. CHEMICAL EXTRACTION TREATABILITY PROGRAM FOR COMPOSITE WASTE SAMPLES FROM SILOS 1 AND 2

TABLE 3-3

RELATIONSHIP OF TREATABILITY DATA TO FS EVALUATION CRITERIA

FS Evaluation Criteria	TREATABILITY DATA					
	Unconfined Compressive Strength - UCS	Leachate Analysis - TCLP - MTCLP - 5-Day Static Leach Test[a]	Bulking Factor (% volume change)	Permeability[a]	Durability - PCT[b] - Shear Strength[a] - Waste Form Temperature Rise[a] - Wet/Dry[a] - Freeze/Thaw[a]	Treatment Method - Cement Stabilization - Metal Extraction - Vitrification
• Overall protection of human health and the environment	X	X		X	X	X
• Compliance with ARARs	X	X				X
• Long-term effectiveness and permanence	X	X		X	X	X
• Reduction of toxicity, mobility, or volume through treatment		X	X	X		X
• Short-term effectiveness			X			X
• Implementability			X		X	X
• Cost			X			X
• State acceptance	X	X	X	X	X	X
• Community acceptance	X	X	X	X	X	X

[a]Cement stabilization only
[b]Vitrification only

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form also influences long-term stability.

- The ability of a technology or formula to reduce the toxicity, mobility, or volume will be measured by indicators such as bulking factor for volume determination, leachate analysis for toxicity determinations, and permeability for mobility reduction.

- Short-term effectiveness is impacted primarily by bulking factor (an indicator of the volume of treated waste that must be handled and disposed of) and performance of the specific technology chosen.

- The implementability of a particular technology is influenced by the volume of waste to be handled as measured by bulking factor, shear strength, and temperature rise, and by the waste form itself. As with implementability, cost is impacted by the technology selected and the volume of waste to be treated.

- The final two evaluation criteria, state and community acceptance, are influenced by the results of all the data and by the other seven criteria.

Additional information on use of evaluation criteria and treatability data in the FS process can be found in "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988).

3.1.4 LALs

LALs act as reference points for evaluating treatability data and are designed to be protective of human health and the environment and to comply with ARARs. LALs are chemical-specific, media-specific numerical concentration limits that should address all contaminants and all pathways found to be of concern during the baseline risk assessment process. They are developed early in the RI/FS process and are based on readily available information (EPA 1991a). These action levels are used by engineers as design criteria during development and selection of remedial alternatives. LALs are a site-specific subset of the RAOs that are presented in Section 3.1.1.

Leachate is regulated by the EPA under 40CFR261 with the use of the TC regulatory levels. Under the Resource Conservation and Recovery Act (RCRA) program the regulatory level identifies as hazardous waste any solid that produces a leachate, using the TCLP analysis, that exceeds specified threshold concentrations listed in 40CFR261.24. These regulatory levels are based on the acceptable drinking water concentrations, multiplied by a dilution-attenuation factor (DAF) which accounts for the degree of attenuation and dilution that a compound is expected to undergo during transport to the drinking water aquifer or receiving stream (EPA 1986c). The default DAF for developing TC regulatory levels is 100.

An acceptable drinking water concentration may be based on risks or ARARs. Because of the presence of multiple contaminants, multiple sources, and multiple exposure pathways at the FEMP, preference is given to risk-based concentrations, unless ARAR-based concentrations are more stringent. Acceptable risk-based groundwater concentrations were derived from the drinking water preliminary

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remedial goals (PRGs) presented in Part III of the Site Wide Characterization Report (DOE, 1993). These PRGs were calculated by using the following equations:

For noncarcinogens, the exposure equation is:

$$C_w = (THI)(BW)(AT)(365\ days/yr)(EF)(ED)[(1/RfD_o)(IR_w)]$$

where

C_w = Leachate action level concentration in water (mg/L)
THI = Target Hazard Index (0.20)
RfD_o = Oral reference dose (mg/kg/day) (chemical-specific)
BW = Adult body weight (70 kg)
AT = Averaging time (ED x 365 days)
EF = Exposure frequency (350 days/yr)
ED = Exposure duration (70 yr)
IR_w = Daily water ingestion rate (2 L/day)

For chemical carcinogens, the exposure equation is:

$$C_w = (TR)(BW)(AT)(365\ days/year)/(ED)(EF)[(SF_o)(IR_w)]$$

where

C_w = Leachate action level concentration in water(mg/L)
TR = Target risk (10^{-5} and 10^{-6}).
BW = Adult body weight (70 kg)
AT = Averaging time (ED x 365 days)
EF = Exposure frequency (350 days/yr)
ED = Exposure duration (70 yr)
SF_o = Oral slope factor $(mg/kg/day)^{-1}$ (chemical specific)
IR_w = Daily water ingestion rate (2 L/day)

For radionuclides, with the exception of radon, the exposure equation is:

$$C_w = (TR)/(EF)(ED)(SF)_o)(IR_w)$$

where

C_w = Leachate action level concentration in water (Pci/L)
TR = Target risk (10^{-5} and 10^{-6}).
EF = Exposure frequency (350 days/yr)
ED = Exposure duration (70 yr)
SF_o = Oral slope factor (risk/Pci)
IR_w = Daily water ingestion rate (2 L/day)

In developing risk-based leachate action levels, target cancer risk levels were established for carcinogens and a target hazard quotient (THQ) and target hazard index (THI) (the sum of the THQs)

was established for noncarcinogens. The EPA suggests a default target risk of 10^{-6} (EPA 1991b). This risk, 10^{-6}, is used as a target risk for the FEMP LALs. In addition, LALs also have been developed using a target risk of 10^{-5}, which has been used by EPA in the past to set TCLP leachate limits, and falls within the acceptable range under CERCLA of 10^{-4} to 10^{-6}.

For noncarcinogenic toxicants, the EPA indicates that the cumulative site hazard index (HI) should be less than 1. However, while total noncancer risk cannot exceed an HI of 1, no direct guidance is available on apportioning the allowable level among the various chemicals in the various environmental media. The most applicable regulatory guidance comes from the Office of Drinking Water, which in calculating maximum contaminant level goals (MCLGs), uses a relative source contribution (RSC) factor to account for the contribution from other sources of exposure (EPA 1989b). If sufficient data are not available to evaluate the drinking water exposure relative to other exposures, the Office of Drinking Water assumes other exposures account for 80 percent of the total, leaving 20 percent for water. Thus the default RSC is 20 percent (0.20).

This method can be adapted to the development of LALs for noncarcinogens. Because it is not known what additional sources are contributing to total exposure, the default RSC of 0.20 will be used to develop individual chemical/media-specific LALs, helping to ensure that the total HI from each exposure does not exceed 1. Thus, the THQ for medium-specific, noncarcinogenic effects will be 0.2, helping to ensure that the THI is less than or equal to 1, as recommended by EPA (1991a).

Once drinking water PRGs were calculated, leachate action levels were developed based on the potential for chemicals to leach into the bedrock aquifer or a receiving water body, thus equating water in the shallow zones to "leachate." To account for dilution-attenuating during the leaching process, acceptable groundwater concentrations were multiplied by a DAF of 100 to produce a single set of risk based leachate levels for all operable units at the FEMP. These leachate action levels are given in Appendix D, Table D-1.

Under the RCRA program, the regulatory level identifies hazardous waste as any solid waste that produces a leachate, using the TCLP analysis, that exceeds specified threshold concentrations listed in 40CFR261.24. Leachate action levels are given in Section 4, Table 4-16.

3.1.5 Treatability Objectives and Desired Data - Stabilization of Untreated Material

The specific objectives of the Remedy Screening (preliminary phase) and Remedy Selection (advanced phase) treatability tests are as follows:

- To develop a database of leachate concentrations of hazardous and radioactive materials for various combinations of stabilized waste forms

- To develop a database of stabilization reagents and relative quantities required to minimize leachable concentrations of radionuclides and HSL constituents from the final waste form

- To establish the proof of process and applicability of the selected stabilization technology

- To screen a large number of parameters and identify those that will be critical for future bench-scale studies

- To determine a range of cement stabilization reagents and relative quantities required so that the final waste form achieves a UCS of approximately 500 psi

- To minimize the final volume of treated waste

- To provide data for use in the FS to estimate the volumes of treated waste that will be generated by each process

- To develop preliminary reagent mixtures for use in future cement stabilization treatability studies

- To provide information for the development of preliminary cost and design data for the FS

- To provide leaching characteristics of stabilized and unstabilized waste for use in fate and transport modeling using results obtained from the TCLP

- To develop the following preliminary process parameters for use in future treatability studies: (1) shear strength, (2) waste form temperature rise, (3) general description of waste before and after reagent addition, (4) permeability of stabilized waste, (5) percentage of water in the waste, (6) hydrogen ion concentration (pH) of the leachate solution, and (7) information about amounts of off-gasing during mixing or curing

- To provide the chemical and radiological data specified by Tables 3-1 and 3-2

3.1.6 Treatability Objectives and Desired Data - Chemical Extraction/Precipitation/Stabilization/Vitrification

Specific test objectives were established so that the performance of various acids, precipitation agents, and stabilizing reagents could be evaluated. These test objectives were used to determine if metal extraction/precipitation/stabilization/vitrification merits further testing or consideration. The objectives are as follows:

- To extract RCRA metals so that the insoluble residue will meet TC Regulatory Limits, i.e., produce a nonhazardous residue as defined by RCRA

- To reduce the level of radioactive components in the insoluble residue and achieve LALs where possible

- To determine the extraction time required

- To determine the effect of different waste-to-extraction solution ratios on the extractions
- To determine the reagents and conditions necessary to precipitate the metals in the extract solution
- To determine the cement stabilization reagents for the residual solids and relative quantities required so that the final waste form achieves a UCS of approximately 500 psi
- To determine the leachability of all radionuclides and Hazardous Substance List (HSL) constituents from the final waste form
- To determine the cement stabilization reagents and relative quantities required to minimize leachate concentrations of radionuclides and HSL constituents from the final waste form of the residual solids
- To estimate the volumes of wastes that will be generated by each process.
- To minimize the final volume of treated waste
- To provide data for use in developing preliminary cost and design data for the RI/FS
- To provide leaching characteristics for use in fate and transport modeling
- To develop preliminary reagent mixture and process parameter data for use in the bench- and pilot-scale studies as follows:
  - For cement stabilization: shear strength, waste form temperature rise with reagent addition, general description of waste before and after reagent addition, permeability of treated sample, percent water in the waste, pH and Redox potential (Eh) of leachate solutions, and indications of gas evolution during mixing and curing
  - For vitrification: percent water in the waste and types and percent additives required

3.1.7 Data Quality Objectives

Concentration-based performance objectives and the resulting testing phase are driven by the remediation goals (RG) established for the site. Data quality objective (DQO) analytical levels are defined in EPA's "Guide for Conducting Treatability Studies Under CERCLA" (EPA 1989d). This guidance states that the requisite analytical levels are dictated by the types and magnitudes of decisions to be made based on the data and objectives of the screening. A description of the analytical levels is presented in Table 3-4 (an excerpt from the EPA's guide).

Data quality needs are used to establish DQOs. The implementation of an appropriate QA/QC program is required to ensure that data of known and documented quality are generated. DQOs will define the QA/QC level for the treatability testing and analysis. Table 3-5 is a list of tests and associated DQOs for stabilization. Table 3-6 is a list of tests and associated DQOs for chemical extraction. Standard Operating Procedures (SOPs) and nonstandard test methods are described in Appendices B and C of the Work Plan.

TABLE 3-4

SUMMARY OF ANALYTICAL LEVELS

Level I	
Type of analysis	Field screening or analysis with portable instruments.
Limitations	Usually not compound-specific, but results are available in real time. Not quantifiable.
Data quality	Can provide an indication of contamination presence. Few QA/QC requirements.
Level II	
Type of analysis	Field analysis with more sophisticated portable instruments or mobile laboratory. Organics by GC; inorganics by AA, ICP, or XRF.
Limitations	Detection limits vary from low parts per million to low parts per billion. Tentative identification of compounds. Techniques/instruments limited mostly to volatile organics and metals.
Data quality	Depends on QA/QC steps employed. Data typically reported in concentration ranges.
Level III	
Type of analysis	Organics/inorganics performed in an off-site analytical laboratory. May or may not use CLP procedures. Laboratory may or may not be a CLP laboratory.
Limitations	Tentative compound identification in some cases.
Data quality	Detection limits similar to CLP. Rigorous QA/QC.
Level IV	
Type of analysis	HSL organics/inorganics by GC/MS, AA, ICP. Low parts-per-billion detection limits. CLP analysis.
Limitations	Tentative identification of non-HSL parameters. Validation of laboratory results may take several weeks.
Data quality	Goal is data of known quality. Rigorous QA/QC.
Level V	
Type of analysis	Analysis by nonstandard methods.
Limitations	May require method development or modification. Method-specific detection limits. Will probably require special lead time.
Data quality	Method-specific.

Source: EPA, "Guide for Conducting Treatability Studies under CERCLA," December 1989

TABLE 3-5

STABILIZATION TEST DQOs

Preliminary (Remedy Screening)			
Test	Work Plan Appendix	DQO/Comment	DQO Level
Bulking Factor	B or C	Minimize waste volume increase. To estimate the volume of waste that will be generated.	V
Modified Toxicity Characteristic Leaching Procedure (MTCLP)	C	During the screening phases, to determine the relative leachability of hazardous and radiological constituents associated with the various stabilization reagent formulations.	V
Waste Form Temperature Rise	C	Preliminary process parameters.	I
Shear Strength	C	Preliminary process parameters.	I
Unconfined Compressive Strength (UCS)	B	To determine the UCS associated with each of the reagent formulations.	II
pH, Eh	C	Preliminary process parameter.	I

TABLE 3-5
(Continued)

Advanced (Remedy Selection)			
Test	Work Plan Appendix	DQO/Comment	DQO Level
Bulking Factor	B or C	Minimize waste volume increase. To estimate the volume of waste that will be generated.	V
UCS	B	To determine the UCS associated with each of the stabilization reagent formulations.	III
Full TCLP	See QAPP	To determine leachability of each of the stabilization reagent formulations. To provide data for the FS risk assessment calculations.	V
5-Day Static Leach Test	C	To provide data for the FS risk assessment calculations.	V
Permeability	C	To provide data for the FS risk assessment calculations.	III
Waste Form Temperature Rise	C	To provide preliminary process parameters.	I
Shear Strength	C	To provide preliminary process parameters.	I
pH, Eh	C	Preliminary process parameter.	I

TABLE 3-5
(Continued)

Optional (Remedy Selection)[a]			
Test	Work Plan Appendix	DQO/Comment	DQO Level
Radon Emanation	C	Estimate effectiveness of treatment in reducing radon emissions.	V
Radon Leaching	C	Estimate effectiveness of treatment in reducing radon leaching.	V
Wet/Dry	C	Estimate effectiveness of treatment in reducing failure due to wet/dry cycles.	III
Freeze/Thaw	C	Estimate effectiveness of treatment in reducing failure due to freeze/thaw cycles.	III

[a]Tests from the preliminary and advanced phases may be used during the optional phase.

TABLE 3-6

METALS EXTRACTIONS TEST DQOs

Test	Work Plan Appendix	DQO/Comment	DQO Level
		Preliminary (Remedy Screening)	
Bulking Factor	B or C	Minimize waste volume increase during stabilization and vitrification. Estimate the volume of waste that will be generated.	V
Modified Toxicity Characteristic Leaching Procedure (MTCLP)	C	During the screening phases, to determine the relative leachability of hazardous and radiological constituents associated with the various stabilization and vitrification reagent formulations.	V
Waste Form Temperature Rise	C	Preliminary Process Parameters (Cement Stabilization)	I
Shear Strength	C	Preliminary Process Parameters (Cement Stabilization)	I
PCT	C	To determine the durability of the glass formulations. To provide data on the relative leachability of radionuclides and glass components with the various reagent formulations.	V
Unconfined Compressive Strength (UCS)	B	To determine the unconfined compressive strength associated with each of the reagent formulations.	II
Uranium By IC	C	To quantitatively compare the effectiveness of various solvents and reagents during leaching and precipitation experiments.	V
Lead By ICP or AA	SW-846	To quantitatively compare the effectiveness of various solvents and reagents during leaching and precipitation experiments.	II

TABLE 3-6
(Continued)

Test	Work Plan Appendix	DQO/Comment	DQO LEVEL
pH, Eh	C	Preliminary process parameter.	I
Temperature	C	To determine the effect temperature has on the rate of dissolution of the metals.	III
		Advanced (Remedy Selection)	
Radiological	See QAPP	To quantify the residual radionuclide concentrations in the insoluble residue resulting from tests with the most effective solvents. This will be used to grade solvents pass/fail.	V
TCLP	See QAPP	To determine if the insoluble residue resulting from tests with the most effective solvents can be classified as non-RCRA material. This will be used to grade solvents pass/fail.	V

TABLE 3-6
(Continued)

Optional (Remedy Selection)[a]			
Test	Work Plan Appendix	DQO/Comment	DQO Level
Radon Emanation	C	Estimate effectiveness of treatment in reducing radon emissions.	V
Radon Leaching	C	Estimate effectiveness of treatment in reducing radon leaching.	V

[a]Tests from the preliminary and advanced phases may be used during the optional phase.

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3.2 EXPERIMENTAL DESIGN AND PROCEDURES - I - STABILIZATION

3.2.1 Stabilization

There are many unknown variables in the activity levels of the OU4 waste as well as the performance of the proposed reagents with the waste. A matrix of interactive experimental tests was created to decrease the number of formulas for subsequent stages based on their effectiveness in treating the waste. The treatability study provided a range of formulas for the stabilization technology which will be evaluated during the remedial design phase. If the test results indicated that a particular combination of reagents would not produce the desired results, then that formula was eliminated from consideration. The most effective formulas will be used during the FS process to estimated the cost of the technology being evaluated.

The Work Plan was written to use portland cement, flyash, sodium silicate, attapulgite, and clinopotilolite as stabilization reagents. In Remedy Screening (preliminary phase) Stage III and in the Remedy Selection (advanced phase), blast furnace slag was used in some formulations. Ferrous chloride was also used in some Silo 3 formulations in Stage III and in the Remedy Selection (advanced phase). Ferrous chloride was added to reduce chrome (Cr+6 to Cr+3) and thus reduce its leachability. Tables 3-7 through 3-9 present the formulas used for each of the silos in the Remedy Screening (preliminary phase) and Remedy Selection (advanced stage). Three preliminary stages (only two on Silo 3) and one advanced stage were performed on each silo. A run number was assigned to each formulation (the recipe for a treatability sample) for each of the stages as a convenient way of tracking the samples. Waste flyash from the Operable Unit 2 (OU2) active flyash pile was utilized in some formulations in this study since use of this material would constitute resource recovery and reduce purchase and shipment costs for off-site flyash.

Waste from Silos 1 and 2 was sieved through a 0.111 inch mesh sieve. Silo 3 waste did not require sieving due to the dry, fine, powdery nature of the waste. The waste and reagents were mixed by hand. A description of the waste was recorded, before and after mixing, and observations noted for evolution of vapor or gases. Shear strength was measured using a Torvane within ten minutes after mixing. Temperature rise, moisture content of the treated mixture, pH, and Eh were also measured. The treated mixture was placed in molds (1.38 inches diameter by 2.76 inches long for the Remedy Screening (preliminary phase); 2 inches by 4 inches for the Remedy Selection (advanced phase), UCS TCLP; and 1.38 inches diameter by 2.9 inches long for five-day static leach). A vibrating table was used to compact the mixture into the mold during filling. Excess mixture was placed in a cup. For some samples, the mixture in the cup was tested for penetration resistance on days 1, 2, and 3. The treated samples were allowed to cure in the molds at ambient temperature for 28 days. After 28 days, the molds were cut off of the sample, and the samples were subjected to UCS tests. A portion of each

TABLE 3-7

SILO 1
REMEDY SCREENING AND REMEDY SELECTION

Constituents for Stabilization Per Sample in Grams								
Run No.	Waste	Bentonite	Type II Portland Cement	Type F Flyash	Blast Furnace Slag	Sodium Silicate	Attapulgite and Clinoptilolite Each	Water Required
Remedy Screening (preliminary phase) Stage I								
1	108	0	64	64	0	0	6	74
2	100	0	68	68	0	0	6	67
3	100	0	51	31	0	0	6	54
4	101	0	54	33	0	0	6	56
5	102	0	31	51	0	0	6	54
6	102	0	33	54	0	0	6	61
7	100	0	26	26	0	0	6	46
8	101	0	27	27	0	0	6	46
9	100	0	43	43	0	0	6	59
9 Dup	101	0	43	43	0	0	6	56
10	101	0	43	43[a]	0	0	6	46
11	100	0	43	43[a]	0	0	6	46
Remedy Screening (preliminary phase) Stage II								
1	100	0	64	64	0	0	6	74
2	100	0	68	68	0	7	6	75
3	100	0	51	31	0	0	6	54
4	101	0	54	33	0	7	6	55
5	100	0	31	51	0	0	6	54
6	101	0	33	54	0	7	6	60
7	101	0	26	26	0	0	6	41

TABLE 3-7
(Continued)

Constituents for Stabilization Per Sample in Grams								
Run No.	Waste	Bentonite	Type II Portland Cement	Type F Flyash	Blast Furnace Slag	Sodium Silicate	Attapulgite and Clinoptilolite Each	Water Required
7 Dup	101	0	26	26	0	0	6	41
8	100	0	27	27	0	7	6	41
9	101	0	43	43	0	4	6	50
12	100	0	43	43	0	4	12A	60
13	100	0	43	43	0	4	12C	56
14	101	0	64	64	0	7	0	60
15	100	0	27	27	0	7	0	24
16	101	0	43	43	0	7	0	40
Remedy Screening (preliminary phase) Stage III								
1	100	0	50	0	50	0	0	46
2	100	0	50	15	25	0	0	40
3	100	0	51	31	0	10	0	40
Remedy Selection (advanced phase)								
1A[b]	560	140	357	217	0	0	42	539
1A Dup	560	140	357	217	0	0	42	568
1B	630	70	357	217	0	0	42	475
1C	700	0	357	217	0	0	42	376
2A	560	140	350	105	175	0	0	447
2B	630	70	350	105	175	0	0	406
2C	700	0	350	105	175	0	0	292

[a]FEMP flyash
[b]Letter indicates zone of silo that was source of raw material.

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TABLE 3-8

SILO 2
REMEDY SCREENING AND REMEDY SELECTION

Constituents for Stabilization Per Sample in Grams								
Run No.	Waste	Bentonite	Type II Portland Cement	Type F Flyash	Blast Furnace Slag	Sodium Silicate	Attapulgite and Clinoptilolite Each	Water Required
Remedy Screening (preliminary phase) Stage I								
1	100	0	64	64	0	0	6	65
2	101	0	68	68	0	0	6	65
3	101	0	51	32	0	0	6	56
4	100	0	54	33	0	0	6	56
5	100	0	31	51	0	0	6	54
6	100	0	33	54	0	0	6	59
7	101	0	26	26	0	0	6	45
8	100	0	27	27	0	0	6	42
9	101	0	43	43	0	0	6	54
10	100	0	43	43[a]	0	0	6	47
11	100	0	43	43[a]	0	0	6	0
Remedy Screening (preliminary phase) Stage II								
1	100	0	65	65	0	0	6	65
2	101	0	68	68	0	7	6	65
3	101	0	51	31	0	0	6	55
4	100	0	54	33	0	7	6	56

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TABLE 3-8
(Continued)

Constituents for Stabilization Per Sample in Grams								
Run No.	Waste	Bentonite	Type II Portland Cement	Type F Flyash	Blast Furnace Slag	Sodium Silicate	Attapulgite and Clinoptilolite Each	Water Required
5	100	0	31	51	0	0	6	54
6	101	0	33	54	0	7	6	59
7	101	0	26	26	0	0	6	44
8	100	0	27	27	0	7	6	42
12	101	0	43	43	0	4	12A	58
13	101	0	43	43	0	4	12C	49
14	100	0	64	64	0	7	0	64
15	101	0	27	27	0	7	0	27
15 Dup	101	0	27	27	0	7	0	27
16	100	0	43	43	0	4	0	43
Remedy Screening (preliminary phase) Stage III								
1	100	0	50	0	50	0	0	51
2	100	0	50	15	25	0	0	46
3	101	0	51	31	0	11	0	40
Remedy Screening (advanced phase)								
1A[b]	560	140	357	217	0	0	42	492
1A Dup	560	140	357	217	0	0	42	485

TABLE 3-8
(Continued)

Constituents for Stabilization Per Sample in Grams								
Run No.	Waste	Bentonite	Type II Portland Cement	Type F Flyash	Blast Furnace Slag	Sodium Silicate	Attapulgite and Clinoptilolite Each	Water Required
1B	630	70	357	217	0	0	42	449
1C	700	0	357	217	0	0	42	339
2A	560	140	350	105	175	0	0	397
2A Dup	560	140	350	105	175	0	0	404
2B	630	70	350	105	175	0	0	332
2C	700	0	350	105	175	0	0	254

[a]FEMP Flyash
[b]Letter indicates zone of silo from which the raw sample came. Number indicates formulation 1 or 2.
A - Attapulgite only
B - Clinoptilolite only

TABLE 3-9

SILO 3
REMEDY SCREENING AND REMEDY SELECTION

Constituents for Stabilization Per Sample in Grams								
Run No.	Waste	Type II Portland Cement	Type F Flyash	Blast Furnace Slag	Sodium Silicate	Ferric Chloride	Attapulgite and Clinoptilolite Each	Water Required
Remedy Screening (preliminary phase) Stage II								
1	100	64	64	0	0	0	6	140
2	100	68	68	0	0	0	6	136
3	100	51	31	0	0	0	6	113
4	100	54	33	0	0	0	6	120
4 Dup	100	54	33	0	0	0	6	119
5	100	31	51	0	0	0	6	116
6	100	33	54	0	0	0	6	117
7	100	26	26	0	0	0	6	100
8	100	27	27	0	0	0	6	103
9	100	43	43	0	0	0	6	110
10	100	43	43[a]	0	0	0	6	107
11	100	43	43[a]	0	0	0	6	105
12	101	43	43	0	4	0	12C	110

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TABLE 3-9
(Continued)

Constituents for Stabilization Per Sample in Grams								
Run No.	Waste	Type II Portland Cement	Type F Flyash	Blast Furnace Slag	Sodium Silicate	Ferric Chloride	Attapulgite and Clinoptilolite Each	Water Required
13	100	43	43	0	4	0	12A	123
Remedy Screening (preliminary phase) Stage III								
1	120	60	0	6	0	0	0	130
2	150	60	0	60	0	1	0	152
3	150	60	0	60	0	0	0	142
4	150	75	23	38	0	0	0	150
5	150	77	47	0	0	1	6C	162
6	150	77	47	0	0	1	0	162
Remedy Selection (advanced phase)								
1	800	320	0	320	0	0	0	693
1 Dup	800	320	0	320	0	0	0	727
2	800	408	248	0	0	6	32C	753

[a]FEMP Flyash
A - Attapulgite only
B - Clinoptilolite only
** Clinoptilolite only

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sample was crushed for a modified TCLP analysis in the preliminary stages. The analytical results of each stage were used to plan the formulations for the subsequent stages.

In the Remedy Selection (advanced phase), the samples were subjected to UCS, full TCLP analysis, permeability testing, and a 5-day static leach test.

The static leach tests were conducted with polyethylene jars and test tube baskets. The jars and baskets were precleaned with hydrochloric acid (HCl) and rinsed multiple times with American Society for Testing and Materials (ASTM) Type 1 water. The test consisted of supporting four small cement stabilized samples (1.38 inches diameter by 2.9 inches long) in each jar within the test tube baskets. The jars were filled with 4.2 liters (L) of water, and allowed to stand for five days. After five days of leaching, the cement samples were removed. The leach water was stirred to ensure thorough mixing, and then filtered and bottled for shipment to the analytical laboratory for analysis in accordance with Table 3-2. The jars were refilled with water and the leaching allowed to continue. After 120 days the samples were removed and the water was stirred, filtered, and analyzed in the same manner as the 5-day samples.

3.2.1.1 Methods

The following methods are described in Appendix E of the Work Plan:

- Laboratory Notebook Recording Procedures
- Analytical Logbook Recording Procedure
- UCS
- Standard Laboratory Sieves: specification, calibration, and maintenance
- Calibration of Thermometers
- Bulking Factor Procedure for Nonsludge Type Waste
- MTCLP
- Waste and Reagent Mixing Procedure
- Generic Stabilization Waste Form Temperature Rise Procedure
- Permeability
- Generic pH and Eh Procedure
- Proposed Radon Emissions from Stabilized Solids
- Proposed Measurement of Radon Leaching in Water
- Shear Strength
- Generic Uranium by Ion Chromatography (IC) with Post-Column Reaction and Phosphorescence or Fluorescence Detection Procedure

3.2.1.2 Data Reported

The following data were recorded during the Remedy Screening (preliminary phase) and Remedy Selection (advanced phase) of stabilization testing:

- UCS

- Permeability (for the Remedy Selection [advanced phase])
- MTCLP (for the Remedy Screening [preliminary phase]), or TCLP and 5-day static leach test (for the Remedy Selection [advanced phase])
- Bulking factor
- Approximate shear strength measured within ten minutes of when waste and reagents are mixed
- Physical characteristics: percent moisture, bulk density
- Amount of water added to each waste form
- The maximum particle size treated; weight and percentage of material sieved from the raw waste before treatment
- General description of the waste form before and after regents are mixed. This includes a description of any grinding of the sample to meet particle size requirements for UCS and if the sample was difficult to mix with the reagents.
- Description of vapor or gas released during mixing and during curing of mixture
- pH and Eh (oxidation/reduction potential in millivolts) of the reagent waste mixture before adding mixture to molds
- pH of the MTCLP and TCLP extraction fluids; pH of the TCLP extraction fluid determination test
- pH of 5-day static leach solution
- Physical appearance of 5-day static leach samples after 120-day soak in deionized water in Remedy Selection (optional phase)
- pH of 120-day leach solution in Remedy Selection (optional phase)
- pH and Eh of a slightly wet water-waste mixture
- TCLP results for reagents combined with clean sand
- Radon emanation test results (Remedy Selection [optional phase])
- Radon leaching test results (Remedy Selection [optional phase])
- Waste form temperature rise after waste and reagents are mixed and the time between mixing and temperature measurements
- Wet/dry testing and freeze/thaw test results (Remedy Selection [optional phase])

The temperature rise is a qualitative test, conducted as a screening test as an early indicator of potential problems and hazards during scale-up. Further investigations of the actual temperature rise may be made during the remedy design phase, when larger equipment (which has a design similar to full-scale equipment) would be used.

3.2.1.3 Reagent Mixtures

To assess the potential contamination contribution of the reagents, blanks, consisting of seven combinations of clean sand, portland cement (Type I and II), attapulgite, clinoptilolite, sodium silicate, and water (i.e., no FEMP waste) were made according to the matrix in Table 3-10, and one sample of each mixture was subjected to TCLP analyses. Each of the above reagents was also subjected to TCLP analyses as potential contaminants. This was performed during OU2 testing.

3.3 EXPERIMENTAL DESIGN AND PROCEDURES - CHEMICAL EXTRACTION - SILOS 1 AND 2

The objective was to determine the effectiveness of various extraction solutions in removing lead, uranium, thorium, and radium from the material in Silos 1 and 2. (The leaching treatability plan is graphically demonstrated in Figure 3-7). Testing was performed in a Remedy Screening (preliminary phase) and a Remedy Selection (advanced phase). In the Remedy Screening (preliminary phase) and in some of the Remedy Selection (advanced phase), the extracts resulting from the application of the various acid and EDTA solutions to the samples were analyzed for lead and uranium. The extracted dried solid residues were also analyzed for gross alpha beta. Uranium and lead were selected as the target compounds in this study because they were present in greater concentrations than thorium or radium. The removal of thorium, uranium, lead, polonium, and radium were to be demonstrated in the Remedy Selection (advanced phase). A typical detailed extraction screening plan is shown in Figure 3-8.

3.3.1 Experimental Design - Remedy Screening

3.3.1.1 Remedy Screening (preliminary phase) - Stage I

Stage I of the leaching experiments was conducted with 1990 archive material. The acid leaching experiments listed in Table 3-11 were conducted to determine which acids had promise and the effects of temperature and acid concentration on the metal solubilities. In the initial tests with the concentrated acids, the effect of temperature was measured by testing at ambient and 80°C. The effect of acid concentration was measured by testing concentrated acid and diluted acid at elevated temperatures.

The experiments were conducted using Hach® chemical oxygen demand (COD) test vials with a magnetic stir bar (3/16 inch x 3/4 inch) to accomplish inertial mixing in each vial. A waste sample of 1.5 or 3 grams (g) was placed in each vial, and 6 g of acid were added. The vials were placed in a

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TABLE 3-10

MIXTURES OF REAGENTS WITH CLEAN SAND

Constituents for Stabilization Per Sample in Grams						
Run No.	Sand	Type I Portland Cement	Type II Portland Cement	Sodium Silicate	Attapulgite and Clinoptilolite Each	Water Required
1	450	150	-	0	5	150
2	390	45.2	-	9.2	3.2	132
3	450	-	150	15	0	135
4	390	-	45.2	9.2	9.2	111.6
5	450	150	-	0	15	157.5
6	375	75	-	0	15	140
7	450	150	-	0	15	165

- No data available

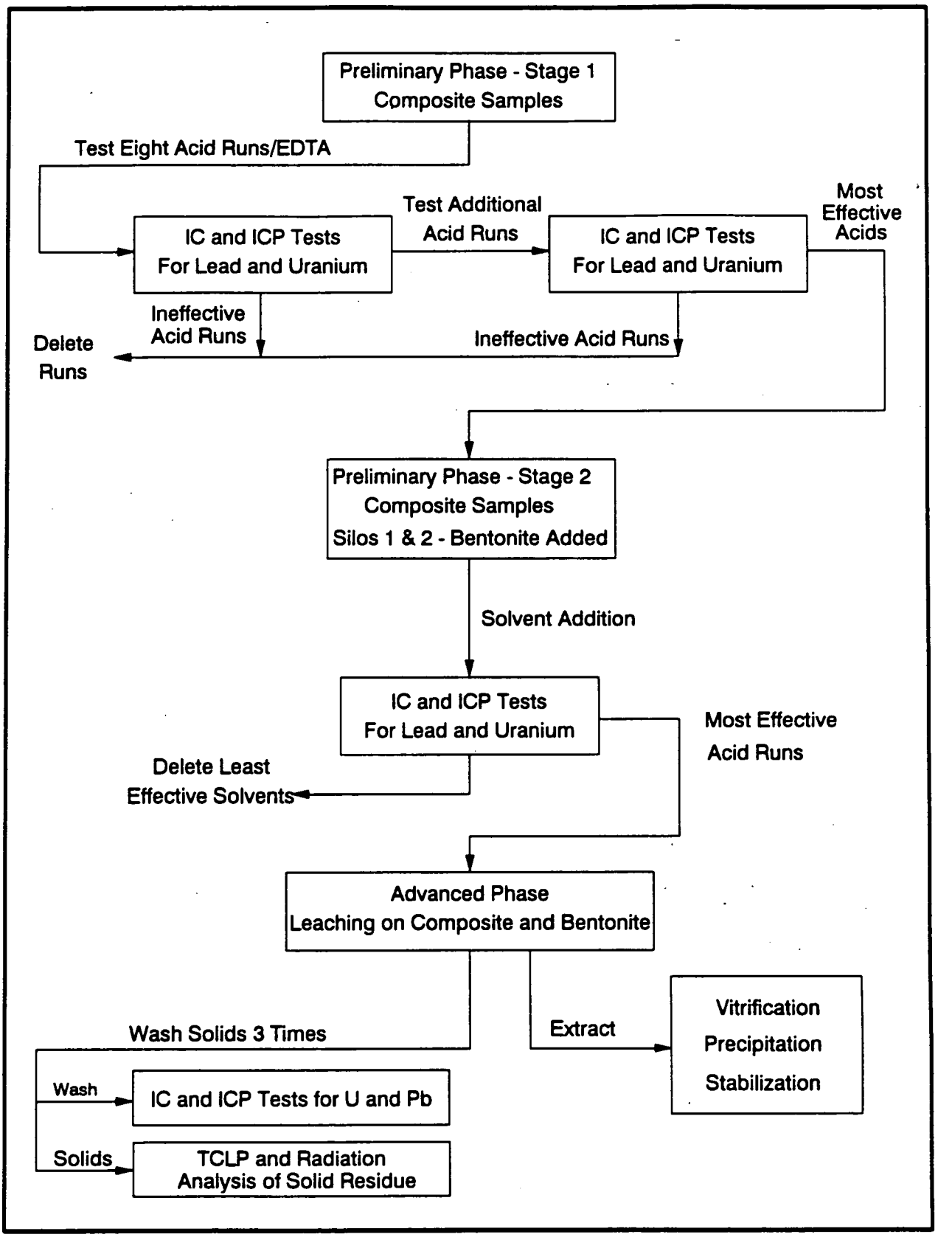

FIGURE 3-7. OVERALL CHEMICAL EXTRACTION TEST STRATEGY - SILOS 1 AND 2

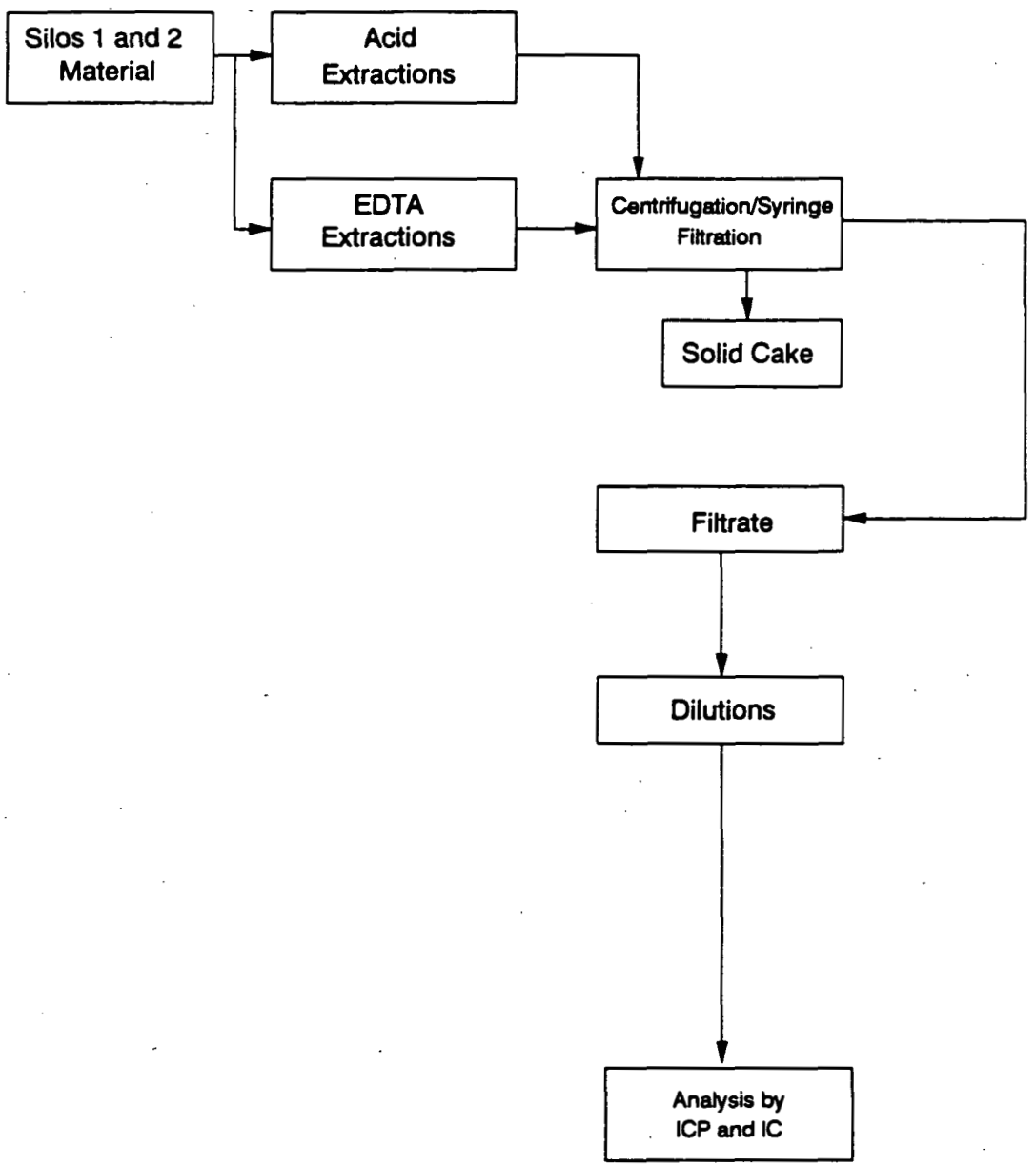

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FIGURE 3-8. PRELIMINARY PHASE CHEMICAL EXTRACTION SCREENING

TABLE 3-11

ACID EXTRACTIONS REMEDIAL SCREENING (PRELIMINARY PHASE) - STAGE I

	Dose (weight acid/ weight sample)		Temperature	
Acid Nominal Concentration	2:1	4:1	Ambient	80°C
60% HNO_3[a] (13N)	X	X	X	
60% HNO_3 (13N)	X	X		X
30% HNO_3 (5.6N)		X		X
15% HNO_3 (2.6N)	X	X		X
36% HCl[b] (11.6N)	X	X	X	
36% HCl (11.6N)	X	X		X
18% HCl (5.4N)		X		X
9% HCl (2.6N)	X	X		X
50% HOAc[c, d] (8.8N)	X[d]	X	X	
50% HOAc (8.8N)	X	X		X
25% HOAc (4.3N)		X		X
12.5% HOAc (2N)	X	X		X

[a]Nitric acid
[b]Hydrochloric acid
[c]Acetic acid
[d]Actual ratio is 2.66:1

block heater which was mounted on top of an orbital shaker. The samples were agitated and heated for two hours. Vial caps were unscrewed to relieve any pressure buildup. Initially, the samples were periodically removed from the block heater and shaken by hand to ensure that the solid material and acid were well mixed, but this procedure was discontinued when good mixing was apparent using the shaker alone. After two hours the samples were removed and centrifuged for 10 to 25 minutes as needed. An aliquot of each sample was filtered through a 0.45 micron syringe filter into a vial, diluted with water by a factor of 100, and analyzed for lead and uranium. In addition, the solid residues were dried at 105°C and analyzed. Uranium and lead analyses originally were planned to be performed using colorimetric screening tests. However, because these colorimetric methods were subject to interferences, IC was used to obtain uranium values and lead was analyzed by Inductively Coupled Plasma (ICP).

During this stage, the matrix of experiments was conducted to determine trends of solubilities. If it was apparent from the analytical results that a particular acid was not successfully leaching the metals, the acid was eliminated from further testing. If the analytical results indicated that a particular extract contained more uranium and lead than another extract, then that extraction condition was considered promising. Those extracts were investigated further during Stage II testing to better define the effect of acid concentration and temperature on the metal solubilities.

3.3.1.2 Remedy Screening (preliminary phase) - Stage II

Stage II testing began with duplication of selected tests from Stage I testing using composite samples from the 1990-91 sampling effort. Though 20 percent bentonite was added to sample aliquots before extraction, the leachates of these early Stage II tests resembled the Stage II leachates with respect to analytical results for lead and uranium. Table 3-12 describes these tests with bentonite dosed waste.

During the latter part of Stage II testing, 1990 archive silo material became limiting and was substituted with 1990 to 1991 composite silo material. This substitution was deemed acceptable since lead and uranium values in leachates from the 1990 samples and 1990-91 composite samples were in the same range. Refer to Table 3-13 for these tests.

Stage II testing was performed using the same equipment and same basic methodologies described under Stage II testing. A Hach COD test vial, containing a stir bar and approximately 7.5 g combined weight of solids plus liquid was shaken in a block heater on top of an orbital shaker. During Stage II testing, sample size varied from 0.5 g to 1.5 g with liquid to solid ratios of 4:1 weight to weight (w/w) to 10:1 w/w. Extraction time was also varied from 2 hours to 24 hours. Extraction temperatures for all tests were 80°C. In addition to varying process conditions, extra processing steps were added. For example, certain tests were duplicated with the addition of water washes or subsequent extraction steps followed by water washes. The liquid:solid ratio for water washes were the same as chemical extraction based on initial sample weight. Also introduced during Stage II testing were the use of

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TABLE 3-12

CHEMICAL EXTRACTION
REMEDY SCREENING (PRELIMINARY PHASE), STAGE II[a]
FEED ARE 1990-91 COMPOSITES + 20 PERCENT BENTONITE

					Extractant 1			
Test Number	Silo	Temp.	Time	Liquid/Solid Ratio	Name	Conc.	Extracts # of	Rinses # of
1	1	80°C	2 hrs.	4:1	HCl	5.4 N	1	3
2	1	80°C	2 hrs.	4:1	Nitric	5.6 N	1	3
3	1	80°C	2 hrs.	4:1	Acetic	8.8 N	1	3
4	1	80°C	2 hrs.	4:1	Acetic	4.3 N	1	3
1 dup	1	80°C	2 hrs.	4:1	HCl	5.4 N	1	3
6	1	80°C	2 hrs.	4:1	HCl	9 N	1	3
7	1	80°C	2 hrs.	4:1	HCl + C12	9 N	1	3
2 dup	1	80°C	2 hrs.	4:1	Nitric	5.6 N	1	3
3 dup	1	80°C	2 hrs.	4:1	Acetic	8.8 N	1	3
4 dup	1	80°C	2 hrs.	4:1	Acetic	4.3 N	1	3
1	2	80°C	2 hrs.	4:1	HCl	5.4 N	1	3
2	2	80°C	2 hrs.	4:1	Nitric	5.6 N	1	3
3	2	80°C	2 hrs.	4:1	Acetic	8.8 N	1	3
4	2	80°C	2 hrs.	4:1	Acetic	4.3 N	1	3
1 dup	2	80°C	2 hrs.	4:1	HCl	5.4 N	1	3
6	2	80°C	2 hrs.	4:1	HCl	9 N	1	3
7	2	80°C	2 hrs.	4:1	HCl + Cl	9 N	1	3
2 dup	2	80°C	2 hrs.	4:1	Nitric	5.6 N	1	3
3 dup		80°C	2 hrs.	4:1	Acetic	8.8 N	1	3
4 dup	2	80°C	2 hrs.	4:1	Acetic	4.3 N	1	3

[a]Only one extractant used for Silos 1 and 2 composite samples.

TABLE 3-13

CHEMICAL EXTRACTION
REMEDY SCREENING (PRELIMINARY PHASE), STAGE II[a]

				Extractant 1					Extractant 2				
Test Number	Silo	Temp	Time	Name	Conc	Extracts # of	Rinses # of	Liqud/Solid Ratio	Time	Name	Conc	Extracts # of	Rinses # of
8	1 & 2	80°C	4 hrs.	HCl	9 N	6	3	4:1	-[b]	-	-	-	-
9	1 & 2	80°C	4 hrs.	HCl	9 N	3	3	4:1	-	-	-	-	-
10	1 & 2	80°C	4 hrs.	Nitric	5.6 N	6	3	4:1	-	-	-	-	-
11	1 & 2	80°C	4 hrs.	Nitric	5.6 N	3	3	4:1	-	-	-	-	-
12	1 & 2	80°C	4 hrs.	EDTA	0.2 M	6	3	4:1	-	-	-	-	-
13	1 & 2	80°C	4 hrs.	EDTA	0.2 M	3	3	4:1	-	-	-	-	-
14	1 & 2	80°C	4 hrs.	EDTA	0.8 M	6	3	4:1	-	-	-	-	-
15	1 & 2	80°C	4 hrs.	EDTA	0.8 M	3	3	4:1	-	-	-	-	-
16	1 & 2	80°C	4 hrs.	HCl	9 N	3	3	4:1	-	-	-	-	-
17	1 & 2	80°C	4 hrs.	EDTA	0.8 M	1	3	10:1	-	-	-	-	-
18	1 & 2	80°C	4 hrs.	EDTA	0.8 M	2	3	10:1	-	-	-	-	-
19	1 & 2	80°C	4 hrs.	EDTA	0.8 M	3	3	10:1	-	-	-	-	-
20	1 & 2	80°C	24 hrs.	EDTA	0.8 M	1	3	10:1	-	-	-	-	-
21	1 & 2	80°C	24 hrs.	EDTA	0.8 M	2	3	10:1	-	-	-	-	-
22	1 & 2	80°C	24 hrs.	EDTA	0.8 M	3	3	10:1	-	-	-	-	-
23	1 & 2	80°C	15 hrs.	KCl	15%	1	3	10:1	24 hrs.	EDTA	0.8 M	1	3
24	1 & 2	80°C	15 hrs.	KCl	15%	1	3	10:1	24 hrs.	EDTA	0.8 M	2	3
25	1 & 2	80°C	15 hrs.	KCl	15%	1	3	10:1	24 hrs.	EDTA	0.8 M	3	3
26	1 & 2	80°C	4 hrs.	ETDA	0.8 M	6	3	4:1	4 hrs.	Nitric	5.6 N	1	3

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TABLE 3-13
(Continued)

			Extractant 1						Extractant 2				
Test Number	Silo	Temp	Time	Name	Conc	Extracts # of	Rinses # of	Liqud/Solid Ratio	Time	Name	Conc	Extracts # of	Rinses # of
27	1 & 2	80°C	4 hrs.	HCl	9 N	6	3	4:1	4 hrs.	EDTA	0.8 M	1	3
28	1 & 2	80°C	4 hrs.	Nitric	5.6 N	6	3	4:1	4 hrs.	EDTA	0.8 M	1	3

[a]Silo samples are a 50:50 (w/w) blend of waste from Silos 1 and 2.
[b]Only one extractant was used on these samples.

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EDTA as extractant and chlorine bleach (NaOCl) as an oxidant. The bleach, which was added to tests using hydrochloric acid as extractant, served to oxidize lower valence uranium species, if any, to the more soluble uranium (VI) species.

3.3.2 Experimental Design - Remedy Selection

The objective of the Remedy Selection (advanced phase) was to demonstrate on larger samples that the extracted solid is a nonhazardous material as defined by RCRA and that uranium, lead, thorium, polonium, and radium were successfully extracted from the solids. The treatments from the Remedy Screening (preliminary phase) tests that yielded solids with the lowest concentrations of lead and uranium were repeated on a larger scale using 100 g aliquots.

Two composite samples from each silo with bentonite added were extracted six times successively with EDTA. Extract samples from the second and some of the fourth extractions were analyzed for lead and uranium. Each sample was leached as four individual aliquots. One sample from each silo was treated with potassium chloride (KCl) and then subjected to six successive extractions with EDTA (refer to Figure 3-9). The other sample stream from each silo was subjected to six successive extractions with EDTA, followed by nitric acid. Refer to Figure 3-10. Solid/liquid separation after each extraction was accomplished using vacuum filtration. The solids were rinsed three times at the end of the extraction process. During successive rinses, filtration became increasingly difficult. Therefore, the liquid separations during rinsing operations were continued using centrifugation. Centrifuge times ranged from 20 minutes to 1 hour. Filter aids and polymers were not tested at this time because of possible interferences with analysis of the residue. Polymer testing was performed with success during the Remedy Selection (optional phase). The extracted solids were subjected to TCLP, with the extract being analyzed for metals and radionuclides (refer to Table 3-2). The solids were also analyzed for radionuclides.

3.3.3 Homogeneity - Time Temperature Study Feed Preparation

Homogeneity tests were conducted on Silo 1 and 2 and samples which had been prepared with 20 percent bentonite for time and temperature studies. Before analysis, each silo sample was sieved through a 12 mesh (1.7 millimeter [mm]) screen and mixed three times. Bentonite was blended into the sample after the first sieving. Analyses of aliquots of each blended sample were performed for lead, thorium, uranium, and gross alpha/beta to demonstrate that the variability in each sample was not greater than the variability due to testing parameters. Standard deviations were calculated for each analytical parameter along with their percent relative standard deviation (RSDs). Acceptable RSDs as stated in the Work Plan are ± 30 percent limit.

3.3.4 Time and Temperature Remedy Screening (preliminary phase) - Stage I

This set of experiments used the most promising formulation from Remedy Selection (advanced phase) extraction testing using KCl/EDTA. Initial range-finding experiments were conducted to determine the

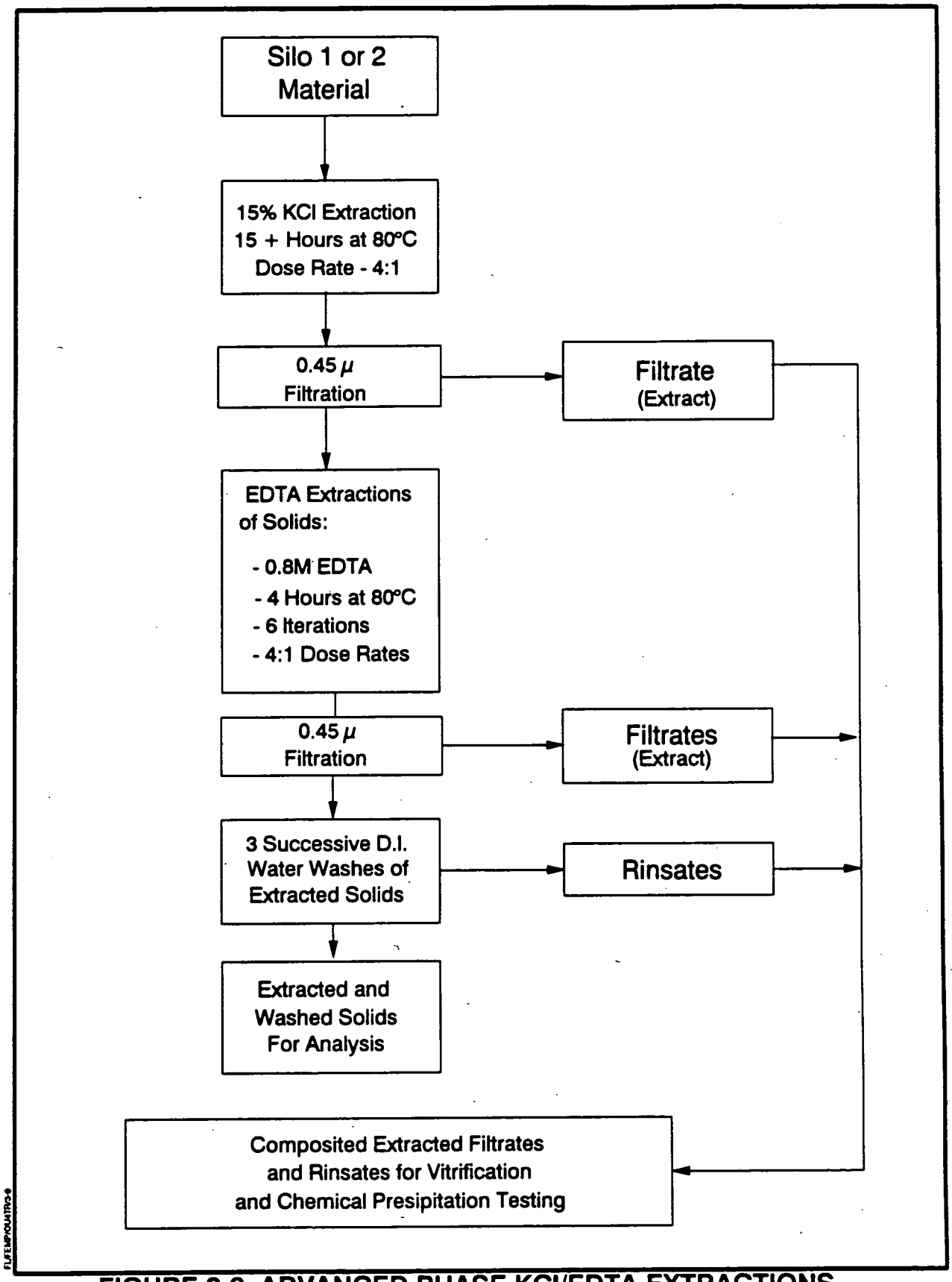

FIGURE 3-9. ADVANCED PHASE KCl/EDTA EXTRACTIONS

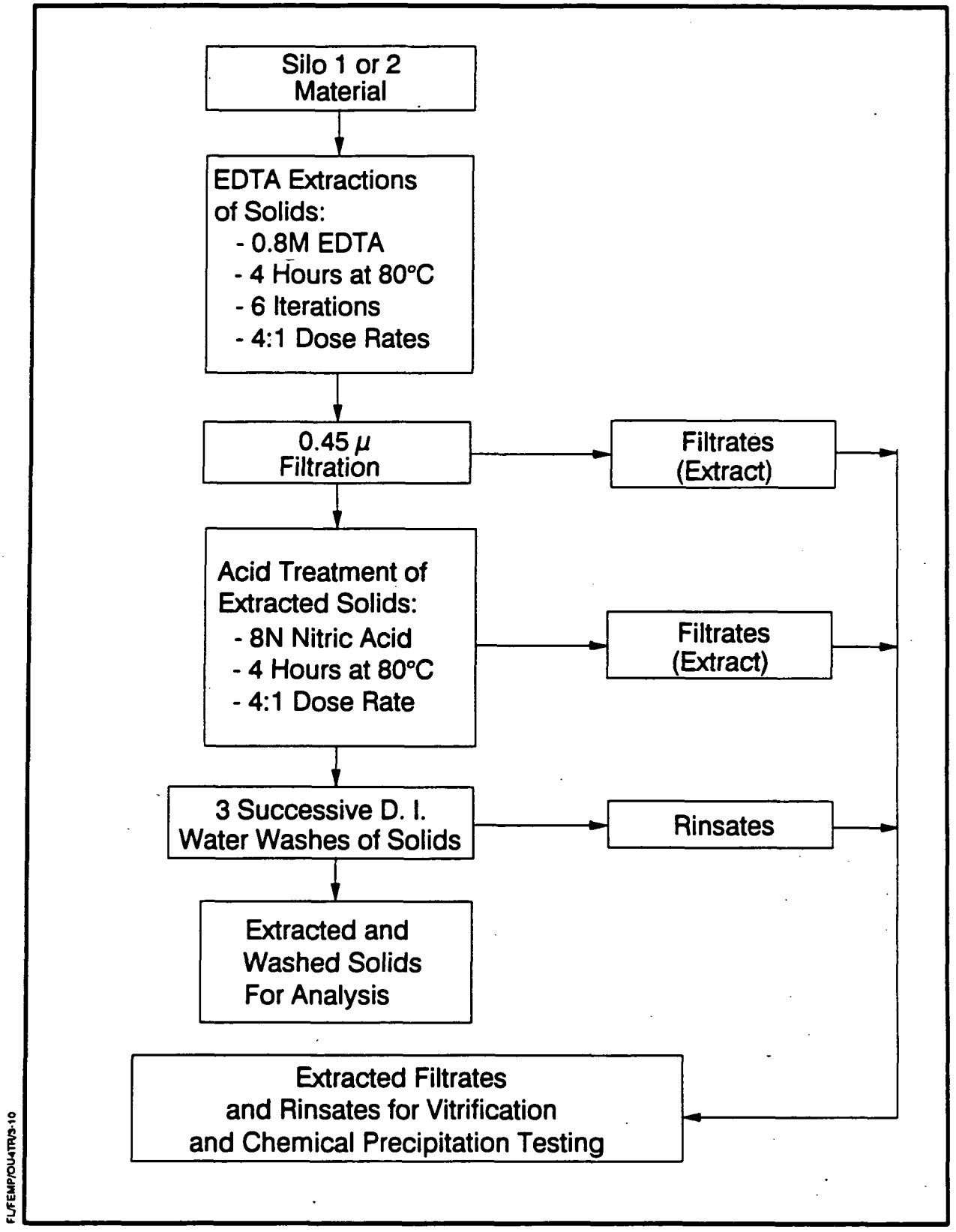

FIGURE 3-10. ADVANCED PHASE EDTA/NITRIC ACID EXTRACTIONS

maximum time the samples would be extracted in the later statistically based experiments. The samples were extracted at 80°C for 7 and 24 hours. Uranium was analyzed by IC; lead was analyzed by ICP. If the concentrations of uranium and lead in the leachate were similar for the two experiments, the 7-hour extraction times were to be used as the maximum extraction time in the statistical study. Otherwise, the maximum time would be 24 hours. The liquid: solid ratio for extractions was 4:1 w/w. The range-finding experimental matrix is listed in Table 3-14.

Experiment numbers 1 through 5, in Table 3-15, are constructed in a two-by-two factorial experimental design matrix with a center point. The minimum temperature and time of extraction was 20°C and 1 hour. The maximum temperature and time of extraction was 80°C and 7 hours. Maximum time was established at 7 hours of extraction as a result of the range-finding experiments.

Four-gram composite samples with 20 percent bentonite were extracted using 25 milliliter (mL) centrifuge tubes, block heater and orbital shaker in these experiments. Concurrently with the tube experiments, a larger- scale time and temperature extraction was performed using a 50 g sample in a 1 L stirred reactor. Tube experiments consisted of an initial extraction using 15 percent KCl for 16 hours at 80°C temperature, followed by two extractions with 0.8 M EDTA. Though the larger-scale experiment also included an initial 16-hour, 15 percent KCl extraction at 80°C temperature, the experiment involved six extraction steps with 0.8 M EDTA instead of just two. In addition, while tube experiments were phase-separated by centrifugation at 2500 revolutions per minute (rpm) and decantation, the larger scale test employed vacuum filtration with a Buchner funnel. Finally, tube experiment solids received three water rinses at 4:1 (w/w) liquid/solid ratio, but the larger scale experiment received ten rinses at 2:1 liquid/solid ratio. Both extracts and water-rinsed residual solids were analyzed for gross alpha/beta, uranium by IC, and lead, thorium, and uranium by ICP.

3.3.5 Washing Studies Remedy Screening (preliminary phase) - Stage I

Washing studies of the leached wet solids were conducted using the filter cake from the larger-scale (50 g) time and temperature study. The filter cake was washed ten times with 100 g deionized water in a 200 mL centrifuge bottle. The volume of each wash was half of the volume used for a single chemical extraction. Phase separation was accomplished by centrifugation and decantation. The uranium and lead content in each rinsate was tested by IC and ICP, respectively.

3.3.6 Vitrification of Extraction Fluids

The extraction fluids used in these tests were generated during the Remedy Selection (advanced phase) extractions. Two basic approaches were used to vitrify the extraction fluids. The first approach was used on the EDTA/HNO_3 extracts (refer to Figure 3-11). Silo 1 and 2 were processed separately. This approach took the combined EDTA extracts from one set of six EDTA extraction runs for one silo. Hydrochloric acid (12N) was added to precipitate the EDTA by lowering the pH to about 1. The slurry was filtered and the filter cake was washed three times with deionized water containing a trace

TABLE 3-14

RANGE-FINDING EXTRACTION TIME MATRIX

Experiment Number	Sample Wgt. (g)	Temperature (°C)	Time (hr)	Number of Extractions
1	4	80	7	1
2	4	80	24	1

TABLE 3-15

EXTRACTION TIME AND TEMPERATURE MATRIX

Experiment Number	Sample Wgt. (g)	Temperature (°C)	Time (hr)	Number of Extractions
1	4	20	1	2
2	4	20	7	2
3	4	80	1	2
4	4	80	7	2
5	4	50	4	2
6	50	80	4	6

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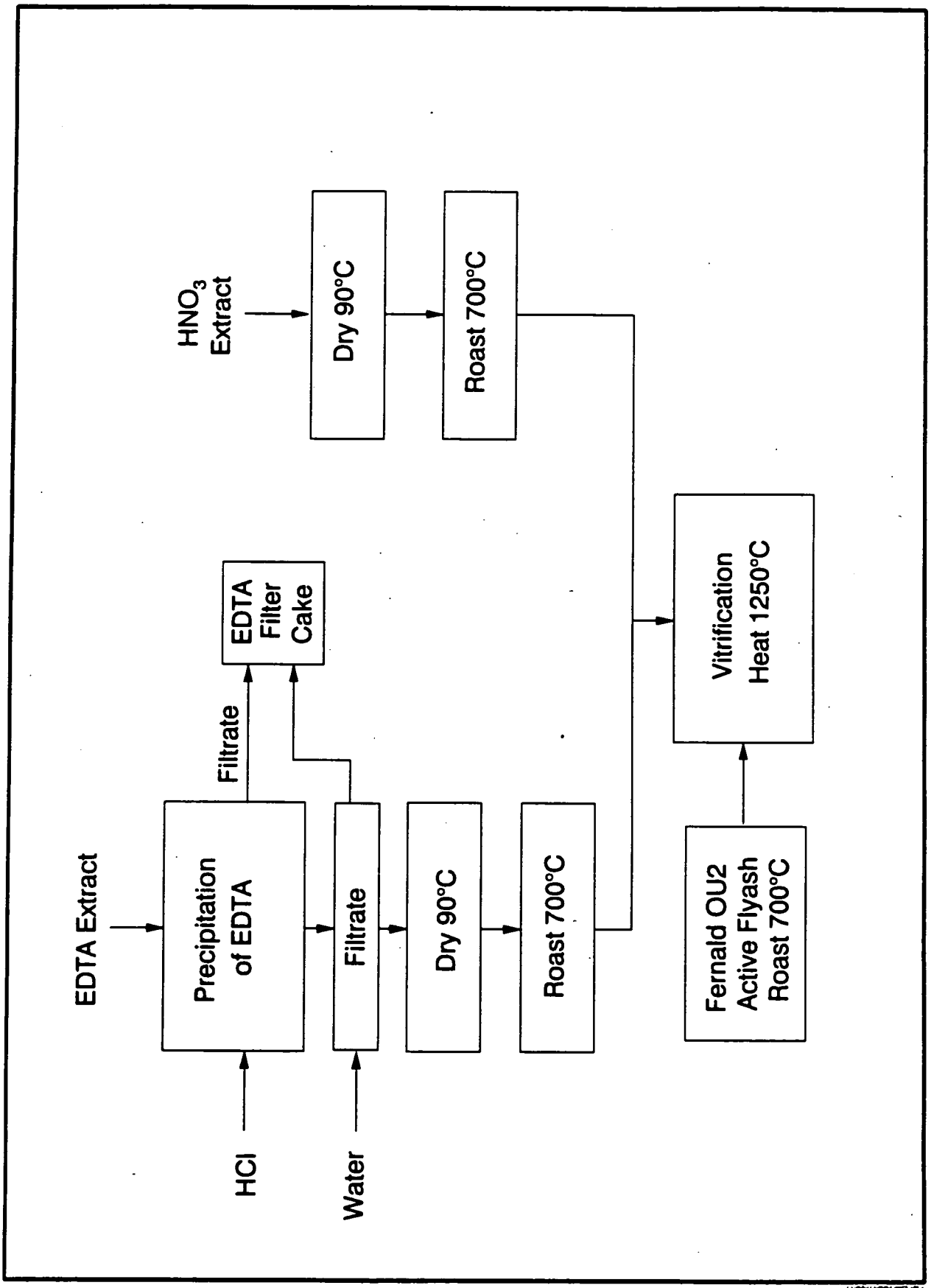

FIGURE 3-11. VITRIFICATION SEQUENCE FOR EDTA/HNO_3 EXTRACT

of hydrochloric acid. The combined filtrate from this processing was dried at 90°C to remove water and hydrochloric acid.

The nitric acid extract associated with the six EDTA extractions was also dried at 90°C. Both the dried EDTA filtrate and nitric acid residues were heated in the furnace at 700°C. The residues were combined and then mixed with an equal weight of roasted Fernald OU2 active flyash, and vitrified at 1250°C.

The above approach was not used on streams with KCl extracts. During drying of KCl/EDTA extracts, high concentrations of KCl were left in the residue. KCl is a flux for glass, and the high concentrations would have required a much higher percentage of soil or flyash relative to the waste. Therefore, a second approach was used on subsequent KCl experiments (refer to Figure 3-12).

In order to avoid high concentrations of KCl, the metals were precipitated from the EDTA/KCl filtrate, leaving the KCl in solution and concentrating the metals in the filter cake. The filter cake resulting from the Nalmet precipitation of 32 L of spent extractant (refer to Section 3.3.7.3) was used as feed. This material was dried at 105°C. In order to remove the organics and to prevent damage to the platinum crucibles, the dried residue was roasted at 400°C, 700°C, and 900°C. The roasted material was combined with an equal mass of site soil and vitrified at 1250°C for 4 hours. The result was 8.27 g of vitrified material from the 180 g of filter cake.

3.3.7 Contaminant Removal from Extracts

3.3.7.1 Precipitation Reagent Screening (preliminary phase) - Stage I

The precipitation work utilized extracts from the Remedy Selection (advanced phase) extraction experiments. Two sets of extract samples from each silo were generated; KCl and EDTA as one set of extracts, and EDTA and nitric acid as the other set. The extract from both silos was composited into two samples. One composite was comprised of KCl and EDTA extracts, plus water rinsates, from all four extractions while the other composite consisted of the nitric acid extracts and water rinsates. Refer to Figures 3-9 and 3-10.

Pretreatment of EDTA/KCl and Nitric Acid Extracts Composites

Typically, metals dissolved in aqueous solutions can be precipitated by raising the pH of the solution. However, EDTA chelates (complexes) are very soluble at elevated pH, so EDTA chelated metals do not precipitate when the pH is raised. Precipitation of the EDTA/KCl composite was therefore accomplished in several steps. In the first step, the pH of the solution was lowered to pH 1.5 or less with HCl to precipitate the EDTA. Then, EDTA solids were removed by vacuum filtration. Ferric sulfate was added to the filtrate such that iron (Fe^{3+}) could displace metals which form very strong complexes. The final concentration of iron in the treated EDTA/KCl composite was 300 ppm as Fe^{3+}.

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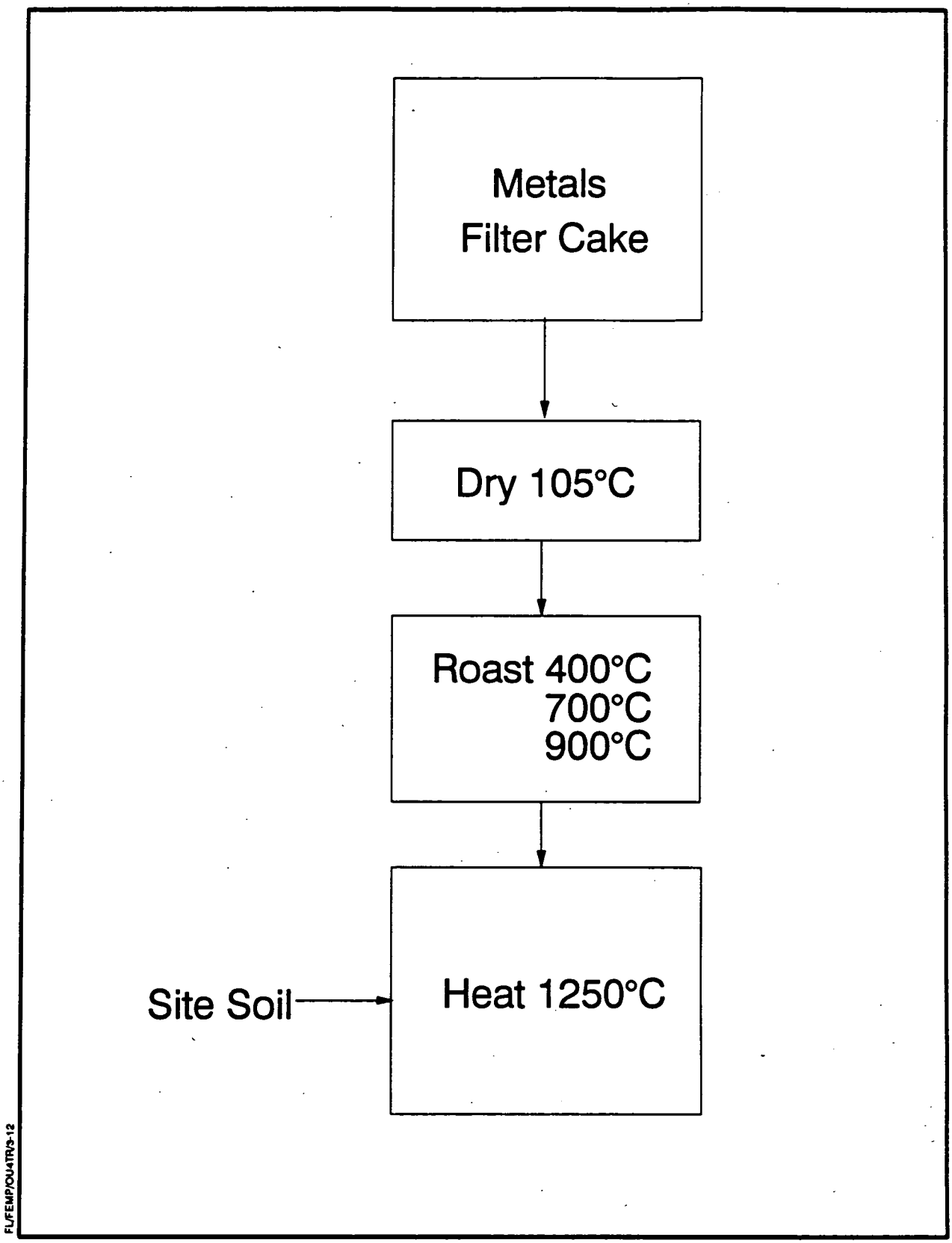

FIGURE 3-12. VITRIFICATION SEQUENCE FOR PRECIPITATE

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Since it was possible that the nitric acid/water (HNO_3/H_2O) composite also contained traces of EDTA. it was also treated with ferric sulfate to give a final concentration of 250 ppm Fe^{3+}. The HNO_3/H_2O composite was not filtered at low pH.

Precipitation of Treated Nitric Acid/Water Extracts Composites - Stage I

Precipitation reagents were added to aliquots of the pretreated HNO_3/H_2O extracts described above. Precipitating and flocculating reagents known to work with metals (primarily Pb and U) in the HNO_3/H_2O composite were investigated based on the "Procedure for Flocculation Mini Jar Test" (see Appendix F. The reagents investigated were the sodium salt solutions of hydroxide, sulfide, sulfate, carbonate, and phosphate. Aluminum sulfate, ferric sulfate, and aqueous sodium silicate (Na_2O: SiO_2) were also investigated. Aluminum sulfate and ferric sulfate additions were preceded and/or followed by the appropriate pH adjustments. Slurries of magnesium oxide, calcium hydroxide, and dolomitic lime were also tested.

A preliminary series of tests using single reagents were followed by a set of sequential multiple-reagent tests. In the sequential tests, the "first addition" reagent was added and allowed to react before the "second addition" reagent was added. The tests performed on the treated HNO_3/H_2O composite are listed in Table 3-16.

Single Reagent Tests

The single reagent tests involved addition of the reagent as a 10 to 30 percent solution to a 20 mL scintillation vial containing 5 mL of sample. The extract was first neutralized with the appropriate base. After neutralization, the appropriate reagent listed in Table 3-16 was incrementally added. The treated leachate solutions were gently shaken on an orbital shaker at 80 rpm. At 12 to 24 hours, the treated solutions were removed, filtered through a 0.45 micron filter, and analyzed for uranium and lead. If no turbidity had developed prior to filtration, the treatment was considered failing.

Multiple Reagent Test (Sequential Addition)

In the multiple reagent tests, which are listed in Table 3-16, the first reagent was added and allowed to react for a period of time, usually 12 to 24 hours. Then, the second reagent was added incrementally (as in the single reagent test) and allowed to react for up to 24 hours. A third reagent was sometimes added in the same manner. The solutions were filtered and the filtrate was analyzed if appropriate.

Precipitation of Treated EDTA/KCl Composite - Stage I

The tests performed on the pretreated EDTA/KCl composite during Stage I testing are listed in Table 3-17. These tests were performed in the same manner as the single- and multiple-reagent tests listed above. An additional reagent was added to the set of reagents because lead proved to be difficult to

TABLE 3-16 5448

REMEDY SCREENING (PRELIMINARY PHASE), STAGE I - PRECIPITATION REAGENTS FOR NITRIC ACID EXTRACTION SOLUTION

Reagent 1	Reagent 1 Conc.[a]	Reagent 2	Reagent 2 Conc.[a]	Reagent 3	Reagent 3 Conc.[a]
Na_2CO_3	9.1%	-	-	-	-
MgO	20%	-	-	-	-
$Ca(OH)_2$	20%	-	-	-	-
Dolomite lime	20%	-	-	-	-
Na_2SO_4	10%	NaOH	1N	-	-
$Fe_2(SO_4)_3$	2.5%	-	-	-	-
$Al_2(SO_4)_3$	20%	-	-	-	-
Na_3PO_4	10%	MgO	20%	-	-
Na_3PO_4	10%	$Ca(OH)_2$	20%	-	-
MgO	20%	Na_3PO_4	10%	-	-
MgO	20%	Na_2CO_3	9.09%	-	-
MgO	20%	Na_2S	20%	-	-
NaOH	1N	Na_3PO_4	10%	-	-
NaOH	1N	Na_2CO_3	9.09%	-	-
NaOH	1N	Na_2S	20%	-	-
Na_3PO_4	10%	-	-	-	-
Na_2SO_4	10	-	-	-	-
NaOH	1N	$Na_2O:SiO_2$	10	-	-
NaOH	1N	Na_3PO_4	10	$Na_2O:SiO_2$	10
NaOH	1N	Na_3PO_4	10	$Na_2O:SiO_2$	10
Na_2CO_3	9.09	$Na_2O:SiO_2$	10	-	-
$Mg(OH)_2$	20	$Na_2O:SiO_2$	10	-	-
$Ca(OH)_2$	20	$Na_2O:SiO_2$	10	-	-
NaOH	1N	Na_2S	20	$NaO:SiO_2$	10
NaOH	-	Nalmet 8154	-	-	-
$Ca(OH)_2$	-	Nalmet 8154	-	-	-

[a]Concentrations are expressed as weight percent, except NaOH, which is expressed as normality.
- Not applicable

TABLE 3-17

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REMEDY SCREENING (PRELIMINARY PHASE), STAGE I - PRECIPITATION REAGENTS FOR EDTA/KCl EXTRACTION SOLUTION

Reagent 1	Reagent 1 Conc.[a]	Reagent 2	Reagent 2 Conc.[a]	Reagent 3	Reagent 3 Conc.[a]
NaOH	1N	-	-	-	-
Na_2CO_3	9.09	-	-	-	-
MgO	20	-	-	-	-
$Ca(OH)_2$	20	-	-	-	-
Dolomite lime	20	-	-	-	-
Na_2SO_4	10	-	-	-	-
$Fe_3(SO_4)_3$	2.5	-	-	-	-
$Al_2(SO_4)_3$	20	NaOH	1N	-	-
Na_3PO_4	10	MgO	20	-	-
Na_3PO_4	10	$Ca(OH)_2$	20	-	-
MgO	20	Na_3PO_4	20	-	-
MgO	20	Na_2CO_3	9.09	-	-
MgO	20	Na_2S	20	-	-
NaOH	1N	Na_3PO_4	10	-	-
NaOH	1N	Na_2CO_3	9.09	-	-
NaOH	1N	Na_2S	20	-	-
Na_2SO_4	10	NaOH	1N	-	-
NaOH	1N	$Na_2O:SiO_2$	10	-	-
Na_3PO_4	10	$Na_2O:SiO_2$	10	NaOH	1N
Na_2CO_3	9.09	$Na_2O:SiO_2$	10	-	-
NaOH	1N	Na_2S	20	$Na_2O:SiO_2$	10
$Mg(OH)_2$	20	$Na_2O:SiO_2$	10	-	-
$Ca(OH)_2$	20	$Na_2O:SiO_2$	10	-	-
NaOH	1N	-	-	-	-
$Ca(OH)_2$	20	-	-	-	-

[a]Concentrations are expressed as weight percent, except NaOH, which is expressed as normality.
- Not applicable

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remove from the EDTA/KCl composite. This reagent, Nalmet 8154, was an organic chelate which forms an insoluble chelate with lead.

Precipitation Reagent Evaluation

3.3.7.2 Remedy Screening (preliminary phase) - Stage II

Stage II continued with testing of the pretreated EDTA/KCl and HNO_3/H_2O extract solutions using larger samples. A list of the tests and the respective reagent dosages is provided in Tables 3-18 and 3-19. After testing of the EDTA/KCl and HNO_3/H_2O solutions was complete, two composite solutions of EDTA/KCl plus HNO_3/H_2O solutions were made. One of these composites was treated with ferric sulfate to give a final concentration of 300 ppm. The other composite was not treated with ferric sulfate. Table 3-20 lists the precipitation reagents tested on the composite. The filtrate from each experiment was analyzed for lead and uranium.

3.3.7.3 Precipitated Solids Settling Tests - Remedy Screening (preliminary phase) - Stage II

Range finding settling rates were determined on 10 to 20 mL samples by recording sludge volume with time. It should be noted that actual settling rates could be substantially higher if larger sample sizes, and hence larger diameter settling vessels, were used.

Later during precipitation testing, a large (approximately 32 L) spent extract composite comprised of the balance of Remedy Selection (advanced phase) leachates was treated by precipitation. The purpose of this large-scale precipitation was to produce material for vitrification and stabilization (see Sections 3.3.6 and 3.3.8). First, EDTA was precipitated by addition of concentrated hydrochloric acid to pH 1.5. The mixture was stirred occasionally for two hours and the EDTA solids were removed by vacuum filtration. Next, 250 ppm of Fe^{3+} was added as ferric sulfate to displace complexed metals from the EDTA. Fifty percent sodium hydroxide was added to pH 3. Then, 0.5 percent of Nalmet 8154 was added and the mixture was stirred for 1/2 hour to precipitate metals. The pH was raised to pH 6.5 with 50 percent sodium hydroxide. At this point, the settling rate was determined for a 1 L aliquot in a 1 L graduate. The resulting filter cake was divided into two 180 g aliquots which were treated by vitrification and cement stabilization. Refer to Figure 3-13.

During precipitation of the 32 L of spent extractant the large resulting sludge volume suggested the need for polymer testing.

Polymer testing was performed based on the "Procedure for Flocculation Mini Jar Tests" (see Appendix F). Polymer testing involved the application of anionic, cationic, and nonionic polymers manufactured by NALCO Chemical Company. The polymers were used to improve settling rates or decrease sludge volume of the Nalmet precipitate.

TABLE 3-18 5448

REMEDY SCREENING (PRELIMINARY PHASE), STAGE II - PRECIPITATION REAGENTS FOR EDTA/KCl EXTRACT SOLUTION

Reagent 1	Reagent 1 Concentration[a]	Reagent 2	Reagent 2 Concentration[a]	Reagent 3	Reagent 3 Concentration[a]
NaOH	-	Nalmet 8154	-	-	-
$Ca(OH)_2$	-	Nalmet 8154	-	-	-
NaOH	25%	Na_2S	-	-	-
NaOH	25%	Na_2S	-	-	-
$Na_3PO_4 \cdot 9\ H_2O$	10%	-	-	-	-
$Na_3PO_4 \cdot 9\ H_2O$	10%	NaOH	25%	-	-
$Na_3PO_4 \cdot 9\ H_2O$	10%	NaOH	25%	-	-
$Na_3PO_4 \cdot 9\ H_2O$	10%	NaOH	25%	-	-
NaOH	25%	Nalmet 8154	-	-	-
NaOH	25%	Nalmet 8154	-	-	-
NaOH	25%	Nalmet 8154	-	-	-
$Na_3PO_4 \cdot 9\ H_2O$	10%	NaOH	25%	-	-
$Na_3PO_4 \cdot 9\ H_2O$	10%	$Ca(OH)_2$	20%	-	-
NaOH	25%	Na_2S	20%	-	-
NaOH	25%	Nalmet 8154	54%	NaOH	25%
NaOH	25%	Nalmet 8154	54%	-	-

[a]Concentrations are expressed as weight percent, except NaOH, which is expressed as normality.
- Not applicable

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TABLE 3-19

REMEDY SCREENING (PRELIMINARY PHASE), STAGE II - PRECIPITATION REAGENTS FOR NITRIC ACID EXTRACTION SOLUTION

Reagent 1	Reagent 1 Concentration[a]	Reagent 2	Reagent 2 Concentration[a]
$Ca(OH)_2$	20%	-	-
$Ca(OH)_2$	20%	-	-
Dolomite lime	20%	-	-
Dolomite lime	20%	-	-
$Ca(OH)_2$	20%	$Na_2O:SiO_2$	10%
$Ca(OH)_2$	20%	$Na_2O:SiO_2$	10%
$Na_3PO_4 \cdot 12\ H_2O$	10%	NaOH	25%
$Na_3PO_4 \cdot 12\ H_2O$	10%	NaOH	25%
$Na_3PO_4 \cdot 12\ H_2O$	10%	Nalmet 8154	-
NaOH	25%	Nalmet 8154	-
NaOH	25%	Nalmet 8154	-
$Na_3PO_4 \cdot 12\ H_2O$	10%	NaOH	25%
$Na_3PO_4 \cdot 12\ H_2O$	10%	NaOH	25%
$Na_3PO_4 \cdot 12\ H_2O$	10%	$Ca(OH)_2$	20%
$Na_3PO_4 \cdot 12\ H_2O$	10%	$Ca(OH)_2$	20%

[a]Concentrations are expressed as weight percent, except NaOH, which is expressed as normality.
- Not applicable

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TABLE 3-20

REMEDY SCREENING (PRELIMINARY PHASE), STAGE II - PRECIPITATION REAGENTS FOR 30% HNO_3/70% EDTA/KCl COMPOSITE

Reagent 1	Reagent 1 Concentration[a]	Reagent 2	Reagent 2 Concentration[a]
NaOH	25%	Na_2S	20%
NaOH	25%	Nalmet 8154	54%
NaOH*	25%	Nalmet 8154	54%

*Composited HNO_3/EDTA/Kcl extract not treated with ferric sulfate.

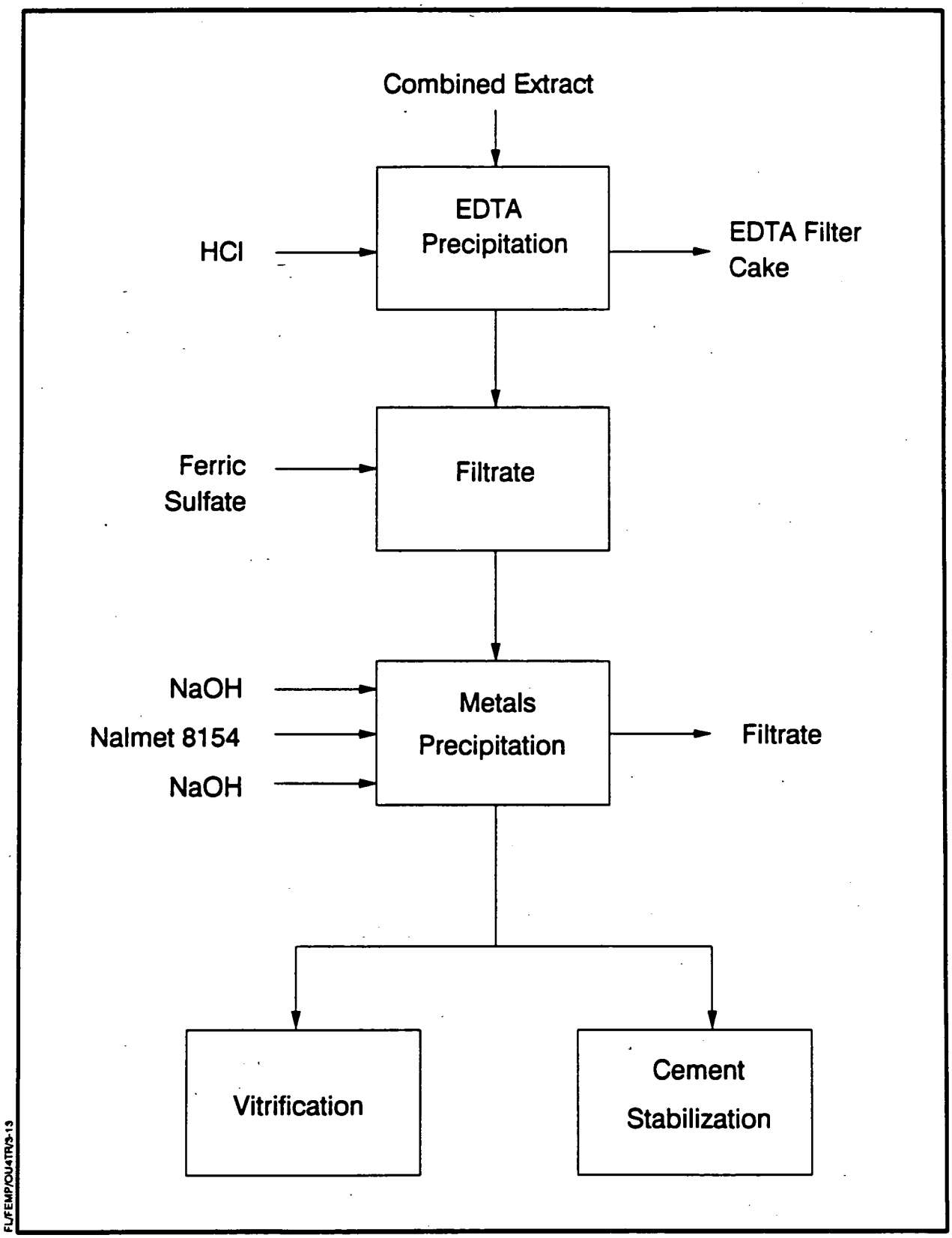

FIGURE 3-13. METALS PRECIPITATION FOR VITRIFICATION AND CEMENT STABILIZATION

3.3.7.4 Removal of Metals from Extracts using - Ion Exchange

Due to the success of the precipitation results, this testing was not performed. 5448

3.3.8 Cement Stabilization of Precipitate

Precipitate (refer to Section 3.3.7.3) was treated with stabilization reagents to make two treatability samples for evaluation. The formulations are given in Table 3-21.

To make the first sample, filter cake was mixed with the reagents, and then water was added to make a paste-like mixture. Pocket penetrometer tests showed that the sample was not setting up as expected. It is postulated that the Nalmet in the filter cake absorbed water and prevented the cement from becoming fully hydrated. Therefore, the approach used to make the second sample was changed. All reagents (clinoptilolite, blast furnace slag, and flyash) were then mixed with the filter cake. The cement was mixed with water to make a slurry. This slurry was then mixed with the previously combined filter cake and reagents. Additional water was then added to achieve a paste-like consistency. Tests were performed on the stabilized cake. These tests included UCS, percent moisture, and MTCLP.

3.3.9 Data Recorded

The following data was recorded during the extractant screening:

- Acid (solvent) and concentration
- Quantity of acid
- Quantity of waste
- Uranium and lead analyses results
- Percent bentonite in waste
- TCLP of insoluble residue Remedy Selection (advanced phase)

The following data were recorded during the extractant time and temperature tests:

- Solvents being tested
- Quantity of waste and solvent being tested
- Lead and uranium concentration in the extractant as a function of time

The following data were recorded during the water washing studies:

- Type of solvent used for chemical extraction
- Quantity of extracted solid being washed
- Quantity of water used for each wash
- Uranium and lead concentration in each rinsate

The following data were recorded during the precipitation screening: Remedy Screening (preliminary phase) Stage I:

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TABLE 3-21

CEMENT STABILIZATION OF PRECIPITATE

Run No.	Waste Precipitate (g)	Type II Cement (g)	Blast Furnace Slag (g)	Type F Flyash (g)	Clinoptiolite (g)	Water (g)
1	100	53	31	15	5	61
2	70	42	21.7	13	7	20

- Quantity and type of extractant
- Precipitation reagents and quantities
- Lead and uranium concentration in filtrate

The following data were recorded during the secondary precipitation Remedy Screening (preliminary phase) Stage II tests:

- Extractant being tested
- Polymers, coagulants, Nalmet 8154, and filter aid added, and their dosages
- Lead and uranium concentration before and after addition of any polymers, coagulants, and filter aid

The following data were recorded during stabilization of precipitated material test:

- MTCLP
- Bulking factor
- Waste form temperature rise after waste and reagents were mixed and the time between mixing and temperature measurement
- Approximate shear strength measured within ten minutes of when waste and reagents were mixed
- Physical characteristics: percent moisture and bulk density
- Amount of water added to each waste form
- The maximum particle size treated; weight and percentage of material sieved from the raw waste before treatment
- General description of the waste form before and after reagents were mixed
- Description of vapor or gas released during mixing and during curing of mixture
- pH and Eh of mixture before adding mixture to molds
- pH of MTCLP extraction fluids

The following data were recorded during the vitrification test:

- MTCLP
- Product Consistency Test (PCT)
- Weights of reagents and waste in final waste form
- Temperature of oven
- Time heating sample
- Bulking factor
- General description of the waste before and after melting

- Physical characteristics: percent moisture, bulk density
- Radon emission tests results

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3.4 EQUIPMENT AND MATERIALS

Table 3-22 lists the major equipment and materials used for the treatability study.

3.5 SAMPLING AND ANALYSIS

3.5.1 Characterization

As a part of the OU4 RI, the contents of the Silos 1 and 2 and Silo 3 were sampled in 1989.

The sampling of the Silos 1 and 2 was only partially successful because of the inability to recover continuous sample cores. Even though an average of 20 feet of penetration of the material was achieved, there was no sample recovery in three locations. One sample contained 12.5 feet of core (66 percent core recovery). Eight sample cores were less than 1.5 feet (4 to 9 percent recovery) and four cores ranged from 3.25 to 4.25 feet (18 to 30 percent recovery).

This and previous sampling studies conducted on the K-65 residues in Silos 1 and 2 produced variable results, indicating that the residues are not homogeneous. Because of the variability in the analytical results from previous studies and the partial recoveries from the 1989 sampling effort, the available data were not complete enough to adequately characterize the K-65 residues for purposes of evaluating remedial actions alternatives or for conducting treatability tests. Therefore, resampling was required as described in the 1991 "Residual Sampling for K-65 Silos Sampling and Analysis Plan" U.S. DOE, Feed Materials Production Center, Fernald Ohio, July 15, 1991.

Selected K-65 samples were analyzed for radiological and chemical constituents to characterize the materials for the evaluation of disposal options. The parameters to be analyzed that were specified by the work plan included TCLP metals and TCLP organics when samples were found to contain organics. However, the sampling Work Plan did not specify TCLP radiological analysis. This data was required in order to compare the leachability of stabilized radionuclides with unstabilized radionuclides.

Radiological TCLP data were obtained by analyzing samples of silo material from the inventory at the treatability laboratory that had not yet been consumed in the treatability studies.

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TABLE 3-22

EQUIPMENT AND MATERIALS[a b]

Number of Items	Description
Multiple	Porcelain evaporation dishes, 145 mm diameter x 48 mm high, 385 ml capacity
Two	Furnaces, Lindberg Model #51333
1 or more	Scale, calibrated, Sartorius Model LC 2200 S/P, B3100 S/P, LC 4200S, and analytical balance
Multiple	Crucible tongs, 250 mm long, stainless steel
Multiple	Crucibles, aluminum oxide and platinum
1	Planetary Mixer, Kitchen-Aid Model K54SS
Two	Digital pH meters, Hach #19000-00 and Jenco #6009
Multiple	pH electrode, Orion standard line combination type, with epoxy body and BNC connector (#91-56)
Multiple	ORP electrode
1	Thermometer, calibrated and traceable
2	Torvane shear device, Soiltest Model CL-600
1	Vibrating table, Lydron Model BP51D1
Multiple	1.38 inch by 2.8 inch plastic molds (cut to length from 6 foot stock)
Multiple	Two-inch by four-inch Jatco Co. plastic molds for UCS
1	Microwave drying oven, CEM AVC Model 80
Multiple	Spatulas, mixing and weighing type
Multiple	Plastic containers, 5 oz. and 8 oz., with caps
1	Laboratory hydraulic press, Carver, 12-ton
Two	Shaker tables, Eberbach Model 6010
Multiple	Hammers
Multiple	Sterile disposable conical centrifuge tubes, 50 ml capacity, with plug seal screw caps
Multiple	Syringes, Becton-Dickinson, 10 ml, with luer slip lock but without needles
Multiple	Acrodisc syringe filters, 0.45, 0.6, 0.8 µm Gelman Sciences
1	Grinder, Brinkman Model ZM - 1
1	Micro analytical Mill, Tekmar A-10
1	Capping compound and warming pot, Soil Test L114A

TABLE 3-22
(Continued)

Number of Items	Description
1	Cylinder capper, Soil Test, CT-54
2	Cylinder Capping Plates
Multiple	Pipette bulbs, pipettes, volumetric flasks, graduated cylinders, beakers, funnels, scintillation vials, bottles, stirring bars, gloves, lab coats, and other lab equipment
Multiple	Protective equipment consisting of Tyvek coveralls, shoe covers, and plastic gloves
Two	Motorized Unconfined Compression Apparatus, Soiltest Model UC 590 and UC 610, with Proving Rings #PR-15 (1500 lb capacity)
1	Motorized Unconfined Compression Apparatus, Brainard-Kilmon Model S-610, with 10,000 lb load cell
Multiple	Pocket penetrometer, Soiltest Model CL-700A
1	Dremel Cutting Tool, Model 850
1	Vernier
1	Digital hot plate/stirrer, PMC dataplate
Multiple	Sieves, 9.5 mm sieve designated std., 0.375 inches sieve opening (Tyler designation 0.371 inches), 8 inches diameter, full height, and 4.75 mm sieve designated std., 0.187 inches sieve opening (Tyler designation #4), 8 inches diameter, full height, 0.111 inches sieve openng (Tyler designation #7), 8 inches diameter, full height
Multiple	Standard weights, Class S and check
Bottles	Glacial acetic acid, Mallinckrodt
Bottles	TCLP fluids #1 and #2 (made up from glacial acetic acid)
Bottles	Sodium hydroxide, 1N, volumetric solution, Mallinckrodt
Bottles	Hydrochloric acid, 1N, volumetric solution, Mallinckrodt
Bottles	Hydrochloric acid, concentrated, vendor
Bottles	Nitric acid, concentrated, Mallinckrodt and Baker
Bottles	Phosphoric acid, 39 weight percent, Mallinckrodt

TABLE 3-22
(Continued)

Number of Items	Description
Multiple	pH buffers, Mallinckrodt and Scientific Products, pH 4.01, 7.00, 10.00
1	Ion chromatograph consisting of parts: Dionex liquid chromatographic module, post-column delivery system, P-E LS30 luminescence detector (in phosphorescence mode), Dionex columns (CS 5 analytical and CG 5 guard), Milton Roy Constametric HPLC Pump
1	Gross Alpha and Beta activity counter, Canberra Model #2404F
Multiple	Permeability, flexible wall permeammeter, Brainard-Kilman, cell #S-480, Panel S-500
2	Eberline air monitor, Model #5A
1	Phipps & Bird Stirrer, 400 series six paddle stirrer
1	Orbital Shaker, Cole Parmer Model 51501
1	Thermolyne Dri-Bath (Block Heater), Model 16500
Multiple	TFE digestion vessels

[a]Additional equipment used to perform analytical tests (e.g., GC, GC/MS, ICP, etc.) are not listed.
[b]Additional equipment requirements are also listed in the SOPs contained in Appendix D of the Work Plan.

3.5.2 Geotechnical Analyses

Geotechnical Testing

Geotechnical testing of the silo sample material collected during the 1989 sampling effort was performed. Material from all three silos was tested according to the following methods:

- Specific gravity - ASTM D854
- Water content - ASTM D2216
- Atterburg Limits - ASTM D4318
- Grain Size - ASTM D422

Silos 1 and 2 were resampled in 1991. Additional geotechnical testing was done on these samples. The above tests plus the following were repeated on the 1991 samples:

- One dimensional consolidation - ASTM D2435
- Standard proctor - ASTM D698/STB CN-435

Both test reports are presented in Appendix G.

3.6 DATA MANAGEMENT

This section pertains to work performed at IT's Technology Development Laboratory (TDL) and Environmental Technology Development Center (ETDC). Two types of laboratory notebooks were used for this project. All laboratory notebooks are uniquely numbered and have sequentially numbered pages.

Project-specific notebooks were signed out by the facility quality assurance officer (QAO) to the individuals working on the project. All daily laboratory activities associated with the project were recorded in the project-specific notebooks. Separate nonproject-specific logbooks were used to record the injection or introduction of samples into analytical instrumentation. These logbooks also were used to record maintenance or problems with instruments. At the completion of the project, the project-specific laboratory notebooks and logbooks will be returned to the facility QAO for retention. Instrument logbooks will be returned to the facility QAO when the book are filled.

All data were written into standard laboratory notebooks or onto standard formatted data entry sheets. These data were entered into a database using computer software designed for the FEMP treatability data. The sample tracking software is a user friendly program designed for easy storage and retrieval of sample information. The stored information can be updated by the user. It is designed to operate on a personal computer. The sample tracking software is written in Clipper 5.01®. Clipper is available from the Nantucket Corporation, Los Angles, California. Although this version is designed specifically for the FEMP, it can be altered to accommodate other project-specific needs.

The output from the sample tracking software consists of various reports. The stabilization report is broken into the following areas: general sample information, data information, formulation information, and TDL analytical information.

The chemical extraction reports are divided into chemical extraction data, reagent addition data, phase separation data, homogeneity and time and temperature data. The data for stabilized precipitate is included with the rest of the stabilization data.

All records management and reporting followed standard QA/QC protocol.

3.7 DEVIATIONS FROM WORK PLAN

3.7.1 Preliminary Remediation Goals

The Work Plan presented PRGs for perched water leachate, but since the Work Plan was developed, EPA has provided additional guidance on PRGs (EPA 1991). The new guidance is specific on the definition of PRGs and that definition does not include goals for leachate; therefore, the leachate goals presented in this report are referred to as "LALs" to minimize confusion when referring to the values. The LALs are given in Appendix D and were used to evaluate the effectiveness of various formulations.

3.7.2 DQO Levels

The DQO analytical level for radiological analysis of the chemical extraction residue was changed from Level IV to Level III. The change was made because this is not CLP analysis, but is standard radiological analysis.

The DQO analytical level for TCLP analysis was revised from Level IV to V.

The TCLP extraction data were not reported in a CLP format; therefore, it will not support an analytical level relative to DQOs of Level IV. Also, the full TCLP as defined in this Work Plan provides for full radiological analyses in addition to normal TCLP analyses. The radiological analyses are to be performed on the TCLP extract; therefore, it is a nonstandard method that requires a Level V designation. Finally, spike recovery values used for cement stabilized waste were calculated based on raw waste during the site characterization as indicated in Section 7.2 of the Work Plan. This is a modification of the standard TCLP method requiring a Level V designation.

3.7.3 Formulations

During Remedy Screening (preliminary phase) Stage I (Silos 1 and 2), and part of Remedial Screening (preliminary phase) Stage II (Silo 3), the quantities of sodium silicates specified in the Work Plan

were not used in the formulations. The quantity actually used was much less than those specified in the Work Plan.

3.7.4 Vitrification

The initial vitrification experiments were on dried leachate as specified in the Work Plan; however, the approach was changed to precipitate the metals from the leachate, and then dry and vitrified the precipitate. Also, sodium carbonate was substituted for the sodium hydroxide. Refer to Section 3.3.6.

3.7.5 Spike Recovery

The Work Plan specifies that TCLP results will be corrected for spike recovery. This had been a requirement of SW-846. The spike recovery correction requirement was retracted by the EPA in the November 24, 1992 Federal Register; therefore, while spikes and determination of percent recovery were performed, correction of results for spike recovery were not.

3.7.6 Analytical

Alkalinity and reactivity are specified for Remedy Selection (advanced phase) analysis for 5-day static and TCLP samples. The alkalinity was dropped because the high calcium content of the samples would make this result uninformative. A Document Change Request (DCR)/2 was submitted to not measure the reactivity if the pH of the leachate was less than or equal to 7. However, due to a limited quantity of sample, reactivity was not measured on samples with pH greater than 7.

3.7.7 Ion Exchange

The Work Plan, Section 4.2.5.5, specifies testing of ion exchange resins for polishing of filtrate resulting from the extraction/precipitation process. This testing was not done due to the successful results achieved during precipitation testing.

3.7.8 Waste and Reagent Mixing

The procedure in Appendix C of the Work Plan states that waste will be sieved before testing. The Silo 3 waste was not sieved due to its dry, powdery nature (i.e., significant amounts of dust and concurrent loss of sample could have occurred).

For Silo 3, Remedy Screening (preliminary phase) Stage II, the time between mixing and temperature measurement was not recorded for 12 samples.

The Work Plan specifies that a description of the waste be recorded before and after mixing with stabilization reagents. This was not done on some samples because the descriptions in these cases were redundant.

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3.7.9 Process Parameters

The shear strength of one Silo 1 sample (Remedy Screening [preliminary phase], Stage I) and some of the Silo 3 samples (Remedy Screening (preliminary phase) Stage II) were not measured as specified in the Work Plan.

4.0 RESULTS AND DISCUSSION

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The overall objective of this treatability testing program was to develop data to assess the performance of cement stabilization or chemical extraction of OU4 wastes. For cement stabilization, the Work Plan identified four response variables -- leachability, UCS, permeability, and final waste form volume increase -- to evaluate the performance of the various cement stabilization mixtures. For chemical extraction, the response variables were leachability and residual radionuclide concentration in the raffinate (treated residue). These performance objectives were used to determine if a particular reagent mixture produced an acceptable waste form.

Figures 4-1 and 4-2 are overall flow diagrams of the treatability test programs for each of the two technologies. The cement stabilization program consisted of Remedy Screening (preliminary phase), Remedy Selection (advanced phase), and Remedy Selection (optional phase) tests of waste from Silos 1, 2, and 3. The chemical extraction program consisted of Remedy Screening and Remedy Selection chemical extraction tests for waste from Silos 1 and 2, followed by Remedy Screening tests on treatment of the spent extractants. An optional phase chemical extraction program was conducted to determine radon emissions from the vitrified product. The results will be presented in the optional phase report.

This section of the treatability study report describes the Remedy Selection phase results for both technologies and the Remedy Screening results for treatment of spent extractants. The material represented by the shaded blocks of Figures 4-1 and 4-2 is discussed in this section.

Section 4.1 presents the cement stabilization treatability test results. Cement-based reagent mixtures which produced an UCS of greater than 500 psi, minimal volume increase, and TCLP leachates meeting the TC regulatory limits were identified. The TCLP leachate contained concentrations of Ra-226, Pb-210, molybdenum, and lead exceeding the LALs. The 5-day static leaching results paralleled the TCLP results. Summaries of the TCLP results for the untreated and treated waste samples, and for UCS, permeability, bulking factor, and leachability for treated waste are presented. Section 4.1 ends with a summary comparison of test results with test objectives.

Section 4.2 presents the chemical extraction results and the results of homogeneity testing of the various silo samples. These samples were subjected to different extraction fluids chosen for their ability to remove the inorganic constituents of concern. Conditions for extraction were changed, and adjustments to the process were made, based on the directions given in the Work Plan. The results of testing the various extractants and varying the time, and temperature conditions, and the number of extraction cycles are presented. The solid residues after extraction were analyzed for their organic and inorganic chemicals and radionuclide constituents. Results of the experiments are presented along with postulated hypotheses to explain unanticipated results. Section 4.2 contains flow diagrams that were

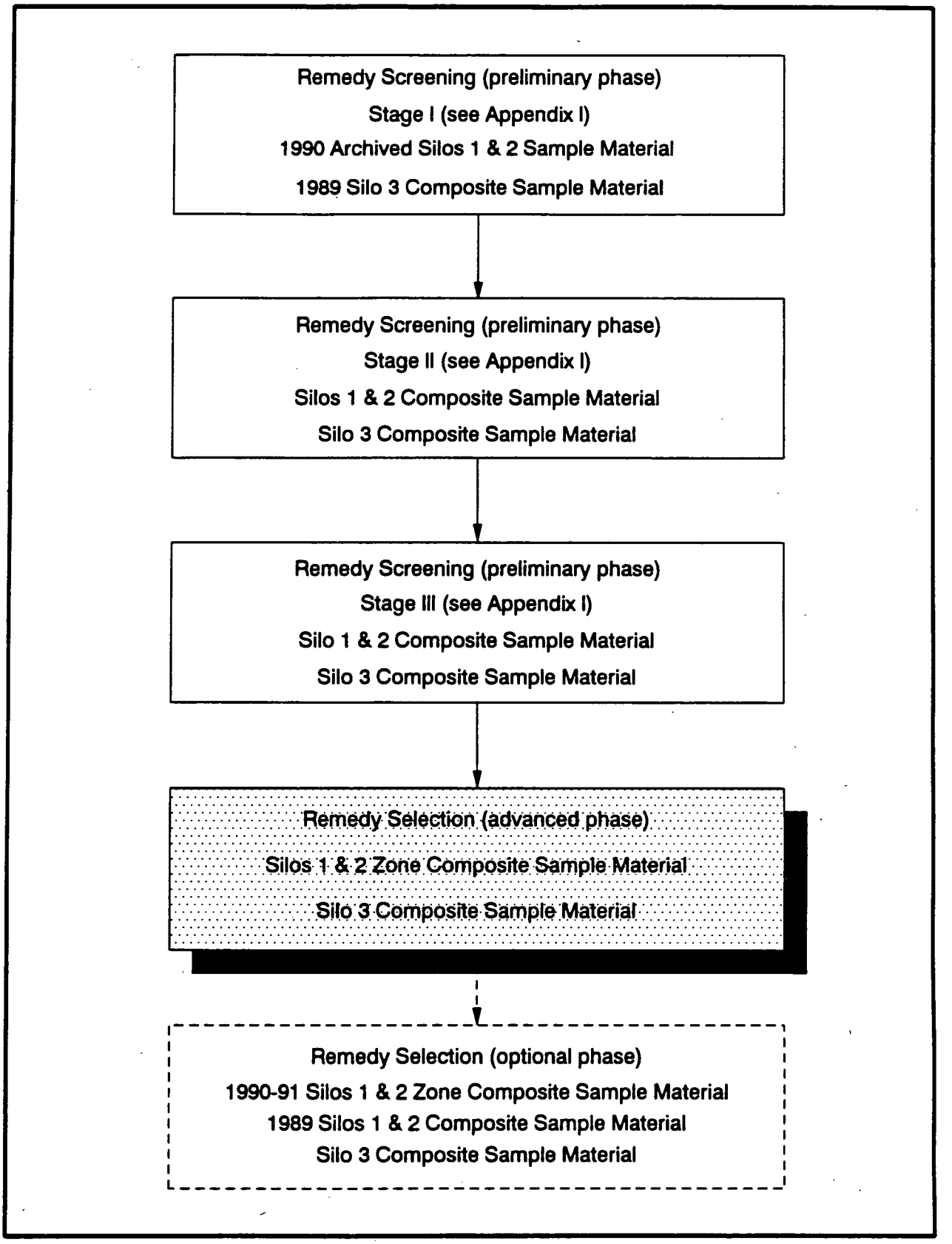

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FIGURE 4-1. STABILIZATION OF UNTREATED MATERIAL (SILOS 1, 2, AND 3)

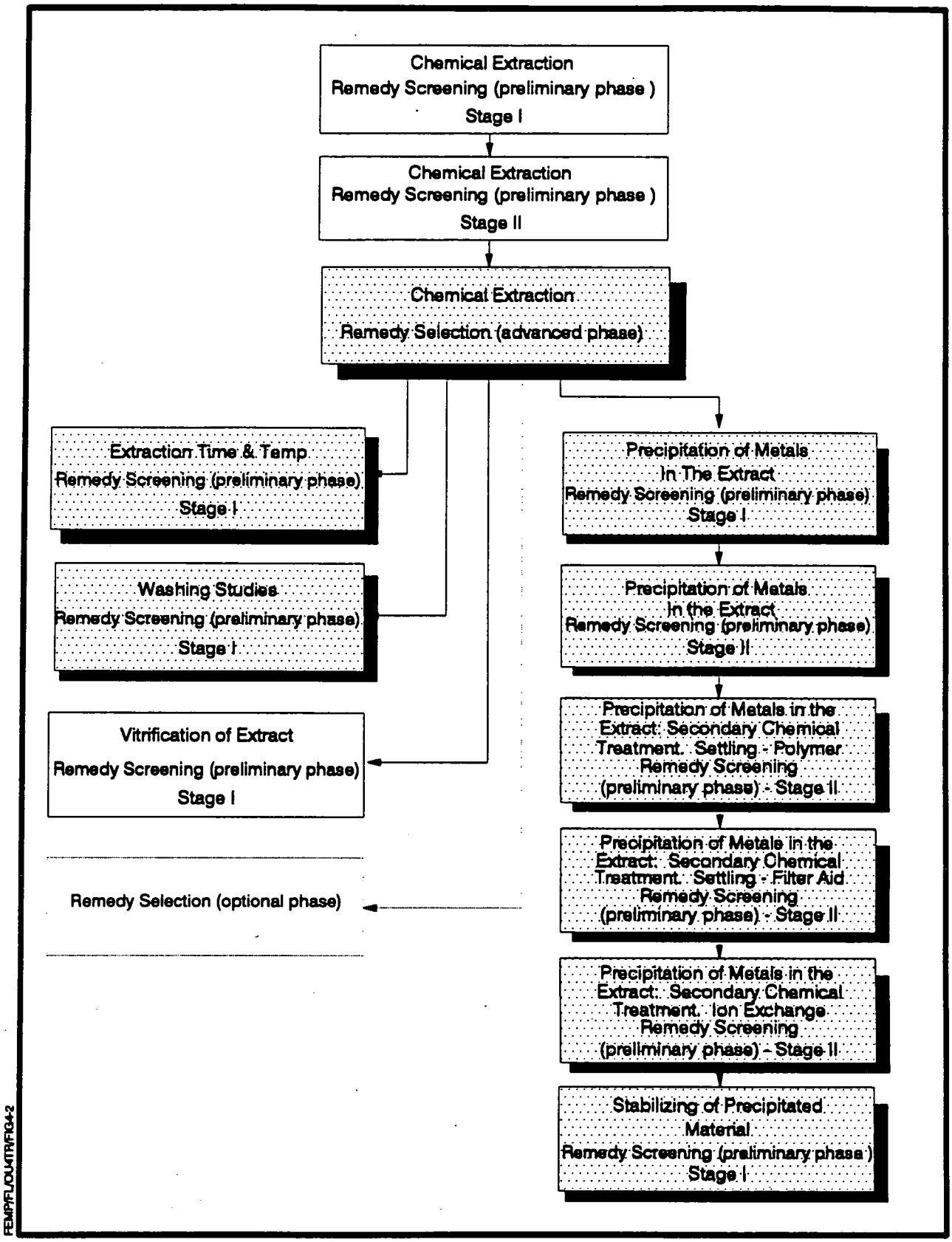

FIGURE 4-2. CHEMICAL EXTRACTION OF COMPOSITE SAMPLES FROM SILOS 1 AND 2

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developed for the tested process and for a process that incorporates some recommended improvements. Sections 4.3 through 4.6 present the QA/QC results. Section 4.7 discusses the schedule and cost for performing the treatability test program. Section 4.5 identifies the project organization and personnel who participated in the treatability test effort.

This report is organized in the following Sections:

4.1	Cement Stabilization - Treatability Test Results
4.1.1	Experimental Design and Results
4.1.1.1	Remedy Screening - Experimental Design and Results Summary
4.1.1.2	Remedy Screening - Experimental Design
4.1.1.3	Remedy Selection Results UCS, Permeability, and Bulking Factor
4.1.2	Data Analysis and Interpretation
4.1.2.1	Determination of Sample Probability Distribution
4.1.2.2	Treatment of Nondetected Results
4.1.2.3	Upper and Lower Confidence Intervals
4.1.3	Waste TCLP Leachate Analysis
4.1.3.1	Cement Stabilized Sample TCLP Leachate Analysis
4.1.3.2	Comparisons of the TCLP Leachate to LALs
4.1.3.3	Comparison of Treated and Untreated TCLP Leachate - Percent Reductions
4.1.4	Five-Day Static Leach
4.1.5	Cement Stabilization Test Objectives
4.2	Chemical Extraction
4.2.1	Chemical Extraction, Prescreening-Experimental Design, and Result Summary
4.2.1.1	Chemical Extraction - Remedy Screening (preliminary phase) Stage I
4.2.1.2	Chemical Extraction - Remedy Screening (Preliminary Phase, Stage 2
4.2.2	Remedy Selection (advanced phase)
4.2.2.1	Experimental Design
4.2.2.2	Remedy Selection Results
4.2.3	Time and Temperature
4.2.3.1	Feed Preparation - Homogeneity
4.2.3.2	Extraction Time and Temperature
4.2.4	Water Washing
4.2.5	Vitrification of Spent Extractant
4.2.6	Contaminant Removal from Spent Extractant - Preliminary Precipitation Stage I
4.2.7	Stage 2 Precipitation and Settling
4.2.7.1	Settling Tests
4.2.8	Cement Stabilization
4.2.10	Proposed Process Overview

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4.3 Quality Assurance/Quality Control
4.3.1 Blank Samples
4.3.1.1 Chemical Extraction Blank Data
4.3.1.2 Five-Day Static Leach Blank Data
4.3.1.3 TCLP Analysis Blank Data
4.4 Duplicate Samples
4.4.1 Chemical Extraction Duplicate Data
4.4.2 Five-Day Static Leach Duplicate Data
4.4.3 TCLP Analysis Duplicate Data
4.5 Spike Analysis
4.5.1 Chemical Extraction Spike Data
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4.6 Data Percent Completeness
4.6.1 Chemical Extraction Data Percent Completeness
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4.6.3 TCLP Analysis Data Percent Completeness
4.7 Schedule/Cost for Performing the Treatability Study
4.8 Key Contacts for OU4 Treatability Study

The FEMP waste TCLP characterization data for Silos 1, 2, and 3 generated for the RI is presented in Appendix A. Chemical and radiological results are presented for individual samples from each zone of Silos 1 and 2 and from Silo 3. Results of statistical analysis of the chemical and radiological results for all the characterization samples from each silo are also presented. The statistical analysis for Silos 1 and 2 was performed on each zone and on each silo as a whole. Results for each of these analyses are presented. The characterization results from Silo 3 are based on one sample. The data from this sample are included in a Statistical Analysis Software (SAS) formatted table for consistent presentation of data. The treatability study cement stabilization data (formulations, UCSs, permeabilities, and mixing information) are included in Appendix B. All data in Appendix B are stored in database files. Appendix C contains the TCLP leaching data for the advanced phase treatability samples. Appendix D contains comparisons of dilution adjusted TCLP leaching data for advanced phase samples to the LALs . Dilution adjustment is accomplished by increasing the analytical results by the same percentage that the mass of the waste is increased by the cement stabilization process. Appendix E contains the 5-day static leaching results. Appendix F is nonstandard procedures that were not included in the work plan. Appendix G contains two geotechnical reports that address testing of silo waste. Appendix H contains results on reagent/sand samples. Appendix I gives additional information on cement stabilization. Appendix J has additional chemical extraction data.

Tables 4-1 through 4-3 show the percent reduction required for the constituents of concern in TCLP leachate to meet LALs. Ra-226 and Pb-210 require greater than 99 percent reduction in all three silos to meet LALs. Silos 1 and 2 also require greater than 99 percent reduction of Ac-227 and Pa-231. Lead and beryllium are the only chemical constituents of concern requiring reduction in Silos 1 and 2. The lead requires more than 99 percent reduction, and the beryllium requires 60 and 84 percent reductions for Silos 1 and 2, respectively. In Silo 3, beryllium, chromium, cobalt, molybdenum, and nickel all require reductions in leachability ranging from 12 percent to 93 percent in order to meet LALs. Several constituents of concern have negative percent reduction required. These constituents have TCLP leachate concentrations which are less than the LALs.

4.1 CEMENT STABILIZATION - TREATABILITY TEST RESULTS

4.1.1 Experimental Design and Results

4.1.1.1 Remedy Screening - Experimental Design and Results Summary

In order to determine trends of the response variables (e.g., UCS values) as a function of the reagent loadings and to determine the envelope of reagents that would meet the performance criteria, Remedy Screening (preliminary phase) experiments were statistically designed to yield widely varying values of the response variables. This was accomplished by using a wide range of reagent loadings. The range of cement and flyash loadings varied from 26 to 68 percent (weight reagent divided by wet weight of waste [w/w]). The adsorbents (attapulgite and clinoptilolite) and set/strength accelerator (sodium silicate) percentages ranged from 0 to 12 and 0 to 7 w/w percent respectively. Blast furnace slag and ferrous chloride ($FeCl_2$) were used in Stage 3 experiments. Details of these experiments are given in Chapter 3. The results and discussions are presented in Appendix I.

The performance of the Remedy Screening (preliminary phase) samples is summarized in Table 4-4. Analysis of the results indicates that solidification of the waste in Silos 1 and 2 can readily achieve the desired UCS. Silo 3 requires higher loadings of reagents to solidify the waste since 43 percent of the formulations do not achieve a 500 psi UCS. For Silo 2, all formulations passed the TC regulatory requirements. However, stabilized samples of Silos 1 and 3 had a significant number of failures for lead (Silo 1) or arsenic and chromium (Silo 3). The leachability of chromium was controlled in Stage III by the addition of a reducing agent ($FeCl_2$) or addition of blast furnace slag to the reagent. The table also lists the maximum and minimum values for uranium and screening gross alpha and beta. Uranium was more leachable from Silo 2 waste than either Silo 1 or Silo 3 waste. The values for gross alpha and beta decreased in order of Silo 1, Silo 2, and Silo 3. The two most promising formulations derived from the Remedy Screening (advanced phase) testing program were used in the Remedy Selection phase of the program. The most promising formulation had an UCS greater than

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TABLE 4-1

% REDUCTION OF SILO 1 RADIOLOGICAL AND CHEMICAL TCLP CONSTITUENTS REQUIRED TO MEET LALS

		% Reduction Required to Meet LAL			
Radionuclides	Concentration in Raw Waste 95% UCI (pCi/L)	Based on HI=0.2 Risk	Based on 10^{-6} Risk	Based on Federal ARARs	Based on State ARARs
Ac-227	7343	NA	99.9183	99.4553	NA
Pa-231	435000	NA	99.9954	99.9885	NA
Pb-210	1.95E+06	NA	99.9998	99.9949	NA
Po-210[1]	1.67E+06	NA	NA	NA	NA
Ra-224[2]	208000	NA	NA	NA	NA
Ra-226	66370	NA	99.9699	96.9866	99.2466
Ra-228	91.8	NA	78.2135	-2078.6[3]	-444.66[3]
Th-228	49.8	NA	19.6787	-2711.2[3]	NA
Th-230	455	NA	56.044	-119.78[3]	NA
U-234	2480	NA	95.9677	71.7742	NA
U-235	133	NA	24.812	77.4436	NA
U-238	2350	NA	95.7447	70.2128	NA
Chemicals	95% UCI (mg/L)				
Beryllium	0.002	-199900[3]	60	-4900[3]	NA
Lead	723.89	99.9309	NA	99.9309	99.3093

[1]The percent reduction required for Pb-210 includes Po-210. Therefore, separate numbers are not given for Po-210.
[2]The percent reduction required for Th-228 includes Ra-224. Therefore, separate numbers are not given for Ra-224.
[3]Negative numbers indicate no reduction is required.
NA - Not applicable.

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TABLE 4-2

% REDUCTION OF SILO 2 RADIOLOGICAL AND CHEMICAL TCLP CONSTITUTENTS REQUIRED TO MEET LALS

		% Reduction Required to Meet LAL			
Radionuclides	Concentration in Raw Water 95% UCI (pCi/L)	Based on HI=0.2 Risk	Based on 10^{-6} Risk	Based on Federal ARARs	Based on State ARARs
Ac-227	4258	NA	99.8591	99.0606	NA
Pa-231	296000	NA	99.9932	99.9831	NA
Pb-2101	1.18E+06	NA	99.9997	99.9915	NA
Po-210[1]	2.20E+05	NA	NA	NA	NA
Ra-224[2]	36200	NA	NA	NA	NA
Ra-226	81840	NA	99.9756	97.5562	99.3891
Th-228	204	NA	80.3922	-586.27[3]	NA
Th-230	293	NA	31.7406	-241.3[3]	NA
U-234	3860	NA	97.4093	81.8653	NA
U-235	158	NA	36.7089	81.0127	NA
U-238	4000	NA	97.5	82.5	NA
Chemicals	95% UCI (mg/L)				
Beryllium	0.005	-79900[3]	84	-1900[3]	NA
Lead	734.43	99.9319	NA	99.9319	99.3192

[1]The percent reduction required for Pb-210 includes Po-210. Therefore, separate numbers are not given for Po-210.
[2]The percent reduction required for Th-228 includes Ra-224. Therefore, separate numbers are not given for Ra-224.
[3]Negative numbers indicate no reduction is required.
NA - Not applicable.

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TABLE 4-3

%REDUCTION OF SILO 3 RADIOLOGICAL AND CHEMICAL TCLP CONSTITUTENTS REQUIRED TO MEET LALS

		% Reduction Required to Meet LAL			
Radionuclides	Concentration in Raw Waste 95% UCI (pCi/L)	Based on HI=0.2 Risk	Based on 10^{-6} Risk	Based on Federal ARARs	Based State ARARs
Pb-210	8.71E+01	NA	96.5557	-14.811[2]	NA
Po-210[1]	2.45E+02	NA	NA	NA	NA
Ra-226	2455	NA	99.1853	18.5336	79.6334
Chemicals	95% UCI (mg/L)				
Beryllium	0.011	-36264[2]	92.7273	-809.09[2]	NA
Chromium	4.55	12.0879	NA	-119.78[2]	NA
Cobalt	15.6	87.1795	NA	NA	NA
Molybdenum	14.7	79.5918	NA	NA	NA
Nickel	29.4	65.9864	NA	65.9864	NA

[1]The percent reduction required for Pb-210 includes Po-210. Therefore, separate numbers are not given for Po-210.
[2]Negative numbers indicate no reduction is required.
NA - indicates Not Applicable.

TABLE 4-4

FERNALD OPERABLE UNIT 4
PRELIMINARY PHASE - CEMENT STABILIZATION
MTCLP SUMMARY

Parameter	Pass/Fail Value *	Units	Percentage of Failures		
			Silo 1	Silo 2	Silo 3
As	2.15	ppm	3	0	43
Ba	43	ppm	0	0	0
Cd	0.43	ppm	0	0	0
Cr	2.15	ppm	0	0	24
Pb	2.15	ppm	22	0	0
Se	0.43	ppm	6	0	0
Ag	2.15	ppm	0	0	0
UCS	500	psi	3	3	43

* Pass/fail value is TC reg. criteria adjusted for maximum dilution from the addition of reagents to waste.

Contaminant	Units	Minimum - Maximum Values		
		Silo 1	Silo 2	Silo 3
U	ppm	0.0-0.53	0.0-1.9	0.0-0.85
Alpha	dpm/4 cc	151-1365	71-724	0-24
Beta	dpm/4 cc	56-783	0-364	2-12

500 psi, met the TC regulatory limits, had relatively low gross alpha and beta values in the MTCLP extraction fluid, and had a relatively low bulking factor.

4.1.1.2 Remedy Selection - Experimental Design

The formulations used for the Remedy Selection (advanced phase) are presented in Table 4-5 and Table 4-6. The units are grams of reagent added to each 100 g of combined wet weight of waste and added bentonite. Table 4-5 is a summary table for the complete silo, while Table 4-6 shows the formulations for each zone of each silo. There were 20, 10, and zero (0) percent bentonite loadings added to zones A, B, and C, respectively for Silos 1 and 2. Bentonite was added to account for the effect of the bentonite added to Silos 1 and 2 to attenuate radon emissions. Bentonite was not added to the Silo 3 waste. Portland cement and blast furnace slag were added to solidify the waste and to add silicates to react with the metals. Cement and flyash additions maintained the treated waste in an alkaline form which should decrease the leachability of the metals of concern. When the cement and flyash were used together, they functioned to increase the strength and decrease the permeability of the treated waste. The flyash and blast furnace slag also may have decreased the effect of inhibitors (e.g., sulfates and oil) on the cement setting and strength formation reactions. Attapulgite and clinoptilolite were added to absorb metals and to decrease their leachability from the treated waste. Ferrous chloride was added as a reducing agent for the hexavalent chromium in Silo 3.

4.1.1.3 Remedy Selection Results UCS, Permeability, and Bulking Factor

Table 4-7 lists the formulations, UCS, bulking factor, bulking factor averages, and permeability values for the Remedy Selection Phase of the treatability study. All of the formulations achieved the UCS goal of 500 psi. There was no defined goal for permeability in the Work Plan. However, EPA's document, "Handbook for Cement Stabilization/Solidification of Hazardous Waste," states that "Permeabilities measured in solidified waste typically range from around 10^{-4} to 10^{-8} cm/s. Such low permeabilities indicate decreased mobility in the treated waste and a slower transfer of contaminants from the solid mass to leaching waters" (EPA 1990b). All of the treated samples had permeabilities between 10^{-7} to 10^{-9} cm/sec. Given these low permeabilities, the dominant flow of water should be around the treated material instead of through the material. Consistently, the cement-blast furnace slag-flyash formulations (formula 2) had lower bulking factors than the chosen cement-flyash formulations (formula 1). In addition, the more bentonite added to the waste, the greater the bulking of the treated waste. In Table 4-7, the Zone A samples had 20 g bentonite added per 80 g of waste, while Zone C had zero bentonite added. The Zone A samples had larger bulking factors. For the given formulations, Silo 3 had the lowest bulking factors while Silo 1 had the largest.

4.1.2 Data Analysis and Interpretation

The leachability of the treated material is analyzed by three different methods in this report. The percent reduction for the constituents of concern were calculated for each zone and for the complete silo. The percent reduction values were used to assist in the evaluation of the effectiveness of

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TABLE 4-5

CEMENT STABILIZATION
ADVANCED PHASE FORMULATIONS[a]

	Formula	Cement	Flyash	Attapulgite	Clinoptilolite	$FeCl_2$	BFS
Silo 1	1	51	31	6	6	0	0
	2	50	15	0	0	0	25
Silo 2	1	51	31	6	6	0	0
	2	50	15	0	0	0	25
Silo 3	1	51	31	0	4	1	0
	2	40	0	0	0	0	40

[a]Reagent loadings per 100 grams of combined wet weight of waste and added bentonite.

TABLE 4-6

CEMENT STABILIZATION
ADVANCED PHASE FORMULATIONS[a]

Silo	Strata	Waste	Bentonite	Cement	Flyash	Attapulgite	Clinoptilolite	Water	Ferrous Chloride	BFS
1	A	80	20	50	15	0	0	64	0	25
1	A	80	20	51	31	6	6	77	0	0
1	B	90	10	50	15	0	0	58	0	25
1	B	90	10	51	31	6	6	68	0	0
1	C	100	0	50	15	0	0	42	0	25
1	C	100	0	51	31	6	6	54	0	0
2	A	80	20	50	15	0	0	57	0	25
2	A	80	20	51	31	6	6	70	0	0
2	B	90	10	50	15	0	0	47	0	25
2	B	90	10	51	31	6	6	64	0	0
2	C	100	0	50	15	0	0	36	0	25
2	C	100	0	51	31	6	6	48	0	0
3	Composite	100	0	40	0	0	0	87	0	40
3	Composite	100	0	40	0	0	0	91	0	40
3	Composite	100	0	51	31	0	4	94	1	0

[a]Reagent loadings per 100 grams of combined wet weight of waste and added bentonite.

TABLE 4-7 5448

RESULTS OF UCS, BULKING FACTOR, AVERAGE BULKING FACTOR, AND PERMEABILITY

Silo No.	Zone	Formulation	UCS (psi)	Bulking Factor (%)	Average Bulking Factor[a] (%)	Permeability
1	A	1	1399	246	216	4E-08
1	A	1-Dup	1087	253	NA	4E-08
1	B	1	1612	196	NA	3E-08
1	C	1	>1487	150	NA	2E-08
1	A	2	>1399	209	167	4E-08
1	B	2	>1437	170	NA	4E-08
1	C	2	>1506	122	NA	2E-08
2	A	1	852	208	168	6E-08
2	A	1-Dup	1164	207	NA	6E-08
2	B	1	>1425	174	NA	5E-08
2	C	1	>1454	122	NA	5E-08
2	A	2	>1404	173	136	4E-08
2	B	2	>1461	141	NA	6E-09
2	C	2	>1528	94	NA	1E-08
3	Composite	1	>1414	63	63	3E-07
3	Composite	2	>1387	50	52.5	2E-07
3	Composite	2-Dup	>1447	55	NA	5E-08

[a]Average for the specific silo formulation combination.
NA - Not applicable.

treatment. In addition, the leachate concentration for the constituents of concern will be compared with the TC regulatory levels and the LALs. The percent reduction for each zone (PR_Z) is calculated using the following equation:

$$PR_z = \frac{100*(C_i - T_{di})}{C_i}$$

where

C_i = Characterization TCLP concentration value for constituent i
T_{di} = Treatability TCLP concentration value for constituent i adjusted for dilution by reagents

The percent reduction for each silo (PR_n) is calculated by:

$$PR_n = \frac{100*(UCI(C_i) - UCI(T_{di}))}{UCI(C_i)}$$

where

$UCI(C_i)$ and $UCI(T_{di})$ are the upper 95 percent confidence interval on the mean for C_i and T_{di}

The percentage of the TC regulatory limits and LALs are calculated using the following equation:

$$PLAL_z = \frac{100*T_{di}}{LAL_i}$$

where

LALi = The TC regulatory limit or LAL for constituent i
$PLAL_z$ = Percentage of leaching limit

To calculate the upper 95 percent confidence interval (UCI) on the mean for each constituent, the sample probability distribution was first determined. SAS was used to determine the descriptive statistics for the samples. The sample probability distribution, maximum and minimum values, mean, median, coefficient of variation, and the lower 95 percent confidence interval (LCI) and UCI on the mean are calculated by SAS. These descriptive statistics are reported in the text and appendices for the waste characterization and cement stabilization treatability results. This method of presentation of data is consistent with the Fernald site-wide risk assessment methodology. Descriptions of the determination of these statistics are presented in the following subsections.

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4.1.2.1 Determination of Sample Probability Distribution

Each data set was evaluated to determine the probability distribution (normal or lognormal) that best describes the data set. SAS was used to determine the sample probability distribution, maximum and minimum values, mean, median, upper and lower confidence limits on the mean, and the coefficient of variables for the data set. The method used consisted of the construction of a probability plot of the data set. If a straight line fits the plotted points reasonably well, a normal distribution will be assumed. If the data do not follow a straight line on the probability plot, the data will be log-transformed and replotted. Although a visual inspection of the probability plot is often sufficient to determine whether the plotted points follow a straight line, a quantitative determination of the "linearity" of the data is performed.

The quantitative evaluation of the probability plots was performed by calculating the correlation coefficient of the plotted points on the normal probability plot or on the lognormal probability plot. The correlation coefficient was compared with a critical value that depended on sample size (n) and the chosen confidence level α (equal to 0.05) (Looney and Gulledge 1985). The values that the correlation coefficient must meet or exceed in order to conclude that the distribution is normal or lognormal are given in Table 4-8.

4.1.2.2 Treatment of Nondetected Results

Analytical results are presented as "nondetects" whenever chemical concentrations in samples do not exceed the detection or quantitation levels for the analytical procedures for those samples. There are numerous terms used to describe the detection or quantitation levels (EPA 1989a). Sample quantitation limits (SQLs) are the most relevant quantitation limits for evaluating nondetected chemicals. SQLs take into account sample characteristics, sample preparation, and analytical adjustments. Generally, the detection limit (DL) (the lowest amount of a chemical that can be "seen" above the normal, random noise of an analytical instrument or method) is multiplied by a factor of three to five to obtain the SQL (EPA 1989a).

For radionuclides, the minimum detectable concentration (MDC) corresponds most directly to the SQL for chemicals. The MDC is the estimate of the activity concentration that can be practically achieved under a specified set of typical measurement parameters. These parameters include the sample size, counting time, counting efficiency, self-absorption and decay corrections, chemical yield, and other factors involved in determining activity concentrations (EPA 1980).

For the purposes of evaluating data in the Treatability Study, the term "SQL" was used for both chemicals and radionuclides.

Although EPA's Risk Assessment Guidance for Superfund Part A, Human Health Evaluation Manual allows for best professional judgement in determining the most appropriate assignment of values for

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TABLE 4-8

CORRELATION COEFFICIENT TEST RESULTS AT A 95% CONFIDENCE LEVEL[a]

n	Value	n	Value
3	0.879	26	0.960
4	0.868	27	0.961
5	0.880	28	0.962
6	0.888	29	0.963
7	0.898	30	0.964
8	0.906	31	0.965
9	0.912	32	0.966
10	0.918	33	0.967
11	0.923	34	0.968
12	0.928	35	0.969
13	0.932	40	0.972
14	0.935	45	0.974
15	0.939	50	0.977
16	0.941	55	0.979
17	0.944	60	0.980
18	0.946	65	0.981
19	0.949	70	0.983
20	0.951	75	0.984
21	0.952	80	0.985
22	0.954	85	0.985
23	0.956	90	0.986
24	0.957	95	0.987
25	0.959	100	0.987

[a](Looney and Gulledge 1985)

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nondetected results (EPA 1989a), EPA Region V has requested that a value of one-half the SQL be assigned for each nondetected result. Statistical treatment of background data for risk assessments will therefore conform with the methodology requested by EPA Region V. This methodology will affect the SAS PR_z and PR_n calculations.

4.1.2.3 Upper and Lower Confidence Intervals (UCI and LCI)

In order to construct the UCI and LCI on the mean value, a determination of the distribution type (normal or lognormal) must be made. Data reported as nondetects will be assigned a value of one-half the SQL for the purpose of calculating the UCI and LCI.

The UCI and LCI were calculated for a normal distribution as follows:

$$UCI = \bar{x} + t_{1-\alpha,n-1} \bullet (s/\sqrt{n})$$

$$LCI = \bar{x} - t_{1-\alpha,n-1} \bullet (s/\sqrt{n})$$

where

$\bar{x}$	=	sample arithmetic mean
$t_{1-\alpha,n-1}$	=	critical value for Student's t-Distribution
α	=	0.05 (i.e., $1-\alpha = 0.95$ or 95% confidence limit for a one-tailed test)
n	=	number of samples in the set
s	=	sample standard deviation

The UCI and LCI were calculated for a lognormal distribution as follows:

$$UCI = \exp\left(\bar{y} + \frac{1}{2} S_y^2 + H_{0.95} \bullet S_y/\sqrt{n-1}\right)$$

$$LCI = \exp\left(\bar{y} - \frac{1}{2} S_y^2 + H_{0.95} \bullet S_y/\sqrt{n-1}\right)$$

where

$\bar{y}$	=	$\Sigma y/n$ = sample arithmetic mean of the log-transformed data, $y = \ln x$
s_y	=	sample standard deviation of the log-transformed data
n	=	number of samples in the data set
$H_{0.95}$	=	value for computing the one-sided upper 95 percent confidence limit on a lognormal mean from standard statistical tables

4.1.3 Waste TCLP Leachate Analysis

A listing of the FEMP TCLP characterization data generated for the RI and the accompanying SAS summary reports are provided in Appendix A. The final column of the first three tables in Appendix A is a calculation of the percentage of the TCLP leachate concentration compared to the TC regulatory limits. The summary SAS tables for the constituents of concern are presented in Tables 4-9 through 4-14. The listing is sorted by silo and zone within each silo. All of the chemical data for all three silos are presented prior to the listing of radionuclide data. The summary SAS report lists the frequency of detection, minimum and maximum values, type of sample probability distribution, mean, median, 95 percent LCI and UCI on the mean, and the coefficient of variation. These data are analyzed in detail in the March 1993 draft OU4 RI report.

Chemicals whose TCLP concentration was greater than 90 percent of the TC regulatory limit are listed in Table 4-15. In this table, a "Yes" below a silo number indicates that the chemical exceeded 90 percent of the TC regulatory limit for that silo. Arsenic, carbon tetrachloride, chromium, lead, and selenium had TCLP leachate concentrations which exceeded 90 percent of the limit in one or more silos.

The LALs are presented in Table 4-16. Section 3.1.4 explains how LALs were developed.

Tables 4-17 through 4-19 present comparisons of the TCLP characterization data for chemical constituents of concern in Silos 1, 2, and 3 to LALs using symbols. Tables 4-20 through 4-22 present the radionuclide comparisons. The symbols used are O, ↔ and ●. The O symbol indicates the constituent UCI is below the HI = 0.2 LAL, 10^{-6} cancer risk-based LAL, Federal or State Standards Groundwater ARARs/TBC-based LALs, respectively. This indicates the constituent TCLP does not present a problem meeting the respective LAL. The ↔ symbol indicates the UCI lies between 0.2 and 1 HI-based LAL or between 10^{-6} and 10^{-4} for the cancer risk-based LAL. This is within the EPA established concentration range for combined risk from exposure to carcinogens and requires additional consideration to determine the risk to public health. The ● symbol indicates the UCI lies outside the HI = 1, 10^{-4} risk, or exceeds the Federal ARAR or State Groundwater LALs. A constituent which lies outside the LAL indicates additional studies are suggested.

4.1.3.1 Cement Stabilized Sample TCLP Leachate Analysis

The TCLP leachability data of the stabilized waste are presented in Appendix C. The MTCLP for the Remedy Screening (preliminary phase) investigations are presented in the Clipper® database in Appendix B. The Clipper® database is described in Appendix B. Appendix C contains results on TCL volatiles, TCL semivolatiles, TCL pesticides/polychorinated biphenyl (PCBs), metals, and radionuclides. The TCLP results are presented in two different formats: results of actual analysis of the extract, and results adjusted for dilution by cement stabilization reagents. The dilution-adjusted data is in Appendix D. The adjustment for dilution is made because addition of the stabilizing

TABLE 4-9

TCLP CHEMICAL DATA, ALL ZONES OF SILO 1, CHARACTERIZATION UNTREATED WASTE SAMPLES

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
2-Butanone	9/11	0.001-0.010	N	0.005	0.005	0.003	0.006	52.356
4-Methyl-2-pentanone	8/13	0.001-0.010	L	0.004	0.002	0.002	0.010[i]	90.652
Acetone	10/11	0.069-0.490	L	0.22	0.17	0.061[i]	0.490[i]	78.204
Antimony	12/12	0.067-0.129	N	0.093	0.102	0.083	0.103	20.674
Barium	12/12	0.348-1.830	L	0.868	0.717	0.663	1.149	46.267
Benzoic acid	4/10	0.006-0.100	L[1]	0.037	0.053	0.022	0.063	59.468
Beryllium	6/12	0.002-0.003	L[1]	0.002	0.002	0.001[i]	0.002	46.762
Boron	12/12	0.168-0.384	L	0.249	0.248	0.213	0.293	28.064
Cadmium	12/12	0.002-0.005	L	0.003	0.003	0.003	0.004	30.082
Chromium	12/12	0.045-0.081	L	0.059	0.054	0.053	0.066	20.648
Cobalt	12/12	0.720-3.060	N	1.816	1.655	1.356	2.277	48.924
Copper	12/12	0.068-0.404	N	0.208	0.206	0.158	0.259	46.578
Di-n-octyl phthalate	4/10	0.005-0.020	L[1]	0.01	0.01	0.007	0.012	41.344
Iron	10/12	0.018-0.100	L	0.042	0.04	0.028	0.067	55.616
Lead	9/9	229.00 -841.00	N	585	682	446.11	723.89	38.302
Methylene chloride	11/13	0.009-0.058	L	0.021	0.013	0.011	0.052	80.619
Molybdenum	12/12	0.036-0.108	N	0.072	0.083	0.059	0.086	35.921
N-Nitroso-di-n-propylamine	4/10	0.018-0.280	L[1]	0.023	0.01	0.011[i]	0.049	158.73
Nickel	12/12	1.320-5.570	L	3.183	2.925	2.388	4.365	43.573

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TABLE 4-9
(Continued)

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Selenium	11/11	0.015-0.306	N	0.135	0.114	0.087	0.183	65.092
Silver	12/12	0.023-0.048	L	0.034	0.033	0.029	0.038	22.707
Tetrachlorethene	1/6	0.001-0.001	L[l]	0.003	0.003	0.002	0.001[i]	57.358
Thallium	9/12	0.002-0.009	N	0.004	0.003	0.003	0.006	70.144
Toluene	7/12	0.001-0.005	N	0.003	0.003	0.002	0.003	39.057
Tributyl phosphate	1/1	0.064-0.064	h	h	0.064	0.064[h]	0.064[h]	.
Vanadium	12/12	0.017-0.032	L	0.023	0.021	0.02	0.026	22.357
Zinc	12/12	0.020-0.323	L	0.128	0.099	0.081	0.222	61.901
bis(2-Ethylhexyl)phthalate	2/10	0.006-0.098	L[l]	0.013	0.01	0.008	0.02	144.64

[c] Distribution: N = Normal; L = Lognormal
[d] If the distribution is normal or if the distribution is log-normal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean given. If the distribution is log-normal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.
[e] If the distribution is normal or if the distribution is log-normal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.
[h] Not applicable if sample size is < 2.
[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.
[j] Freqency of detection is less than 5%.
[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.
[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as log-normal.
[m] Statistics for constituent with outliers rejected

TABLE 4-10

TCLP CHEMICAL DATA, ALL ZONES OF SILO 2, CHARACTERIZATION OF UNTREATED WASTE SAMPLES

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
2-Butanone	2/6	0.002-0.002	L[1]	0.004	0.003	0.002[i]	0.002[i]	125.49
4-Methyl-2-pentanone	1/8	0.001-0.001	L[1]	0.005	0.005	0.003	0.001[i]	89.106
Acetone	3/8	0.015-0.092	L[1]	0.029	0.038	0.012[i]	0.068	86.133
Antimony	8/8	0.079-0.123	L	0.092	0.086	0.081	0.104	18.13
Arsenic	9/10	0.003-0.322	L	0.052	0.004	0.002[i]	0.322[i]	193.75
Barium	10/10	0.157-8.470	L	2.412	0.798	0.246	8.470[i]	129.62
Beryllium	9/9	0.003-0.005	L	0.005	0.005	0.004	0.005	13.329
Boron	4/4	0.240-1.500	L[1]	0.527	0.507	0.196[i]	1.418	84.327
Cadmium	9/9	0.010-0.077	L	0.042	0.025	0.023	0.077[i]	62.063
Chromium	10/10	0.086-0.207	L	0.128	0.127	0.111	0.149	24.791
Cobalt	9/9	1.180-6.160	L	2.653	1.58	1.463	4.823	74.061
Copper	9/9	0.274-3.860	L	1.191	0.525	0.406	3.46	108.95
Lead	8/8	117.00-772.00	L	398.74	324.48	229.55	734.43	58.402
Magnesium	9/9	7.350-29.600	L	13.67	9.24	8.551	22.017	61.672
Methylene chloride	3/8	0.014-0.046	L[1]	0.007	0.006	0.004[i]	0.015	119.27
Molybdenum	9/9	0.034-0.099	L	0.055	0.046	0.042	0.073	43.51
N-Nitroso-di-n-propylamine	1/8	0.005-0.005	L[1]	0.009	0.01	0.008	0.005[i]	18.856
Nickel	9/9	2.008-5.770	L	3.155	2.4	2.267	4.437	44.675
Selenium	10/10	0.026-0.568	L	0.101	0.049	0.038	0.197	162.53
Silver	10/10	0.053-0.164	L	0.091	0.083	0.076	0.109	31.382

TABLE 4-10
(Continued)

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Thallium	8/9	0.002-0.029	L	0.007	0.003	0.002[i]	0.028	129.52
Vanadium	7/7	0.046-0.060	L	0.052	0.052	0.049	0.056	9.186
Zinc	9/9	0.114-0.563	L	0.272	0.17	0.156	0.486	65.163
bis(2-Ethylhexyl)phthalate	3/8	0.006-0.055	L[l]	0.012	0.01	0.007	0.018	106.93

[c] Distribution: N = Normal; L = Lognormal
[d] If the distribution is normal or if the distribution is log-normal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.
[e] If the distribution is normal or if the distribution is log-normal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the man is given. If the distribution is log-normal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.
[h] Not applicable if sample size is < 2.
[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.
[j] Frequency of detection is less than 5%.
[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.
[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as log-normal.
[m] Statistics for constituent with outliers rejected

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TABLE 4-11

TCLP CHEMICAL DATA, SILO 3, CHARACTERIZATION OF UNTREATED WASTE SAMPLES

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c] (mg/L)	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Arsenic	1/1	5.310-5.310	h	5.310	h	h	h	h
Barium	1/1	0.059-0.059	h	0.059	h	h	h	h
Beryllium	1/1	0.011-0.011	h	0.011	h	h	h	h
Boron	1/1	10.100-10.100	h	10.100	h	h	h	h
Cadmium	1/1	0.062-0.062	h	0.062	h	h	h	h
Chromium	1/1	4.550-4.550	h	4.550	h	h	h	h
Cobalt	1/1	15.600-15.600	h	15.600	h	h	h	h
Copper	1/1	0.486-0.486	h	0.486	h	h	h	h
Lithium	1/1	72.200-72.200	h	72.200	h	h	h	h
Manganese	1/1	2.870-2.870	h	2.870	h	h	h	h
Mercury	1/1	0.000-0.000	h	0.000	h	h	h	h
Molybdenum	1/1	14.700-14.700	h	14.700	h	h	h	h
Nickel	1/1	29.400-29.400	h	29.400	h	h	h	h
Selenium	1/1	0.922-0.922	h	0.922	h	h	h	h
Thallium	1/1	0.042-0.042	h	0.042	h	h	h	h
Vanadium	1/1	2.410-2.410	h	2.410	h	h	h	h
Zinc	1/1	0.181-0.181	h	0.181	h	h	h	h

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If

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TABLE 4-11
(Continued)

the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size is < 2.

j Frequency of detection is less than 5%.

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

m Statistics for constituent with outliers rejected

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TABLE 4-12

TCLP RADIOLOGICAL DATA, ALL ZONES OF SILO 1, CHARACTERIZATION OF UNTREATED WASTE SAMPLES

Radionuclide	Frequency of Detection	Range of Detection (pCi/L)	Dist[c]	Mean[d] (pCi/L)	Median (pCi/L)	Lower 95% CI on Mean (pCi/L)	Upper 95% CI on Mean (pCi/L)	Coefficient of Variations (%)
Ac-227	3/3	5014.0-7343.0	L[l]	6454.1	7302	4464.1[i]	7343.0[i]	20.341
Pb-210	3/3	509000-1.67E6	L[l]	946331	997000	346608[i]	1.67E6[i]	55.065
Po-210	3/3	71200-208000	L[l]	125665	134000	50659[i]	208000[i]	49.717
Ra-226	3/3	40150-66370	L[l]	48974	44080	31205[i]	66370[i]	28.169
Ra-228	2/3	75.600-91.800	L[l]	47.042	75.6	8.796[i]	91.800[i]	66.583
Th-228	3/3	14.900-49.800	L[l]	30.962	40	10.476[i]	49.800[i]	51.577
Th-230	3/3	307.00-455.00	L[l]	380.38	394	271.93[i]	455.00[i]	19.303
Th-232	3/3	5.650-8.420	L[l]	6.875	6.83	4.911[i]	8.420[i]	19.953
U-234	3/3	238.00-2480.0	L[l]	573.75	320	66.721[i]	2480.0[i]	125.55
U-235/236	3/3	9.740-133.00	L[l]	26.336	14.1	2.426[i]	133.00[i]	133.78
U-238	3/3	246.00-2350.0	L[l]	576.83	332	73.061[i]	2350.0[i]	122

[c] Distribution: N = Normal; L = Lognormal
[d] If the distribution is normal or if the distribution is log-normal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.
[e] If the distribution is normal or if the distribution is log-normal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.
[h] Not applicable if sample size is < 2.
[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted or the upper 95% CI and the minimum is substituted for the lower 95% CI.
[j] Freqency of detection is less than 5%.
[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.
[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as log-normal.
[m] Statistics for constituent with outliers rejected

TABLE 4-13

TCLP RADIOLOGICAL DATA, ALL ZONES OF SILO 2, CHARACTERIZATION OF UNTREATED WASTE SAMPLES

Radionuclide	Frequency of Detection	Range of Detection (pCi/L)	Dist[c]	Mean[d] (pCi/L)	Median (pCi/L)	Lower 95% CI on Mean (pCi/L)	Upper 95% CI on Mean (pCi/L)	Coefficient of Variations (%)
Ac-227	3/3	2620.0-4258.0	L[l]	3359.9	3400	2230.5[i]	4258.0[i]	23.914
Pb-210	3/3	104000-220000	L[l]	139637	119000	71216[i]	220000[i]	42.725
Po-210	3/3	18100-36200	L[l]	23537	19900	12491[i]	36200[i]	40.315
Ra-226	3/3	24410-81840	L[l]	54138	79430	16917[i]	81840[i]	52.484
Ra-228	2/3	11.000-19.700	L[l]	14.813	15	9.061[i]	19.700[i]	28.587
Th-228	3/3	24.700-204.00	L[l]	82.884	113	13.212[i]	204.00[i]	78.712
Th-230	3/3	72.800-293.00	L[l]	132.88	110	39.794[i]	293.00[i]	74.319
Th-232	1/3	1.870-1.870	L[l]	10.534	25	0.844[i]	1.870[i]	77.236
U-234	3/3	417.00-3860.0	L[l]	1553.7	2330	217.34[i]	3860.0[i]	78.328
U-235/236	3/3	19.200-158.00	L[l]	66.192	95.6	10.346[i]	158.00[i]	76.449
U-238	3/3	421.00-4000.0	L[l]	1592.9	2400	217.76[i]	4000.0[i]	78.852

c Distribution: N = Normal; L = Lognormal

d If the distribution is normal or if the distribution is log-normal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is log-normal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size is < 2.

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TABLE 4-13
(Continued)

i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.
j Frequency of detection is less than 5%.
k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.
l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as log-normal.
m Statistics for constituent with outliers rejected

TABLE 4-14

TCLP RADIOLOGICAL DATA, SILO 3, CHARACTERIZATION OF UNTREATED WASTE SAMPLES

Radionuclide	Frequency of Detection	Range of Detection (pCi/L)	Dist[c]	Mean[d] (pCi/L)	Median (pCi/L)	Lower 95% CI on Mean (pCi/L)	Upper 95% CI on Mean (pCi/L)	Coefficient of Variations (%)
Ac-227	1/1	5.540-5.540	h	5.54	h	h	h	h
Pb-210	1/1	87.100-87.100	h	87.1	h	h	h	h
Po-210	1/1	245.00-245.00	h	245	h	h	h	h
Ra-226	1/1	2455.0-2455.0	h	2455	h	h	h	h
Th-228	1/1	3.170-3.170	h	3.17	h	h	h	h
Th-230	1/1	10.400-10.400	h	10.4	h	h	h	h
U-234	1/1	92.200-92.200	h	92.2	h	h	h	h
U-235/236	1/1	5.090-5.090	h	5.09	h	h	h	h
U-238	1/1	86.000-86.000	h	86	h	h	h	h

c Distribution: N = Normal; L = Lognormal.

d If the distribution is normal or if the distribution is log-normal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is log-normal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size is < 2.

j Frequency of detection is less than 5%.

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.

k Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as log-normal.

m Statistics for constituent with outliers rejected.

TABLE 4-15

CHEMICALS IN TCLP EXTRACTS THAT EXCEEDED 90 PERCENT OF THE TC REGULATORY LIMITS FOR THE CHARACTERIZATION SAMPLES

Chemical	Silo 1	Silo 2	Silo 3
Arsenic	No	No	Yes
Carbon tetrachloride	No	Yes	No
Chromium	No	No	Yes
Lead	Yes	Yes	No
Selenium	No	No	Yes

Yes - indicates that compound exceeded 90% of the TC regulatory limit.
No - indicates that compound was less than 90% of the TC regulatory limit.

TABLE 4-16

PROPOSED ON-PROPERTY DISPOSAL LEACHATE ACTION LEVELS

	Risk-Based Action Levels[a]		ARAR/TBC-Based Action Levels[a]		
			Federal Standards		State Stds.
Chemical	HI=0.20 RfD-Based LALs[b]	10^{-6} CSF-Based LALs[c], above background	Source[d]	Conc.[e]	Groundwaters[f]
RADIONUCLIDES (pCi/L)					
Ac-227 + 7 progeny	NA	6	4 mrem dose limit[g]	40	NA
Pa-231	NA	20	4 mrem dose	50	NA
Pb-210 + 2 progeny	NA	3	MCL[h]	100	NA
Po-210[k]	NA	NA	NA	NA	NA
Ra-224[l]	NA	NA	NA	NA	NA
Ra-226 + 5 progeny	NA	20	PMCL[i]	2000	500
Ra-228 + 1 progeny	NA	20	PMCL	2000	500
Th-228 + 7 progeny	NA	40	4 mrem dose	1400	NA
Th-230	NA	200	4 mrem dose	1000	NA
Th-232	NA	200	4 mrem dose	200	NA
U-234	NA	100	PMCL	700	NA
U-235 + 1 progeny	NA	100	PMCL	30	NA
U-238 + 2 progeny	NA	100	PMCL	700	NA
INORGANICS (mg/L)					
Antimony	0.3	NA	NA	NA	NA

TABLE 4-16
(Continued)

Chemical	Risk-Based Action Levels[a]		ARAR/TBC-Based Action Levels[a]		
			Federal Standards		State Stds.
	HI=0.20 RfD-Based LALs[b]	10^{-6} CSF-Based LALs[c], above background	Source[d]	Conc.[e]	Groundwaters[f]
Arsenic	0.7	NA	MCL	5	5
Barium	40	NA	MCL	200	100
Beryllium	4	0.0008	PMCL	0.1	NA
Boron	70	NA	NA	NA	NA
Cadmium	0.4	NA	MCL	0.5	1
Chromium	4	NA	MCL	10	5
Cobalt	2	NA	NA	NA	NA
Copper[j]	NA	NA	NA	NA	NA
Lead	0.5	NA	MCL	0.5	5
Manganese	70	NA	NA	NA	NA
Mercury	0.2	NA	MCL	0.2	0.2
Molybdenum	3	NA	NA	NA	NA
Nickel	10	NA	PMCL	10	NA
Selenium	4	NA	MCL	5	1
Silver	2	NA	MCL	5	5
Thallium	0.05	NA	PMCL	0.2	NA
Vanadium	5	NA	NA	NA	NA
Zinc	100	NA	NA	NA	NA

TABLE 4-16
(Continued)

Chemical	Risk-Based Action Levels[a]		ARAR/TBC-Based Action Levels[a]		
			Federal Standards		State Stds.
	HI=0.20 RfD-Based LALs[b]	10^{-6} CSF-Based LALs[c], above background	Source[d]	Conc.[e]	Groundwaters[f]
Cyanide	10	NA	PMCL	0.2	NA
ORGANICS (mg/L)					
2-Butanone	40	NA	NA	NA	NA
3-Methyl-2-butanone[j]	NA	NA	NA	NA	NA
2-Hexanone[j]	NA	NA	NA	NA	NA
4,4-DDE[m]	0.4	0.01	NA	NA	NA
4,4-DDT[m]	0.4	0.01	NA	NA	NA
4-Methyl-2-pentanone	40	NA	NA	NA	NA
Acetone	70	NA	NA	NA	NA
Aldrin	0.02	0.0002	NA	NA	NA
Aroclor-1254	NA	0.0005	MCL	0.05	NA
Aroclor-1260	NA	0.0005	MCL	0.05	NA
Benzoic Acid	2900	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	10	0.3	NA	NA	NA
Methylester butanoic acid[l]	NA	NA	NA	NA	NA
Carbon Tetrachloride	0.5	0.03	MCL	0.5	0.5
Chloroform	7	0.6	MCL	10	NA
Di-n-octyl Phthalate	10	NA	NA	NA	NA

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TABLE 4-16
(Continued)

Chemical	Risk-Based Action Levels[a]		ARAR/TBC-Based Action Levels[a]		
			Federal Standards		State Stds.
	HI=0.20 RfD-Based LALs[b]	10^{-6} CSF-Based LALs[c], above background	Source[d]	Conc.[e]	Groundwaters[f]
Dieldrin	0.04	0.0002	NA	NA	NA
Diethylphthalate	600	NA	NA	NA	NA
Dimethylphthalate	7000	NA	NA	NA	NA
Endosulfan I	0.04	NA	NA	NA	NA
Endosulfan II	0.04	NA	NA	NA	NA
Endrin	0.2	NA	NA	NA	NA
Fluoranthene	30	NA	NA	NA	NA
Heptachlorepoxide	0.01	0.0004	NA	NA	NA
Methylene Chloride	40	0.5	PMCL	0.5	NA
N-Nitroso-di-n-propylamine	NA	0.0005	NA	NA	NA
Phenol	400	NA	NA	NA	NA
Pyrene	20	NA	NA	NA	NA
Styrene	100	NA	NA	NA	NA
Tetrachlorethene	7	0.07	MCL	0.5	NA
Toluene	100	NA	MCL	100	NA
Tributyl phosphate[j]	NA	NA	NA	NA	NA
Xylenes (total)	1500	NA	MCL	1000	NA

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TABLE 4-16
(Continued)

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[a] Leachate action levels are developed based on the potential for chemicals in those zones to leach into the bedrock aquifer or a receiving surface water body, thus equating water in the shallow zones to "leachate." Leachate is regulated by the U.S. EPA under 40CFR261 with the use of the toxicity characteristic leaching procedure (TCLP). TCLP regulatory levels are based on the acceptable drinking water concentrations multiplied by a dilution attenuation factor (DAF), which accounts for the degree of attenuation and dilution that a compound is expected to undergo during transport to the drinking water aquifer or receiving stream (U.S. EPA 1986c; 51FR21650).

[b] Based on a Hazard Index-based groundwater preliminary remediation goal and a DAF of 100. Preliminary remediation goals were developed using equations and parameters for drinking water ingestion and RfDs from Health Effects Assessment Summary Tables (EPA, 1992a) and the Integration Risk Information System (EPA, 1992b). Blank spaces in the table indicate information is not available to determine a value.

[c] Based on cancer risk-based groundwater preliminary remediation goal and a DAF of 100. The preliminary remediation goals were developed using equations and parameters for drinking water ingestion and chemical-specific SFs from HEAST IRIS. Values represent DAF times the cleanup goal above background values since 10^{-6} target risk represents an incremental lifetime cancer risk goal.

[d] ARAR-based leachate action levels are developed from several sources. The primary source is promulgated or proposed maximum contaminant levels (MCLs) developed under the Safe Drinking Water Act, 40CFR141, 142. If no MCL exists that strictly applies to the individual radionuclide, a leachate action level is developed using the DAF times the 4 mrem dose limit that strictly applies to man-made beta and gamma emitters.

[e] Concentration in pCi/L for radionuclides and mg/L for chemicals multiplied by the DAF, corresponding to the MCL or PMCL values.

[f] Based on DAF applied to OAC3745-81-16; for many radionuclides, values are based on the DAF applied to an average annual dose of beta particle and photon (e.g., gamma) of 4 mrem/year.

[g] Leachate action level based on DAF applied to the remediation goal interpretation to 4 mrem/year dose limit for beta and gamma emitters may be applicable to alpha emitters. Preliminary remediation goal developed using committed effective dose equivalents (CEDE) to 4 mrem/year of intake at a rate of 730 L/year, using dose conversion factors (DCFs) from EPA (1988b).

[h] Leachate action level is based on the DAF applied to the remediation goal developed using the strictly applicable MCL of 4 mrem/year for man-made beta and gamma emitters (40CFR141, 142). Value developed using the CODE or critical organ dose equivalent (if available or if more conservative) to 4 mrem/year of intake at a rate of 730 L/year, using DCFs from EPA (1988b).

[i] Proposed MCLs from "Federal Register", Vol. 55, No. 138, p. 33050.

[j] No toxicity data available to develop a leachate action level.

[k] Po-210 is included with its precursor, Pb-210.

[l] Ra-224 is included with its precursor, Th-228.

[m] Leachate action levels are based on the values derived from DDT.

NA - indicates Not Applicable.

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TABLE 4-17

TCLP CHEMICAL DATA FOR SILO 1 UNTREATED WASTE CHARACTERIZATION SAMPLES

Chemical	Comparison of UCI to LALs			
	HI=0.2	10^{-6} Risk	ARAR	Groundwater
2-Butanone	○	○	○	○
4-Methyl-2-pentanone	○	○	○	○
Acetone	○	○	○	○
Antimony	○	○	○	○
Barium	○	○	○	○
Benzoic acid	○	○	○	○
Beryllium	○	↔	○	○
bis(2-Ethylhexyl)phthalate	○	○	○	○
Boron	○	○	○	○
Cadmium	○	○	○	○
Chromium	○	○	○	○
Cobalt	↔	○	○	○
Copper	○	○	○	○
Di-n-octyl phthalate	○	○	○	○
Lead	●	○	●	●
Methylene chloride	○	○	○	○
Molybdenum	○	○	○	○
Nickel	○	○	○	○

Notes:

○ = Passed LAL
↔ = Discussion area
● = Additional study suggested

Table 4-18 5448

TCLP CHEMICAL DATA FOR SILO 2 UNTREATED WASTE CHARACTERIZATION SAMPLES

	Comparison of UCI to LALs			
Chemical	HI=0.2	10^{-6} Risk	ARAR	Groundwater
2-Butanone	○	○	○	○
4-Methyl-2-pentanone	○	○	○	○
Acetone	○	○	○	○
Antimony	○	○	○	○
Arsenic	○	○	○	○
Barium	○	○	○	○
Beryllium	○	↔	○	○
bis(2-Ethylhexyl)phthalate	○	○	○	○
Boron	○	○	○	○
Cadmium	○	○	○	○
Chromium	○	○	○	○
Cobalt	↔	○	○	○
Lead	●	○	●	●
Methylene chloride	○	○	○	○
Molybdenum	○	○	○	○
Nickel	○	○	○	○
N-Nitroso-di-n-propylamine	○	↔	○	○
Selenium	○	○	○	○

Notes:

○ = Passed LAL
↔ = Discussion area
● = Additional study suggested

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TABLE 4-19

TCLP CHEMICAL DATA FOR SILO 3 UNTREATED WASTE CHARACTERIZATION SAMPLES

	Comparison of UCI to LALs			
Chemical	HI=0.2	10^{-6} Risk	ARAR	Groundwater
Arsenic	●	○	●	●
Barium	○	○	○	○
Beryllium	○	●	○	○
Boron	○	○	○	○
Cadmium	○	○	○	○
Chromium	↔	○	○	○
Cobalt	●	○	○	○
Copper	○	○	○	○
Manganese	○	○	○	○
Mercury	○	○	○	○
Molybdenum	↔	○	○	○
Nickel	↔	○	●	○
Selenium	○	○	○	○
Thallium	○	○	○	○
Vanadium	○	○	○	○
Zinc	○	○	○	○

Notes:

○ = Passed LAL
↔ = Discussion area
● = Additional study suggested

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TABLE 4-20

RADIOLOGICAL TCLP DATA OF UNTREATED WASTE CHARACTERIZATION SAMPLES FOR ALL ZONES OF SILO 1

	Comparison of UCI to LALs			
Radionuclide	HI=0.2	10^{-6} Risk	ARAR	Groundwater
Ac-227	○	●	●	○
Pb-210	○	●	●	○
Po-210	○	○	○	○
Ra-226	○	●	●	●
Ra-228	○	↔	○	○
Th-228	○	↔	○	○
Th-230	○	↔	○	○
Th-232	○	○	○	○
U-234	○	↔	●	○
U-235/236	○	↔	●	○
U-238	○	↔	●	○

Notes:

○ - Passed LAL
↔ - Discussion area
● - Additional study suggested

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TABLE 4-21

RADIOLOGICAL TCLP DATA OF UNTREATED WASTE CHARACTERIZATION SAMPLES FOR ALL ZONES OF SILO 2

	Comparison of UCI to LALs			
Radionuclide	HI=0.2	10^{-6} Risk	ARAR	Groundwater
Ac-227	○	●	●	○
Pb-210	○	●	●	○
Po-210	○	○	○	○
Ra-226	○	●	●	●
Ra-228	○	○	○	○
Th-228	○	↔	○	○
Th-230	○	↔	○	○
Th-232	○	○	○	○
U-234	○	↔	●	○
U-235/236	○	↔	●	○

Notes:

○ - Passed LAL
↔ - Discussion area
● - Additional study suggested

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TABLE 4-22

RADIOLOGICAL TCLP DATA OF UNTREATED WASTE CHARACTERIZATION SAMPLES FOR SILO 3

	Comparison of UCI to LALs			
Radionuclide	HI=0.2	10^{-6} Risk	ARAR	Groundwater
Ra-226	○	●	●	●
Pa-231	○	↔	●	○
Ac-227	○	○	○	○
Pb-210	○	↔	○	○
Po-210	○	○	○	○
Ra-228	○	↔	○	○
Th-228	○	○	○	○
Th-230	○	○	○	○
Th-232	○	○	○	○
U-234	○	○	○	○

Notes:

○ - Passed LAL
↔ - Discussion area
● - Additional study suggested

reagents reduces the concentrations of the various constituents of concern in the treated waste. In order to determine if leachate concentration reductions are due to treatability or dilution, the results are adjusted for dilution. The summary SAS tables for the constituents of concern are presented in Tables 4-23 through 4-34.

During the course of OU2 treatability testing, full TCLP and radiological analysis of reagent blanks were conducted to determine possible contributions from the reagents to the leachate quality of the treated waste. These were the same reagents used for OU4 treatability testing. Additional experimental blanks were produced using seven mixtures of reagents on which TCLP and radiological analysis were performed to determine if potential contamination could be introduced by the experimental equipment or procedures. These mixtures were made in the same equipment and allowed to cure in the same type of molds in which the treated waste would cure. "Clean" sand (i.e., sand sold for use in a child's sand box) was substituted in these mixtures for the site waste and site flyash. Appendix H contains the leaching data for the reagent blanks and experimental blanks. The reagents which were mixed with water and cured have leachates with similar or lower concentrations of contaminants than the reagents by themselves. With the exception of Pb-210 and beryllium, the reagents are not adding significant concentrations of metal, organic, or radionuclides to the waste/reagent mixtures that would cause the mixtures to exceed the LALs. This data can be found in Table 4-35. Portland cement may be contributing leachable levels of Pb-210 and beryllium that exceeds the LALs.

It is important to remember that a direct comparison of the TCLP results and leachate limits reported in this study do not necessarily indicate the acceptability of the treatment technologies tested. This is due to two reasons. First, the TCLP methodology does not indicate the expected field performance of the treatment technology because it does not replicate the conditions found naturally in the environment around the FEMP. TCLP methodology is based on a traumatic physical attack on the treated material, followed by the application of an acetic solution to the physically altered substrate. It is doubtful that this sequence of events would be replicated by natural processes at the FEMP. Second, the leachate limits presented in this report assume the waste would be abandoned in shallow land-fill trenches. On-property disposal alternatives require placement of the treated waste in an engineered disposal facility. This facility would alter the infiltration rate of water through the waste and increase the effects of dilution and attenuation on leachate entering the aquifer. Thus the actual leachate concentrations produced by the combination of the two technologies are expected to be well below the TCLP results in this report. This means that those technologies producing leachate concentrations which exceed the listed leachate limits may still be viable technologies if considered as a part of an integrated disposal option.

TABLE 4-23

DILUTION ADJUSTED TCLP TREATABILITY SAS DATA, ALL ZONE OF SILO 1, FORMULA 1

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
2-Butanone	2/4	0.004-0.006	L[k]	0.005	0.005	0.004	0.006[i]	15.848
Acetone	2/4	0.027-0.033	L[k]	0.013	0.017	0.004[i]	0.033[i]	79.542
Antimony	3/4	0.076-0.090	L[k]	0.055	0.083	0.020[i]	0.090[j]	52.839
Barium	4/4	0.854-1.715	L[k]	1.349	1.505	0.934	1.715[i]	26.983
Benzoic Acid	2/4	0.008-0.008	L[k]	0.020	0.029	0.006[i]	0.008[i]	84.305
Boron	4/4	0.330-0.417	L[k]	0.365	0.359	0.321[i]	0.415	11.074
Chromium	4/4	0.119-0.124	L[k]	0.121	0.122	0.119[i]	0.124[i]	1.824
Lead	4/4	0.047-0.355	L[k]	0.150	0.173	0.056	0.355[i]	67.746
Molybdenum	4/4	20.000-27.767	L[k]	24.568	25.631	20.698	27.767[i]	13.817
Selenium	4/4	0.194-0.439	L[k]	0.275	0.270	0.170[i]	0.439[i]	40.874
Tributyl phosphate	4/4	0.035-0.505	L[k]	0.150	0.272	0.029[i]	0.505[i]	95.695
Vanadium	4/4	0.022-0.044	L[k]	0.030	0.029	0.021[i]	0.043	31.124
Zinc	4/4	0.023-0.040	L[k]	0.032	0.033	0.023[i]	0.040[i]	25.502

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[e] If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size is < 2

TABLE 4-23
(Continued)

[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.
[j] Frequency of detection is less than 5%
[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.
[k] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.
[m] Statistics for constituent with outliers rejected

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TABLE 4-24

DILUTION ADJUSTED TREATABILITY TCLP SAS DATA, ALL ZONES OF SILO 1, FORMULA 2

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Acetone	3/3	0.023-0.046	L[l]	0.035	0.042	0.019[i]	0.046[i]	33.264
Antimony	3/3	0.066-0.100	L[l]	0.079	0.075	0.055[i]	0.100[i]	21.753
Barium	3/3	1.188-1.342	L[l]	1.274	1.297	1.146[i]	1.342[i]	6.201
Boron	3/3	0.272-0.413	L[l]	0.337	0.340	0.237[i]	0.413[i]	20.597
Lead	3/3	0.009-0.202	L[l]	0.029	0.014	0.002[i]	0.202[i]	147.41
Molybdenum	3/3	11.844-21.863	L[l]	17.771	21.673	9.827[i]	21.863[i]	31.042
Selenium	3/3	0.188-0.388	L[l]	0.273	0.278	0.148[i]	0.388[i]	35.102
Tributyl phosphate	3/3	0.029-0.361	L[l]	0.074	0.040	0.007[i]	0.361[i]	131.88
Vanadium	3/3	0.024-0.067	L[l]	0.044	0.055	0.018[i]	0.067[i]	46.118
Zinc	3/3	0.027-0.029	L[l]	0.028	0.028	0.026[i]	0.029[i]	4.116

c Distribution: N = Normal; L = Lognormal

d If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size is < 2

i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

j Frequency of detection is less than 5%

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

m Statistics for constituent with outliers rejected

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TABLE 4-25

DILUTION ADJUSTED TREATABILITY TCLP SAS DATA, ALL ZONES OF SILO 2, FORMULA 1

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
2-Butanone	1/4	0.008-0.008	L[1]	0.006	0.005	0.004[1]	0.007	24.33
Acetone	4/4	0.050-0.097	L[1]	0.067	0.065	0.049[1]	0.093	28.375
Antimony	3/4	0.064-0.091	L[1]	0.05	0.068	0.019[1]	0.091[1]	53.733
Arsenic	4/4	0.009-0.019	L[1]	0.014	0.015	0.009	0.019[1]	31.068
Barium	4/4	2.233-2.796	L[1]	2.531	2.563	2.268	2.796[1]	9.122
Benzoic Acid	1/4	0.005-0.005	L[1]	0.028	0.05	0.007	0.005[1]	58.065
Boron	4/4	0.225-0.260	L[1]	0.241	0.24	0.221[1]	0.260[1]	7.329
Cadmium	1/4	0.012-0.012	L[1]	0.004	0.003	0.001[1]	0.009	95.561
Chromium	4/4	0.115-0.167	L[1]	0.14	0.142	0.115	0.167[1]	16.648
Copper	1/4	0.058-0.058	L[1]	0.009	0.005	0.002[1]	0.039	145.25
Lead	4/4	0.066-0.784	L[1]	0.165	0.125	0.045[1]	0.606	124.25
Molybdenum	4/4	0.833-3.417	L[1]	1.66	1.796	0.745[1]	3.417[1]	62.92
Selenium	4/4	0.000-0.117	L[1]	0.01	0.033	0	0.117[1]	108.74
Tributyl phosphate	4/4	0.388-1.223	L[1]	0.812	0.961	0.445	1.223[1]	40.704
Vanadium	3/4	0.022-0.051	L[1]	0.023	0.036	0.006[1]	0.051[1]	70.944
Zinc	4/4	0.027-0.048	L[1]	0.034	0.032	0.025[1]	0.046	26.568

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.

TABLE 4-25
(Continued)

[e] If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size < 2

[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

[j] Frequency of detection is less than 5%

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

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TABLE 4-26

DILUTION ADJUSTED TREATABILITY SAS DATA FOR ALL ZONES OF SILO 2, FORMULA 2

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variables (%)
Acetone	3 /3	0.019 - 0.078	L[1]	0.042	0.049	0.012[i]	0.078[i]	60.4
Aluminum	3 /3	0.821 - 1.281	L[1]	0.958	0.835	0.626[i]	1.281[i]	26.747
Antimony	3 /3	0.060 - 0.083	L[1]	0.07	0.069	0.054[i]	0.083[i]	16.08
Arsenic	3 /3	0.010 - 0.020	L[1]	0.015	0.018	0.008[i]	0.02[i]	33.658
Barium	3 /3	1.920 - 2.395	L[1]	2.219	2.376	1.796[i]	2.395[i]	12.061
Boron	3 /3	0.259 - 0.337	L[1]	0.306	0.329	0.239[i]	0.337[i]	13.945
Calcium	3 /3	1323.2 -1336.5	L[1]	1331.4	1334.6	1319.3[i]	1336.5[i]	0.541
Chlorobenzene	1 /3	0.002 - 0.002	L[1]	0.002	0.003	0.002[i]	0.002[i]	15.061
Chromium	3 /3	0.021 - 0.045	L[1]	0.029	0.026	0.015[i]	0.045[i]	41.087
Lead	3 /3	0.031 - 0.075	L[1]	0.053	0.063	0.024[i]	0.075[i]	40.073
Lithium	3 /3	0.414 - 0.555	L[1]	0.482	0.487	0.377[i]	0.555[i]	14.495
Magnesium	3 /3	0.842 - 0.996	L[1]	0.932	0.966	0.802[i]	0.996[i]	8.726
Molybdenum	3 /3	0.570 - 2.624	L[1]	1.44	1.996	0.365[i]	2.624[i]	60.82
Potassium	3 /3	49.810 -54.182	L[1]	52.186	52.662	48.554[i]	54.182[i]	4.251
Selenium	3 /3	0.020 - 0.131	L[1]	0.069	0.128	0.011[i]	0.131[i]	68.318
Silicon	3 /3	8.764 -18.897	L[1]	14.578	18.707	6.935[i]	18.897[i]	37.501
Tetrachloroethene	1 /3	0.002 - 0.002	L[1]	0.002	0.003	0.002[i]	0.002[i]	15.061
Thallium	1 /3	0.006 - 0.006	L[1]	0.002	0.001	0[i]	0.006[i]	110.6
Tributyl phosphate	3 /3	0.190 - 0.970	L[1]	0.528	0.798	0.118[i]	0.97[i]	62.764

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TABLE 4-26
(Continued)

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variables (%)
Vanadium	2 /3	0.066 - 0.080	L[l]	0.03	0.066	0.002[i]	0.08[i]	79.127
Zinc	3 /3	0.035 - 0.047	L[l]	0.038	0.035	0.028[i]	0.047[i]	18.483

[c] Distribution: N = Normal; L = Lognormal
[d] If the distribution is normal or if the distribution is lognormal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.
[e] If the distribution is normal or if the distribution is lognormal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.
[h] Not applicable if sample size is ≤ 2
[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size ≤ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.
[j] Frequency of detection is less than 5%
[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.
[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.
[m] Statistics for constituent with outliers rejected

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TABLE 4-27

DILUTION ADJUSTED TREATABILITY TCLP SAS DATA, SILO 3, FORMULA 1

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Arsenic	1/1	0.089-0.089	h	0.089	h	h	h	h
Barium	1/1	0.387-0.387	h	0.387	h	h	h	h
Beryllium	1/1	0.005-0.005	h	0.005	h	h	h	h
Boron	1/1	2.542-2.542	h	2.542	h	h	h	h
Chromium	1/1	0.992-0.992	h	0.992	h	h	h	h
Molybdenum	1/1	11.084-11.084	h	11.084	h	h	h	h
Selenium	1/1	0.335-0.335	h	0.335	h	h	h	h
Thallium	1/1	0.024-0.024	h	0.024	h	h	h	h
Vanadium	1/1	0.686-0.686	h	0.686	h	h	h	h
Zinc	1/1	0.020-0.020	h	0.02	h	h	h	h

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[e] If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size is < 2

[j] Frequency of detection is less than 5%

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

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TABLE 4-28

DILUTION ADJUSTED TREATABILITY TCLP SAS DATA, SILO 3, FORMULA 2

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Acetone	2/2	0.013-0.040	h	0.026	h	h	h	h
Antimony	1/2	0.074-0.074	h	0.074	h	h	h	h
Arsenic	2/2	0.089-0.100	h	0.094	h	h	h	h
Barium	2/2	0.428-0.439	h	0.433	h	h	h	h
Beryllium	2/2	0.004-0.004	h	0.004	h	h	h	h
Boron	2/2	2.320-2.338	h	2.329	h	h	h	h
Chromium	2/2	0.051-0.059	h	0.055	h	h	h	h
Molybdenum	2/2	11.079-12.122	h	11.601	h	h	h	h
Selenium	2/2	0.248-0.261	h	0.255	h	h	h	h
Thallium	2/2	0.032-0.039	h	0.036	h	h	h	h
Vanadium	2/2	0.707-0.716	h	0.711	h	h	h	h
Zinc	2/2	0.020-0.025	h	0.023	h	h	h	h

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[e] If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is <50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size is < 2

[j] Frequency of detection is less than 5%

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

TABLE 4-29

DILUTION ADJUSTED TREATABILITY SAS RADIOLOGICAL DATA FOR ALL ZONES OF SILO 1, FORMULA 1

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variables (%)
Pb-210	4 /4	156.12 -732.04	L[l]	426.79	538.83	190.42	732.04 [i]	49.126
Po-210	4 /4	74.175 -150.10	L[l]	107.87	110.29	76.751	150.1 [i]	27.923
Ra-226	3 /3	9417.5 - 24660	L[l]	13420	10408	5498.6 [i]	24660 [i]	57.517
Ra-228	1 /3	6.447 - 6.447	L[l]	2.439	1.5	0.59 [i]	6.447 [i]	90.697
U-Total	2 /4	0.003 - 0.003	L[l]	0.001	0.002	0 [i]	0.003 [i]	85.107

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and frequency of detection $\geq$ 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[e] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and the frequency of detection $\geq$ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size is $\leq$ 2

[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size $\leq$ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

[j] Frequency of detection is less than 5%

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

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TABLE 4-30

DILUTION ADJUSTED TREATABILITY SAS RADIOLOGICAL DATA FOR ALL ZONES OF SILO 1, FORMULA 2

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coef. of Var. (%)
Pb-210	3 /3	56.844 -268.06	L[n]	107.01	80.418	27.132 [i]	268.06 [i]	85.667
Po-210	3 /3	44.106 -173.38	L[l]	101.25	135.74	29.575 [i]	173.38 [i]	56.471
Ra-226	3 /3	6996.2 - 11882	L[l]	9372.8	9904.9	5954.3 [i]	11882 [i]	25.616
Ra-228	1 /3	7.814 - 7.814	L[l]	2.6	1.5	0.522 [i]	7.814 [i]	101.13
U-Total	2 /3	0.003 - 0.003	L[l]	0.002	0.003	0 [i]	0.003 [i]	68.151

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[e] If the distribution is normal or if the distribution is lognormal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size is ≤ 2.

[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size ≤ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

[j] Frequency of detection is less than 5%

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

TABLE 4-31

DILUTION ADJUSTED TREATABILITY SAS RADIOLOGICAL DATA FOR ALL ZONES OF SILO 2, FORMULA 1

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coef. of Var. (%)
Pb-210	4 /4	359.22 -961.16	L[l]	622.32	659.22	385.26	961.16 [i]	37.283
Po-210	4 /4	21.553 -131.65	L[l]	60.043	71.359	23.479	131.65 [i]	65.812
Ra-226	4 /4	14194 - 94369	L[l]	25297	17485	8947.7 [i]	71517	108.74
Ra-228	3 /4	7.476 -16.194	L[l]	6.24	7.913	1.902 [i]	16.194 [i]	72.002
U-Total	1 /4	0.004 - 0.004	L[l]	0.001	0.001	0 [i]	0.003	125.43

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and frequency of detection $\geq$ 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[e] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and the frequency of detection $\geq$ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size is $\leq$ 2.

[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size $\leq$ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

[j] Frequency of detection is less than 5%

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

TABLE 4-32

DILUTION ADJUSTED TREATABILITY SAS RADIOLOGICAL DATA FOR SILO 2, FORMULA 2

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Pb-210	3/3	96.388 -158.37	L[l]	130.96	147.15	83.356 [i]	158.37 [i]	24.651
Po-210	3 /3	15.760 -59.886	L[l]	33.149	38.593	10.528 [i]	59.886 [i]	57.95
Ra-226	3 /3	10456 - 21863	L[l]	13863	11654	7083.8 [i]	21863 [i]	42.767
Ra-228	3 /3	5.875 - 9.734	L[l]	7.595	7.662	4.961 [i]	9.734 [i]	24.9
U-Total	1 /3	0.003 - 0.003	L[l]	0.001	0.001	0 [i]	0.003 [i]	104.74

[c] Distribution: N = Normal; L = Lognormal.

[d] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and frequency of detection $\geq$ 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[e] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and the frequency of detection $\geq$ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size $\leq$ 2

[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size $\leq$ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

[j] Freqency of detection is less than 5%

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

TABLE 4-33

DILUTION ADJUSTED TCLP TREATABILITY RADIOLOGICAL SAS DATA FOR SILO 3, FORMULA 1

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variables (%)
Pb-210	1/1	360.75-360.75	h	360.75	h	h	h	h
Ra-226	1/1	1712.2-1712.2	h	1712.2	h	h	h	h
Ra-228	1/1	111.21-111.21	h	111.21	h	h	h	h
U-Total	1/1	0.006 - 0.006	h	0.006	h	h	h	h

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[d] If the distribution is normal or if the distribution is lognormal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size ≤ 2

[j] Frequency of detection is less than 5%

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

TABLE 4-34

DILUTION ADJUSTED TCLP TREATABILITY RADIOLOGICAL SAS DATA FOR SILO 3, FORMULA 2

Radionuclide	Frequency of Detection	Range of Detection (pCi/L)	Dist[c]	Mean[d] (pCi/L)	Median (pCi/L)	Lower 95% CI on Mean (pCi/L)	Upper 95% CI on Mean (pCi/L)	Coefficient of Variables (%)
Pb-210	1 /2	6.830 - 6.830	h	h	4.165	6.83[h]	6.83[h]	90.489
Po-210	1 /2	11.280 -11.280	h	h	7.415	11.28[h]	11.28[h]	73.715
Ra-226	2 /2	194.24 -1320.1	h	h	757.19	194.24[h]	1320.1[h]	105.14
Ra-228	2 /2	82.730 -92.990	h	h	87.86	82.73[h]	92.99[h]	8.257

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and frequency of detection $\geq$ 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[e] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and the frequency of detection $\geq$ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size is $\leq$ 2

[j] Frequency of detection is less than 5%

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

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TABLE 4-35

COMPARISON OF STABILIZED REAGENT AND SAND TCLP TO LEACHATE ACTION LEVELS

	Highest Concentration Detected (pCi/L)	% of Highest Detected Concentration to Leachate Action Levels			
		HI = 0.20	10^{-6} Risk	Federal ARARs	STATE Groundwaters
Pb-210	3.09	NA	103	3.1	NA
Ra-226	4.03	NA	20	0.20	0.8
Ra-228	7.1	NA	36	0.36	1.4
Th-total	8.19	NA	0.45	0.45	NA
U-235	0.0341	NA	0.07	0.24	NA
U-238	4.705	NA	1.6	0.22	NA

	Highest Concentration Detected (mg/L)	% of Highest Detected Concentration to Leachate Action Levels			
		HI = 0.20	10^{-6} Risk	Federal ARARs	STATE Groundwaters
Antimony	0.107	35.7	NA	NA	NA
Barium	0.941	2.4	NA	0.47	0.9
Beryllium	0.0033	0.1	413	3.3	NA
Boron	0.539	0.8	NA	NA	NA
Chromium	0.222	5.6	NA	2.2	4.4
Cobalt	0.0203	1.0	NA	NA	NA
Copper	0.0445	NA	NA	NA	NA
Manganese	0.0807	0.1	NA	NA	NA
Molybdenum	0.0293	1.0	NA	NA	NA
Nickel	0.0735	0.7	NA	0.7	NA
Silver	0.1	5.0	NA	2.0*	2.0
Vanadium	0.0647	1.3	NA	NA	NA
Zinc	0.126	0.1	NA	NA	NA

*Formulations with less than 26% cement loading were not considered in this comparison.

NA - Not applicable

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4.1.3.2 Comparisons of the TCLP Leachate to LALs

TCLP leachate concentrations (95 percent UCI) for treatability samples were compared to the LALs. The comparison of the treatability data was made using dilution adjusted data. The results of the comparisons are presented in the tables in two ways: symbolically and numerically. The first method uses symbols to highlight the chemicals and radionuclides that are borderline or exceed the leachate action levels so that they can be identified with a quick scan of the table. Tables 4-36A through 4-38B present this information for chemicals, for treatability samples. This is the same symbolic method used for the characterization data in Section 4.1.3. The numerical results of the comparisons for the treatability samples is presented for the chemicals in Tables 4-39A through 4-41B. The data are similarly presented for the radionuclides. The treatability symbolized comparisons are made in Tables 4-42A through 4-44B. The numerical comparisons for the treatability data are presented in Tables 4-45A through 4-47B.

For all three silos, molybdenum, Pb-210, and Ra-226 exceeded the LALs. Lead and beryllium exceeded the LALs for Silos 2 and 3, respectively. As a general trend, formulations containing blast furnace slag had lower contaminant concentrations in the TCLP leachate than formulas with only cement and flyash.

Preliminary results from optional phase tests show that much of the radon (generated by the decay of radium) diffuses out of the cement stabilized samples. Radon, which is highly soluble in water, decays to Po-210 and Pb-210. This will result in higher concentrations of Po-210 and Pb-210 in the leachate that would occur due to direct leaching from the sample.

4.1.3.3 Comparison of Treated and Untreated TCLP Leachate - Percent Reductions

The percent reduction results are presented for each silo and formulation separately. The comparisons are made for all silo zone samples for Silos 1, and 2, and 3. Zone to zone comparisons are presented for Silos 1, and 2. The results from the complete silo samples are indicative of what may be expected from treatment of the complete silo. The zone to zone comparisons show the effect of the heterogeneity of the waste. For a heterogeneous feed, if the zone to zone percent reductions values are similar, then the treatment process is consistently effective or ineffective for the constituent in question.

The calculations with combined zones compare the mean (average) and UCI results from the SAS analyses of untreated sample and treated sample data. A statistical evaluation was not conducted for Silo 3 since there were not enough samples to calculate a UCI.

The zone to zone comparisons are presented in two different formats. If there are three or more data points in the untreated and treated samples, two different percent reductions are calculated. The first is calculated on the mean (average) of both untreated and treated samples. The other is calculated using

TABLE 4-36A 5448

DILUTION ADJUSTED TCLP TREATABILITY DATA FOR SILO 1, FORMULA 1

	Comparison of UCI to LALs			
Chemical	HI=0.2	10^{-6} CSF	ARAR	Groundwater
2-Butanone	○	○	○	○
Acetone	○	○	○	○
Antimony	○	○	○	○
Barium	○	○	○	○
Benzoic Acid	○	○	○	○
Boron	○	○	○	○
Chromium	○	○	○	○
Lead	○	○	○	○
Molybdenum	●	○	○	○
Selenium	○	○	○	○
Tributyl phosphate	○	○	○	○
Vanadium	○	○	○	○
Zinc	○	○	○	○

Notes:

○ = Passed LAL
● = Additional study suggested

TABLE 4-36B

DILUTION ADJUSTED TCLP TREATABILITY DATA FOR SILO 1, FORMULA 2

	Comparison of UCI to LALs			
Chemical	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Acetone	○	○	○	○
Antimony	○	○	○	○
Barium	○	○	○	○
Boron	○	○	○	○
Lead	○	○	○	○
Molybdenum	●	○	○	○
Selenium	○	○	○	○
Tributyl phosphate	○	○	○	○
Vanadium	○	○	○	○
Zinc	○	○	○	○

Notes:

○ = Passed LAL
● = Additional study suggested

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TABLE 4-37A

DILUTION ADJUSTED TCLP TREATABILITY DATA FOR SILO 2, FORMULA 1

	Comparison of UCI to LALs			
Chemical	HI=0.2	10^{-6} CSF	ARAR	Groundwater
2-Butanone	O	O	O	O
Acetone	O	O	O	O
Antimony	O	O	O	O
Arsenic	O	O	O	O
Barium	O	O	O	O
Benzoic Acid	O	O	O	O
Boron	O	O	O	O
Cadmium	O	O	O	O
Chromium	O	O	O	O
Copper	O	O	O	O
Lead	↔	O	●	O
Molybdenum	↔	O	O	O
Selenium	O	O	O	O
Tributyl phosphate	O	O	O	O
Vanadium	O	O	O	O
Zinc	O	O	O	O

Notes:

O = Passed LAL
↔ = Discussion area
● = Additional study suggested

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TABLE 4-37B

DILUTION ADJUSTED TCLP TREATABILITY DATA FOR SILO 2, FORMULA 2

	Comparison of UCI to LALs			
Chemical	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Acetone	O	O	O	O
Antimony	O	O	O	O
Arsenic	O	O	O	O
Barium	O	O	O	O
Boron	O	O	O	O
Chromium	O	O	O	O
Lead	O	O	O	O
Molybdenum	O	O	O	O
Selenium	O	O	O	O
Tetrachloroethene	O	O	O	O
Thallium	O	O	O	O
Tributyl phosphate	O	O	O	O
Vanadium	O	O	O	O

Notes:

O = Passed LAL
● = Additional study suggested

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TABLE 4-38A

DILUTION ADJUSTED TCLP TREATABILITY DATA FOR SILO 3, FORMULA 1

	Comparison of 1 Sample Result to LALs			
Chemical	HI=0.2	10^{-6} Risk	ARAR	Groundwater
Acetone	O	O	O	O
Arsenic	O	O	O	O
Barium	O	O	O	O
Beryllium	O	↔	O	O
Boron	O	O	O	O
Chromium	O	O	O	O
Molybdenum	↔	O	O	O
Selenium	O	O	O	O
Thallium	O	O	O	O
Vanadium	O	O	O	O
Zinc	O	O	O	O

Notes:

O = Passed LAL
↔ = Discussion area

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TABLE 4-38B

DILUTION ADJUSTED TCLP TREATABILITY DATA FOR SILO 3, FORMULA 2

	Comparison of Mean of 2 Samples to LALs			
Chemical	HI=0.2	10^{-6} Risk	ARAR	Groundwater
Acetone	O	O	O	O
Antimony	O	O	O	O
Arsenic	O	O	O	O
Barium	O	O	O	O
Beryllium	O	↔	O	O
Boron	O	O	O	O
Chromium	O	O	O	O
Molybdenum	↔	O	O	O
Selenium	O	O	O	O
Thallium	O	O	O	O
Vanadium	O	O	O	O
Zinc	O	O	O	O

Notes:

O = Passed LAL
↔ = Discussion area

TABLE 4-39A - 5448

DILUTION ADJUSTED TCLP TREATABILITY DATA FOR ALL ZONES OF SILO 1, FORMULA 1

	Comparison of UCI to LALs			
Chemical	HI=0.2	10^{-6} Risk	ARAR	Groundwater
2-Butanone	○	○	○	○
Acetone	○	○	○	○
Antimony	○	○	○	○
Barium	○	○	○	○
Benzoic Acid	○	○	○	○
Boron	○	○	○	○
Chromium	○	○	○	○
Lead	○	○	○	○
Molybdenum	●	○	○	○
Selenium	○	○	○	○
Tributyl phosphate	○	○	○	○
Vanadium	○	○	○	○
Zinc	○	○	○	○

Notes:

○ = Passed LAL
● = Additional study suggested

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TABLE 4-39B

DILUTION ADJUSTED TCLP TREATABILITY DATA FOR ALL ZONES OF SILO 1, FORMULA 2

	Comparison of UCI to LALs			
Chemical	HI=0.2	10^{-6} Risk	ARAR	Groundwater
Acetone	○	○	○	○
Antimony	○	○	○	○
Barium	○	○	○	○
Boron	○	○	○	○
Lead	○	○	○	○
Molybdenum	●	○	○	○
Selenium	○	○	○	○
Tributyl phosphate	○	○	○	○
Vanadium	○	○	○	○
Zinc	○	○	○	○

Notes:

○ = Passed LAL
● = Additional study suggested

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TABLE 4-40A

DILUTION ADJUSTED TCLP TREATABILITY DATA FOR ALL ZONES OF SILO 2, FORMULA 1

	Comparison of UCI to LALs			
Chemical	HI=0.2	10^{-6} Risk	ARAR	Groundwater
2-Butanone	O	O	O	O
Acetone	O	O	O	O
Antimony	O	O	O	O
Arsenic	O	O	O	O
Barium	O	O	O	O
Benzoic Acid	O	O	O	O
Boron	O	O	O	O
Cadmium	O	O	O	O
Chromium	O	O	O	O
Copper	O	O	O	O
Lead	↔	O	●	O
Molybdenum	↔	O	O	O
Selenium	O	O	O	O
Tributyl phosphate	O	O	O	O
Vanadium	O	O	O	O
Zinc	O	O	O	O

Notes:

O = Passed LAL
↔ = Discussion area
● = Additional study suggested

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TABLE 4-40B

DILUTION ADJUSTED TCLP TREATABILITY DATA FOR ALL ZONES OF SILO 2, FORMULA 2

	Comparison of UCI to LALs			
Chemical	HI=0.2	10^{-6} Risk	ARAR	Groundwater
Acetone	O	O	O	O
Antimony	O	O	O	O
Arsenic	O	O	O	O
Barium	O	O	O	O
Boron	O	O	O	O
Chromium	O	O	O	O
Lead	O	O	O	O
Molybdenum	O	O	O	O
Selenium	O	O	O	O
Tetrachloroethene	O	O	O	O
Thallium	O	O	O	O
Tributyl phosphate	O	O	O	O
Vanadium	O	O	O	O

Notes:

O = Passed LAL
● = Additional study suggested

TABLE 4-41A 5448

DILUTION ADJUSTED TCLP TREATABILITY DATA FOR SILO 3, FORMULA 1

	Comparison to LALs			
Chemical	HI=0.2	10-6 CSF	ARAR	Groundwater
Acetone	0.04	NA	NA	NA
Antimony	17	NA	NA	NA
Arsenic	13	NA	2	2
Barium	1	NA	0.2	0.4
Beryllium	0.1	528	4	NA
Boron	3	NA	NA	NA
Chromium	1	NA	1	1
Molybdenum	387	NA	NA	NA
Selenium	6	NA	5	25
Thallium	71	NA	18	NA
Vanadium	14	NA	NA	NA
Zinc	0.02	NA	NA	NA

TABLE 4-41B 5448

DILUTION ADJUSTED TCLP TREATABILITY DATA FOR SILO 3, FORMULA 2

	Comparison to LALs			
Chemical	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Acetone	0.03	NA	NA	NA
Arsenic	13	NA	2	2
Barium	1	NA	0.2	0.4
Beryllium	0.1	584	5	NA
Boron	4	NA	NA	NA
Chromium	25	NA	10	20
Molybdenum	369	NA	NA	NA
Selenium	8	NA	7	33
Thallium	49	NA	12	NA
Vanadium	14	NA	NA	NA
Zinc	0.02	NA	NA	NA

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TABLE 4-42A

DILUTION ADJUSTED RADIOLOGICAL TCLP TREATABILITY DATA FOR SILO 1, FORMULA 1

	Comparison of One Sample to LALs			
Radionuclide	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Pb-210	○	●	●	○
Po-210	○	○	○	○
Ra-226	○	●	●	●
Ra-228	○	○	○	○
U-234	○	○	○	○
U-235/236	○	○	○	○
U-238	○	○	○	○

TABLE 4-42B

DILUTION ADJUSTED RADIOLOGICAL TCLP TREATABILITY DATA FOR SILO 1, FORMULA 2

	Comparison of One Sample to LALs			
Radionuclide	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Pb-210	○	↔	●	○
Po-210	○	○	○	○
Ra-226	○	●	●	●
Ra-228	○	○	○	○
U-234	○	○	○	○
U-235/236	○	○	○	○
U-238	○	○	○	○

Notes:

○ = Passed LAL
↔ = Discussion area
● = Additional study suggested

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TABLE 4-43A

DILUTION ADJUSTED RADIOLOGICAL TCLP TREATABILITY DATA FOR SILO 2, FORMULA 1

	Comparison of UCI to PRGs			
Radionuclide	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Pb-210	○	●	●	○
Po-210	○	○	○	○
Ra-226	○	●	●	●
Ra-228	○	○	○	○
U-234	○	○	○	○
U-235/236	○	○	○	○
U-238	○	○	○	○

TABLE 4-43B

DILUTION ADJUSTED RADIOLOGICAL TCLP TREATABILITY DATA FOR SILO 2, FORMULA 2

	Comparison of UCI to PRGs			
Radionuclide	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Pb-210	○	↔	●	○
Po-210	○	○	○	○
Ra-226	○	●	●	●
Ra-228	○	○	○	○
U-234	○	○	○	○
U-235/236	○	○	○	○
U-238	○	○	○	○

Notes:

○ - Passed LAL
↔ - Discussion area
● - Additional study suggested

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TABLE 4-44A

DILUTION ADJUSTED RADIOLOGICAL TCLP TREATABILITY DATA FOR SILO 3, FORMULA 1

	Comparison of LAL			
Radionuclide	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Pb-210	○	●	●	○
Ra-226	○	↔	○	●
Ra-228	○	↔	○	○
U-234	○	○	○	○
U-235/236	○	○	○	○
U-238	○	○	○	○

TABLE 4-44B

DILUTION ADJUSTED RADIOLOGICAL TCLP TREATABILITY DATA FOR SILO 3, FORMULA 2

	Comparison of LAL			
Radionuclide	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Pb-210	○	↔	○	○
Po-210	○	○	○	○
Ra-226	○	↔	○	●
Ra-228	○	↔	○	○

Notes:

○ - Passed LAL
↔ - Discussion area
● - Additional study suggested

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TABLE 4-45A

DILUTION ADJUSTED RADIOLOGICAL TCLP TREATABILITY

	Percent of Leachate Action Level			
Radionuclide	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Pb-210	NA	24401	732	NA
Po-210	NA	NA	NA	NA
Ra-226	NA	123300	1233	4932
Ra-228	NA	32	0.3	1
U-234	NA	1	0.1	NA
U-235/236	NA	1	3	NA
U-238	NA	1	0.1	NA

TABLE 4-45B

DILUTION ADJUSTED RADIOLOGICAL TCLP TREATABILITY

	Percent of Leachate Action Level			
Radionuclide	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Pb-210	NA	8935	268	NA
Po-210	NA	NA	NA	NA
Ra-226	NA	59410	594	2376
Ra-228	NA	39	0.4	2
U-234	NA	1	0.1	NA
U-235/236	NA	1	3	NA
U-238	NA	1	0.1	NA

1NA - Not applicable

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TABLE 4-46A

DILUTION ADJUSTED RADIOLOGICAL TCLP TREATABILITY DATA FOR SILO 2, FORMULA 1

	Percent of Leachate Action Level			
Radionuclide	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Pb-210	NA	32039	961	NA
Po-210	NA	NA	NA	NA
Ra-226	NA	357585	3576	14303
Ra-228	NA	81	1	3
U-234	NA	1	0.1	NA
U-235/236	NA	0.04	0.1	NA
U-238	NA	1	0.1	NA

TABLE 4-46B

DILUTION ADJUSTED RADIOLOGICAL TCLP TREATABILITY DATA FOR SILO 2, FORMULA 2

	Percent of Leachate Action Level			
Radionuclide	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Pb-210	NA	5279	158	NA
Po-210	NA	NA	NA	NA
Ra-226	NA	109315	1093	4373
Ra-228	NA	49	0.5	2
U-234	NA	1	0.1	NA
U-235/236	NA	0.04	0.1	NA
U-238	NA	1	0.1	NA

NA - Not applicable

TABLE 4-47A 5448

DILUTION ADJUSTED RADIOLOGICAL TCLP TREATABILITY DATA FOR SILO 3, FORMULA 1

	Percent of Leachate Action Level			
Radionuclide	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Pb-210	NA	139	4	NA
Po-210	NA	NA	NA	NA
Ra-226	NA	3786	38	151
Ra-228	NA	439	4	18

TABLE 4-47B

DILUTION ADJUSTED RADIOLOGICAL TCLP TREATABILITY DATA FOR SILO 3, FORMULA 2

	Percent of Leachate Action Level			
Radionuclide	HI=0.2	10^{-6} CSF	ARAR	Groundwater
Pb-210	NA	12025	361	NA
Ra-226	NA	8561	86	342
Ra-228	NA	556	6	22
U-234	NA	2	0.3	NA

NA - Not applicable

the UCI. If there are less than three data points in either the untreated or treated samples, the percent reductions are calculated using the mean of two or more data points or the available single data point. If a constituent of concern was presented in the characterization sample yet not in the stabilized sample, or visa versa, the constituent and its TCLP concentration are presented and no calculations are performed.

Tables 4-48A through 4-50B show the percent reduction calculation results for the chemical constituents in the Silo 1 combined Zones A, B, and C. Tables 4-51A through 4-55B are the analogous tables for the radionuclides from Silo 1. Antimony, lead, and zinc had reductions. Lead consistently had greater than 99 percent reductions. Barium, boron, selenium, vanadium, and particularly molybdenum had negative percent reductions (i.e., concentration in TCLP leachate increased as a result of cement stabilization) using formulations 1 (cement/flyash) and 2 (blast furnace slag/cement/flyash). Chromium also had a negative percent reduction for formulation 1. Pb-210, Po-210, and U-total consistently have high percent reductions (>97 percent). Radium percent reductions ranged from approximately 62 to 93 percent.

Tables 4-56A through 4-63B show the percent reduction calculations results for Silo 2. Antimony, barium, boron, cadmium, chromium, copper, lead, selenium, thallium, and zinc had reductions. Consistent with the Silo 1 results, the percent reduction of lead was greater than 99 percent. Molybdenum had a negative percent reduction for both formulations 1 and 2, although not as much as for Silo 1. Negative percent reductions were observed for 2-butanone, barium, and chromium for formulation 1 (cement-flyash). Acetone and vanadium had negative percent reductions for formulation 2 (blast furnace slag-cement-fly ash). As with Silo 1, Pb-210, Po-210, and U-total had high percent reductions. The Ra-226 and Ra-228 percent reductions ranged from -287 to 86 and 11 to 70 percent, respectively, in the zone to zone comparisons.

In Silo 3, all of the chemical constituents of concern had a reduction (>52 percent) except for barium. Formulation 2 (blast furnace slag-cement-flyash) had all positive percent reductions for radionuclides. The cement-flyash-ferrous chloride formulation had a negative percent reduction for Pb-210. See Tables 4-64A through 4-65B for presentation of Silo 3 percent reduction tables.

Percent reductions could not be calculated for constituents of concern when the constituent was not present in either the untreated or the treated waste. Tables 4-66A through 4-70B lists the constituents of concern detected in the TCLP leachate in the untreated material but not in the TCLP of the stabilized waste. Tables 4-71A through 4-73B present the constituents of concern detected in leachate from the treated waste but not in the untreated waste. The TCLP leachate concentration of each of the constituents is shown in these tables.

TABLE 4-48A

PERCENT REDUCTION OF CONSTITUENTS OF CONCERN
DILUTION ADJUSTED TCLP TREATABILITY DATA
ALL ZONES OF SILO 1, FORMULA 1

Chemical	Mean Percent Reduction	Upper 95% CI on Mean Percent Reduction
2-Butanone	0	0
Antimony	40.9	12.6
Barium	-55.4	-49.3
Benzoic acid	NA	NA
Boron	-46.6	-41.6
Chromium	-105.1	-87.9
Lead	>99.9	>99.9
Molybdenum	-34022.2	-32187.2
Selenium	-103.7	-139.9
Tributyl phosphate	NA	NA
Vanadium	-30.4	-65.4
Zinc	75.0	82.0

NA - Not applicable.

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TABLE 4-48B

PERCENT REDUCTION OF CONSTITUENTS OF CONCERN
DILUTION ADJUSTED TCLP TREATABILITY DATA
ALL ZONES OF SILO 1, FORMULA 2

Chemical	Mean Percent Reduction	Upper 95% CI on Mean Percent Reduction
Antimony	15.1	2.9
Barium	-46.8	-16.8
Boron	-35.3	-41.0
Lead	>99.9	>99.9
Molybdenum	-24581.9	-25322.1
Selenium	-102.2	-112.0
Tributyl phosphate	NA	NA
Vanadium	-91.3	-157.7
Zinc	78.1	86.9

NA - Not applicable.

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TABLE 4-49A

PERCENT REDUCTIONS FOR SILO 1, ZONE A, DILUTION ADJUSTED TCLP TREATABILITY DATA, FORMULA 1 (2 SAMPLES)

Chemical	Mean Percent Reduction
2-Butanone	9.8
Acetone	NA
Antimony	50.0
Barium	-86.1
Benzoic Acid	NA
Boron	-93.1
Chromium	-58.4
Lead	>99.9
Molybdenum	-30054.2
Selenium	-306.2
Tributyl phosphate	NA
Vanadium	19.7
Zinc	59.3

TABLE 4-49B

PERCENT REDUCTIONS FOR SILO 1, ZONE A, DILUTION ADJUSTED TCLP TREATABILITY DATA, FORMULA 2 (1 SAMPLE)

Chemical	Mean Percent Reduction
Acetone	NA
Antimony	4.9
Barium	-47.3
Boron	-46.2
Lead	>99.9
Molybdenum	-25397.6
Selenium	-292.5
Tributyl phosphate	NA
Vanadium	20.8
Zinc	62.2

NA - Not applicable.

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TABLE 4-50A

PERCENT REDUCTIONS FOR SILO 1, ZONE B, DILUTION ADJUSTED TCLP TREATABILITY DATA, FORMULA 1 (1 SAMPLE)

Chemical	Mean Percent Reduction
Antimony	3.7
Barium	-66.3
Benzoic acid	NA
Boron	-60.6
Chromium	-116.4
Lead	>99.9
Molybdenum	-36435.5
Selenium	-113.5
Tributyl phosphate	NA
Vanadium	-101.2
Zinc	66.1

TABLE 4-50B

PERCENT REDUCTIONS FOR SILO 1, ZONE B, DILUTION ADJUSTED TCLP TREATABILITY DATA, FORMULA 2 (1 SAMPLE)

Chemical	Mean Percent Reduction
Acetone	53.0
Antimony	19.9
Barium	-54.1
Boron	-30.9
Lead	>99.9
Molybdenum	-28667.3
Selenium	-72.4
Tributyl phosphate	NA
Vanadium	-148.0
Zinc	75.5

Note: There was only one sample for Formula 2 that was compared with five characterization samples. No upper 95% CI was calculated.
NA - Not applicable.

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TABLE 4-51A

PERCENT REDUCTIONS FOR SILO 1, ZONE C, DILUTION ADJUSTED TCLP TREATABILITY DATA, FORMULA 1

Chemical	Mean Percent Reduction
2-Butanone	-29.4
Acetone	NA
Antimony	3.2
Barium	-29.1
Boron	-25.0
Chromium	-145.8
Lead	NA
Magnesium	90.0
Molybdenum	-40716.3
Selenium	-259.7
Silicon	53.3
Tributyl phosphate	NA
Vanadium	-70.7
Zinc	77.2

TABLE 4-51B

PERCENT REDUCTIONS FOR SILO 1, ZONE C, DILUTION ADJUSTED TCLP TREATABILITY DATA, FORMULA 2

Chemical	Mean Percent Reduction
Acetone	88.5
Antimony	16.5
Barium	-79.5
Boron	-56.3
Lead	NA
Molybdenum	-24071.6
Selenium	-217.9
Tributyl phosphate	NA
Vanadium	-254.2
Zinc	77.5

Note: There was only one sample for Formula 2 compared with four characterization samples.

NA - Not applicable.

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TABLE 4-52A

PERCENT REDUCTIONS OF CONSTITUENTS OF CONCERN - SILO COMPOSITE
DILUTION ADJUSTED TCLP RADIOLOGICAL TREATABILITY DATA
SILO 1, FORMULA 1

Radionuclide	Mean Percent Reduction	Upper 95% CI on Mean Percent Reduction
Pb-210	>99.9	>99.9
Po-210	>99.9	>99.9
Ra-226	72.6	62.8
Ra-228	94.8	93.0
U-Total	>99.9	97.3

TABLE 4-52B

PERCENT REDUCTIONS OF CONSTITUENTS OF CONCERN - SILO COMPOSITE
DILUTION ADJUSTED TCLP RADIOLOGICAL TREATABILITY DATA
SILO 1, FORMULA 2

Radionuclide	Mean Percent Reduction	Upper 95% CI on Mean Percent Reduction
Pb-210	>99.9	>99.9
Po-210	>99.9	99.9
Ra-226	80.9	82.1
Ra-228	94.5	91.5
U-Total	>99.9	97.3

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TABLE 4-53A

PERCENT REDUCTION, SILO 1, ZONE A
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA, FORMULA 1

Radionuclide	Percent Reduction
Pb-210	>99.9
Po-210	>99.9
Ra-226	38.6
Ra-228	91.5
U-Total	99.8

TABLE 4-53B

PERCENT REDUCTION, SILO 1, ZONE A
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA, FORMULA 2

Radionuclide	Percent Reduction
Pb-210	>99.9
Po-210	>99.9
Ra-226	82.6
Ra-228	89.7

Note: There was only one sample from Formula 2 compared with one characterization sample.

TABLE 4-54A

PERCENT REDUCTION, SILO 1, ZONE B
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA, FORMULA 1

Radionuclide	Percent Reduction
Pb-210	>99.9
Po-210	>99.9
Ra-226	85.8
U-Total	99.6

TABLE 4-54B

PERCENT REDUCTION, SILO 1, ZONE B
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA, FORMULA 2

Radionuclide	Percent Reduction
Pb-210	>99.9
Po-210	99.9
Ra-226	85.1
U-Total	99.6

Note: There was only one sample from Formula 2 compared with one characterization sample.

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TABLE 4-55A

PERCENT REDUCTION, SILO 1, ZONE C
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA, FORMULA 1

Radionuclide	Percent Reduction
Pb-210	99.9
Po-210	99.8
Ra-226	76.4

TABLE 4-55B

PERCENT REDUCTION, SILO 1, ZONE C
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA, FORMULA 2

Radionuclide	Percent Reduction
Pb-210	>99.9
Po-210	99.8
Ra-226	73.0
U-Total	>99.9

Note: There was only one sample from Formula 2 compared with one characterization sample.

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TABLE 4-56A

PERCENT REDUCTION OF CONSTITUENTS OF CONCERN - SILO COMPOSITE
DILUTION ADJUSTED TCLP TREATABILITY DATA
SILO 2, FORMULA 1

Chemical	Mean Percent Reduction	Upper 95% CI on Mean Percent Reducation
2-Butanone	-50.0	-250.0
Antimony	45.6	12.5
Arsenic	73.1	94.1
Barium	-4.9	67.0
Benzoic acid	NA	NA
Boron	54.3	81.7
Cadmium	90.5	88.3
Chromium	-9.4	-12.1
Copper	99.2	98.9
Lead	>99.9	>99.9
Molybdenum	-2918.2	-4580.8
Selenium	90.1	40.6
Tributyl phosphate	NA	NA
Vanadium	55.8	8.9
Zinc	87.5	90.5

NA - Not applicable.

TABLE 4-56B 5448

PERCENT REDUCTION OF CONSTITUENTS OF CONCERN - SILO COMPOSITE DILUTION ADJUSTED TCLP TREATABILITY DATA SILO 2, FORMULA 2

Chemical	Mean Percent Reduction	Upper 95% CI on Mean Percent Reducation
Acetone	-44.8	-14.7
Antimony	23.9	20.2
Arsenic	71.2	93.8
Barium	8.0	71.7
Boron	41.9	76.2
Chromium	77.3	69.8
Lead	>99.9	>99.9
Molybdenum	-2518.2	-3494.5
Selenium	31.7	33.5
Tetrachloroethene	NA	NA
Thallium	71.4	78.6
Tributyl phosphate	NA	NA
Vanadium	43.3	-42.9
Zinc	86.0	90.3

NA - indicates Not Applicable.

TABLE 4-57A 5448

**PERCENT REDUCTIONS FOR SILOS 2, ZONE A
DILUTION ADJUSTED TCLP TREATABILITY DATA
FORMULA 1**

Chemical	Mean Percent Reduction
2-Butanone	-219.2
Acetone	NA
Antimony	39.9
Arsenic	86.8
Barium	-1021.2
Boron	84.0
Cadmium	32.0
Chromium	-6.5
Lead	99.9
Molybdenum	-2683.4
Selenium	44.6
Tributyl phosphate	NA
Vanadium	77.9
Zinc	92.6

Note: There were only two samples for Formula 1 that was compared with one characterization sample. No upper 95% CI was calculated.

NA - Not applicable.

TABLE 4-57B 5448

PERCENT REDUCTIONS FOR SILO 2, ZONE A DILUTION ADJUSTED TCLP TREATABILITY DATA FORMULA 2

Chemical	Mean Percent Reduction
Acetone	NA
Antimony	46.7
Arsenic	88.0
Barium	-902.3
Boron	82.8
Chromium	66.0
Lead	>99.9
Molybdenum	-1587.4
Selenium	67.6
Silicon	36.5
Tetrachloroethene	NA
Thallium	NA
Tributyl phosphate	NA
Zinc	91.7

Note: There was only one sample for Formula 2 that was compared with one characterization sample. No upper 95% CI was calculated.

NA - Not applicable.

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TABLE 4-58A

PERCENT REDUCTIONS, SILO 2, ZONE B, DILUTION ADJUSTED TCLP TREATABILITY DATA, FORMULA 1

Chemical	Mean Percent Reduction
Acetone	NA
Arsenic	90.9
Barium	20.5
Boron	63.6
Chromium	-0.8
Lead	>99.9
Molybdenum	-5577.9
Selenium	72.0
Tributyl phosphate	98.8
Vanadium	-10.9
Zinc	94.7

TABLE 4-58B

PERCENT REDUCTIONS, SILO 2, ZONE B, DILUTION ADJUSTED TCLP TREATABILITY DATA, FORMULA 2

Chemical	Mean Percent Reduction
Acetone	NA
Antimony	7.6
Arsenic	91.2
Barium	26.3
Boron	52.9
Chromium	83.1
Lead	>99.9
Molybdenum	-4355.8
Selenium	59.6
Tributyl phosphate	98.9
Vanadium	-45.2
Zinc	93.8

Note: There was only one sample for Formula 2 that was compared with two characterization samples. No upper 95% CI was calculated.

NA - Not applicable.

TABLE 4-59A

PERCENT REDUCTIONS, SILO 2, ZONE C
DILUTION ADJUSTED TCLP TREATABILITY DATA
FORMULA 1 (1 SAMPLE)

Chemical	Mean Percent Reduction
Acetone	-86.7
Antimony	-3.9
Arsenic	-443.7
Barium	10.4
Benzoic acid	NA
Boron	NA
Chromium	-7.2
Copper	89.6
Lead	99.8
Molybdenum	-5595.8
Selenium	-106.6
Tributyl phosphate	NA
Vanadium	1.4
Zinc	85.7

Note: There was only one sample for Formula 1 that was compared with seven characterization samples. No upper 95% CI was calculated.

NA - Not applicable.

TABLE 4-59B 5448

**PERCENT REDUCTIONS, SILO 2, ZONE C
DILUTION ADJUSTED TCLP TREATABILITY DATA
FORMULA 2 (1 SAMPLE)**

Chemical	Mean Percent Reduction
Acetone	-49.9
Antimony	21.4
Arsenic	-565.4
Barium	22.9
Boron	NA
Chromium	82.6
Lead	>99.9
Molybdenum	-4272.6
Selenium	-190.2
Tributyl phosphate	NA
Vanadium	-53.2
Zinc	81.8

Note: There was only one sample for Formula 2 that was compared with seven characterization samples. No upper 95% CI was calculated.

NA - Not applicable.

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TABLE 4-60A

PERCENT REDUCTION OF CONSTITUENTS OF CONCERN - SILO COMPOSITE DILUTION ADJUSTED TCLP TREATABILITY DATA SILO 2, FORMULA 1

Radionuclide	Mean Percent Reduction	Upper 95% CI on Mean Percent Reduction
Pb-210	99.6	99.6
Po-210	99.7	99.6
Ra-226	53.3	12.6
Ra-228	57.9	17.8
U-Total	>99.9	>99.9

TABLE 4-60B

PERCENT REDUCTIONS OF CONSTITUENTS OF CONCERN - SILO COMPOSITE DILUTION ADJUSTED TCLP TREATABILITY DATA SILO 2, FORMULA 2

Radionuclide	Mean Percent Reduction	Upper 95% CI on Mean Percent Reduction
Pb-210	99.9	99.9
Po-210	99.9	99.8
Ra-226	74.4	73.3
Ra-228	48.7	50.6
U-Total	>99.9	>99.9

TABLE 4-61A 5448

PERCENT REDUCTION, SILO 2, ZONE A
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA
FORMULA 1

Radionuclide	Percent Reduction
Pb-210	99.1
Po-210	99.9
Ra-226	-286.6
Ra-228	NA

TABLE 4-61B

PERCENT REDUCTION, SILO 2, ZONE A
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA
FORMULA 2

Radionuclide	Percent Reduction
Pb-210	99.9
Po-210	>99.9
Ra-226	10.4
Ra-228	NA

Note: There was only one sample from Formula 2 compared with one characterization sample.

NA - indicates Not Applicable.

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TABLE 4-62A

PERCENT REDUCTION, SILO 2, ZONE B
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA
FORMULA 1

Radionuclide	Percent Reduction
Pb-210	99.8
Po-210	99.9
Ra-226	82.7
Ra-228	24.1

TABLE 4-62B

PERCENT REDUCTION, SILO 2, ZONE B
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA
FORMULA 2

Radionuclide	Percent Reduction
Pb-210	>99.9
Po-210	99.8
Ra-226	85.8
Ra-228	11.5

Note: There was only one sample from Formula 2 compared with one characterization sample.

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TABLE 4-63A

PERCENT REDUCTION, SILO 2, ZONE C
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA
FORMULA 1

Radionuclide	Percent Reduction
Pb-210	99.5
Po-210	99.3
Ra-226	78.2
Ra-228	62.1
U-Total	>99.9

TABLE 4-63B

PERCENT REDUCTION, SILO 2, ZONE C
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA
FORMULA 2

Radionuclide	Percent Reduction
Pb-210	99.9
Po-210	99.8
Ra-226	86.8
Ra-228	70.2
U-Total	>99.9

Note: There was only one sample from Formula 2 compared with one characterization sample.

TABLE 4-64A

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PERCENT REDUCTION OF CHEMICAL CONSTITUENTS OF CONCERN, DILUTION ADJUSTED TCLP TREATABILITY DATA, SILO 3, FORMULA 1

Chemical	Percent Reduction
Arsenic	98.3
Barium	-556
Beryllium	57.5
Chromium	78.2
Selenium	63.7
Thallium	42.2
Vanadium	71.5
Zinc	89.2

TABLE 4-64B

PERCENT REDUCTION OF CHEMICAL CONSTITUENTS OF CONCERN, DILUTION ADJUSTED TCLP TREATABILITY DATA, SILO 3, FORMULA 2

Chemical	Percent Reduction
Antimony	NA
Arsenic	98.2
Barium	-635
Beryllium	61.6
Chromium	98.8
Selenium	72.4
Thallium	15.0
Vanadium	70.5
Zinc	87.5

Note: Characterization data consists of one sample. Formula 2 data consists of two samples which were averaged. No upper 95% CI was calculated.

NA - Not applicable.

TABLE 4-65A 5448

PERCENT REDUCTION FOR SILO 3 RADIONUCLIDES
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA
FORMULA 1

Radionuclide	Percent Mean Reduction
Pb-210	-121.6
Ra-226	62.7
Ra-228	NA
U-Total	98.2

TABLE 4-65B

PERCENT REDUCTION FOR SILO 3 RADIONUCLIDES
DILUTION ADJUSTED TCLP RADIOLOGICAL DATA
FORMULA 2

Radionuclide	Percent Mean Reduction
Pb-210	97.0
Po-210	98.0
Ra-226	82.8
Ra-228	NA

Note: Characterization data consists of one sample. Formula 2 data consists of two samples which were averaged. No upper 95% CI was calculated.

NA - Not applicable.

TABLE 4-66A 5448

CHEMICAL CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CHARACTERIZATION TCLP AND NOT DETECTED IN CEMENT STABILIZED TCLP SAMPLES FOR SILO 1, FORMULA 1

Chemical	Concentration (mg/L)
4-Methyl-2-pentanone	0.004
Benzoic acid	0.037
Beryllium	0.002
Cadmium	0.003
Cobalt	1.816
Copper	0.208
Di-n-octylphthalate	0.01
Iron	0.042
Methylene chloride	0.021
N-nitroso-di-n-propylamine	0.023
Nickel	3.183
Silver	0.034
Tetrachloroethene	0.003
Thallium	0.004
Toluene	0.003
bis(2-Ethylhexyl)phthalate	0.013

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TABLE 4-66B

CHEMICAL CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CHARACTERIZATION TCLP AND NOT DETECTED IN CEMENT STABILIZED TCLP SAMPLES FOR SILO 1, FORMULA 2

Chemical	Concentration (mg/L)
2-Butanone	0.005
4-Methyl-2-pentanone	0.004
Benzoic acid	0.037
Beryllium	0.002
Cadmium	0.003
Chromium	0.059
Cobalt	1.816
Copper	0.208
Di-n-octylphthalate	0.01
Iron	0.042
Methylene chloride	0.021
N-nitroso-di-n-propylamine	0.023
Nickel	3.183
Silver	0.034
Tetrachloroethene	0.003
Thallium	0.004
Toluene	0.003
bis(2-Ethylhexyl)phthalate	0.013

TABLE 4-67 5448

RADIOLOGICAL CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CHARACTERIZATION TCLP AND NOT DETECTED IN CEMENT STABILIZED TCLP SAMPLES FOR SILO 1, FORMULAS 1 AND 2

Radionuclide	Quantity (pCi/L)
Ac-227	6454.1
Th-228	30.962
Th-230	380.38
Th-232	6.875

TABLE 4-68A 5448

CHEMICAL CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CHARACTERIZATION TCLP AND NOT DETECTED IN CEMENT STABILIZED TCLP SAMPLES FOR SILO 2, FORMULA 1

Chemical	Mean Concentration (mg/L)
4-Methyl-2-pentanone	0.01
Beryllium	0.01
Cobalt	2.65
Iron	0.08
Methylene chloride	0.01
N-Nitroso-di-n-propylamine	0.01
Nickel	3.16
Silver	0.09
Thallium	0.01
bis(2-Ethylhexyl)phthalate	0.01

TABLE 4-68B

CHEMICAL CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CHARACTERIZATION TCLP AND NOT DETECTED IN CEMENT STABILIZED SAMPLES TCLP FOR SILO 2, FORMULA 2

Chemical	Mean Concentration (mg/L)
2-Butanone	0.004
4-Methyl-2-pentanone	0.01
Beryllium	0.01
Cadmium	0.04
Cobalt	2.65
Copper	1.19
Iron	0.08
Methylene chloride	0.01
N-Nitroso-di-n-propylamine	0.01
Nickel	3.16
Silver	0.09
bis(2-Ethylhexyl)phthalate	0.01

TABLE 4-69 5448

RADIOLOGICAL CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CHARACTERIZATION TCLP AND NOT DETECTED IN CEMENT STABILIZED TCLP SAMPLES FOR SILO 2, FORMULAS 1 AND 2

Radionuclide	Concentration (pCi/L)
Ac-227	3359.9
Th-228	82.884
Th-230	132.88
Th-232	10.534

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TABLE 4-70A

CHEMICAL CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CHARACTERIZATION TCLP AND NOT DETECTED IN CEMENT STABILIZED TCLP SAMPLES FOR SILO 3, FORMULA 1

Chemical	Concentration (mg/L)
Cadmium	0.1
Cobalt	15.6
Copper	0.5
Manganese	2.9
Mercury	0.0004
Nickel	29.4

TABLE 4-70B

CHEMICAL CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CHARACTERIZATION TCLP AND NOT DETECTED IN CEMENT STABILIZED TCLP SAMPLES FOR SILO 3, FORMULA 2

Chemical	Concentration (mg/L)
Cadmium	0.1
Cobalt	15.6
Copper	0.5
Manganese	2.9
Mercury	0.0004
Nickel	29.4

TABLE 4-71A

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CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CEMENT STABILIZED TCLP SAMPLES AND NOT DETECTED IN CHARACTERIZATION TCLP SAMPLES SILO 1, FORMULA 1

Chemical	Concentration (mg/L)
Benzoic Acid	0.02

TABLE 4-71B

CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CEMENT STABILIZED TCLP SAMPLES AND NOT DETECTED IN CHARACTERIZATION TCLP SAMPLES SILO 1, FORMULA 2

Chemical	Concentration (mg/L)
None	

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TABLE 4-72A

CHEMICAL CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CEMENT STABILIZED TCLP SAMPLES TCLP AND NOT DETECTED IN CHARACTERIZATION TCLP SAMPLES FOR SILO 2, FORMULA 1

Chemical	Mean Concentration (mg/L)
Benzoic acid	0.028
Tributyl phosphate	0.812

TABLE 4-72B

CHEMICAL CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CEMENT STABILIZED TCLP SAMPLES AND NOT DETECTED IN CHARACTERIZATION TCLP SAMPLES FOR SILO 2, FORMULA 2

Chemical	Mean Concentration (mg/L)
Tetrachloroethene	0.002
Tributyl phosphate	0.528

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TABLE 4-73A

CHEMICAL CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CEMENT STABILIZED TCLP SAMPLES AND NOT DETECTED IN CHARACTERIZATION TCLP SAMPLES TCLP FOR SILO 3, FORMULA 1

Chemical	Concentration (mg/L)
None	

TABLE 4-73B

CHEMICAL CONSTITUENTS OF CONCERN THAT WERE DETECTED IN CEMENT STABILIZED TCLP SAMPLES AND NOT DETECTED IN CHARACTERIZATION TCLP SAMPLES FOR SILO 3, FORMULA 2

Chemical	Concentration (mg/L)
Antimony	0.028

As a general trend for the cement stabilization of waste from all three silos, the blast furnace slag-cement-flyash formulations were more effective than the cement/flyash formulations. Two of the three chemicals which had TCLP leachate concentrations exceeding the LALs had significantly positive percent reductions (i.e., lower leachate concentrations after cement stabilization). Lead from Silos 1 and 2 had percent reductions greater than 99 percent. Beryllium from Silo 3 had a percent reduction greater than 77 percent. Molybdenum exhibited large negative percent reductions (i.e., higher concentrations after cement stabilization) in the Silos 1 and 2 TCLP leachates. For the two radionuclides (Pb-210 and Ra-226) which had TCLP leachate concentrations exceeding the LALs, the percent reduction for Pb-210 was in the high 90 percents and Ra-226 ranged from negative to positive percent reductions.

4.1.4 Five-Day Static Leach

The 5-day static leach is a procedure that is much different than the TCLP. The TCLP tumbles crushed samples in a water/acetate solution for 18 hours, while the 5-day static is performed with monoliths in stagnant deionized water for 5 days.

The chemical results of the 5-day static leach test are summarized in SAS Tables 4-74A through 4-76B. The radiological results are summarized in SAS Tables 4-77A through 4-79B. Tables of the specific results for each sample are included in Appendix E.

The interpretation and use of the data are currently undecided. Therefore, the data will be presented without interpretation. However, the results are generally the same order of magnitude as for the TCLP leachate. In general, the cement-blast furnace slag or cement-flyash-blast furnace slag formulations exhibited better leaching characteristics for constituents of concern than the cement-flyash formulations.

4.1.5 Cement stabilization Test Objectives

All of the performance objectives established in the Treatability Study Work Plan for this project were met. The performance objectives are listed along with a brief comment on how each objective was achieved. The objectives and accomplishments are as follows:

- To develop a database of cement stabilization reagents and corresponding hazardous and radioactive materials leachability for stabilized waste forms

  Data on cement stabilization of the OU4 wastes were obtained during this program. Relationships of the leachate concentrations to the LALs are provided. The data is managed in a database program which was written using Clipper® software. A copy of the Clipper® printout is presented in Appendix B and a copy of the TCLP leachability data are in Appendix C. Comparisons to the LALs are in Appendix D. Comparison of the constituents of concern 95 percent UCI to the LALs are presented in Section 4.1.2.

TABLE 4-74A

FIVE-DAY STATIC LEACH DATA, SILO 1, FORMULA 1

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Barium	4/4	0.170-0.471	L[l]	0.289	0.315	0.158[i]	0.471[i]	48.064
Chromium	4/4	0.021-0.033	L[l]	0.026	0.025	0.020[i]	0.033	21.626
Lead	4/4	0.042-1.370	L[l]	0.545	1.235	0.073	1.370[i]	64.271
Molybdenum	4/4	6.530-13.400	L[l]	8.224	7.23	5.583[i]	12.113	37.441
Selenium	4/4	0.040-0.136	L[l]	0.069	0.069	0.034[i]	0.136[i]	57.762
Vanadium	1/4	0.011-0.011	L[l]	0.006	0.005	0.004[i]	0.01	44.961
Zinc	4/4	0.012-0.052	L[l]	0.027	0.029	0.013	0.052[i]	54.671

c Distribution: N = Normal; L = Lognormal

d If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size is < 2

i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

j Frequency of detection is less than 5%

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

m Statistics for constituent with outliers rejected

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1.5448

TABLE 4-74B

FIVE-DAY STATIC LEACH DATA, SILO 1, FORMULA 2

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Antimony	1/3	0.032-0.032	L[l]	0.019	0.015	0.009i	0.032[l]	46.675
Barium	3/3	0.199-0.306	L[l]	0.233	0.208	0.156i	0.306[l]	24.972
Cyanide	1/3	0.009-0.009	L[l]	0.004	0.003	0.001i	0.009[l]	81.075
Lead	3/3	0.635-0.707	L[l]	0.658	0.636	0.594i	0.707[l]	6.261
Molybdenum	3/3	1.830-4.810	L[l]	2.725	2.3	1.163i	4.810[l]	53.764
Selenium	3/3	0.021-0.046	L[l]	0.032	0.035	0.017i	0.046[l]	36.875
Zinc	1/3	0.006-0.006	L[l]	0.003	0.003	0.001i	0.006[l]	50.654

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[e] If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size is < 2

[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

[j] Frequency of detection is less than 5%

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

TABLE 4-75A

FIVE-DAY STATIC LEACH DATA, SILO 2, FORMULA 1

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Antimony	1/4	0.032-0.032	L[l]	0.018	0.015	0.012[i]	0.028	43.137
Arsenic	3/4	0.004-0.005	L[l]	0.003	0.004	0.001[i]	0.005[i]	48.56
Boron	2/4	0.051-0.067	L[l]	0.038	0.038	0.021[i]	0.067[i]	49.412
Chromium	3/4	0.010-0.016	L[l]	0.01	0.011	0.006[i]	0.016[i]	41.632
Cyanide	1/4	0.006-0.006	L[l]	0.003	0.003	0.002[i]	0.005	52.941
Lead	4/4	0.381-0.646	L[l]	0.461	0.43	0.345[i]	0.615	26.138
Molybdenum	4/4	0.063-0.287	L[l]	0.131	0.154	0.051[i]	0.287[i]	70.501
Selenium	3/4	0.012-0.027	L[l]	0.014	0.018	0.006[i]	0.027[i]	60.415

c Distribution: N = Normal; L = Lognormal.

d If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size is < 2.

i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

j Frequency of detection is less than 5%.

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

m Statistics for constituent with outliers rejected.

TABLE 4-75B

5-DAY STATIC LEACH DATA, SILO 2, FORMULA 2

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Arsenic	2/3	0.003-0.004	L[l]	0.002	0.003	0.001[i]	0.004[i]	52.915
Barium	3/3	0.379-0.494	L[l]	0.417	0.386	0.325[i]	0.494[i]	15.362
Lead	3/3	0.132-0.237	L[l]	0.186	0.207	0.111[i]	0.237[i]	28.168
Mercury	1/3	0.000-0.000	L[l]	0	0	0[i]	0[i]	43.301
Molybdenum	3/3	0.028-0.133	L[l]	0.075	0.112	0.018[i]	0.133[i]	61.225
Selenium	3/3	0.005-0.014	L[l]	0.009	0.012	0.004[i]	0.014[i]	43.835
Zinc	2/3	0.009-0.016	L[l]	0.007	0.009	0.001[i]	0.016[i]	73.651

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[e] If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size is < 2

[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

[j] Frequency of detection is less than 5%

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

TABLE 4-76A

FIVE-DAY STATIC LEACH DATA, SILO 3, FORMULA 1

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Arsenic	1/1	0.011-0.011	h	0.011	h	h	h	h
Barium	1/1	0.042-0.042	h	0.042	h	h	h	h
Boron	1/1	0.671-0.671	h	0.671	h	h	h	h
Chromium	1/1	0.497-0.497	h	0.497	h	h	h	h
Molybdenum	1/1	5.200-5.200	h	5.2	h	h	h	h
Potassium	1/1	204.00-204.00	h	204	h	h	h	h
Selenium	1/1	0.144-0.144	h	0.144	h	h	h	h
Thallium	1/1	0.013-0.013	h	0.013	h	h	h	h
Vanadium	1/1	0.161-0.161	h	0.161	h	h	h	h

c Distribution: N = Normal; L = Lognormal

d If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size is < 2

j Frequency of detection is less than 5%

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

m Statistics for constituent with outliers rejected

TABLE 4-76B

FIVE-DAY STATIC LEACH DATA, SILO 3, FORMULA 2

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Arsenic	2/2	0.011-0.012	h	0.012	h	h	h	h
Barium	2/2	0.050-0.051	h	0.051	h	h	h	h
Beryllium	1/2	0.002-0.002	h	0.002	h	h	h	h
Boron	2/2	0.379-0.420	h	0.399	h	h	h	h
Chromium	2/2	0.042-0.046	h	0.044	h	h	h	h
Molybdenum	2/2	2.820-3.310	h	3.065	h	h	h	h
Selenium	2/2	0.049-0.051	h	0.05	h	h	h	h
Vanadium	2/2	0.140-0.151	h	0.146	h	h	h	h

c Distribution: N = Normal; L = Lognormal

d If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size < 2

j Frequency of detection is less than 5%

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

m Statistics for constituent with outliers rejected

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TABLE 4-77A

FIVE-DAY STATIC LEACH RADIOLOGICAL DATA FOR SILO 1, FORMULA 1

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coeffficient of Variations (%)
Pb-210	4 /4	92.600 -662.00	L[l]	318.1	435	110.06	662[i]	65.117
Po-210	4 /4	169.00 -216.00	L[l]	196.21	201.5	173.45	216[i]	10.093
Ra-226	4 /4	3360.0 - 10800	L[l]	5897.6	6530	2805.4[i]	10800[i]	57.907
Th-Total	1 /4	0.003 - 0.003	L[l]	0.001	0.001	0[i]	0.003	98.353
U-Total	4 /4	0.001 - 0.002	L[l]	0.001	0.001	0.001[i]	0.002	25.885

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and frequency of detection $\geq$ 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[e] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and the frequency of detection $\geq$ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size is $\leq$ 2

[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size $\leq$ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

[j] Freqency of detection is less than 5%.

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

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TABLE 4-77B

FIVE-DAY STATIC LEACH RADIOLOGICAL DATA FOR SILO 1, FORMULA 2

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	the SID)
Ac-227	2 /3	1.100 - 1.820	L[l]	1	1.1	0.334 [i]	1.82 [i]	4 7
Pb-210	3 /3	1870.0 -2350.0	L[l]	2149.5	2260	1749.3 [i]	2350 [i]	2 1
Po-210	3 /3	362.00 -533.00	L[l]	442.15	448	318.93 [i]	533 [i]	9 9
Ra-226	3 /3	416.00 -4060.0	L[l]	1020.9	630	132 [i]	4060 [i]	5 1
U-Total	2 /3	0.009 - 0.033	L[l]	0.005	0.009	0 [i]	0.033 [i]	3 0

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[d] If the distribution is normal or if the distribution is lognormal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size is ≤ 2.

[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size ≤ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

[j] Freqency of detection is less than 5%.

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

TABLE 4-78A

FIVE-DAY STATIC LEACH RADIOLOGICAL DATA FOR SILO 2, FORMULA 1

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Ac-227	1/4	1.380-1.380	L[l]	0.644	0.5	0.355 [i]	1.171	61.111
Pb-210	4/4	1900.0-3350.0	L[l]	2268.4	2040	1665.5 [i]	3089.5	29.253
Po-210	4/4	322.00-417.00	L[l]	370.14	374.5	322.88	417 [i]	11.47
Ra-226	4/4	19400-37000	L[l]	25149	23700	18026 [i]	35086	30.175
Ra-228	4/4	5.090-8.930	L[l]	7.277	7.855	5.449	8.93 [i]	22.092
U-Total	4/4	0.002-0.003	L[l]	0.002	0.003	0.002	0.003 [i]	22.881

c Distribution: N = Normal; L = Lognormal

d If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and frequency of detection $\geq$ 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and the frequency of detection $\geq$ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size is $\leq$ 2

i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size $\leq$ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

j Freqency of detection is less than 5%

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

m Statistics for constituent with outliers rejected

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TABLE 4-78B

FIVE-DAY STATIC LEACH RADIOLOGICAL DATA FOR SILO 2, FORMULA 2

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean^d (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Pb-210	3/3	644.00-1160.0	L[l]	824.76	751	493.01[i]	1160[i]	31.976
Po-210	3/3	103.00-220.00	L[l]	156.14	168	81.631[i]	220[i]	35.817
Ra-226	3/3	6870.0-18600	L[l]	11531	12000	4970.5[i]	18600[i]	47.08
U-Total	3/3	0.001-0.001	L[l]	0.001	0.001	0.001[i]	0.001[i]	1.635

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and frequency of detection $\geq$ 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[e] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and the frequency of detection $\geq$ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size is $\leq$ 2

[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size $\leq$ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

[j] Freqency of detection is less than 5%

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

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TABLE 4-79A

FIVE-DAY STATIC LEACH RADIOLOGICAL DATA FOR SILO 3, FORMULA 1

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Po-210	1/1	11.000-11.000	[h]	[h]	11	11 [h]	11 [h]	-
Ra-226	1/1	247.00-247.00	[h]	[h]	247	247 [h]	247 [h]	-
U-Total	1/1	0.002-0.002	[h]	[h]	0.002	0.002 [h]	0.002 [h]	-

c Distribution: N = Normal; L = Lognormal

d If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and frequency of detection $\geq$ 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and the frequency of detection $\geq$ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size is $\leq$ 2

i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size $\leq$ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

j Freqency of detection is less than 5%

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

m Statistics for constituent with outliers rejected

TABLE 4-79B

FIVE-DAY STATIC LEACH RADIOLOGICAL DATA FOR SILO 3, FORMULA 2

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Ra-226	2/2	249.00-308.00	[h]	278.5	278.5	249 [h]	308 [h]	14.98

[c] Distribution: N = Normal; L = Lognormal

[d] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and frequency of detection $\geq$ 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

[e] If the distribution is normal or if the distribution is lognormal, the number of detects $\geq$ 7, and the frequency of detection $\geq$ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

[h] Not applicable if sample size is $\leq$ 2

[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size $\leq$ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

[j] Freqency of detection is less than 5%

[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

[l] Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

[m] Statistics for constituent with outliers rejected

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- To determine the cement stabilization reagents and relative quantities required to minimize leachate concentrations of radionuclides and HSL constituents from the final waste form

  The cement stabilization reagents and relative quantities required to minimize leachate concentrations of radionuclides and HSL constituents are presented in the Clipper® database in Appendix B.

- To determine the cement stabilization reagents and relative quantities required so that the final waste form achieves a UCS of approximately 500 psi

  The cement stabilization reagents and relative quantities required to achieve a UCS of 500 psi are presented in Section 4.1. All of the formulations tested in the Remedy Selection (advanced phase) of this study met the UCS criteria of 500 psi.

- To minimize the final volume of treated waste

  The final treated waste volume was calculated for each of the formulations tested. Formulations containing cement-blast furnace slag-flyash had lower bulking factors than the cement-flyash formulations. As might be expected, the addition of bentonite to the waste added to the bulking factor. For the given formulations, Silo 3 had the lowest bulking factors and Silo 1 had the highest.

- To estimate the volumes of treated waste that will be generated by each process

  The data on bulking factors presented in the Clipper® database, Appendix B, are provided to estimate the volumes of treated waste for each formulation.

- To provide leaching characteristics for use in later treatability studies

  The leaching characteristics for each formulation tested are presented in Appendix C and the dilution adjusted leaching data are presented in Appendix D.

- To develop process parameters for use in later treatability studies

  For cement stabilization, process parameters are: shear strength, waste form temperature rise with reagent addition, general description of waste before and after reagent addition, permeability of treated waste sample, percent water in the waste, pH and Eh of the leachate solutions, and observations if there was evolution of gas during mixing or during curing process. This data is presented in Appendices B and I.

  Preliminary process parameters for use in future treatability studies or in the remediation were collected. These parameters were designed to indicate if there might be gross processing problems while using the grout mixture. The parameters are shear strength, waste form temperature rise with reagent addition, penetration resistance, and amount of gas released during mixing, i.e., if significant amounts were released. The treated sample is considered processible if the mixture has a low shear strength (<1 ton/ft^2), minimal temperature rise (<7°C), and no observed gas release during mixing or curing. In addition to improved handling, the treated waste should set to achieve a penetration resistance of greater than 4.5 tons/ft^2 after a day of curing. Silos 1 and 3 Formulation 2

(blast furnace slag) required longer than 24 hours to meet the penetration resistance of 4.5 tons/ft^2. Both formulations for Silo 3 exceeded the 7°C temperature rise upon mixing with water. In addition, the Silo 3 waste tends to set up within 10 minutes after water is added. This latter occurrence s minimized by agitating the wet material or by added excess water. All other parameters were successfully met. These processing deviations from the ideal will require additional steps or special handling during processing. Therefore, all mixtures are processible.

- To provide chemical and radiological data as shown in Table 3-4 of the Work Plan

  The leaching results are described in Section 4.1.2. A copy of the TCLP leaching data are presented in Appendix C. Comparisons of dilution adjusted TCLP leaching data to LALs are presented in Appendix D.

- To establish the proof of process and applicability of the selected cement stabilization technology

  Reagent formulations were identified which met the performance objectives for UCS and the TC regulatory limits (leachability objectives). There is no defined goal for permeability in the Work Plan. EPA has defined a permeability criteria of 10^{-4} to 10^{-8} cm/s. The Remedy Selection treated samples had permeabilities ranging between 10^{-7} to 10^{-9} cm/s. See Section 4.1.1.

- To screen a large number of parameters and identify those that will be critical for later bench-scale studies

  Various reagents were investigated at several distinct values. The effects of the reagents on the performance objectives were determined. It is recommended that tests be conducted in future work to investigate the effects of various reagents which will reduce the leachability of Pb-210, Ra-226, beryllium, and molybdenum.

- To provide data for evaluation of Silos 1 and 2 alternatives as described in the TS Work Plan

  - 2A - Nonremoval, In Situ Cement stabilization, and Cap
  - 6 - Removal, Treatment, and On-Property Disposal
  - 7 - Removal, Treatment, and Off-Site Disposal and Silo 3 alternatives:
  - 2B - Nonremoval, In Situ Cement stabilization, and Cap
  - 3 - Removal and On-Property Disposal
  - 4 - Removal and Off-Site Disposal

  Data for evaluation the viability of these alternatives are presented in Section 4 and the appendices.

It is recommended that further work be done optimizing the cement-flyash-blast furnace slag formulations. Also, time did not allow for the development of optimum moisture content as in: density relationships and/or the influence of the water content in the stabilization mixtures. This should be done in the interest of reducing the bulking factor and increasing the compressive strength by compactive or other measures in lieu of adding more reagent. Additionally, the heat rise needs to

be better controlled for Silo 3 stabilization. Either optimizing the addition of reagents over time or an increased use of a an increase use of a more inert reagent that could act as a heat sink should be investigated although this will increase the bulking factor for this site.

The fact that the molybdenum exceeded the LALs is disturbing. The formulations need a reagent that can produce an insoluble molybdenum compound such as phosphate. Formulations containing some pulverized phosphate rock (calcium phosphate) should be investigated.

Extreme heterogeneity in the silo materials caused problems in stabilization. Additional formulations need to be tested to produce a stabilization blend that can overcome this heterogeneity.

4.2 CHEMICAL EXTRACTION

Figure 3-4 shows an overview of the current treatability program. The right side of the figure shows the general approach of the chemical extraction process. The waste was extracted producing a solid (raffinate) and a liquid stream (spent extractant). The solid was analyzed for radiological and TCLP parameters. The spent extractant was treated by direct vitrification of the liquid and by precipitation. The objective of the precipitation process was to remove contaminants from the spent extractants. The precipitated material was further treated by using cement stabilization and vitrification technologies. Figure 4-2 details the phases and stages of the chemical extraction program. The first two blocks in Figure 4-2 represent the Remedy Screening (preliminary phase) Stages I and II chemical extraction program. In these latter two stages, small samples were used and analyzed with in-house analytical. (See Section 4.2.1. for more details.) The Remedy Screening chemical extraction tests were followed by the Remedy Selection (advanced phase) program where larger scale experiments were conducted and the raffinate from the tests were analyzed at a laboratory using CLP protocols. (See Section 4.2.2.) This phase was followed by two parallel programs. One program better defined the extraction process (chemical extraction time and temperature and washing studies). The other established the treatment of the spent extractants. The time and temperature and washing studies are discussed in Sections 4.2.3 and 4.2.4, respectively. The subsections of 4.2.5 through 4.2.8 discuss the treatment of the spent extractant. The subsections and titles are listed below:

- 4.2.5 Vitrification of Spent Extractant
- 4.2.6 Stage I Precipitation
- 4.2.7 Stage II Precipitation and Settling
- 4.2.8 Cement Stabilization of Precipitated Material.

The remaining subsection 4.2.9 describes the proposed chemical extraction process based on the current work and the preliminary data from the Remedy Selection (optional phase) work.

The chemical extraction phase for the treatability program was designed to determine the best process capable of extracting the constituents of concern from silo materials, leaving a raffinate capable of meeting TC regulatory limits. The raffinate and solids produced from the decontamination of the extract should also exhibit low volume. A detailed description of the experimental design is presented in Section 3.3.

4.2.1 Chemical Extraction, Prescreening-Experimental Design, and Result Summary

The objective of preliminary phase Stage I of the treatability program was to screen several types of reagents for their ability to extract target compounds (lead and uranium) and to decrease the gross alpha and gross beta in the raffinate.

Mineralogical technology literature reviews and previous IT experiences indicated that mineral acids and chelates such as EDTA have the capabilities of extracting the metals from minerals. Extractions using acids and EDTA were investigated during the Remedy Screening (preliminary phase) Stage I portion of the OU4 program. The actual laboratory steps involved are more fully explained in Section 3 of this report.

4.2.1.1 Chemical Extraction - Remedy Screening (preliminary phase) Stage I

Stage I was used to identify promising acid extractants, concentrations and extraction temperatures. The acids investigated within the program were hydrochloric, nitric, and acetic acids. See Table 3-11 for the list of experiments and conditions investigated in the Stage I study. The variables were acid type, acid strength, extract-to-sample ratio or dose rate (Table 3-11), and extraction temperature. Performance was measured by the gross alpha and gross beta in the raffinate.

Hydrochloric and nitric acids were more effective than acetic acid in extracting uranium and lead into the extractant. Acetic acid, which is a weak acid used in the TCLP procedure, was about 80 percent as effective as the two strong acids, hydrochloric and nitric acids. Since the acetic acid extractant is less acidic than the two strong acids, the acetate ion must be participating in the extraction of the target metals. Acetic acid was dropped from the program, since it was less efficient at uranium and lead removal.

The target metals were most effectively extracted with 27 percent (concentrated) hydrochloric acid and 30 percent (1 part acid to 1 part water) nitric acid. It is hypothesized that there was not enough free water available in the concentrated nitric acid (60 percent) to effectively solvate (extract) the lead and uranium from the silo waste. When the nitric acid was diluted with water, the acid solution was better able to solvate the target metals.

Two dose rates (2:1 and 4:1 (w/w)) and temperatures (ambient and 80°C) were investigated. The 4:1 dose rate and 80°C extraction temperature were most effective at extracting the uranium and lead in a single extraction step.

The conditions and acid type for the maximum decrease in gross alpha and gross beta were not the same as for maximum lead and uranium removal. The best extractant for reduction in gross alpha and beta in one extraction step was 2 M acetic acid at 80°C. The best performing acid based on the amount of lead in the extract was 2.6 M nitric acid at 80°C. At closer inspection of the gross alpha and beta data, it was observed that approximately half of the values after one extraction were higher than the untreated waste. This was particularly evident for the Silo 1 waste for gross alpha. This data can be found in the Remedy Screening (preliminary phase I), Stage I data in Tables J-1 and J-2 in Appendix J. A possible explanation for this phenomenon is the removal of shielding elements which are more soluble than the radionuclides, such as natural lead, by the extractant, thus increasing the concentration and availability of the radionuclides. The extractant also may have caused the waste to break up into smaller particles, exposing more surface area.

4.2.1.2 Chemical Extraction - Remedy Screening (Preliminary Phase, Stage 2)

An assessment of the data for Stage I identified the most promising extractants which were carried into Stage II extractions. The laboratory procedures in Stage II were similar to Stage I. The tests performed during Stage II are listed in Tables 3-12 and 3-13. Three acids, hydrochloric, nitric, and acetic acid, and EDTA were studied. The conditions for the tests were dose rate (4:1 and 10:1), temperature (80° C), and extraction time (2 and 4 hours). Multiple extractions were also analyzed. The data for these experiments are presented in tables in Appendix J.

With some of the tests, bentonite was added to the silo waste to simulate the effect of the bentonite that was placed in the silos to reduce radon emissions.

The gross alpha and beta values of the raffinate were not sufficiently decreased by any of the three acids investigated. Therefore, EDTA (0.2 and 0.8M) was investigated in Stage II to improve the total radiological removal from the raffinate. EDTA was significantly more efficient at lowering the gross alpha and beta activity than the acids previously investigated. These experiments are listed in Table 3-12.

In addition, analysis of the Stage II data indicated that to achieve substantial reductions in the total radiological activity of the waste, multiple extraction steps would be required.

To determine if the multiple extraction process was being limited by the saturation of the extractant, further experiments were conducted. Two sets of tests at 80° C were conducted where the dose rate was increased to 10:1 from 4:1 and the time of extraction was increased from four to 24 hours. The

10:1 dose rate was only slightly improved over the 4:1. It can be concluded that the EDTA extractants at 80 C are not saturated by the dissolving material. Yet there may be a kinetic verses equilibrium phenomenon occurring during the first extraction. During the 24 hour extraction, the raffinate had higher gross alpha and gross beta values than the four hour extraction. The opposite trend occurred on the third extraction step. A possible explanation of these observations is that several materials dissolved relatively quickly. When these dissolved materials were allowed to stand for longer periods of time, some of the dissolved material reprecipitated. By the third extraction step, the concentration of cations and anions in the extraction solution was low enough that the rate of reprecipitation was diminished or effectively terminated. These results were the basis for the decision that subsequent tests would be 80° C, 4:1 dose rate, six extractions with EDTA, and four hours extraction time.

Multiple extractions were conducted with: hydrochloric acid (HCl), nitric acid(HNO_3), EDTA, potassium chloride pretreatment followed by EDTA (KCl/EDTA), hydrochloric acid and nitric acid followed by EDTA (HCl/EDTA and HNO_3/EDTA), EDTA followed by nitric acid (EDTA/HNO_3), nitric acid followed by two water rinses then by EDTA (HNO_3/RINSE/EDTA) were investigated. The least reduction in gross alpha and gross beta in the raffinate were measured for six sequential extractions with the acids, HCl/EDTA, and HNO_3/EDTA. With the latter two experiments, the pH of the raffinate was not adjusted to near neutral conditions before addition of EDTA. Therefore, it is highly likely that most of the EDTA precipitated on the solid residue instead of effectively penetrating the particle to extract the metals. The maximum reductions in total gross alpha and beta activity in the raffinate after six or seven extractions were from the KCl/EDTA, EDTA/HNO_3, and HNO_3/RINSE/EDTA. The latter extraction sequence was more effective than HNO_3/EDTA since the two water rinses raised the pH of the solid above the precipitation pH for EDTA.

However, the KCl/EDTA and EDTA/$HN0_3$ showed the most promise, and were carried forward into the Remedy Selection (advanced phase) extractions.

4.2.2 Remedy Selection (Advanced Phase)

4.2.2.1 Experimental Design

The reagent combinations of choice carried into the Remedy Selection (advanced phase) of the program were:

- A single 15 percent KCl extraction (recommended by Haque, 1988) followed by six extractions of 0.8M EDTA; and six extractions of 0.8M EDTA followed by one water wash and one 8N HNO_3 extraction.

It was necessary to conduct a single water wash between the EDTA and nitric acid cycles because nitric acid is an oxidant while EDTA is a organic species which can be oxidized by nitric acid. The feed material was prepared by combining ninety grams of Silo 1 and 2 material, with 10 g bentonite. This feed material was extracted with four grams of extractant per gram of silo material. Both extractant combinations were used on samples from each silo. After the chemical extractions, the residue was then washed three times with water, separated, collected, and saved for compositing. Each run was replicated four times. This testing is illustrated in Figure 4-3. These processes are more fully described in Section 3.3.2.

4.2.2.2 Remedy Selection Results

The Remedy Selection (advanced phase) chemical extraction test results are presented in Table 4-80. Analysis of the data in the table indicates that the extracted solids using both the KCl/EDTA and the EDTA/HNO_3 processes were below the TC regulatory levels for RCRA metals. The percent reduction column is based on a comparison of the TCLP of the raffinate solid with the characterization TCLP. The concentrations of chemicals in the TCLP leachate, with the exception of barium and mercury, were either reduced or were not at detected in the raffinate. Barium showed increased concentrations in the Silo 1 samples, and relatively small decreases in the Silo 2 samples. Even with the increase, the highest barium concentrations are still less than 5 percent of the TCLP limit. Mercury was undetected in three of the samples, but showed a slight increase in the TCLP leachate in the fourth (Silo 2 EDTA/HNO_3 extraction process sample). The result was approximately 1 percent of the TCLP limit. The apparent increases may be due to sample heterogeneity. Another possibility is that these metals were chemically altered during the chemical extraction process to make them more soluble. Even if a large fraction was removed by the chemical extraction process, the increased solubility of the metals remaining in the raffinate could give higher concentrations in the TCLP leachate.

Table 4-81 presents the results of the radiological analysis of the TCLP leachate. This table also compares these results to the characterization TCLP data. The table shows that the leachate concentrations of most radionuclides were greatly reduced. The leachable concentrations of uranium and thorium were greatly increased in the KCl/EDTA residue from Silo 1. The leachable concentrations of thorium and uranium were reduced in the other samples.

Table 4-82 presents the total radiological analysis of the residues. The table shows concentration increases for several of the radioisotopes: specifically, total thorium, and total uranium. It is postulated that radionuclides which are not extracted, are concentrated in the solids fraction by the removal of the more chelatable and more acid soluble substances. Also, elements that are detected by measurements that are influenced by self-absorption or self-attenuation can exhibit increased measured activity when the absorbent or attenuating materials are removed from the surface of the particle being measured, as for example, lead by EDTA extraction.

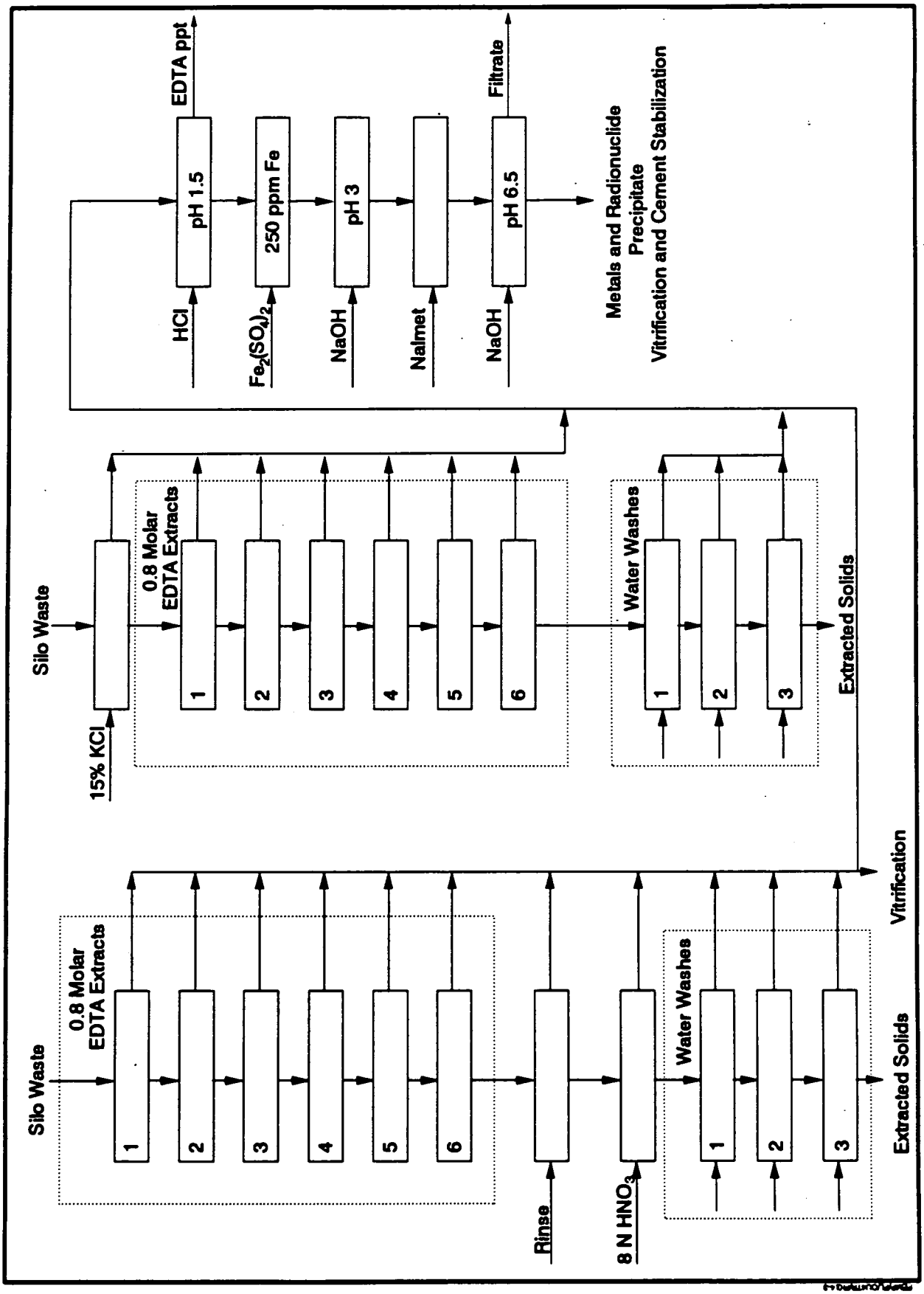

FIGURE 4-3. ADVANCED PHASE EXTRACTION AND PRECIPITATION

TABLE 4 - 80

RCRA METALS

REMEDY SELECTION (ADVANCED PHASE) CHEMICAL EXTRACTION SOLIDS ANALYZED BY TCLP

Sample No.	Silo No.	Extractant	Arsenic µg/L	Reduction %	Barium µg/L	Reduction %	Cadmium µg/L	Reduction %	Chromium µg/L	Reduction %	Lead µg/L	Reduction %
100058-10510201	1	KCl/EDTA	0.2 U	0	4640	-434.6	2 U	100	10 U	100	2120	99.638
100058-10510401	1	EDTA/HNO3	0.2 U	0	2430	-180	2 U	100	31	47.458	677	99.886
100073-10510601	2	KCl/EDTA	22.6 +	56.538	1530	36.567	2 U	100	10 U	100	997	99.75
100073-10510801	2	EDTA/HNO3	0.2 U	100	2070	14.179	2 U	100	10 U	100	108	99.973
TC Regulatory Limit (in the extract)			5000		100000		1000		5000		5000	

Sample No.	Silo No.	Extractant	Mercury µg/L	Reduction %	Selenium µg/L	Reduction %	Silver µg/L	Reduction %
100058-10510201	1	KCl/EDTA	0.2 U	0	14.9	88.963	10 U	100
100058-10510401	1	EDTA/HNO3	0.2 U	0	28.8 S	78.667	10 U	100
100073-10510601	2	KCl/EDTA	0.2 U	0	6.2	93.861	10 U	100
100073-10510801	2	EDTA/HNO3	19.4	-1.94	7.5	92.574	10 U	100
TC Regulatory Limit (in the extract)			200		1000		5000	

U - Anlayte was analyzed for but not detected.
+ - Correlation coefficient for the MSA is less than 0.955.
S - The reported value was determined by the Method of Standard Additions.

Table 4–81
TCLP for Radionuclides

FEMP OU4 Remedy Selection (Advanced Phase) Chemical Extraction Solids
Analyzed by TCLP for Radionuclides

Sample No.	Silo No.	Extractant	Ac–227 (pCi/L) Treat.	Ac–227 (pCi/L) Charact.	Pa–231 (pCi/L) Treat.	Pa–231 (pCi/L) Charact.	Pb–210 (pCi/L) Treat.	Pb–210 (pCi/L) Charact.	Po–210 (pCi/L) Treat.	Po–210 (pCi/L) Charact.
100058–10510201	1	KCl/EDTA	182	6454	<280		23300	946331	2240	125665
100058–10510401	1	EDTA/HNO3	46.7	6454	<857		25000	946331	2260	125665
100073–10510601	2	KCl/EDTA	2920	3359	<1473		20200	139639	1660	23537
100073–10510801	2	EDTA/HNO3	5.87	3359	<631		1280	139639	266	23537

Sample No.	Silo No.	Extractant	Ra–226 (pCi/L) Treat.	Ra–226 (pCi/L) Charact.	Ra–228 (pCi/L) Treat.	Ra–228 (pCi/L) Charact.	Th– total (ug/L) Treat.	Th– total (ug/L) Charact.	U–total (ug/L) Treat.	U–total (ug/L) Charact.
100058–10510201	1	KCl/EDTA	1350	48974	<3.0	47	5750	62	5250	1740
100058–10510401	1	EDTA/HNO3	**	48974	**	47	9.05	62	82.9	1740
100073–10510601	2	KCl/EDTA	1440	54138	11.5	14.8	<6950	95	4640	4803
100073–10510801	2	EDTA/HNO3	3650	54138	<3.0	14.8	2.87	95	69.1	4803

** – Will not have results due to low yield.

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TABLE 4 - 82

RADIOLOGICAL ANALYSES - 80°C
TOTAL CONSTITUENT ANALYES

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ADVANCED PHASE CHEMICAL EXTRATION SOLIDS RADIOLOGICAL ANALYSIS

Sample No.	Silo No.	Extractant	Characterization Ac-227 pCi/g	Treatability Ac-227 pCi/g	Reduction %	Characterization Pa-231 pCi/g	Treatability Pa-231 pCi/g	Reduction %
100058-10510201	1	KCl/EDTA	8142	5435	33.2474	ND	18640	ND
100058-10510401	1	EDTA/HNO3	8142	5561	31.6998	ND	16140	ND
100073-10510601	2	KCl/EDTA	6443.9	3160	50.9614	ND	15350	ND
100073-10510801	2	EDTA/HNO3	6443.9	1948	69.7699	ND	9676	ND

Sample Sample No.	Silo Silo No.	Extractant	Characterization Pb-210 pCi/g	Treatability Pb-210 pCi/g	Reduction %	Characterization Po-210 pCi/g	Treatability Po-210 pCi/g	Reduction %
100058-10510201	1	KCl/EDTA	194584.4	26750	86.2528	236533.3	3090	98.6936
100058-10510401	1	EDTA/HNO3	194584.4	55670	71.3903	236533.3	8890	96.2415
100073-10510601	2	KCl/EDTA	110671.7	23690	78.5943	120966.7	7570	93.7421
100073-10510801	2	EDTA/HNO3	110671.7	15030	86.4193	120966.7	5620	95.3541

Sample No.	Silo No.	Extractant	Characterization Ra-228 pCi/g	Treatability Ra-228 pCi/g	Reduction %	Characterization Th-total µg/g	Treatability Th-total µg/g	Reduction %
100058-10510201	1	KCl/EDTA	ND	<38	ND	4352.1	5450	-25.227
100058-10510401	1	EDTA/HNO3	ND	<86	ND	4352.1	<19200	**
100073-10510601	2	KCl/EDTA	ND	<67	ND	131.2	2520	-1820.7
100073-10510801	2	EDTA/HNO3	ND	<53	ND	131.2	141	-7.4695

Sample No.	Silo No.	Extractant	Characterization Ra-226 pCi/g	Treatability Ra-226 pCi/g	Reduction %	Characterization U-total µg/g	Treatability U-total µg/g	Reduction %
100058-10510201	1	KCl/EDTA	501217.8	4518	99.0986	1778.6	921	48.2177
100058-10510401	1	EDTA/HNO3	501217.8	16270	96.7539	1778.6	451	74.643
100073-10510601	2	KCl/EDTA	254256.7	9750	96.1653	1184	4125	-248.4
100073-10510801	2	EDTA/HNO3	254256.7	7393	97.0923	1184	1992	-68.243

ND No positive results were found: no calculation was performed.
** Detection limit for treatability sample is higher than the characterization positive result.

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In addition, Table 4-83 shows that the radionuclide concentrations of the raffinate from both of the KCl/EDTA extractions fell below the 100 n Ci/g limit of 40CFR191 while the raffinate from one of the Silo 1 EDTA/HNO_3 extractions did not.

4.2.3 Time and Temperature

4.2.3.1 Feed Preparation-Homogeneity

Samples for time and temperature extractions were homogenized to eliminate sample heterogeneity or a variable that might affect results.

The untreated waste samples were blended with bentonite after having been forced through a 12 mesh sieve (-12 mesh). The samples were mixed and sieved three times. The samples were then aliquotted for analysis in triplicate and samples were analyzed for gross alpha/beta. Standard deviations were calculated for each parameter along with their percent relative standard deviations (RSDs). Acceptable RSDs as stated in the Work Plan are ±30 percent. These data can be found in Table 4-84. The RSD's were within the ±30 percent limit. The highest was ± 15.8 percent for uranium.

4.2.3.2 Extraction Time and Temperature

The time and temperature studies compared extraction efficiencies based on analytical results for residual solids. The spent extraction liquids were also analyzed. The test conditions and analytical results are summarized in the Clipper® file located in Appendix B. The solid residues and feed analytical results are listed in Table 4-85.

The lead analytical results for the residual solids indicated seven hours and 80°C as the preferred time and temperature. Uranium results showed that increased time and elevated temperature were favored, but the differences between 50°C and 80°C were not apparent. Thorium results indicated no appreciable reduction under any of the test conditions. In fact, thorium results for the treated residual solids were in many cases higher than initial values. This phenomenon was probably the result of two conditions: the feed values are not corrected for moisture content and treated residues were oven dried at 105°C; and extraction often changes the sample matrix such that the sample is more amenable to the test.

Gross alpha and beta results are inconclusive because extraction brings about removal of such shielding elements as lead. In addition, extraction often erodes particle size to effectively increase sample surface area, a parameter which also effects the gross alpha and beta analysis.

TABLE 4-83 5448

ADVANCED PHASE CHEMICAL EXTRACTION SOLIDS TOTAL ACTIVITY OF RADIONUCLIDES WITH HALF-LIVES GREATER THAN 20 YEARS

Sample Number[a]	Silo Number	Extractant	Total Activity (nCi/g)
100058-10510201	1	KCl/EDTA	93
100058-10510401	1	EDTA/HNO_3	224
100073-10510601	2	KCl/EDTA	59
100073-10510801	2	EDTA/HNO_3	36

[a]Composite samples

TABLE 4 - 84

FEED HOMOGENEITY

STATISTICAL INFORMATION ON FEED HOMOGENEITY FOR CHEMICAL EXTRACTION EXPERMENTS

Sample No.	Silo No.	Sample Description		Analysis by ICP Pb ppm	Th ppm	U ppm		Analysis by IC U ppm		Gross Alpha (µCi/g)	Gross Beta (µCi/g)
100058-10324601	1	Feed		57340	58.4	689		697		2.260	0.844
100058-10324601	1	Feed		47180	52.9	644		668		2.090	0.760
100058-10324601	1	Feed		49130	59.7	704		681		2.030	0.763
			avg	51217	57.0	679.1	avg	682.0	avg	2.127	0.789
			sd	4402.4	3.0	25.6	sd	11.9	sd	0.097	0.039
			%RSD	8.60	5.23	3.77	%RSD	1.74	%RSD	4.580	4.932

Sample No.	Silo No.	Sample Description		Analysis by ICP Pb ppm	Th ppm	U ppm		Analysis by IC U ppm		Gross Alpha µCi/g	Gross Beta µCi/g
100073-10324602	2	Feed		30730	69.4	1643		1335		1.100	0.413
100073-10324602	2	Feed		31500	72.7	2051		1313		1.150	0.438
100073-10324602	2	Feed		30410	66.1	1400		1340		1.150	0.406
			avg	30880	69.4	1698	avg	1329.3	avg	1.133	0.419
			sd	457.46	2.71	268.60	sd	11.73	sd	0.024	0.014
			%RSD	1.48	3.91	15.82	%RSD	0.88	%RSD	2.080	3.278

avg = average
sd = standard deviation
%RSD = percent relative standard deviation

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TABLE 4-85

TIME AND TEMPERATURE STUDY
RESIDUAL SOLIDS RESULTS[a]

Time (hrs)	Temperature (°C)	Silo Number	ICP Pb (ppm)	ICP Th (ppm)	U by IC (ppm)	Gross Alpha (µCi/g)	Gross Beta (µCi/g)
1[b]	80	1	2662	102.2	575	0.665	0.25
7	80	1	1412	99.37	414	0.807	0.313
1	20	1	4630	95.12	599	1.1	0.394
7	20	1	4091	102.8	428	0.518	0.231
4	50	1	3087	91.15	373	0.652	0.198
1	80	2	1785	94.38	1392	0.213	0.0671
7	80	2	1134	94.13	751	0.2	0.06
1	20	2	4097	89.09	1239	0.353	0.11
7	20	2	3667	96.93	931	0.237	0.058
4	50	2	2131	71.39	790	0.302	0.0573
Untreated Feed Average 1			51217	57	682	2.13	0.789
Untreated Feed Average 2			30880	69.38	1329.33	1.13	0.419

[a]Feeds were Silo 1 or 2 composite 1990-91 samples blend with 20% bentonite.
[b]Samples were first treated with 15% KCl for 16 hours at given temperature, then extracted with 0.8M EDTA for the time and temperature listed in table. The liquid to solid ratio was 4:1 (w/w).

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4.2.4 Water Washing

The raffinate from the EDTA extractions contained some residual EDTA. Any EDTA left in the solids would make the metals more soluble and potentially cause failure in the leaching performance tests. It was necessary to conduct several water washes to remove residual EDTA. The data are presented graphically for Silos 1 and 2 in Figures 4-4 and 4-5, and Table 4-4.

The results show that the lead and uranium concentrations were a nonlinear function of the number of washes. This phenomenon may be due to the more pH neutral water extracting the alkaline species from the solids, thus decreasing the pH of the solids to the point where the metals would become more soluble, or may be due to a noted decrease in the particle size of the solids thus increasing the surface area extracted.

4.2.5 Vitrification of Spent Extractant

The extract from the advanced phase was dried in an oven as a pretreatment step for vitrification of the residual solids. Two approaches were used in the vitrification tests. In the first test, some of the spent nitric acid extract and EDTA filtrate (from precipitation of the EDTA) advanced phase tests were dried to residual solids, then mixed with site soil and vitrified. In the second test, the spent extractants were combined. The EDTA and metals were precipitated separately. The metals precipitate was collected, dried, calcined, blended with site flyash, then vitrified. Figure 3-11 through 3-13 depict a flow diagram for the complete extraction to vitrification sequence.

Table 4-86 shows the MTCLP and PCT results from the vitrified extracts. The data shows that both the Silo 1 and Silo 2 samples vitrified with site flyash passed the MTCLP. The composite sample vitrified with site soil failed the MTCLP for lead and exhibited higher gross alpha and beta levels in the MTCLP leachate. In the PCT tests, the sample vitrified with site soil had over double the concentration of silicone (24.30 ppm vs 10.29 and 7.99) than the two site flyash samples. In addition, the uranium concentration was almost four times greater in the site soil samples than in the site flyash samples. The MTCLP and PCT data indicate for these screening tests that a vitrified product can be made and that site flyash maybe a better reagent that site soil. This does not indicate that site soil would not work, but that further testing is needed to identify the appropriate waste/glass former flux ratios.

4.2.6 Contaminant Removal From Spent Extractant - Preliminary Precipitation Stage 1

Several different chemical and proprietary reagents and processing steps were investigated for their ability to remove the contaminants of concern. These reagents are described in Table 3-17. The reagents were added, then noted for their ease of separability and how much contaminant remained in the liquid phase after the separation step. From these test observations, selected reagents were chosen to be carried into the Stage 2 precipitation test program. The Stage 1 test data is located in the Clipper program in the Appendix B.

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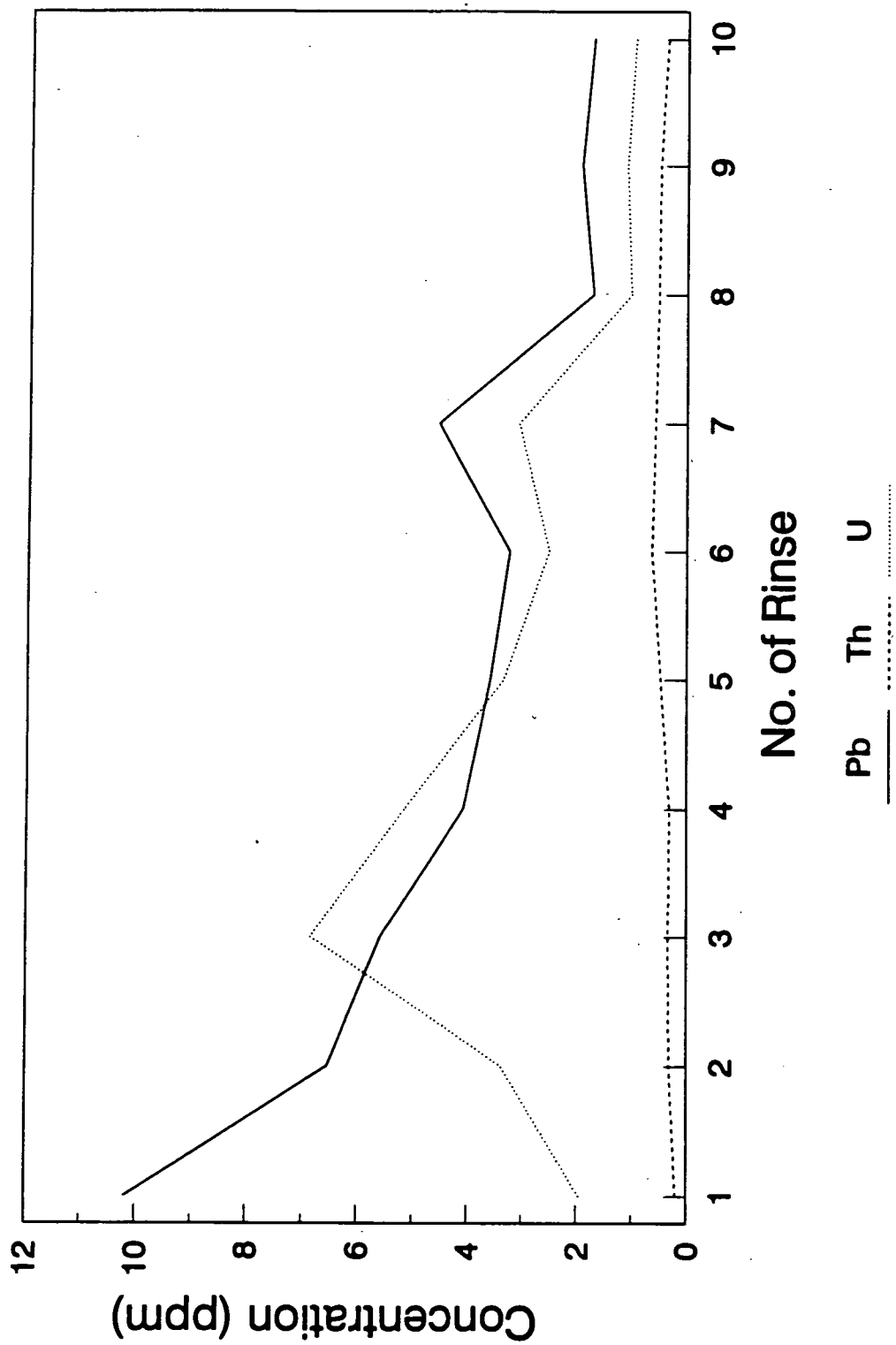

FIGURE 4-4. WASHING STUDIES - SILO 1

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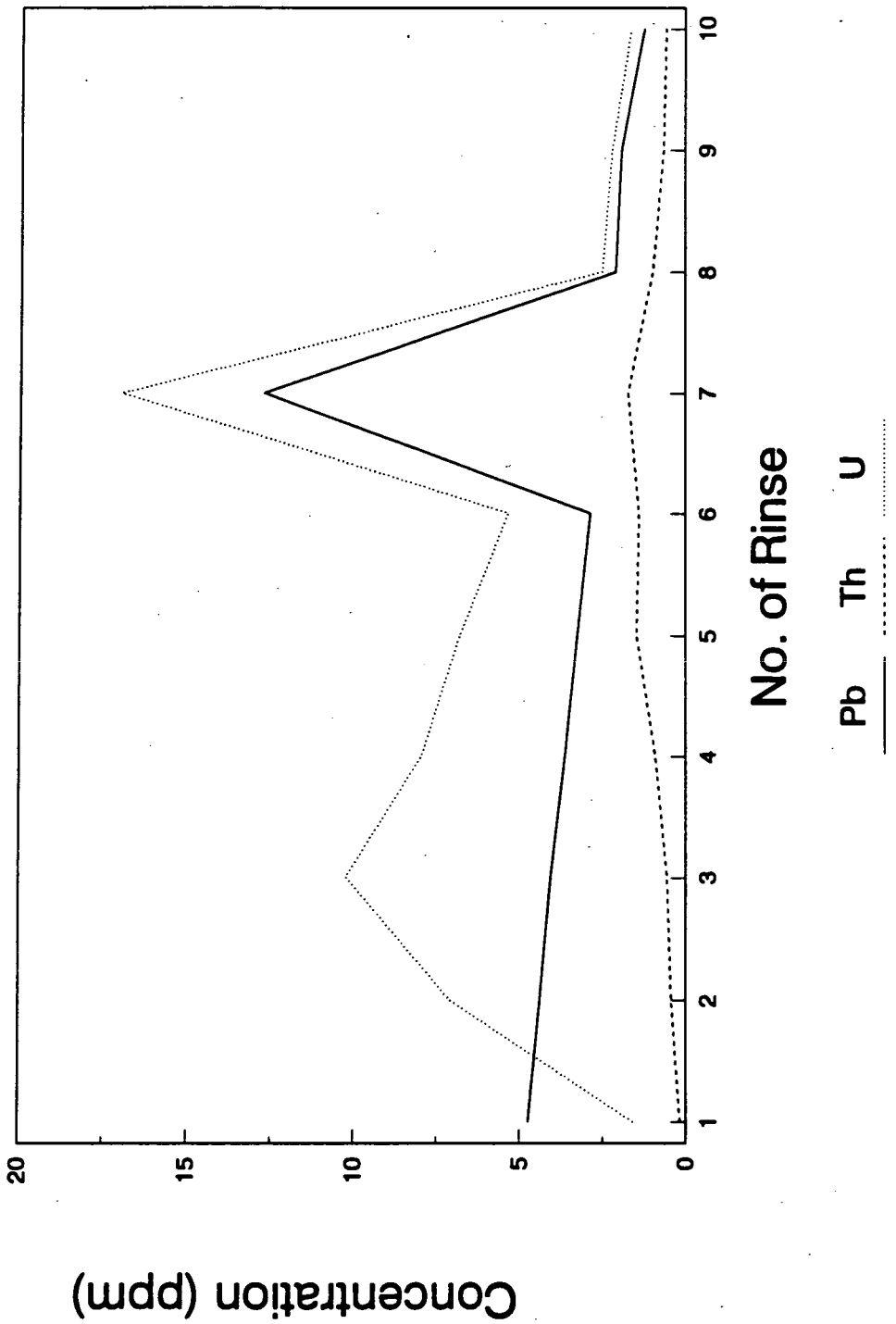

FIGURE 4-5. WASHING STUDIES - SILO 2

TABLE 4-86

CHEMICAL EXTRACTION - VITRIFICATION

MTCLP

Origin	Sample	Ag (mg/l)	As (mg/l)	Ba (mg/l)	Cd (mg/l)	Cr (mg/l)	Pb (mg/l)	Se (mg/l)	G Alpha (dpm/4 cc)	G Beta (dpm/4 cc)
Nalmet[b]	Silos 1 and Silo 2 + Site Soil	<0.02	<0.20	<0.066	<0.02	<0.015	31.5	<0.5	25	117
EDTA/HNO_3	Silo 2 + FA[a]	<0.02	<0.20	0.741	<0.02	<0.015	<0.25	<0.5	17	10
EDTA/HNO_3	Silo 1 + FA	<0.02	<0.20	1.09	<0.02	<0.015	<0.5	<0.5	NA	NA

PCT

Origin	Sample	Al (mg/l)	B (mg/l)	Ca (mg/l)	Fe (mg/l)	K (mg/l)	Li (mg/l)	Mg (mg/l)	Na (mg/l)	Si (mg/l)	Th (mg/l)	U (mg/l)	Gross Alpha (dpm/4cc)	Gross Beta (dpm/4cc)
Nalmet[b]	Silo 2 + Silo 1 + site soil	1.02	0.09	13.33	<0.003	11.95	0.05	0.13	24.30	24.30	<0.04	0.11	4	0
EDTA/HNO_3	Silo 2 + FA	3.14	<0.03	2.13	<0.009	<0.84	ND	1.02	7.01	10.29	<0.12	0.03	4	0
EDTA/HNO_3	Silo 1 + FA	0.33	0.08	9.8	<0.003	<0.28	0.04	1.55	4.34	7.99	<0.04	<0.02	0	4

[a]Flyash
[b]Reagents contained KCl/EDTA + EDTA/HNO_3 + Nalmet.

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4.2.7 Stage II Precipitation and Settling

The best of the Stage 1 reagents were tested with larger extract samples. Some reagents were combined with another sequential precipitation step. These reagent sequences are described in Table 3-18 for reference. Preliminary settling tests were also conducted during this stage to determine which reagent scheme would offer the lowest precipitate sludge volume. The best performances were provided by sulfide and Nalmet. Because of the potential hydrogen sulfide problem with sulfide, only Nalmet was carried into the next phase.

Initial treatments using sodium sulfide were not successful because sulfide may have been consumed during treatment through oxidation. The initial sulfide tests involved low dosages and long mixing times (overnight) which may have been sufficient for air in the headspace of the reaction vials to oxidize most of the sulfide present. The absence of sulfide at the end of the treatments was evidenced by a change of the typical black metal sulfide color to yellow. In addition, certain metals, like nickel, may have acted as catalysts to accelerate the oxidation process.

Stage II precipitation testing began with duplications and variations on the most promising treatments from Stage 1 testing. The first set of tests was performed using the treated EDTA/KCl composite plus 300 ppm of Fe^{3+}, and the HNO_3/H_2O composite plus 250 ppm. These two feeds were previously described in Section 3.3.7.1. Description and analytical data pertaining to these tests are also contained in the Clipper report located in Appendix B. Results of the first set of 21 tests showed that the HNO_3/H_2O composite plus 250 ppm of Fe^{3+} could be treated with calcium hydroxide to pH 9 and produce a fast-settling, easily-flexible sludge, while reducing Pb and U to less than 1 ppm each. In contrast, the treated EDTA/KCl composite plus 300 ppm of Fe^{3+} (treated to remove EDTA) proved more difficult to treat with respect to Pb removal. A second set of tests focused on the treatment of the treated EDTA/KCl composite. In addition, two other feeds were tested: a 30 percent nitric acid, 70 percent KCL/EDTA w/w blend of the composite with 300 ppm of Fe^{3+}, and the same blend without Fe^{3+}. These experiments are listed in Table 4-87. The Nalmet 8154 and the sodium sulfide treatments were successful, but the Nalmet was chosen since it is a less hazardous reagent.

4.2.7.1 Settling Tests

The Stage II precipitation tests were performed not only to confirm the most promising treatment processes, but also to obtain range finding information about relative settling rates of various treatments. These range finder settling data are listed in the Clipper® print-out in Appendix B. In addition to the small scale settling tests, a larger scale settling test was performed while preparing precipitated solids for vitrification and stabilization tests. (Refer to Section 3.3.7.3). The settling rate (inches/minute) for the Nalmet sludge is plotted with time in Figure 4-6. This settling rate should be sufficient for standard settling equipment.

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TABLE 4-87

STAGE II PRECIPITATION TEST RESULTS

Feed	Treatment	pH	Lead (ppm)	Uranium (ppm)
Treated EDTA/KCl Composite +300 ppm Fe3+	3.64% (wt) (Na3PO4-12 H2O), followed by pH adjustment with NaOH	8.9	55.2	0.33
Treated EDTA/KCl Composite +300 ppm Fe3+	3.64% (wt) (Na3PO4-12 H2O), followed by pH adjustment with Ca(OH)2	8.9	8.03	ND
Treated EDTA/KCl Composite +300 ppm Fe3+	0.82% (wt) Na2S added to liquid, after adjustment to pH 9 with NaOH	9.1	<0.5	0.23
Treated EDTA/KCl Composite +300 ppm Fe3+	0.62% (wt) Nalmet 8154 added to liquid, after adjustment to pH 3 with NaOH	6.2	<0.5	0.17
Treated EDTA/KCl Composite +300 ppm Fe3+	0.12% (wt) Nalmet 8154 added to liquid, after adjustment to pH 3 with NaOH	6.4	90.8	0.14
Treated EDTA/KCl + HNO3 Comp. +300 ppm Fe3+	0.82% (wt) Na2S added to liquid, after adjustment to pH 9 with NaOH	9.3	<0.5	4.9
Treated EDTA/KCl + HNO3 Comp. +300 ppm Fe3+	0.62% (wt) Nalmet 8154 added to liquid, after adjustment to pH 3 with NaOH	5	<0.5	0.55
Treated EDTA/KCl + HNO3 Comp. without Fe3+	0.62% (wt) Nalmet 8154 added to liquid, after adjustment to pH 3 with NaOH	4.7	16.2	0.31

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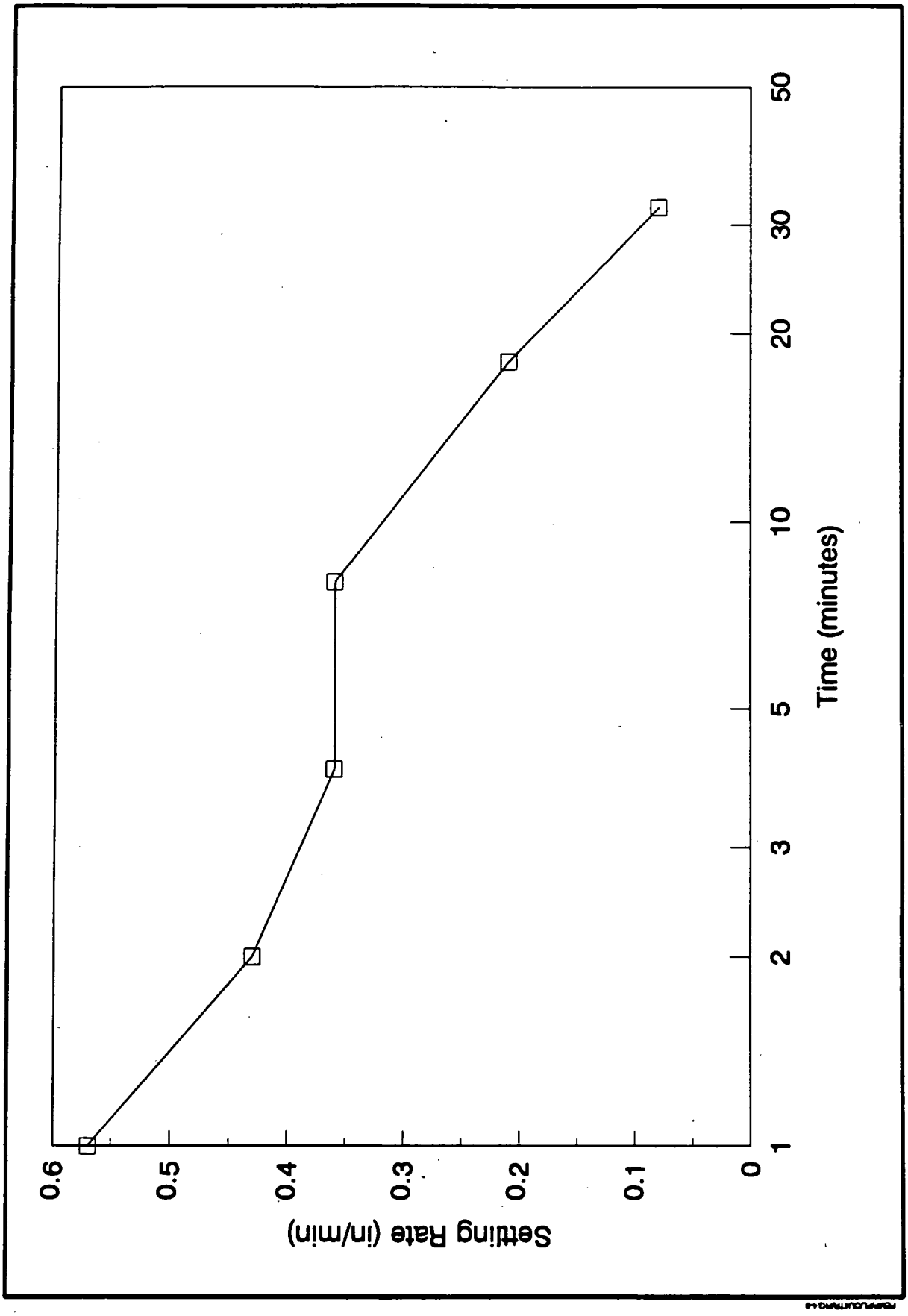

Figure 4-6. Settling Rate of Nalmet Sludge

Small aliquots of the Nalmet sludge were also tested with Nalco cationic, anionic, and non-ionic organic polymers. The polymer testing method was based on the "Procedure for Flocculation Mini Jar Tests" (See Appendix F). The polymers were used to improve settling rates and decrease the Nalmet Sludge Volume. There were no apparent improvements resulting from any of the polymer treatments. Therefore, further testing with polymers was stopped.

4.2.8 Cement Stabilization

Precipitate from the experiments described in Section 4.2.7 were stabilized with preselected cement stabilization reagents found in Table 3-21. Samples based on the two formulations were made, then subjected to performance analysis. The UCS for the first formulation was 381 psi and 372 psi for each of the two specimens. The UCS on the second formulation was 1165 psi. It is suspected that the cement was not fully hydrated in first sample. In the second sample, water was mixed with cement before it was added to the waste and other reagents. The analytical data showed that the only detectable RCRA metal was barium at a low level. Uranium was also nondetectable. These data are in Clipper® file in the Appendix B.

4.2.9 Proposed Process Overview

The purpose of this process is to reduce the volume of material that must be disposed of as a mixed waste. This would be done by chemically extracting radioactive and hazardous constituents from the silo material with EDTA. The extracted solids would be rinsed with water and dewatered to produce a material suitable for disposal.

The combined extracts would be treated to recover EDTA and to remove the hazardous and radioactive constituents in two stages. First, the extract would be acidified to precipitate EDTA for reuse. Then, the extracted hazardous and radioactive constituents would be precipitated, dewatered, dried, and vitrified to give a resulting product that would be approximately 10 percent of the weight of the original untreated silo material. The two solid residues from the process would be packaged for interim storage on site.

Process economics were optimized by:

- Recovering EDTA via crystallization
- Reusing weak extracts from the last three extraction steps as make up for the next, first three extracts
- Reusing the rinse water from the rinsing steps as make-up water for dissolving the recovered EDTA

Figure 4-7 is a flow diagram of the proposed process.

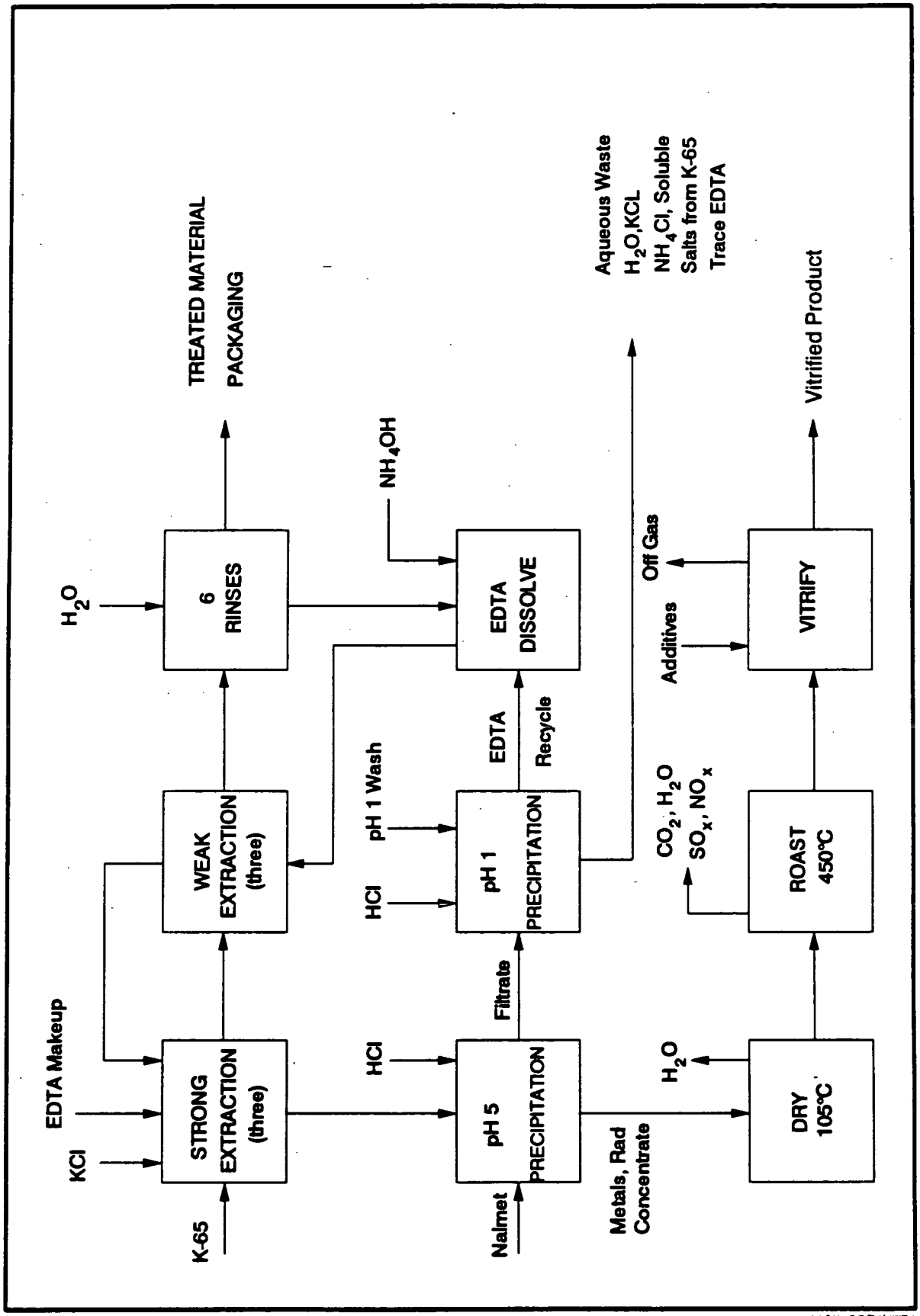

FIGURE 4-7. RECOMMENDED PROCESS

FEMP/FL/OU4TR4-7

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Recommendation

It is recommended that further work be done optimizing the cement-flyash-blast furnace slag formulations. Also, time did not allow for the development of optimum moisture content as in: density relationships and/or the influence of the water content in the stabilization mixtures. This should be done in the interest of reducing the bulking factor and increasing the compressive strength by compactive or other measures in lieu of adding more reagent. Additionally, the heat rise needs to be better controlled for Silo 3 stabilization. Either optimizing the addition of reagents over time or an increased use of a an increase use of a more inert reagent that could act as a heat sink should be investigated although this will increase the bulking factor for this site.

4.3 QUALITY ASSURANCE/QUALITY CONTROL

The Fernald RI/FS QAPP, Revision 3, is the governing QA document for the remedial investigation at the FEMP. The QAPP includes the quality objectives, the performance requirements to meet these objectives, and the methods for verifying that the objectives have been met. To meet the analytical DQOs of the QAPP, strict documentation procedures are used in conjunction with reagent blanks, duplicate samples, and spiked samples to determine the precision, accuracy, and completeness of the data.

Daily laboratory activities were recorded in laboratory notebooks specifically assigned to this project. Logbooks were assigned to specific functions or equipment, and were used to record equipment maintenance, daily checks, and standards preparation. These notebooks and logbooks are returned to the QAO after completion of the project or when the notebook is filled. Data recording and verification procedures are described in the Treatability Study Work Plan for OU4, Section 7.0, Data Management.

Analyte specific QA/QC requirements for analytical work are specified in the Fernald RI/FS QAPP, Sections 4 and 9. Three types of routine quality control samples were analyzed; blanks, duplicates (or spike duplicates), and spike samples. The purpose and results of these quality control samples are explained in this section.

The Fernald RI/FS QAPP also specifies that data completeness be $\geq$90 percent.

Three separate tasks are discussed: chemical extraction, 5-day static leach, and TCLP analysis of stabilized materials. Each task is further subdivided into analytical categories. Each of the QC samples for these tasks and analytical categories are discussed separately. Data for percent completeness combines all analytical categories within a task.

Three categories of analyses were requested for the chemical extraction samples; TCL pesticides/PCBs, metals, and radionuclides.

Three categories of analyses were requested for the 5-day static leach samples: metals, general chemistry, and radionuclides.

Six categories of analyses were requested for the TCLP samples: volatile organics, semi-volatile organics, pesticides/PCBs, metals, general chemistry, and radionuclides.

Iron was analyzed and reported with the metals data, but was not a requested analyte, and data are not included in this discussion.

Five-day static leach samples were submitted for analysis in three batches. These batches were combined for analysis and only one set of QC samples were prepared.

Table 4-88 lists the specific organics, metals, general chemistry parameters, and radionuclides analyzed. This table is taken from the Treatability Study Work Plan for Operable Unit 4, Table 3-4, Polonium-210 was added to the requested radionuclide parameters, and total radium was changed to Ra-226 and Ra-228 isotopic analysis. Cement stabilized samples contain considerable alkalinity, and it was decided to delete the requirement of alkalinity measurements.

Statistical comparison of duplicate and spike sample results near the detection limit are not valid. Analyte concentrations should be greater than five times the detection limit for statistical comparison.

4.3.1 Blank Samples

Blank samples are analyzed to determine if detectable quantities of an analyte are being introduced into samples from either the reagents used or laboratory apparatus. Blank contamination does not automatically invalidate sample results, and must be judged on a case-by-case basis.

There are two general types of blank samples discussed. Analysis of TCLP leachates included a reagent blank that was subjected to the same extraction and measurement process as samples. This blank is intended to show the presence of contamination present in the reagents or test apparatus, and will be referred to as an extraction blank.

Prior to many inorganics analysis, samples are digested in acid. A sample preparation blank consists of laboratory water that is prepared in the same manner as the sample, and is also used to show the presence of contaminates in either reagents or apparatus.

Table 4-89 lists blank results with detectable quantities of analyte.

TABLE 4-88

LIST OF ORGANIC ANALYTES

VOLATILES		
Chloromethane	Chloroform	Benzene
Bromoethane	1,2-Dichloroethane	trans-1,3-Dichloropropene
Vinyl Chloride	2-Butanone	Bromoform
Choroethane	1,1,1-Trichloroethane	4-Methyl-2-pentanone
Methyl Chloride	Carbon Tetrachloride	2-Hexanone
Acetone	Bromodichloromethane	Tetrachloroethene
Carbon Disulfide	1,2-Dichloropropane	Toluene
1,1-Dichlorethene	Cis-1,3-Dichloropropene	1,1,2,2-Tetrachloroethane
1,1-Dichloroethane	Trichlorethene	Chlorobenzene
1,2-Dichloroethene	Dibtromochloromethane	Ethyl Benzene
(total)	1,1,2-Trichloroethane	Styrene
		Xylenes (total)
		Vinyl Acetate
PESTICIDE/PCB		
alpha-BHC	gamma-Chlordane	Aroclor-1016
beta-BHC	Toxaphene	Aroclor-1221
delta-BHC	Heptachlor epoxide	Aroclor-1232
gamma-BHC	Endosulfan I	Aroclor-1242
Heptachlor	Dieldrin	Aroclor-1248
Aldrin	4,4-DDE	Aroclor-1254
Endrin ketone	Endrin	Aroclor-1260
Endrin	Endosulfan II	
aldehyde	4,4-DDT	
alpha-Chlordane	Methoxychlor	
SEMIVOLATILES		
Benzo(g,h,i) perylene	4-Chloro-3-methylphenol	N-nitrosodiphenylamine

TABLE 4-88

LIST OF ORGANIC ANALYTES

SEMIVOLATILES		
Phenol	2-Methylnapthalene	4-Bromophenyl-phenylether
bis(2-Choroethyl)ether	Hexachlorocyclopentadiene	Hexachlorobenzene
2-Chlorophenol	2,4,6-Trichlorophenol	Pentachlorophenol
1,3-Dichlorobenzene	2,4,5-Trichlorophenol	Phenanthrene
1,4-Dichlorobenzene	2-Chloronapthalene	Anthracene
1,2-Dichlorobenzene	2-Nitroaniline	Carbazole
2-Methylphenol	Dimethylphthalate	Di-n-butylphthalate
bis(2-Chloroisopropyl) Ether	Acenaphthylene	Fluoranthene
4-Methylphenol	2,6-Dinitrotoluene	Pyrene
N-Nitroso-di-n-propylamine	3-Nitroaniline	Butylbenzylphthalate
Hexachloroethane	Acenaphthlene	3,3'-Dichlorbenzidine
Nitrobenzene	2,4-Dinitrophenol	Benzo(a)anthracene
Isophorone	4-Nitrophenol	Chrysene
2-Nitrophenol	Dibenzofuran	bis(2-Ethylhexyl)phthalate
2,4-Dimethylphenol	2,4-Dinitrotoluene	Di-n-octylphthalate
bis-(2-Chlorethoxy)methane	Diethylphthalate	Benzo(b)fluoranthene
2,4-Dichlorophenol	4-Chlorophenyl-phenylether	Benzo(k)fluoranthene
1,2,4-Trichlorobenzene	Fluorene	Benzo(a)pyrene
Naphthalene	4-Nitroaniline	Benzoic acid
4-Chloroaniline	Indeno(1,2,3-cd)pyrene	Dibenzo(a,h)anthracene
Tributyl phosphate	4,6-Dinitro-2-methylphenol	Benzyl alcohol
Hexachlorobutadiene		

TABLE 4-88

LIST OF INORGANIC ANAYLTES (CONTINUED)

METALS	
Aluminum	Magnesium
Antimony	Manganese
Arsenic	Mercury
Barium	Molybdenum
Beryllium	Potassium
Boron	Nickel
Calcium	Selenium
Cadmium	Silicon
Chromium	Silver
Cobalt	Sodium
Copper	Thallium
Lead	Vanadium
Lithium	Zinc
GENERAL CHEMISTRY	
Chloride	Nitrate
Reactivity (as sulfide)	pH
Fuoride	Phosphorous
Ammonia	Sulfate
	Cyanide
RADONUCLIDES	
Radium^{226}	Lead^{210}
Radium^{228}	Actinium^{227}
Thorium - total	Protactium^{231}
Uranium - total	Polonium^{210}

TABLE 4-89

ANALYTES DETECTED IN BLANKS

CHEMICAL EXTRACTION				
ANALYSIS CATEGORY	TYPES OF BLANK	ANALYTE	CONTAMINATION CONCENTRATION	DETECTION LIMIT
Metals	Extraction (two analyzed)	Barium	7.3 µg/l[1] 7.6 µg/l	2.0 µg/l
		Boron	66.7 µg/l	50.0 µg/l
		Calcium	117 µg/l 125 µ/l	20.0 µg/l
		Silicon	196 µg/l 126 µ/l	100 µg/l
		Zinc	12.5 µ/l 21.0 µ/l	5.0 µg/l
	Sample Preparation	Calcium	26.3 µ/l	20 µg/l
		Silicon	32.5 µg/l	100 µg/l
		Zinc	6.8 µg/l	5.0 µg/l
FIVE-DAY STATIC LEACH				
ANALYSIS CATEGORY	TYPE OF BLANK	ANALYTE	CONTAMINATION CONCENTRATION	DETECTION LIMIT
Metals	Extraction	Calcium	31 µg/l	20.0 µg/l
	Sample Preparation (three analyzed)	Arsenic	2.1 µg/l	2.0 µg/l
		Zinc	5.38 µg/l	5.0 µg/l
General Chemistry	Extraction	Fluoride	0.053 mg/l	0.05 mg/l
		Phosphorous	0.03 mg/l	0.02 mg/l
Radionuclide	Extraction	Radium^{226}	1.38 pCi/l	Unknown

[1]More than one value indicates that more than one blank was contaminated.

TABLE 4-89

ANALYTES DETECTED IN BLANKS (CONTINUED)

TCLP ANALYSIS				
ANALYSIS CATEGORY	TYPE OF BLANK	ANALYTE	CONTAMINATION CONCENTRATION	DETECTION LIMIT
Metals	Extraction	Barium	4.7 µg/l	2.0 µg/l
		Calcium	94.6 µg/l	20.0 µg/l
		Silicon	143 µg/l	100 µg/l
		Zinc	8.7 µg/l	5.0 µg/l
Radionuclides	Sample Preparation (two analyzed)	Uranium, total	1.23 µg/l[2] 1.41 µg/l	Unknown
		Thorium, total	2.02 µg/l	
		Radium[226]	4.84 pCi/l 3.63 pCi/l	
		Lead[210]	2.72 pCi/l 1.12 pCi/l	
Volatile Organics	Unknown	Methylene chloride	5 µg/l 51 µg/l 33 µg/l	Unknown
		Acetone	8 µg/l 13 µg/l	Unknown
		Toluene	1 µg/l 2 µg/l 1 µg/l	Unknown

[2]More than one value indicates that more than one blank was contaminated.

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4.3.1.1 Chemical Extraction Blank Data

Data for two sample preparation blanks and one extraction blank are reported for the Pesticide/PCB analysis. There were no detectable quantities of any compound.

Two extraction blanks and one sample preparation blank were analyzed for metals. Both extraction blanks contained measurable amounts of silicon, barium, calcium, iron, and zinc. One extraction blank also contained boron. The sample preparation blank contained measurable amounts of calcium, iron, zinc, and silicon.

Blank data for the radiological analyses were not reported in certificates delivered.

4.3.1.2 Five-Day Static Leach Blank Data

Three categories of analyses were requested for the 5-day static leach samples; metals, general chemistry, and radionuclides. Samples were submitted in three batches. These batches were combined at the laboratory and one set of QC was performed.

One extraction blank was submitted for analysis. There were detectable amounts of calcium (31 µg/L), fluoride (0.053 mg/L), phosphorous (0.03 mg/L), and Ra-226 (1.38 pCi/L). All of these are very close to the detection limits for the respective analytical methods.

Sample preparation blanks were analyzed for 26 metals. One preparation blank contained levels of arsenic (2.1 µg/L) and zinc (5.38 µg/L) slightly above the detection limit. One preparation blank had no detectable quantities of any analyte.

4.3.1.3 TCLP Analysis Blank Data

Extraction and sample preparation blanks were analyzed for 25 metals. There were no detectable quantities of any analyte in the sample preparation blank. The extraction blank contained measurable quantities of barium (4.7 µg/L), calcium (94.6 µg/L), silicon (143 µg/L), and zinc (89.7 µg/L). The barium, silicon, and zinc contamination is at a level close to the detection limit. The calcium contamination is almost five times the detection limit of 20 µg/L.

Of the eight general chemistry parameters analyzed, sulfide (1.67 mg/L) was the only parameter with detectable quantities in the sample preparation blanks. This is close to the sulfide detection limit of 0.5 mg/L. The extraction blank was not analyzed.

The radionuclide analysis data indicates that two blank samples were analyzed, but does not specify what type of blanks they are. One blank had detectable quantities of Pb-210 (2.72 pCi/L), Ra-226 (4.84 pCi/L), total thorium (1.23 µg/L), and total uranium (2.02 µg/L). The other blank contained detectable quantities of Pb-210 (1.12 pCi/L), Ra-226 (3.63 pCi/L), and total uranium (1.41 µg/L).

4.3.2 Duplicate Samples

There are two different types of duplicate samples: experimental and analytical. Experimental duplicates are two separate samples prepared by the treatability laboratory in exactly the same manner. Analytical duplicates are prepared by the analytical laboratory during sample processing.

The purpose of analytical duplicate samples is to show measurement precision. Experimental duplicates indicate variabilities within the sample and reagents. Precision and sample variability are expressed as the relative percent difference (RPD) between the original and duplicate sample. This is calculated according to the following equation:

$$RPD_1\% = \frac{\frac{C1-C2}{C1+C2}}{2} * 100$$

where

C1 = The larger of two measurements
C2 = The smaller of two measurements

The Fernald /FS QAPP, Table 4-1, specifies a 10 percent tolerance for precision of metals and general chemistry parameters. Table 4-2 of the RI/FS QAPP specifies precision tolerances for each organic parameter. Table 4-3 of the RI/FS QAPP specifies 20 percent tolerance for precision on radionuclide analysis for total uranium, Ra-226, and Ra-228. Precision requirements for other radionuclide parameters are not specified, but are assumed to be 20 percent. There are no precision requirements for experimental duplicates; any results exceeding 20 percent RPD will be mentioned.

Precision is determined only for those sample analytes that were greater than the detection limit. Precision calculations of analyte concentrations near the detection limit are not statistically valid.

Table 4-90 lists duplicate sample results that exceed the tolerances specified in the Fernald Ri/FS QAPP, section 4, Tables 4-1 through 4-3.

4.3.2.1 Chemical Extraction Duplicate Data

Experimental duplicates consisted of eight duplicate tests performed in the preliminary phase, stage 1.

Six pesticide/PCB compounds in one analytical duplicate sample were compared for precision. The RPD for all compounds was $\leq\pm$ 6 percent, which meets the QAPP requirements.

Two metals, silicon (13.4 percent RPD) and potassium (200 percent RPD), were outside the acceptable limits.

TABLE 4-90

ANALYTES NOT MEETING PRECISION REQUIREMENTS

CHEMICAL EXTRACTION				
ANALYSIS CATEGORY	DUPLICATE TYPE	ANALYTE	RELATIVE PERCENT DIFFERENCE (RPD)	>5 TIMES THE DETECTION LIMIT?
Metals	Analytical	Silicon	13.4	Yes
	Experimental (Three Analyzed)	Boron	10.3	Yes
		Chromium	14.4 10.7	No Yes
		Molybdenum	16.0	Yes
		Selenium	12.1	Yes
		Zinc	66.2	Yes
FIVE-DAY STATIC LEACH				
ANALYSIS CATEGORY	DUPLICATE TYPE	ANALYTE	RELATIVE PERCENT DIFFERENCE (RPD)	>5 TIMES THE DETECTION LIMIT?
Metals	Experimental	Chronium	14.4	No
General Chemistry	Analytical	Sulfate	11.0	Yes
		Ammonia	15.5	Yes
		Nitrate	29.9	Yes
		Cyanide	11.9	Yes
	Experimental (Three Analyzed)	Ammonia	34.0 31.0	Yes Yes
		Fluoride	19.8	No
		Phosphorous	18.2	Yes
		Sulfide	37.1	No
Radionuclide	Experimental (Three Analyzed)	Radium^{226}	12.0 35.7 21.2	Unknown
		Lead^{210}	145	
		Polonium^{210}	17.8	
		Uranium, Total	29.4	

TABLE 4-90

(Continued)

CHEMICAL EXTRACTION				
ANALYSIS CATEGORY	DUPLICATE TYPE	ANALYTE	RELATIVE PERCENT DIFFERENCE (RPD)	>5 TIMES THE DETECTION LIMIT?
Metals	Analytical	Lead	54.8	Yes
	Experimental (Three Analyzed)	Selenium	15.1	Yes
		Antimony	12.9	No
		Arsenic	39.3 11.4	No Yes
		Boron	11.9 10.5	No No
		Chromium	37.0 14.0	Yes No
		Lead	69.4 59.1	Yes Yes
		Magnesium	22.8	Yes
		Molybdenum	22.9	Yes
		Potassium	11.1	Yes
		Selenium	24.9	Yes
		Silicon	25.5	Yes
		Thallium	20.1	Yes
		Vanadium	16.1	No
		Zinc	84.1 30.0 20.6	No No No
General Chemistry	Analytical	Fluoride	13.5	Yes
	Experimental (three analyzed)	Phosphorous	15.4 21.3 40.0	No Yes No
		Sulfate	22.9	Yes

TABLE 4-90

(CONTINUED)

Rad	Experimental (three analyzed)	Lead^{210}	29.5 35.4	Unknown
		Polonium^{210}	37.4 125.4	Unknown
		Radium^{226}	136.9 148.7	Unknown
Volatiles	Experimental (three analyzed)	Acetone	42.9 26.7 103.4	Unknown

[1]More than one value indicates that more than one blank was contaminated.

[1]More than one value indicates that more than one blank was contaminated.

Duplicate data were not reported for radiological analyses.

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4.3.2.2 Five-Day Static Leach Duplicate Data

One experimental duplicate sample was submitted for analysis.

The three batches of samples were combined for metals analysis. Thirteen analytes in the analytical duplicate were compared for precision. The RPD of all 13 analytes was <10 percent.

Thirty-eight of 78 (3 experimental duplicate samples times 26 analytes) experimental duplicate results were compared to precision. The RPD for 32 analytes was less than 10 percent. Boron, chromium, molybdenum, selenium, and zinc are the analytes that did not meet the precision tolerance.

Five of the 27 general chemistry results compared did not meet the precision requirements. Ammonia, fluoride, phosphorus, and sulfide and the parameters not meeting the precision tolerance.

Three experimental duplicates were submitted for radiological analysis. Ten of the 24 (three samples times eight analytes) analytes were compared for precision. Lead-210, Po-210, Ra-226, and Ra-228 did not meet the precision requirement. None of the three Ra-226 measurements met the precision requirement. Analytical duplicate data were not reported for radionuclide analysis.

4.3.2.3 TCLP Analysis Duplicate Data

One analytical duplicate and three experimental duplicate analyses were analyzed for 25 metals each. Of the twenty-five analytical duplicate metals compared, only two exceeded the 10 percent precision requirement; lead and selenium. Both analyte concentrations were well above the detection limits. Forty-five of seventy-five (three samples times twenty-five analytes) experimental duplicate analytes were compared. Nineteen of the forty-five results did not meet the precision requirement.

Of the seven general chemistry parameters analyzed, only fluoride had analytical duplicate results that exceeded the limit. Two parameters in the experimental duplicates, phosphorous and sulfate, exceeded the precision requirement.

Analytical duplicate results for volatiles, semivolatiles, and radionuclides were not available.

Seven radionuclide results from three experimental duplicate samples were compared. One result met the precision requirement.

Six volatile results (three compounds) from three experimental duplicate samples were compared. Acetone was the only compound that did not meet the precision requirement.

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4.3.3 SPIKE ANALYSIS

Spike sample analysis is designed to measure data accuracy and provide information regarding the effect of the sample matrix on sample preparation and analysis. Accuracy is expressed as percent recovery (R) of the spike. Percent recovery of the spike is the amount of spike measured above the sample concentration, expressed as a percentage of the spike added. There are many factors which may affect measurement accuracy, and poor spike recovery is an indication of analyte measurement interference.

Percent recovery is calculated according to the following equation:

$$\%R = \frac{SSR - SR}{SA} * 100$$

where

SSR = Measured concentration of spike sample
SR = Measured concentration of original sample
SA = Concentration of spike added

Table 4-91 lists those analytes with spike recoveries that do not meet the QAPP accuracy requirements.

4.3.3.1 Chemical Extraction Spike Data

Accuracy requirements for Pesticide/PCB analysis are found in the Fernald RI/FS QAPP, Table 4-2. Six compounds were spiked in one sample. All six compounds met the accuracy requirements.

Accuracy requirements of metals analysis are ± 20 percent. One spike sample was prepared; 22 of 26 metals analyzed were spiked. Accuracy for all metals except lead (-28 percent) and silicon (174 percent) met the QAPP requirement. The original sample was spiked with silicon and reanalyzed, and the silicon recovery was 133.5 percent.

Spike data were not reported for radionuclide analyses.

4.3.3.2 Five-Day Static Leach Spike Data

All three sample batches were combined for metals analysis. Twenty of the 26 metals analyzed were spiked, and 19 of the 20 spikes had recoveries of less than or equal to 20 percent. Selenium spike recovery was 125 percent.

Spike data for radionuclide analyses were not reported.

TABLE 4-91

SPIKE SAMPLES NOT MEETING ACCURACY REQUIREMENTS

CHEMICAL EXTRACTION			
ANALYSIS CATEGORY	SPIKE OR SPIKE DUPLICATE	ANALYTE	PERCENT RECOVERY (%)
Metals	Spike	Lead	-28
		Silicon	174.2
	Post Spike[3]	Silicon	133.5
FIVE-DAY STATIC LEACH			
ANALYSIS CATEGORY	SPIKE OR SPIKE DUPLICATES	ANALYTE	PERCENT RECOVERY (%)
Metals	Spike	Selenium	125
	Spike Duplicate	Nitrate	125
	Spike	Cyanide	77.8
	Spike Duplicate	Cyanide	87.56
TCLP ANALYSIS			
ANALYSIS CATEGORY	SPIKE OR SPIKE DUPLICATES	ANALYTE	PERCENT RECOVERY (%)
Metals	Spike	Lead	-339
		Selenium	237
		Silver	75.9
General Chemistry	Spike	Ammonia	135
	Spike Duplicate	Ammonia	139
Volatile Organics	Spike	2-Butanone	164

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4.3.3.3 TCLP Analysis Spike Data

Twenty-two of twenty-five metals were spiked. Two analytes, lead and selenium, exhibit severe measurement interference. Silver also shows signs of measurement interference. This is not unusual. Chloride present in the sample will cause silver to precipitate as silver chloride, resulting in low spike recovery.

4.3.4 Data Percent Completeness

Data percent completeness is a measure of how much of the data collected is valid. Percent completeness (percent C) is calculated using the following equation:

$$\%C = \frac{V}{n} * 100$$

where

V = Number of measurements judged valid
n = Total number of sample measurements

The Fernald RI/FS QAPP, Tables 4-1 through 4-3, specifies that data be 90 percent complete.

A summary of percent completeness data is presented in Table 4-92.

4.3.4.1 Chemical Extraction Data Percent Completeness

Four chemical extraction samples were submitted for TCLP extraction and analysis of 27 pesticide/PCB compounds, 27 metals, and 8 radionuclides. Aliquots of the original samples were also directly analyzed for eight radionuclides.

Of the 280 total measurements (4 x 70 measurements), 278 measurements (99.3 percent) were judged valid, for a completeness of 99.3 percent.

4.3.4.2 Five-Day Static Leach Data Percent Completeness

Eighteen five-day static leach samples were submitted for analysis of twenty-six metals, nine general chemistry parameters, and eight radionuclides, for a total 774 measurements. Nine radionuclide measurements were not completed. All of the remaining 765 measurements were judged valid, for a completeness of 98.8 percent.

4.3.4.3 TCLP Analysis Data Percent Completeness

Seventeen samples were submitted for analysis of twenty-five metals, nine general chemistry parameters, eight radionuclides, thirty-four volatile organics, and sixty-seven semivolatile organics, for a total of 2,431 measurements. Eighteen radionuclide data points were missing. A total of 2,377

TABLE 4-92

DATA COMPLETENESS SUMMARY

TASK	ANALYSIS CATEGORY	TOTAL NUMBER OF MEASUREMENTS	NUMBER OF VALID MEASUREMENTS	PERCENT COMPLETE (%)
Chemical Extraction	Metals	108	108	100
	General Chemistry	64	62	96.9
	Pesticide/ PCB	108	108	100
	Task Total	280	278	99.3
Five-Day Leach	Metals	468	468	100
	General Chemistry	162	162	100
	Radionuclides	144	135	93.8
	Task Total	774	765	98.8
TCLP Analysis	Metals	425	425	100
	General Chemistry	117	117	100
	Radionuclides	136	118	86.8
	Volatiles	578	578	100
	Semivolatiles	1139	737	100
	Task Total	2414	2377	98.5
TOTAL PROJECT		3468	3420	98.6

measurements were judged valid, for 98.5 percent completeness.

4.4 SCHEDULE/COST FOR PERFORMING THE TREATABILITY STUDY 5448

Treatability work for OU4 was initiated in October 1991 when the first cement stabilization sample was mixed. Treatability testing, with the exception of sample analyses and optional phase testing, was completed in November 1992.

Optional phase testing started in September 1992.

As of January 31, 1993, $1,101,816 had been paid for treatability testing. This does not include costs for any analytical work performed outside of the treatability laboratory.

4.5 KEY CONTACTS FOR OU4 TREATABILITY STUDY

The principal parties include: DOE Fernald Field Office, FERMCO, and IT Corporation.

Personnel involved in the management of the entire RI/FS include Jack R. Craig, DOE Project Director, who is responsible for the RI/FS, and IT's John E. Razor, who serves as Project Director and is responsible for the technical content of all the RI/FS consultant's documents.

Personnel specifically involved in OU4 include Randi Allen, DOE OU4 Manager. Susan Rhyne serves as IT's RI/FS OU4 Manager.

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APPENDIX A

LABORATORY QUALIFIERS

Organic Qualifiers

U = Indicates compound was analyzed for but not detected.

J = Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.

B = This flag is used when the analyte is found in the associated blank as well as the sample. It indicates possible/probable blank contamination.

E = This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis. If one or more compounds had a response greater than full scale, the sample or extract was diluted and reanalyzed. The diluted sample is identified by a "D" suffix appended to the sample number.

F = Estimated value due to a confirmed compound which is off-scale in both columns.

D = This flag is used for all compounds identified in the analysis at a secondary dilution factor.

X = A flag that FORMASTER III CLP software automatically inserts to indicate that the data was entered manually.

NA = Analysis not performed for this analyte.

VALIDATION QUALIFIER CODES

Codes related to Identification:

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

(No Code) = Confirmed identification.

[IDL is defined as the lowest measurable quantity above that of random noise multiplied times a factor of two (2)]

R = Results unusable. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. Resampling and reanalysis are necessary.

N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

Codes Related to Quantitation:

J = Analyte present. Reported value may not be accurate or precise.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

Codes Related to Radiochemical Samples:

J = Analyte present. Reported value may not be accurate or precise. Qualifier is applied where:

- Calculated total uranium value is outside the acceptance limits.
- Calculated percent enrichment value is outside the acceptance limits.
- Calculated U-234 to U-238 activity is outside the acceptance limits.

R = Result unusable. Analyte may or may not be present in the sample. Qualifier is applied where QC data not located or where QC data exceeds control limits. Supporting data necessary to confirm result. Resampling and reanalysis are necessary.

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099741	Silo 1 NE Z-A	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	1,2-Dichloroethane	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	2-Butanone	0.01	J	mg/L	-	NA
099741	Silo 1 NE Z-A	2-Hexanone	0.01	U	mg/L	-	NA
099741	Silo 1 NE Z-A	4-Methyl-2-pentanone	0.01	J	mg/L	-	NA
099741	Silo 1 NE Z-A	Acetone	0.15	B	mg/L	-	NA
099741	Silo 1 NE Z-A	Benzene	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	Bromodichloromethane	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	Bromoform	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	Bromomethane	0.01	U	mg/L	-	NA
099741	Silo 1 NE Z-A	Carbon disulfide	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	Chlorobenzene	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	Chloroethane	0.01	U	mg/L	-	NA
099741	Silo 1 NE Z-A	Chloromethane	0.01	U	mg/L	-	NA
099741	Silo 1 NE Z-A	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	Dibromochloromethane	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	Ethylbenzene	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	Methylene chloride	0.029	B	mg/L	-	NA
099741	Silo 1 NE Z-A	Styrene	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	Toluene	0.005		mg/L	J	NA
099741	Silo 1 NE Z-A	Total xylenes	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	Trichloroethene	0.005	U	mg/L	-	NA
099741	Silo 1 NE Z-A	Vinyl Acetate	0.01	U	mg/L	-	NA
099742	Silo 1 NE Z-A	Aluminum	0.326		mg/L	-	NA
099742	Silo 1 NE Z-A	Antimony	0.103		mg/L	-	NA
099742	Silo 1 NE Z-A	Arsenic	0.002	U	mg/L	U	NA
099742	Silo 1 NE Z-A	Barium	1.4		mg/L	-	1.4
099742	Silo 1 NE Z-A	Beryllium	0.0023	B	mg/L	-	NA
099742	Silo 1 NE Z-A	Boron	0.182		mg/L	-	NA
099742	Silo 1 NE Z-A	Cadmium	0.0051		mg/L	-	0.5
099742	Silo 1 NE Z-A	Calcium	83.4		mg/L	-	NA
099742	Silo 1 NE Z-A	Chromium	0.071		mg/L	-	1.4
099742	Silo 1 NE Z-A	Cobalt	1.39		mg/L	-	NA
099742	Silo 1 NE Z-A	Copper	0.197		mg/L	-	NA
099742	Silo 1 NE Z-A	Iron	0.0492	B	mg/L	-	NA
099742	Silo 1 NE Z-A	Lead	564		mg/L	-	11280.0
099742	Silo 1 NE Z-A	Magnesium	13.8		mg/L	-	NA
099742	Silo 1 NE Z-A	Manganese	0.171		mg/L	-	NA
099742	Silo 1 NE Z-A	Mercury	0.0002	U	mg/L	U	NA
099742	Silo 1 NE Z-A	Molybdenum	0.0771		mg/L	-	NA
099742	Silo 1 NE Z-A	Nickel	3.05		mg/L	-	NA
099742	Silo 1 NE Z-A	Potassium	12.4		mg/L	-	NA
099742	Silo 1 NE Z-A	Selenium	0.0878		mg/L	-	8.8
099742	Silo 1 NE Z-A	Silicon	31.3		mg/L	-	NA
099742	Silo 1 NE Z-A	Silver	0.0411		mg/L	-	0.8
099742	Silo 1 NE Z-A	Thallium	0.002	UWN	mg/L	U	NA
099742	Silo 1 NE Z-A	Vanadium	0.0288	B	mg/L	-	NA
099742	Silo 1 NE Z-A	Zinc	0.0838		mg/L	-	NA
099749	Silo 1 NE Z-A	1,2-Dichlorobenzene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	1,2,4-Trichlorobenzene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	1,3-Dichlorobenzene	0.02	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099749	Silo 1 NE Z-A	1,4-Dichlorobenzene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	2-Chloronaphthalene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	2-Chlorophenol	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	2-Methylnaphthalene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	2-Methylphenol	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	2-Nitroaniline	0.1	U	mg/L	-	NA
099749	Silo 1 NE Z-A	2-Nitrophenol	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	2,4-Dichlorophenol	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	2,4-Dimethylphenol	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	2,4-Dinitrophenol	0.1	U	mg/L	-	NA
099749	Silo 1 NE Z-A	2,4-Dinitrotoluene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	2,4,5-Trichlorophenol	0.1	U	mg/L	-	NA
099749	Silo 1 NE Z-A	2,4,6-Trichlorophenol	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	2,6-Dinitrotoluene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	3-Nitroaniline	0.1	U	mg/L	-	NA
099749	Silo 1 NE Z-A	3,3'-Dichlorobenzidine	0.04	U	mg/L	-	NA
099749	Silo 1 NE Z-A	4-Bromophenyl phenyl ether	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	4-Chloro-3-methylphenol	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	4-Chloroaniline	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	4-Chlorophenylphenyl ether	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	4-Methylphenol	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	4-Nitroaniline	0.1	U	mg/L	-	NA
099749	Silo 1 NE Z-A	4-Nitrophenol	0.1	U	mg/L	-	NA
099749	Silo 1 NE Z-A	4,4'-DDD	0.0001	U	mg/L	-	NA
099749	Silo 1 NE Z-A	4,4'-DDE	0.0001	U	mg/L	-	NA
099749	Silo 1 NE Z-A	4,4'-DDT	0.0001	U	mg/L	-	NA
099749	Silo 1 NE Z-A	4,6-Dinitro-2-methylphenol	0.1	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Acenaphthene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Acenaphthylene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Aldrin	0.00005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	alpha-BHC	0.00005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	alpha-Chlordane	0.0005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Anthracene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Aroclor-1016	0.0005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Aroclor-1221	0.0005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Aroclor-1232	0.0005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Aroclor-1242	0.0005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Aroclor-1248	0.0005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Aroclor-1254	0.001	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Aroclor-1260	0.001	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Benzoic acid	0.1	BJ	mg/L	-	NA
099749	Silo 1 NE Z-A	Benzo(a)anthracene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Benzo(a)pyrene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Benzo(b)fluoranthene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Benzo(g,h,i)perylene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Benzo(k)fluoranthene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Benzyl alcohol	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	beta-BHC	0.00005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	bis(2-Chloroethoxy)methane	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	bis(2-Chloroethyl)ether	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	bis(2-Ethylhexyl) phthalate	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Butyl benzyl phthalate	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Chrysene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	delta-BHC	0.00005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Dibenzofuran	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Dibenzo(a,h)anthracene	0.02	U	mg/L	-	NA

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TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099749	Silo 1 NE Z-A	Dieldrin	0.0001	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Diethyl phthalate	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Dimethyl phthalate	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Di-n-butyl phthalate	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Di-n-octyl phthalate	0.02	BJ	mg/L	-	NA
099749	Silo 1 NE Z-A	Endosulfan II	0.0001	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Endosulfan sulfate	0.0001	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Endosulfan-I	0.00005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Endrin	0.0001	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Endrin ketone	0.0001	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Fluoranthene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Fluorene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	gamma-BHC (Lindane)	0.00005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	gamma-Chlordane	0.0005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Heptachlor	0.00005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Heptachlor epoxide	0.00005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Hexachlorobenzene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Hexachlorobutadiene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Hexachlorocyclopentadiene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Hexachloroethane	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Isophorone	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Methoxychlor	0.0005	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Naphthalene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Nitrobenzene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	N-Nitroso-di-n-propylamine	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	N-Nitrosodiphenylamine	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Pentachlorophenol	0.1	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Phenanthrene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Phenol	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Pyrene	0.02	U	mg/L	-	NA
099749	Silo 1 NE Z-A	Toxaphene	0.001	U	mg/L	-	NA
099868	Silo 1 SE Z-A	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	2-Butanone	0.005	BJ	mg/L	J	NA
099868	Silo 1 SE Z-A	2-Hexanone	0.01	U	mg/L	-	NA
099868	Silo 1 SE Z-A	4-Methyl-2-pentanone	0.001	J	mg/L	-	NA
099868	Silo 1 SE Z-A	Acetone	0.11	B	mg/L	J	NA
099868	Silo 1 SE Z-A	Benzene	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	Bromodichloromethane	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	Bromoform	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	Bromomethane	0.01	U	mg/L	-	NA
099868	Silo 1 SE Z-A	Carbon disulfide	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	Chlorobenzene	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	Chloroethane	0.01	U	mg/L	-	NA
099868	Silo 1 SE Z-A	Chloromethane	0.01	U	mg/L	-	NA
099868	Silo 1 SE Z-A	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	Dibromochloromethane	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	Ethylbenzene	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	Methylene chloride	0.013	B	mg/L	J	NA
099868	Silo 1 SE Z-A	Styrene	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	Toluene	0.005	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099868	Silo 1 SE Z-A	Total xylenes	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	Trichloroethene	0.005	U	mg/L	-	NA
099868	Silo 1 SE Z-A	Vinyl Acetate	0.01	U	mg/L	-	NA
099869	Silo 1 SE Z-A	Aluminum	0.39		mg/L	-	NA
099869	Silo 1 SE Z-A	Antimony	0.108		mg/L	-	NA
099869	Silo 1 SE Z-A	Arsenic	0.002	UWN	mg/L	J	NA
099869	Silo 1 SE Z-A	Barium	0.603		mg/L	-	0.6
099869	Silo 1 SE Z-A	Beryllium	0.0028	B	mg/L	-	NA
099869	Silo 1 SE Z-A	Boron	0.199		mg/L	-	NA
099869	Silo 1 SE Z-A	Cadmium	0.0039	B	mg/L	-	0.4
099869	Silo 1 SE Z-A	Calcium	108		mg/L	-	NA
099869	Silo 1 SE Z-A	Chromium	0.081		mg/L	-	1.6
099869	Silo 1 SE Z-A	Cobalt	1.17		mg/L	-	NA
099869	Silo 1 SE Z-A	Copper	0.189		mg/L	-	NA
099869	Silo 1 SE Z-A	Iron	0.0468	B	mg/L	-	NA
099869	Silo 1 SE Z-A	Lead	682		mg/L	-	13640.0
099869	Silo 1 SE Z-A	Magnesium	9.22		mg/L	-	NA
099869	Silo 1 SE Z-A	Manganese	0.136		mg/L	-	NA
099869	Silo 1 SE Z-A	Mercury	0.0002	U	mg/L	-	NA
099869	Silo 1 SE Z-A	Molybdenum	0.0886		mg/L	-	NA
099869	Silo 1 SE Z-A	Nickel	2.18		mg/L	-	NA
099869	Silo 1 SE Z-A	Potassium	16.1		mg/L	-	NA
099869	Silo 1 SE Z-A	Selenium	0.0837		mg/L	-	8.4
099869	Silo 1 SE Z-A	Silicon	27.5		mg/L	-	NA
099869	Silo 1 SE Z-A	Silver	0.0475		mg/L	-	1.0
099869	Silo 1 SE Z-A	Thallium	0.0063	B	mg/L	-	NA
099869	Silo 1 SE Z-A	Vanadium	0.0319	B	mg/L	-	NA
099869	Silo 1 SE Z-A	Zinc	0.0672		mg/L	-	NA
099876	Silo 1 SE Z-A	1,2-Dichlorobenzene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	1,2,4-Trichlorobenzene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	1,3-Dichlorobenzene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	1,4-Dichlorobenzene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	2-Chloronaphthalene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	2-Chlorophenol	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	2-Methylnaphthalene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	2-Methylphenol	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	2-Nitroaniline	0.12	U	mg/L	-	NA
099876	Silo 1 SE Z-A	2-Nitrophenol	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	2,4-Dichlorophenol	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	2,4-Dimethylphenol	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	2,4-Dinitrophenol	0.12	U	mg/L	-	NA
099876	Silo 1 SE Z-A	2,4,5-Trichlorophenol	0.12	U	mg/L	-	NA
099876	Silo 1 SE Z-A	2,4,6-Trichlorophenol	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	2,6-Dinitrotoluene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	3-Nitroaniline	0.12	U	mg/L	-	NA
099876	Silo 1 SE Z-A	3,3'-Dichlorobenzidine	0.05	U	mg/L	-	NA
099876	Silo 1 SE Z-A	4-Bromophenyl phenyl ether	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	4-Chloro-3-methylphenol	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	4-Chloroaniline	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	4-Chlorophenylphenyl ether	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	4-Methylphenol	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	4-Nitroaniline	0.12	U	mg/L	-	NA
099876	Silo 1 SE Z-A	4-Nitrophenol	0.12	U	mg/L	-	NA
099876	Silo 1 SE Z-A	4,4'-DDD	0.0001	U	mg/L	-	NA
099876	Silo 1 SE Z-A	4,4'-DDE	0.0001	U	mg/L	-	NA
099876	Silo 1 SE Z-A	4,4'-DDT	0.0001	U	mg/L	-	NA

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TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099876	Silo 1 SE Z-A	4,6-Dinitro-2-methylphenol	0.12	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Acenaphthene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Acenaphthylene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Aldrin	0.00005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	alpha-BHC	0.00005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	alpha-Chlordane	0.0005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Anthracene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Aroclor-1016	0.0005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Aroclor-1221	0.0005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Aroclor-1232	0.0005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Aroclor-1242	0.0005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Aroclor-1248	0.0005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Aroclor-1254	0.001	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Aroclor-1260	0.001	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Benzoic acid	0.12	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Benzo(a)anthracene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Benzo(a)pyrene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Benzo(b)fluoranthene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Benzo(g,h,i)perylene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Benzo(k)fluoranthene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Benzyl alcohol	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	beta-BHC	0.00005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	bis(2-Chloroethoxy)methane	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	bis(2-Chloroethyl)ether	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	bis(2-Chloroisopropyl) ether	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	bis(2-Ethylhexyl) phthalate	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Butyl benzyl phthalate	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Chrysene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	delta-BHC	0.00005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Dibenzofuran	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Dibenzo(a,h)anthracene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Dieldrin	0.0001	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Diethyl phthalate	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Dimethyl phthalate	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Di-n-butyl phthalate	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Di-n-octyl phthalate	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Endosulfan II	0.0001	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Endosulfan sulfate	0.0001	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Endosulfan-I	0.00005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Endrin	0.0001	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Endrin ketone	0.0001	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Fluoranthene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Fluorene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	gamma-BHC (Lindane)	0.00005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	gamma-Chlordane	0.0005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Heptachlor	0.00005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Heptachlor epoxide	0.00005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Hexachlorobenzene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Hexachlorocyclopentadiene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Hexachloroethane	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Indeno(1,2,3-cd)pyrene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Isophorone	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Methoxychlor	0.0005	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Naphthalene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Nitrobenzene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	N-Nitroso-di-n-propylamine	0.06		mg/L	-	NA
099876	Silo 1 SE Z-A	N-Nitrosodiphenylamine	0.025	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099876	Silo 1 SE Z-A	Pentachlorophenol	0.12	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Phenanthrene	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Phenol	0.025	U	mg/L	-	NA
099876	Silo 1 SE Z-A	Pyrene	0.025	U	mg/L	-	NA
099883	Silo 1 NWZ-A	2-Butanone	0.01	BJ	mg/L	U	NA
099883	Silo 1 NWZ-A	2-Hexanone	0.01	U	mg/L	U	NA
099883	Silo 1 NWZ-A	4-Methyl-2-pentanone	0.01	BJ	mg/L	U	NA
099883	Silo 1 NWZ-A	Benzene	0.005	U	mg/L	-	NA
099883	Silo 1 NWZ-A	Methylene chloride	0.005	B	mg/L	U	NA
099883	Silo 1 NWZ-A	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099884	Silo 1 NWZ-A	Aluminum	0.441		mg/L	-	NA
099884	Silo 1 NWZ-A	Antimony	0.103		mg/L	-	NA
099884	Silo 1 NWZ-A	Arsenic	0.002	U	mg/L	-	NA
099884	Silo 1 NWZ-A	Barium	0.808		mg/L	-	0.8
099884	Silo 1 NWZ-A	Beryllium	0.0031	B	mg/L	-	NA
099884	Silo 1 NWZ-A	Boron	0.179		mg/L	-	NA
099884	Silo 1 NWZ-A	Cadmium	0.0041	B	mg/L	-	0.4
099884	Silo 1 NWZ-A	Calcium	85.6		mg/L	-	NA
099884	Silo 1 NWZ-A	Chromium	0.0781		mg/L	-	1.6
099884	Silo 1 NWZ-A	Cobalt	0.82		mg/L	-	NA
099884	Silo 1 NWZ-A	Copper	0.163		mg/L	-	NA
099884	Silo 1 NWZ-A	Iron	0.0587	B	mg/L	-	NA
099884	Silo 1 NWZ-A	Lead	698		mg/L	-	13960.0
099884	Silo 1 NWZ-A	Magnesium	7.16		mg/L	-	NA
099884	Silo 1 NWZ-A	Manganese	0.145		mg/L	-	NA
099884	Silo 1 NWZ-A	Mercury	0.0002	U	mg/L	-	NA
099884	Silo 1 NWZ-A	Molybdenum	0.0893		mg/L	-	NA
099884	Silo 1 NWZ-A	Nickel	1.32		mg/L	-	NA
099884	Silo 1 NWZ-A	Potassium	6.22		mg/L	-	NA
099884	Silo 1 NWZ-A	Selenium	0.0147	+N	mg/L	-	1.5
099884	Silo 1 NWZ-A	Silicon	13.5		mg/L	-	NA
099884	Silo 1 NWZ-A	Silver	0.0425		mg/L	-	0.9
099884	Silo 1 NWZ-A	Thallium	0.0024	B	mg/L	-	NA
099884	Silo 1 NWZ-A	Vanadium	0.0293	B	mg/L	-	NA
099884	Silo 1 NWZ-A	Zinc	0.0837		mg/L	-	NA
099891	Silo 1 NWZ-A	1,2-Dichlorobenzene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	1,2,4-Trichlorobenzene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	1,3-Dichlorobenzene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	1,4-Dichlorobenzene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	2-Chloronaphthalene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	2-Chlorophenol	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	2-Methylnaphthalene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	2-Methylphenol	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	2-Nitroaniline	0.1	U	mg/L	J	NA
099891	Silo 1 NWZ-A	2-Nitrophenol	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	2,4-Dichlorophenol	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	2,4-Dimethylphenol	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	2,4-Dinitrophenol	0.1	U	mg/L	-	NA
099891	Silo 1 NWZ-A	2,4-Dinitrotoluene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	2,4,5-Trichlorophenol	0.1	U	mg/L	-	NA
099891	Silo 1 NWZ-A	2,4,6-Trichlorophenol	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	2,6-Dinitrotoluene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	3-Nitroaniline	0.1	U	mg/L	J	NA
099891	Silo 1 NWZ-A	3,3'-Dichlorobenzidine	0.04	U	mg/L	-	NA
099891	Silo 1 NWZ-A	4-Bromophenyl phenyl ether	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	4-Chloro-3-methylphenol	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	4-Chloroaniline	0.02	U	mg/L	J	NA

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TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099891	Silo 1 NWZ-A	4-Chlorophenylphenyl ether	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	4-Methylphenol	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	4-Nitroaniline	0.1	U	mg/L	J	NA
099891	Silo 1 NWZ-A	4-Nitrophenol	0.1	U	mg/L	J	NA
099891	Silo 1 NWZ-A	4,6-Dinitro-2-methylphenol	0.1	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Acenaphthene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Acenaphthylene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Anthracene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Benzoic acid	0.05	BJ	mg/L	U	NA
099891	Silo 1 NWZ-A	Benzo(a)anthracene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Benzo(a)pyrene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Benzo(b)fluoranthene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Benzo(g,h,i)perylene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Benzo(k)fluoranthene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Benzyl alcohol	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	bis(2-Chloroethoxy)methane	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	bis(2-Chloroethyl)ether	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	bis(2-Ethylhexyl) phthalate	0.098		mg/L	J	NA
099891	Silo 1 NWZ-A	Butyl benzyl phthalate	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Chrysene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Dibenzofuran	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Dibenzo(a,h)anthracene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Diethyl phthalate	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Dimethyl phthalate	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Di-n-butyl phthalate	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Di-n-octyl phthalate	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Fluoranthene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Fluorene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Hexachlorobenzene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Hexachlorobutadiene	0.02	U	mg/L	-	NA
099891	Silo 1 NWZ-A	Hexachlorocyclopentadiene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Hexachloroethane	0.02	U	mg/L	-	NA
099891	Silo 1 NWZ-A	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Isophorone	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Naphthalene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Nitrobenzene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	N-Nitroso-di-n-propylamine	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	N-Nitrosodiphenylamine	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Pentachlorophenol	0.1	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Phenanthrene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Phenol	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A	Pyrene	0.02	U	mg/L	J	NA
099891	Silo 1 NWZ-A DL	4,4'-DDD	0.0003	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	4,4'-DDE	0.0003	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	4,4'-DDT	0.0003	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Aldrin	0.00015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	alpha-BHC	0.00015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	alpha-Chlordane	0.0015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Aroclor-1016	0.0015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Aroclor-1221	0.0015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Aroclor-1232	0.0015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Aroclor-1242	0.0015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Aroclor-1248	0.0015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Aroclor-1254	0.003	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Aroclor-1260	0.003	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	beta-BHC	0.00015	U	mg/L	UJ	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099891	Silo 1 NWZ-A DL	delta-BHC	0.00015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Dieldrin	0.0003	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Endosulfan II	0.0003	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Endosulfan sulfate	0.0003	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Endosulfan-I	0.00015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Endrin	0.0003	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Endrin ketone	0.0003	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	gamma-BHC (Lindane)	0.00015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	gamma-Chlordane	0.0015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Heptachlor	0.00015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Heptachlor epoxide	0.00015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Methoxychlor	0.0015	U	mg/L	UJ	NA
099891	Silo 1 NWZ-A DL	Toxaphene	0.003	U	mg/L	UJ	NA
099907	Silo 1 NWZ-B	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	2-Butanone	0.01	BJ	mg/L	U	NA
099907	Silo 1 NWZ-B	2-Hexanone	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	4-Methyl-2-pentanone	0.001	J	mg/L	-	NA
099907	Silo 1 NWZ-B	Acetone	0.01	BE	mg/L	U	NA
099907	Silo 1 NWZ-B	Benzene	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Bromodichloromethane	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Bromoform	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Bromomethane	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Carbon disulfide	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Chlorobenzene	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Chloroethane	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Chloromethane	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Dibromochloromethane	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Ethylbenzene	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Methylene chloride	0.005	B	mg/L	U	NA
099907	Silo 1 NWZ-B	Styrene	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Tetrachlorethene	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Toluene	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Total xylenes	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Trichloroethene	0.005	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Vinyl Acetate	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,1-Dichloroethane	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,1-Dichloroethene	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,1,1-Trichloroethane	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,1,2-Trichloroethane	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,1,2,2-Tetrachloroethane	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,2-Dichloroethane	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,2-Dichloroethylene	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	1,2-Dichloropropane	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	2-Butanone	0.002	DJ	mg/L	-	NA
099907	Silo 1 NWZ-B	2-Hexanone	0.02	U	mg/L	-	NA
099907	Silo 1 NWZ-B	4-Methyl-2-pentanone	0.02	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Acetone	0.22	BD	mg/L	-	NA
099907	Silo 1 NWZ-B	Benzene	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Bromodichloromethane	0.01	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099907	Silo 1 NWZ-B	Bromoform	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Bromomethane	0.02	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Carbon disulfide	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Carbon Tetrachloride	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Chlorobenzene	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Chlorobenzene	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Chloroethane	0.02	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Chloroform	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Chloromethane	0.02	U	mg/L	-	NA
099907	Silo 1 NWZ-B	cis-1,3-Dichloropropene	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Dibromochloromethane	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Ethylbenzene	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Methylene chloride	0.058	BD	mg/L	-	NA
099907	Silo 1 NWZ-B	Styrene	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Tetrachlorethene	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Toluene	0.003	BDJ	mg/L	-	NA
099907	Silo 1 NWZ-B	Total xylenes	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	trans-1,3-Dichloropropene	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Trichloroethene	0.01	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Vinyl Acetate	0.02	U	mg/L	-	NA
099907	Silo 1 NWZ-B	Vinyl chloride	0.02	U	mg/L	-	NA
099908	Silo 1 NWZ-B	Aluminum	0.228		mg/L	-	NA
099908	Silo 1 NWZ-B	Antimony	0.0744		mg/L	-	NA
099908	Silo 1 NWZ-B	Arsenic	0.002	U	mg/L	-	NA
099908	Silo 1 NWZ-B	Barium	0.728		mg/L	-	0.7
099908	Silo 1 NWZ-B	Beryllium	0.002	U	mg/L	-	NA
099908	Silo 1 NWZ-B	Boron	0.188		mg/L	U	NA
099908	Silo 1 NWZ-B	Cadmium	0.0031	B	mg/L	-	0.3
099908	Silo 1 NWZ-B	Calcium	85.3		mg/L	-	NA
099908	Silo 1 NWZ-B	Chromium	0.0498		mg/L	-	1.0
099908	Silo 1 NWZ-B	Cobalt	0.738		mg/L	-	NA
099908	Silo 1 NWZ-B	Copper	0.0727		mg/L	-	NA
099908	Silo 1 NWZ-B	Iron	0.1	B	mg/L	-	NA
099908	Silo 1 NWZ-B	Lead	356		mg/L	U	NA
099908	Silo 1 NWZ-B	Magnesium	8.76		mg/L	-	NA
099908	Silo 1 NWZ-B	Manganese	0.0688		mg/L	-	NA
099908	Silo 1 NWZ-B	Mercury	0.0002	U	mg/L	-	NA
099908	Silo 1 NWZ-B	Molybdenum	0.0516		mg/L	J	NA
099908	Silo 1 NWZ-B	Nickel	1.71		mg/L	-	NA
099908	Silo 1 NWZ-B	Potassium	14		mg/L	-	NA
099908	Silo 1 NWZ-B	Selenium	0.114		mg/L	-	11.4
099908	Silo 1 NWZ-B	Silicon	26.5		mg/L	-	NA
099908	Silo 1 NWZ-B	Silver	0.0319		mg/L	-	0.6
099908	Silo 1 NWZ-B	Thallium	0.0094	B	mg/L	-	NA
099908	Silo 1 NWZ-B	Vanadium	0.0208	B	mg/L	-	NA
099908	Silo 1 NWZ-B	Zinc	0.02		mg/L	-	NA
099915	Silo 1 NWZ-B	1,2-Dichlorobenzene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	1,2,4-Trichlorobenzene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	1,3-Dichlorobenzene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	1,4-Dichlorobenzene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	2-Chloronaphthalene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	2-Chlorophenol	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	2-Methylnaphthalene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	2-Methylphenol	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	2-Nitroaniline	0.1	U	mg/L	-	NA
099915	Silo 1 NWZ-B	2-Nitrophenol	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	2,4-Dichlorophenol	0.02	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099915	Silo 1 NWZ-B	2,4-Dimethylphenol	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	2,4-Dinitrophenol	0.1	U	mg/L	-	NA
099915	Silo 1 NWZ-B	2,4-Dinitrotoluene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	2,4,5-Trichlorophenol	0.1	U	mg/L	-	NA
099915	Silo 1 NWZ-B	2,4,6-Trichlorophenol	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	2,6-Dinitrotoluene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	3-Nitroaniline	0.1	U	mg/L	-	NA
099915	Silo 1 NWZ-B	3,3'-Dichlorobenzidine	0.04	U	mg/L	-	NA
099915	Silo 1 NWZ-B	4-Bromophenyl phenyl ether	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	4-Chloro-3-methylphenol	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	4-Chloroaniline	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	4-Chlorophenylphenyl ether	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	4-Methylphenol	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	4-Nitroaniline	0.1	U	mg/L	-	NA
099915	Silo 1 NWZ-B	4-Nitrophenol	0.1	U	mg/L	-	NA
099915	Silo 1 NWZ-B	4,4'-DDD	0.0001	U	mg/L	-	NA
099915	Silo 1 NWZ-B	4,4'-DDE	0.0001	U	mg/L	-	NA
099915	Silo 1 NWZ-B	4,4'-DDT	0.0001	U	mg/L	-	NA
099915	Silo 1 NWZ-B	4,6-Dinitro-2-methylphenol	0.1	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Acenaphthene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Acenaphthylene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Aldrin	0.00005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	alpha-BHC	0.00005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	alpha-Chlordane	0.0005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Anthracene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Aroclor-1016	0.0005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Aroclor-1221	0.0005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Aroclor-1232	0.0005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Aroclor-1242	0.0005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Aroclor-1248	0.0005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Aroclor-1254	0.001	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Aroclor-1260	0.001	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Benzoic acid	0.006	BJ	mg/L	-	NA
099915	Silo 1 NWZ-B	Benzo(a)anthracene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Benzo(a)pyrene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Benzo(b)fluoranthene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Benzo(g,h,i)perylene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Benzo(k)fluoranthene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Benzyl alcohol	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	beta-BHC	0.00005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	bis(2-Chloroethoxy)methane	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	bis(2-Chloroethyl)ether	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	bis(2-Ethylhexyl) phthalate	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Butyl benzyl phthalate	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Chrysene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	delta-BHC	0.00005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Dibenzofuran	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Dibenzo(a,h)anthracene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Dieldrin	0.0001	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Diethyl phthalate	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Dimethyl phthalate	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Di-n-butyl phthalate	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Di-n-octyl phthalate	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Endosulfan II	0.0001	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Endosulfan sulfate	0.0001	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Endosulfan-I	0.00005	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099915	Silo 1 NWZ-B	Endrin	0.0001	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Endrin ketone	0.0001	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Fluoranthene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Fluorene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	gamma-BHC (Lindane)	0.00005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	gamma-Chlordane	0.0005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Heptachlor	0.00005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Heptachlor epoxide	0.00005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Hexachlorobenzene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Hexachlorobutadiene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Hexachlorocyclopentadiene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Hexachloroethane	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Isophorone	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Methoxychlor	0.0005	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Naphthalene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Nitrobenzene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	N-Nitroso-di-n-propylamine	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	N-Nitrosodiphenylamine	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Pentachlorophenol	0.1	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Phenanthrene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Phenol	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Pyrene	0.02	U	mg/L	-	NA
099915	Silo 1 NWZ-B	Toxaphene	0.001	U	mg/L	-	NA
099928	Silo 1 NWZ-B	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	1,2-Dichloroethane	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	2-Butanone	0.002	BJ	mg/L	-	NA
099928	Silo 1 NWZ-B	2-Hexanone	0.01	U	mg/L	-	NA
099928	Silo 1 NWZ-B	4-Methyl-2-pentanone	0.002	J	mg/L	-	NA
099928	Silo 1 NWZ-B	Acetone	0.43	BE	mg/L	-	NA
099928	Silo 1 NWZ-B	Benzene	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Bromodichloromethane	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Bromoform	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Bromomethane	0.01	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Carbon disulfide	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Carbon Tetrachloride	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Chlorobenzene	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Chloroethane	0.01	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Chloroform	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Chloromethane	0.01	U	mg/L	-	NA
099928	Silo 1 NWZ-B	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Dibromochloromethane	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Ethylbenzene	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Methylene chloride	0.013	B	mg/L	-	NA
099928	Silo 1 NWZ-B	Styrene	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Tetrachlorethene	0.001	J	mg/L	-	NA
099928	Silo 1 NWZ-B	Toluene	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Total xylenes	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Trichloroethene	0.005	U	mg/L	-	NA
099928	Silo 1 NWZ-B	Vinyl Acetate	0.01	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099928	Silo 1 NWZ-B	Vinyl chloride	0.01	U	mg/L	-	NA
099929	Silo 1 NWZ-B	Aluminum	0.232		mg/L	-	NA
099929	Silo 1 NWZ-B	Antimony	0.0747		mg/L	-	NA
099929	Silo 1 NWZ-B	Arsenic	0.002	UW	mg/L	-	NA
099929	Silo 1 NWZ-B	Barium	0.699		mg/L	-	0.7
099929	Silo 1 NWZ-B	Beryllium	0.002	U	mg/L	-	NA
099929	Silo 1 NWZ-B	Boron	0.168		mg/L	-	NA
099929	Silo 1 NWZ-B	Cadmium	0.0034	B	mg/L	-	0.3
099929	Silo 1 NWZ-B	Calcium	83.4		mg/L	-	NA
099929	Silo 1 NWZ-B	Chromium	0.0528		mg/L	-	1.1
099929	Silo 1 NWZ-B	Cobalt	0.72		mg/L	-	NA
099929	Silo 1 NWZ-B	Copper	0.0681		mg/L	-	NA
099929	Silo 1 NWZ-B	Iron	0.0335	B	mg/L	-	NA
099929	Silo 1 NWZ-B	Lead	348		mg/L	-	6960.0
099929	Silo 1 NWZ-B	Magnesium	8.56		mg/L	-	NA
099929	Silo 1 NWZ-B	Manganese	0.0671		mg/L	-	NA
099929	Silo 1 NWZ-B	Mercury	0.0002	U	mg/L	-	NA
099929	Silo 1 NWZ-B	Molybdenum	0.0502		mg/L	-	NA
099929	Silo 1 NWZ-B	Nickel	1.67		mg/L	-	NA
099929	Silo 1 NWZ-B	Potassium	14		mg/L	-	NA
099929	Silo 1 NWZ-B	Selenium	0.143		mg/L	-	14.3
099929	Silo 1 NWZ-B	Silicon	26		mg/L	-	NA
099929	Silo 1 NWZ-B	Silver	0.0331		mg/L	-	0.7
099929	Silo 1 NWZ-B	Thallium	0.0083	B	mg/L	-	NA
099929	Silo 1 NWZ-B	Vanadium	0.0226	B	mg/L	-	NA
099929	Silo 1 NWZ-B	Zinc	0.0899		mg/L	-	NA
099932	Silo 1 NWZ-B	1,2-Dichlorobenzene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	1,2,4-Trichlorobenzene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	1,3-Dichlorobenzene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	1,4-Dichlorobenzene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	2-Chloronaphthalene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	2-Chlorophenol	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	2-Methylnaphthalene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	2-Methylphenol	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	2-Nitroaniline	0.11	U	mg/L	-	NA
099932	Silo 1 NWZ-B	2-Nitrophenol	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	2,4-Dichlorophenol	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	2,4-Dimethylphenol	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	2,4-Dinitrophenol	0.11	U	mg/L	-	NA
099932	Silo 1 NWZ-B	2,4-Dinitrotoluene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	2,4,5-Trichlorophenol	0.11	U	mg/L	-	NA
099932	Silo 1 NWZ-B	2,4,6-Trichlorophenol	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	3-Nitroaniline	0.11	U	mg/L	-	NA
099932	Silo 1 NWZ-B	3,3'-Dichlorobenzidine	0.044	U	mg/L	-	NA
099932	Silo 1 NWZ-B	4-Bromophenyl phenyl ether	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	4-Chloro-3-methylphenol	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	4-Chloroaniline	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	4-Chlorophenylphenyl ether	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	4-Methylphenol	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	4-Nitroaniline	0.11	U	mg/L	-	NA
099932	Silo 1 NWZ-B	4-Nitrophenol	0.11	U	mg/L	-	NA
099932	Silo 1 NWZ-B	4,4'-DDD	0.0001	U	mg/L	-	NA
099932	Silo 1 NWZ-B	4,4'-DDE	0.0001	U	mg/L	-	NA
099932	Silo 1 NWZ-B	4,4'-DDT	0.0001	U	mg/L	-	NA
099932	Silo 1 NWZ-B	4,6-Dinitro-2-methylphenol	0.11	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Acenaphthene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Acenaphthylene	0.022	U	mg/L	-	NA

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TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099932	Silo 1 NWZ-B	Aldrin	0.00005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	alpha-BHC	0.00005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	alpha-Chlordane	0.0005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Anthracene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Aroclor-1016	0.0005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Aroclor-1221	0.0005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Aroclor-1232	0.0005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Aroclor-1242	0.0005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Aroclor-1248	0.0005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Aroclor-1254	0.001	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Aroclor-1260	0.001	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Benzoic acid	0.11	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Benzo(a)anthracene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Benzo(a)pyrene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Benzo(b)fluoranthene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Benzo(g,h,i)perylene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Benzo(k)fluoranthene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Benzyl alcohol	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	beta-BHC	0.00005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	bis(2-Chloroethoxy)methane	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	bis(2-Chloroethyl)ether	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	bis(2-Chloroisopropyl) ether	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	bis(2-Ethylhexyl) phthalate	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Butyl benzyl phthalate	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Chrysene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	delta-BHC	0.00005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Dibenzofuran	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Dibenzo(a,h)anthracene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Dieldrin	0.0001	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Diethyl phthalate	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Dimethyl phthalate	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Di-n-butyl phthalate	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Di-n-octyl phthalate	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Endosulfan II	0.0001	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Endosulfan sulfate	0.0001	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Endosulfan-I	0.00005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Endrin	0.0001	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Endrin ketone	0.0001	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Fluoranthene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Fluorene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	gamma-BHC (Lindane)	0.00005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	gamma-Chlordane	0.0005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Heptachlor	0.00005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Heptachlor epoxide	0.00005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Hexachlorobenzene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Hexachlorocyclopentadiene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Hexachloroethane	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Indeno(1,2,3-cd)pyrene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Isophorone	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Methoxychlor	0.0005	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Naphthalene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Nitrobenzene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	N-Nitroso-di-n-propylamine	0.018	J	mg/L	-	NA
099932	Silo 1 NWZ-B	N-Nitrosodiphenylamine	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Pentachlorophenol	0.11	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Phenanthrene	0.022	U	mg/L	-	NA
099932	Silo 1 NWZ-B	Phenol	0.022	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

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OU4 Chemical Characterization Data, Silo 1							
Sample	Other	Constituent	Result	Lab	Units	Q5	% of TCLP Reg Limits
099932	Silo 1 NWZ-B	Pyrene	0.022	U	mg/L	-	NA
099960	Silo 1 SE Z-B	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	1,2-Dichloroethane	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	2-Butanone	0.005	BJ	mg/L	-	NA
099960	Silo 1 SE Z-B	2-Hexanone	0.01	U	mg/L	-	NA
099960	Silo 1 SE Z-B	4-Methyl-2-pentanone	0.001	J	mg/L	-	NA
099960	Silo 1 SE Z-B	Acetone	0.069	B	mg/L	-	NA
099960	Silo 1 SE Z-B	Benzene	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Bromodichloromethane	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Bromoform	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Bromomethane	0.01	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Carbon disulfide	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Carbon Tetrachloride	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Chlorobenzene	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Chloroethane	0.01	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Chloroform	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Chloromethane	0.01	U	mg/L	-	NA
099960	Silo 1 SE Z-B	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Dibromochloromethane	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Ethylbenzene	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Methylene chloride	0.009	B	mg/L	-	NA
099960	Silo 1 SE Z-B	Styrene	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Tetrachlorethene	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Toluene	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Total xylenes	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Trichloroethene	0.005	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Vinyl Acetate	0.01	U	mg/L	-	NA
099960	Silo 1 SE Z-B	Vinyl chloride	0.01	U	mg/L	-	NA
099962	Silo 1 SE Z-B	1,2-Dichlorobenzene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	1,2,4-Trichlorobenzene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	1,3-Dichlorobenzene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	1,4-Dichlorobenzene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	2-Chloronaphthalene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	2-Chlorophenol	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	2-Methylnaphthalene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	2-Methylphenol	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	2-Nitroaniline	0.14	U	mg/L	-	NA
099962	Silo 1 SE Z-B	2-Nitrophenol	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	2,4-Dichlorophenol	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	2,4-Dimethylphenol	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	2,4-Dinitrophenol	0.14	U	mg/L	-	NA
099962	Silo 1 SE Z-B	2,4-Dinitrotoluene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	2,4,5-Trichlorophenol	0.14	U	mg/L	-	NA
099962	Silo 1 SE Z-B	2,4,6-Trichlorophenol	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	2,6-Dinitrotoluene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	3-Nitroaniline	0.14	U	mg/L	-	NA
099962	Silo 1 SE Z-B	3,3'-Dichlorobenzidine	0.057	U	mg/L	-	NA
099962	Silo 1 SE Z-B	4-Bromophenyl phenyl ether	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	4-Chloro-3-methylphenol	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	4-Chloroaniline	0.029	U	mg/L	-	NA

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TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099962	Silo 1 SE Z-B	4-Chlorophenylphenyl ether	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	4-Methylphenol	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	4-Nitroaniline	0.14	U	mg/L	-	NA
099962	Silo 1 SE Z-B	4-Nitrophenol	0.14	U	mg/L	-	NA
099962	Silo 1 SE Z-B	4,6-Dinitro-2-methylphenol	0.14	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Acenaphthene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Acenaphthylene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Anthracene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Benzoic acid	0.079	J	mg/L	-	NA
099962	Silo 1 SE Z-B	Benzo(a)anthracene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Benzo(a)pyrene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Benzo(b)fluoranthene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Benzo(g,h,i)perylene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Benzo(k)fluoranthene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Benzyl alcohol	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	bis(2-Chloroethoxy)methane	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	bis(2-Chloroethyl)ether	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	bis(2-Chloroisopropyl) ether	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	bis(2-Ethylhexyl) phthalate	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Butyl benzyl phthalate	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Chrysene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Dibenzofuran	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Dibenzo(a,h)anthracene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Diethyl phthalate	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Dimethyl phthalate	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Di-n-butyl phthalate	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Di-n-octyl phthalate	0.008	J	mg/L	-	NA
099962	Silo 1 SE Z-B	Fluoranthene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Fluorene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Hexachlorobenzene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Hexachlorobutadiene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Hexachlorocyclopentadiene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Hexachloroethane	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Indeno(1,2,3-cd)pyrene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Isophorone	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Naphthalene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Nitrobenzene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	N-Nitroso-di-n-propylamine	0.15		mg/L	-	NA
099962	Silo 1 SE Z-B	N-Nitrosodiphenylamine	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Pentachlorophenol	0.14	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Phenanthrene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Phenol	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B	Pyrene	0.029	U	mg/L	-	NA
099962	Silo 1 SE Z-B R	Acenaphthylene	0.029	U	mg/L	-	NA
099967	Silo 1 SE Z-B	Aluminum	0.313		mg/L	-	NA
099967	Silo 1 SE Z-B	Antimony	0.129		mg/L	-	NA
099967	Silo 1 SE Z-B	Arsenic	0.002	UN	mg/L	J	NA
099967	Silo 1 SE Z-B	Barium	0.65		mg/L	-	0.7
099967	Silo 1 SE Z-B	Beryllium	0.0023	B	mg/L	-	NA
099967	Silo 1 SE Z-B	Boron	0.346		mg/L	-	NA
099967	Silo 1 SE Z-B	Cadmium	0.0045	B	mg/L	-	0.5
099967	Silo 1 SE Z-B	Calcium	23		mg/L	-	NA
099967	Silo 1 SE Z-B	Chromium	0.0654		mg/L	-	1.3
099967	Silo 1 SE Z-B	Cobalt	3.06		mg/L	-	NA
099967	Silo 1 SE Z-B	Copper	0.289		mg/L	-	NA
099967	Silo 1 SE Z-B	Iron	0.0462	B	mg/L	-	NA
099967	Silo 1 SE Z-B	Lead	841	E	mg/L	-	16820.0

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

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OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099967	Silo 1 SE Z-B	Magnesium	9.68		mg/L	-	NA
099967	Silo 1 SE Z-B	Manganese	0.145		mg/L	-	NA
099967	Silo 1 SE Z-B	Mercury	0.0002	U	mg/L	-	NA
099967	Silo 1 SE Z-B	Molybdenum	0.108		mg/L	-	NA
099967	Silo 1 SE Z-B	Nickel	4.33		mg/L	-	NA
099967	Silo 1 SE Z-B	Potassium	18.3		mg/L	-	NA
099967	Silo 1 SE Z-B	Selenium	0.283		mg/L	-	28.3
099967	Silo 1 SE Z-B	Silicon	36.1		mg/L	J	NA
099967	Silo 1 SE Z-B	Silver	0.0387		mg/L	-	0.8
099967	Silo 1 SE Z-B	Thallium	0.0044	BW	mg/L	-	NA
099967	Silo 1 SE Z-B	Vanadium	0.0269	B	mg/L	-	NA
099967	Silo 1 SE Z-B	Zinc	0.194		mg/L	-	NA
099976	Silo 1 SE Z-B	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	1,2-Dichloroethane	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	2-Butanone	0.005	BJ	mg/L	JB	NA
099976	Silo 1 SE Z-B	2-Hexanone	0.01	U	mg/L	-	NA
099976	Silo 1 SE Z-B	4-Methyl-2-pentanone	0.002	J	mg/L	-	NA
099976	Silo 1 SE Z-B	Acetone	0.17	B	mg/L	JB	NA
099976	Silo 1 SE Z-B	Benzene	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Bromodichloromethane	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Bromoform	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Bromomethane	0.01	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Carbon disulfide	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Carbon Tetrachloride	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Chlorobenzene	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Chloroethane	0.01	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Chloroform	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Chloromethane	0.01	U	mg/L	-	NA
099976	Silo 1 SE Z-B	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Dibromochloromethane	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Ethylbenzene	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Methylene chloride	0.021	B	mg/L	JB	NA
099976	Silo 1 SE Z-B	Styrene	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Tetrachlorethene	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Toluene	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Total xylenes	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Trichloroethene	0.005	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Vinyl Acetate	0.01	U	mg/L	-	NA
099976	Silo 1 SE Z-B	Vinyl chloride	0.01	U	mg/L	-	NA
099985	Silo 1 SE Z-B	Aluminum	0.278		mg/L	-	NA
099985	Silo 1 SE Z-B	Antimony	0.104		mg/L	-	NA
099985	Silo 1 SE Z-B	Arsenic	0.002	UWN	mg/L	J	NA
099985	Silo 1 SE Z-B	Barium	0.829		mg/L	-	0.8
099985	Silo 1 SE Z-B	Beryllium	0.002	U	mg/L	-	NA
099985	Silo 1 SE Z-B	Boron	0.284		mg/L	-	NA
099985	Silo 1 SE Z-B	Cadmium	0.0037	B	mg/L	-	0.4
099985	Silo 1 SE Z-B	Calcium	21.6		mg/L	-	NA
099985	Silo 1 SE Z-B	Chromium	0.0561		mg/L	-	1.1
099985	Silo 1 SE Z-B	Cobalt	1.67		mg/L	-	NA
099985	Silo 1 SE Z-B	Copper	0.215		mg/L	-	NA

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TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099985	Silo 1 SE Z-B	Iron	0.0419	B	mg/L	-	NA
099985	Silo 1 SE Z-B	Lead	833	E	mg/L	-	16660.0
099985	Silo 1 SE Z-B	Magnesium	6.12		mg/L	-	NA
099985	Silo 1 SE Z-B	Manganese	0.111		mg/L	-	NA
099985	Silo 1 SE Z-B	Mercury	0.0002	U	mg/L	-	NA
099985	Silo 1 SE Z-B	Molybdenum	0.101		mg/L	-	NA
099985	Silo 1 SE Z-B	Nickel	2.56		mg/L	-	NA
099985	Silo 1 SE Z-B	Potassium	14.5		mg/L	-	NA
099985	Silo 1 SE Z-B	Selenium	0.306		mg/L	-	30.6
099985	Silo 1 SE Z-B	Silicon	27.6		mg/L	JB	NA
099985	Silo 1 SE Z-B	Silver	0.0301		mg/L	-	0.6
099985	Silo 1 SE Z-B	Thallium	0.0039	B	mg/L	-	NA
099985	Silo 1 SE Z-B	Vanadium	0.0216	B	mg/L	-	NA
099985	Silo 1 SE Z-B	Zinc	0.17		mg/L	-	NA
100003	Silo 1 NE Z-B	Aluminum	0.37		mg/L	-	NA
100003	Silo 1 NE Z-B	Antimony	0.1		mg/L	-	NA
100003	Silo 1 NE Z-B	Arsenic	0.002	UN	mg/L	UJ	NA
100003	Silo 1 NE Z-B	Barium	1.83		mg/L	-	1.8
100003	Silo 1 NE Z-B	Beryllium	0.0021	B	mg/L	J	NA
100003	Silo 1 NE Z-B	Boron	0.384		mg/L	-	NA
100003	Silo 1 NE Z-B	Cadmium	0.002	B	mg/L	J	0.2
100003	Silo 1 NE Z-B	Calcium	31.1		mg/L	-	NA
100003	Silo 1 NE Z-B	Chromium	0.052		mg/L	-	1.0
100003	Silo 1 NE Z-B	Cobalt	2.81		mg/L	-	NA
100003	Silo 1 NE Z-B	Copper	0.404		mg/L	-	NA
100003	Silo 1 NE Z-B	Iron	0.0623	B	mg/L	UJ	NA
100003	Silo 1 NE Z-B	Magnesium	9.35		mg/L	-	NA
100003	Silo 1 NE Z-B	Manganese	0.242		mg/L	-	NA
100003	Silo 1 NE Z-B	Mercury	0.0002	U	mg/L	-	NA
100003	Silo 1 NE Z-B	Molybdenum	0.0885		mg/L	-	NA
100003	Silo 1 NE Z-B	Nickel	4.56		mg/L	-	NA
100003	Silo 1 NE Z-B	Potassium	9.56	B	mg/L	J	NA
100003	Silo 1 NE Z-B	Selenium	0.0765	+	mg/L	J	7.7
100003	Silo 1 NE Z-B	Silicon	37.9		mg/L	-	NA
100003	Silo 1 NE Z-B	Silver	0.028		mg/L	-	0.6
100003	Silo 1 NE Z-B	Thallium	0.0058	B	mg/L	J	NA
100003	Silo 1 NE Z-B	Vanadium	0.0176	B	mg/L	J	NA
100003	Silo 1 NE Z-B	Zinc	0.323		mg/L	-	NA
100010	Silo 1 NE Z-B	1,2-Dichlorobenzene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	1,2,4-Trichlorobenzene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	1,3-Dichlorobenzene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	1,4-Dichlorobenzene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	2-Chloronaphthalene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	2-Chlorophenol	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	2-Methylnaphthalene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	2-Methylphenol	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	2-Nitroaniline	0.1	U	mg/L	-	NA
100010	Silo 1 NE Z-B	2-Nitrophenol	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	2,4-Dichlorophenol	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	2,4-Dimethylphenol	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	2,4-Dinitrophenol	0.1	U	mg/L	-	NA
100010	Silo 1 NE Z-B	2,4-Dinitrotoluene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	2,4,5-Trichlorophenol	0.1	U	mg/L	-	NA
100010	Silo 1 NE Z-B	2,4,6-Trichlorophenol	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	2,6-Dinitrotoluene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	3-Nitroaniline	0.1	U	mg/L	-	NA
100010	Silo 1 NE Z-B	3,3'-Dichlorobenzidine	0.04	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

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OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
100010	Silo 1 NE Z-B	4-Bromophenyl phenyl ether	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	4-Chloro-3-methylphenol	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	4-Chloroaniline	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	4-Chlorophenylphenyl ether	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	4-Methylphenol	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	4-Nitroaniline	0.1	U	mg/L	-	NA
100010	Silo 1 NE Z-B	4-Nitrophenol	0.1	U	mg/L	-	NA
100010	Silo 1 NE Z-B	4,6-Dinitro-2-methylphenol	0.1	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Acenaphthene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Acenaphthylene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Anthracene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Benzoic acid	0.1	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Benzo(a)anthracene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Benzo(a)pyrene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Benzo(b)fluoranthene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Benzo(g,h,i)perylene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Benzo(k)fluoranthene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Benzyl alcohol	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	bis(2-Chloroethoxy)methane	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	bis(2-Chloroethyl)ether	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	bis(2-Ethylhexyl) phthalate	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Butyl benzyl phthalate	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Chrysene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Dibenzofuran	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Dibenzo(a,h)anthracene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Diethyl phthalate	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Dimethyl phthalate	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Di-n-butyl phthalate	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Di-n-octyl phthalate	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Fluoranthene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Fluorene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Hexachlorobenzene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Hexachlorobutadiene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Hexachlorocyclopentadiene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Hexachloroethane	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Isophorone	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Naphthalene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Nitrobenzene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	N-Nitroso-di-n-propylamine	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	N-Nitrosodiphenylamine	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Pentachlorophenol	0.1	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Phenanthrene	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Phenol	0.02	U	mg/L	-	NA
100010	Silo 1 NE Z-B	Pyrene	0.02	U	mg/L	-	NA
099726	Silo 1 SE Z-C	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	1,1-Dichloroethene	0.005	U	mg/L	UJ	NA
099726	Silo 1 SE Z-C	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	1,2-Dichloroethane	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	2-Butanone	0.001	J	mg/L	J	NA
099726	Silo 1 SE Z-C	2-Hexanone	0.01	U	mg/L	-	NA
099726	Silo 1 SE Z-C	4-Methyl-2-pentanone	0.01	U	mg/L	-	NA
099726	Silo 1 SE Z-C	Benzene	0.005	U	mg/L	UJ	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099726	Silo 1 SE Z-C	Bromodichloromethane	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	Bromoform	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	Bromomethane	0.01	U	mg/L	-	NA
099726	Silo 1 SE Z-C	Carbon disulfide	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	Chlorobenzene	0.005	U	mg/L	UJ	NA
099726	Silo 1 SE Z-C	Chloroethane	0.01	U	mg/L	-	NA
099726	Silo 1 SE Z-C	Chloromethane	0.01	U	mg/L	-	NA
099726	Silo 1 SE Z-C	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	Dibromochloromethane	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	Ethylbenzene	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	Methylene chloride	0.038	B	mg/L	-	NA
099726	Silo 1 SE Z-C	Styrene	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	Toluene	0.002	BJ	mg/L	-	NA
099726	Silo 1 SE Z-C	Total xylenes	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099726	Silo 1 SE Z-C	Trichloroethene	0.005	U	mg/L	UJ	NA
099726	Silo 1 SE Z-C	Vinyl Acetate	0.01	U	mg/L	-	NA
099727	Silo 1 SE Z-C	Aluminum	0.241		mg/L	-	NA
099727	Silo 1 SE Z-C	Antimony	0.0673		mg/L	-	NA
099727	Silo 1 SE Z-C	Arsenic	0.002	U	mg/L	U	NA
099727	Silo 1 SE Z-C	Barium	0.706		mg/L	-	0.7
099727	Silo 1 SE Z-C	Beryllium	0.002	U	mg/L	U	NA
099727	Silo 1 SE Z-C	Boron	0.283		mg/L	-	NA
099727	Silo 1 SE Z-C	Cadmium	0.0021	B	mg/L	-	0.2
099727	Silo 1 SE Z-C	Calcium	21.7		mg/L	-	NA
099727	Silo 1 SE Z-C	Chromium	0.0447		mg/L	-	0.9
099727	Silo 1 SE Z-C	Cobalt	1.64		mg/L	-	NA
099727	Silo 1 SE Z-C	Copper	0.12		mg/L	-	NA
099727	Silo 1 SE Z-C	Iron	0.0261	B	mg/L	-	NA
099727	Silo 1 SE Z-C	Lead	229		mg/L	-	4580.0
099727	Silo 1 SE Z-C	Magnesium	6.79		mg/L	-	NA
099727	Silo 1 SE Z-C	Manganese	0.153		mg/L	-	NA
099727	Silo 1 SE Z-C	Mercury	0.0002	U	mg/L	-	NA
099727	Silo 1 SE Z-C	Molybdenum	0.0362		mg/L	-	NA
099727	Silo 1 SE Z-C	Nickel	2.8		mg/L	-	NA
099727	Silo 1 SE Z-C	Potassium	3.83	B	mg/L	-	NA
099727	Silo 1 SE Z-C	Selenium	0.161		mg/L	-	16.1
099727	Silo 1 SE Z-C	Silicon	35.2		mg/L	-	NA
099727	Silo 1 SE Z-C	Silver	0.0227		mg/L	-	0.5
099727	Silo 1 SE Z-C	Thallium	0.002	U	mg/L	U	NA
099727	Silo 1 SE Z-C	Vanadium	0.0168	B	mg/L	-	NA
099727	Silo 1 SE Z-C	Zinc	0.129		mg/L	-	NA
099734	Silo 1 SE Z-C	1,2-Dichlorobenzene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	1,2,4-Trichlorobenzene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	1,3-Dichlorobenzene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	1,4-Dichlorobenzene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	2-Chloronaphthalene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	2-Chlorophenol	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	2-Methylnaphthalene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	2-Methylphenol	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	2-Nitroaniline	0.1	U	mg/L	-	NA
099734	Silo 1 SE Z-C	2-Nitrophenol	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	2,4-Dichlorophenol	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	2,4-Dimethylphenol	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	2,4-Dinitrophenol	0.1	U	mg/L	-	NA
099734	Silo 1 SE Z-C	2,4-Dinitrotoluene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	2,4,5-Trichlorophenol	0.1	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

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OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099734	Silo 1 SE Z-C	2,4,6-Trichlorophenol	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	2,6-Dinitrotoluene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	3-Nitroaniline	0.1	U	mg/L	-	NA
099734	Silo 1 SE Z-C	3,3'-Dichlorobenzidine	0.04	U	mg/L	-	NA
099734	Silo 1 SE Z-C	4-Bromophenyl phenyl ether	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	4-Chloro-3-methylphenol	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	4-Chloroaniline	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	4-Chlorophenylphenyl ether	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	4-Methylphenol	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	4-Nitroaniline	0.1	U	mg/L	-	NA
099734	Silo 1 SE Z-C	4-Nitrophenol	0.1	U	mg/L	-	NA
099734	Silo 1 SE Z-C	4,4'-DDD	0.0001	U	mg/L	-	NA
099734	Silo 1 SE Z-C	4,4'-DDE	0.0001	U	mg/L	-	NA
099734	Silo 1 SE Z-C	4,4'-DDT	0.0001	U	mg/L	-	NA
099734	Silo 1 SE Z-C	4,6-Dinitro-2-methylphenol	0.1	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Acenaphthene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Acenaphthylene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Aldrin	0.00005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	alpha-BHC	0.00005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	alpha-Chlordane	0.0005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Anthracene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Aroclor-1016	0.0005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Aroclor-1221	0.0005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Aroclor-1232	0.0005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Aroclor-1242	0.0005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Aroclor-1248	0.0005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Aroclor-1254	0.001	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Aroclor-1260	0.001	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Benzoic acid	0.01	BJ	mg/L	-	NA
099734	Silo 1 SE Z-C	Benzo(a)anthracene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Benzo(a)pyrene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Benzo(b)fluoranthene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Benzo(g,h,i)perylene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Benzo(k)fluoranthene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Benzyl alcohol	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	beta-BHC	0.00005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	bis(2-Chloroethoxy)methane	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	bis(2-Chloroethyl)ether	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	bis(2-Ethylhexyl) phthalate	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Butyl benzyl phthalate	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Chrysene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	delta-BHC	0.00005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Dibenzofuran	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Dibenzo(a,h)anthracene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Dieldrin	0.0001	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Diethyl phthalate	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Dimethyl phthalate	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Di-n-butyl phthalate	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Di-n-octyl phthalate	0.005	BJ	mg/L	-	NA
099734	Silo 1 SE Z-C	Endosulfan II	0.0001	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Endosulfan sulfate	0.0001	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Endosulfan-I	0.00005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Endrin	0.0001	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Endrin ketone	0.0001	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Fluoranthene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Fluorene	0.02	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099734	Silo 1 SE Z-C	gamma-BHC (Lindane)	0.00005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	gamma-Chlordane	0.0005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Heptachlor	0.00005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Heptachlor epoxide	0.00005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Hexachlorobenzene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Hexachlorobutadiene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Hexachlorocyclopentadiene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Hexachloroethane	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Isophorone	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Methoxychlor	0.0005	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Naphthalene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Nitrobenzene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	N-Nitroso-di-n-propylamine	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	N-Nitrosodiphenylamine	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Pentachlorophenol	0.1	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Phenanthrene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Phenol	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Pyrene	0.02	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Toxaphene	0.001	U	mg/L	-	NA
099734	Silo 1 SE Z-C	Tributyl phosphate	0.064		mg/L	-	NA
099937	Silo 1 NWZ-C	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	2-Butanone	0.006	BJ	mg/L	J	NA
099937	Silo 1 NWZ-C	2-Hexanone	0.01	U	mg/L	-	NA
099937	Silo 1 NWZ-C	4-Methyl-2-pentanone	0.002	J	mg/L	J	NA
099937	Silo 1 NWZ-C	Acetone	0.22	BE	mg/L	J	NA
099937	Silo 1 NWZ-C	Benzene	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	Bromodichloromethane	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	Bromoform	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	Bromomethane	0.01	U	mg/L	-	NA
099937	Silo 1 NWZ-C	Carbon disulfide	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	Chlorobenzene	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	Chloroethane	0.01	U	mg/L	-	NA
099937	Silo 1 NWZ-C	Chloromethane	0.01	U	mg/L	-	NA
099937	Silo 1 NWZ-C	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	Dibromochloromethane	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	Ethylbenzene	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	Methylene chloride	0.012	B	mg/L	-	NA
099937	Silo 1 NWZ-C	Styrene	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	Toluene	0.001	J	mg/L	J	NA
099937	Silo 1 NWZ-C	Total xylenes	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	Trichloroethene	0.005	U	mg/L	-	NA
099937	Silo 1 NWZ-C	Vinyl Acetate	0.01	U	mg/L	-	NA
099938	Silo 1 NWZ-C	Aluminum	0.269		mg/L	-	NA
099938	Silo 1 NWZ-C	Antimony	0.104		mg/L	-	NA
099938	Silo 1 NWZ-C	Barium	1.13		mg/L	-	1.1
099938	Silo 1 NWZ-C	Beryllium	0.002	U	mg/L	-	NA
099938	Silo 1 NWZ-C	Boron	0.231		mg/L	-	NA
099938	Silo 1 NWZ-C	Cadmium	0.0028	B	mg/L	-	0.3
099938	Silo 1 NWZ-C	Calcium	31		mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

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OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099938	Silo 1 NWZ-C	Chromium	0.0469		mg/L	-	0.9
099938	Silo 1 NWZ-C	Cobalt	2.16		mg/L	-	NA
099938	Silo 1 NWZ-C	Copper	0.245		mg/L	-	NA
099938	Silo 1 NWZ-C	Iron	0.0374	B	mg/L	-	NA
099938	Silo 1 NWZ-C	Lead	714		mg/L	-	14280.0
099938	Silo 1 NWZ-C	Magnesium	8		mg/L	-	NA
099938	Silo 1 NWZ-C	Manganese	0.178		mg/L	-	NA
099938	Silo 1 NWZ-C	Mercury	0.0002	U	mg/L	-	NA
099938	Silo 1 NWZ-C	Molybdenum	0.0915		mg/L	-	NA
099938	Silo 1 NWZ-C	Nickel	3.68		mg/L	-	NA
099938	Silo 1 NWZ-C	Potassium	8.8		mg/L	-	NA
099938	Silo 1 NWZ-C	Silicon	37.7		mg/L	-	NA
099938	Silo 1 NWZ-C	Silver	0.0238		mg/L	-	0.5
099938	Silo 1 NWZ-C	Thallium	0.0026	BW	mg/L	-	NA
099938	Silo 1 NWZ-C	Vanadium	0.0172	B	mg/L	-	NA
099938	Silo 1 NWZ-C	Zinc	0.172		mg/L	-	NA
099945	Silo 1 NWZ-C	1,2-Dichlorobenzene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	1,2,4-Trichlorobenzene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	1,3-Dichlorobenzene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	1,4-Dichlorobenzene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	2-Chloronaphthalene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	2-Chlorophenol	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	2-Methylnaphthalene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	2-Methylphenol	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	2-Nitroaniline	0.11	U	mg/L	-	NA
099945	Silo 1 NWZ-C	2-Nitrophenol	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	2,4-Dichlorophenol	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	2,4-Dimethylphenol	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	2,4-Dinitrophenol	0.11	U	mg/L	-	NA
099945	Silo 1 NWZ-C	2,4,5-Trichlorophenol	0.11	U	mg/L	-	NA
099945	Silo 1 NWZ-C	2,4,6-Trichlorophenol	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	2,6-Dinitrotoluene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	3-Nitroaniline	0.11	U	mg/L	-	NA
099945	Silo 1 NWZ-C	3,3'-Dichlorobenzidine	0.043	U	mg/L	-	NA
099945	Silo 1 NWZ-C	4-Bromophenyl phenyl ether	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	4-Chloro-3-methylphenol	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	4-Chloroaniline	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	4-Chlorophenylphenyl ether	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	4-Methylphenol	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	4-Nitroaniline	0.11	U	mg/L	-	NA
099945	Silo 1 NWZ-C	4-Nitrophenol	0.11	U	mg/L	-	NA
099945	Silo 1 NWZ-C	4,4'-DDD	0.0001	U	mg/L	-	NA
099945	Silo 1 NWZ-C	4,4'-DDE	0.0001	U	mg/L	-	NA
099945	Silo 1 NWZ-C	4,4'-DDT	0.0001	U	mg/L	-	NA
099945	Silo 1 NWZ-C	4,6-Dinitro-2-methylphenol	0.11	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Acenaphthene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Acenaphthylene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Aldrin	0.00005	U	mg/L	-	NA
099945	Silo 1 NWZ-C	alpha-BHC	0.00005	U	mg/L	-	NA
099945	Silo 1 NWZ-C	alpha-Chlordane	0.0005	U	mg/L	J	NA
099945	Silo 1 NWZ-C	Anthracene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Aroclor-1016	0.0005	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Aroclor-1221	0.0005	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Aroclor-1232	0.0005	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Aroclor-1242	0.0005	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Aroclor-1248	0.0005	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Aroclor-1254	0.001	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

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OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
099945	Silo 1 NWZ-C	Aroclor-1260	0.001	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Benzoic acid	0.11	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Benzo(a)anthracene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Benzo(a)pyrene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Benzo(b)fluoranthene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Benzo(g,h,i)perylene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Benzo(k)fluoranthene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Benzyl alcohol	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	beta-BHC	0.00005	U	mg/L	-	NA
099945	Silo 1 NWZ-C	bis(2-Chloroethoxy)methane	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	bis(2-Chloroethyl)ether	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	bis(2-Chloroisopropyl) ether	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	bis(2-Ethylhexyl) phthalate	0.006	J	mg/L	J	NA
099945	Silo 1 NWZ-C	Butyl benzyl phthalate	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Chrysene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	delta-BHC	0.00005	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Dibenzofuran	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Dibenzo(a,h)anthracene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Dieldrin	0.0001	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Diethyl phthalate	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Dimethyl phthalate	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Di-n-butyl phthalate	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Di-n-octyl phthalate	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Endosulfan II	0.0001	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Endosulfan sulfate	0.0001	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Endosulfan-I	0.00005	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Endrin	0.0001	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Endrin ketone	0.0001	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Fluoranthene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Fluorene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	gamma-BHC (Lindane)	0.00005	U	mg/L	J	NA
099945	Silo 1 NWZ-C	gamma-Chlordane	0.0005	U	mg/L	J	NA
099945	Silo 1 NWZ-C	Heptachlor	0.00005	U	mg/L	J	NA
099945	Silo 1 NWZ-C	Heptachlor epoxide	0.00005	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Hexachlorobenzene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Hexachlorocyclopentadiene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Hexachloroethane	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Indeno(1,2,3-cd)pyrene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Isophorone	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Methoxychlor	0.0005	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Naphthalene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Nitrobenzene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	N-Nitroso-di-n-propylamine	0.28		mg/L	-	NA
099945	Silo 1 NWZ-C	N-Nitrosodiphenylamine	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Pentachlorophenol	0.11	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Phenanthrene	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Phenol	0.022	U	mg/L	-	NA
099945	Silo 1 NWZ-C	Pyrene	0.022	U	mg/L	-	NA
100023	Silo 1 NE Z-C	1,1-Dichloroethane	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	1,1-Dichloroethene	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	1,2-Dichloropropane	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	2-Hexanone	0.01	U	mg/L	-	NA
100023	Silo 1 NE Z-C	4-Methyl-2-pentanone	0.001	J	mg/L	J	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

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OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
100023	Silo 1 NE Z-C	Acetone	0.072	B	mg/L	-	NA
100023	Silo 1 NE Z-C	Benzene	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	Bromodichloromethane	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	Bromoform	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	Bromomethane	0.01	U	mg/L	-	NA
100023	Silo 1 NE Z-C	Carbon disulfide	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	Chlorobenzene	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	Chloroethane	0.01	U	mg/L	-	NA
100023	Silo 1 NE Z-C	Chloromethane	0.01	U	mg/L	-	NA
100023	Silo 1 NE Z-C	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	Dibromochloromethane	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	Ethylbenzene	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	Methylene chloride	0.011	B	mg/L	-	NA
100023	Silo 1 NE Z-C	Styrene	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	Toluene	0.002	BJ	mg/L	-	NA
100023	Silo 1 NE Z-C	Total xylenes	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	Trichloroethene	0.005	U	mg/L	-	NA
100023	Silo 1 NE Z-C	Vinyl Acetate	0.01	U	mg/L	-	NA
100024	Silo 1 NE Z-C	Aluminum	0.334		mg/L	-	NA
100024	Silo 1 NE Z-C	Antimony	0.0744		mg/L	-	NA
100024	Silo 1 NE Z-C	Arsenic	0.002	UN	mg/L	UJ	NA
100024	Silo 1 NE Z-C	Barium	0.691		mg/L	-	0.7
100024	Silo 1 NE Z-C	Beryllium	0.002	U	mg/L	-	NA
100024	Silo 1 NE Z-C	Boron	0.266		mg/L	-	NA
100024	Silo 1 NE Z-C	Cadmium	0.0022	B	mg/L	J	0.2
100024	Silo 1 NE Z-C	Calcium	73.5		mg/L	-	NA
100024	Silo 1 NE Z-C	Chromium	0.0522		mg/L	-	1.0
100024	Silo 1 NE Z-C	Cobalt	2.97		mg/L	-	NA
100024	Silo 1 NE Z-C	Copper	0.298		mg/L	-	NA
100024	Silo 1 NE Z-C	Iron	0.0181	B	mg/L	J	NA
100024	Silo 1 NE Z-C	Magnesium	10.4		mg/L	-	NA
100024	Silo 1 NE Z-C	Manganese	0.308		mg/L	-	NA
100024	Silo 1 NE Z-C	Mercury	0.0002	U	mg/L	-	NA
100024	Silo 1 NE Z-C	Molybdenum	0.0393		mg/L	-	NA
100024	Silo 1 NE Z-C	Nickel	5.57		mg/L	-	NA
100024	Silo 1 NE Z-C	Potassium	3.34	B	mg/L	J	NA
100024	Silo 1 NE Z-C	Selenium	0.131		mg/L	-	13.1
100024	Silo 1 NE Z-C	Silicon	41.8		mg/L	-	NA
100024	Silo 1 NE Z-C	Silver	0.0339		mg/L	-	0.7
100024	Silo 1 NE Z-C	Thallium	0.0027	B	mg/L	J	NA
100024	Silo 1 NE Z-C	Vanadium	0.0208	B	mg/L	J	NA
100024	Silo 1 NE Z-C	Zinc	0.104		mg/L	-	NA
100031	Silo 1 NE Z-C	1,2-Dichlorobenzene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	1,2,4-Trichlorobenzene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	1,3-Dichlorobenzene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	1,4-Dichlorobenzene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	2-Chloronaphthalene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	2-Methylnaphthalene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	2-Methylphenol	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	2-Nitroaniline	0.1	U	mg/L	-	NA
100031	Silo 1 NE Z-C	2-Nitrophenol	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	2,4-Dichlorophenol	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	2,4-Dimethylphenol	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	2,4-Dinitrophenol	0.1	U	mg/L	-	NA
100031	Silo 1 NE Z-C	2,4-Dinitrotoluene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	2,4,5-Trichlorophenol	0.1	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

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OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
100031	Silo 1 NE Z-C	2,4,6-Trichlorophenol	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	2,6-Dinitrotoluene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	3-Nitroaniline	0.1	U	mg/L	-	NA
100031	Silo 1 NE Z-C	3,3'-Dichlorobenzidine	0.04	U	mg/L	-	NA
100031	Silo 1 NE Z-C	4-Bromophenyl phenyl ether	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	4-Chloro-3-methylphenol	0.004	J	mg/L	J	NA
100031	Silo 1 NE Z-C	4-Chloroaniline	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	4-Chlorophenylphenyl ether	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	4-Methylphenol	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	4-Nitroaniline	0.1	U	mg/L	-	NA
100031	Silo 1 NE Z-C	4-Nitrophenol	0.008	J	mg/L	J	NA
100031	Silo 1 NE Z-C	4,6-Dinitro-2-methylphenol	0.1	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Acenaphthene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Acenaphthylene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Anthracene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Benzoic acid	0.1	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Benzo(a)anthracene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Benzo(a)pyrene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Benzo(b)fluoranthene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Benzo(g,h,i)perylene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Benzo(k)fluoranthene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Benzyl alcohol	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	bis(2-Chloroethoxy)methane	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	bis(2-Chloroethyl)ether	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	bis(2-Ethylhexyl) phthalate	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Butyl benzyl phthalate	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Chrysene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	delta-BHC	0.00005	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Dibenzofuran	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Dibenzo(a,h)anthracene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Diethyl phthalate	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Dimethyl phthalate	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Di-n-butyl phthalate	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Di-n-octyl phthalate	0.005	J	mg/L	J	NA
100031	Silo 1 NE Z-C	Fluoranthene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Fluorene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Hexachlorobenzene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Hexachlorobutadiene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Hexachlorocyclopentadiene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Hexachloroethane	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Naphthalene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Nitrobenzene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	N-Nitroso-di-n-propylamine	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	N-Nitrosodiphenylamine	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Pentachlorophenol	0.1	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Phenanthrene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Phenol	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C	Pyrene	0.02	U	mg/L	-	NA
100031	Silo 1 NE Z-C R	Endrin ketone	0.0001	U	mg/L	-	NA
100037	Silo 1 NE Z-C	1,1-Dichloroethane	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	1,1-Dichloroethene	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	1,2-Dichloroethylene	0.005	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

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OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
100037	Silo 1 NE Z-C	1,2-Dichloropropane	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	2-Hexanone	0.01	U	mg/L	-	NA
100037	Silo 1 NE Z-C	4-Methyl-2-pentanone	0.01	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Acetone	0.49	BE	mg/L	-	NA
100037	Silo 1 NE Z-C	Benzene	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Bromodichloromethane	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Bromoform	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Bromomethane	0.01	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Carbon disulfide	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Chlorobenzene	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Chloroethane	0.01	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Chloroform	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Chloromethane	0.01	U	mg/L	-	NA
100037	Silo 1 NE Z-C	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Dibromochloromethane	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Ethylbenzene	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Methylene chloride	0.019	B	mg/L	-	NA
100037	Silo 1 NE Z-C	Styrene	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Toluene	0.002	BJ	mg/L	-	NA
100037	Silo 1 NE Z-C	Total xylenes	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Trichloroethene	0.005	U	mg/L	-	NA
100037	Silo 1 NE Z-C	Vinyl Acetate	0.01	U	mg/L	-	NA
100038	Silo 1 NE Z-C	Aluminum	0.349		mg/L	-	NA
100038	Silo 1 NE Z-C	Antimony	0.0739		mg/L	-	NA
100038	Silo 1 NE Z-C	Arsenic	0.002	UN	mg/L	UJ	NA
100038	Silo 1 NE Z-C	Barium	0.348		mg/L	-	0.3
100038	Silo 1 NE Z-C	Beryllium	0.0022	B	mg/L	J	NA
100038	Silo 1 NE Z-C	Boron	0.281		mg/L	-	NA
100038	Silo 1 NE Z-C	Cadmium	0.0027	B	mg/L	J	0.3
100038	Silo 1 NE Z-C	Calcium	17.6		mg/L	-	NA
100038	Silo 1 NE Z-C	Chromium	0.0557		mg/L	-	1.1
100038	Silo 1 NE Z-C	Cobalt	2.65		mg/L	-	NA
100038	Silo 1 NE Z-C	Copper	0.24		mg/L	-	NA
100038	Silo 1 NE Z-C	Iron	0.0179	B	mg/L	UJ	NA
100038	Silo 1 NE Z-C	Magnesium	9.77		mg/L	-	NA
100038	Silo 1 NE Z-C	Manganese	0.232		mg/L	-	NA
100038	Silo 1 NE Z-C	Mercury	0.0002	U	mg/L	-	NA
100038	Silo 1 NE Z-C	Molybdenum	0.0445		mg/L	-	NA
100038	Silo 1 NE Z-C	Nickel	4.77		mg/L	-	NA
100038	Silo 1 NE Z-C	Potassium	2.95	B	mg/L	J	NA
100038	Silo 1 NE Z-C	Selenium	0.0865		mg/L	-	8.7
100038	Silo 1 NE Z-C	Silicon	42.1		mg/L	-	NA
100038	Silo 1 NE Z-C	Silver	0.029		mg/L	-	0.6
100038	Silo 1 NE Z-C	Thallium	0.002	U	mg/L	-	NA
100038	Silo 1 NE Z-C	Vanadium	0.0203	B	mg/L	J	NA
100038	Silo 1 NE Z-C	Zinc	0.0938		mg/L	-	NA
100041	Silo 1 NE Z-C	1,4-Dichlorobenzene	0.02	U	mg/L	-	NA
100041	Silo 1 NE Z-C	2-Methylphenol	0.02	U	mg/L	-	NA
100041	Silo 1 NE Z-C	2,4-Dinitrophenol	0.1	U	mg/L	-	NA
100041	Silo 1 NE Z-C	2,4-Dinitrotoluene	0.02	U	mg/L	-	NA
100041	Silo 1 NE Z-C	2,4,5-Trichlorophenol	0.1	U	mg/L	-	NA
100041	Silo 1 NE Z-C	2,4,6-Trichlorophenol	0.02	U	mg/L	-	NA
100041	Silo 1 NE Z-C	4-Methylphenol	0.02	U	mg/L	-	NA
100041	Silo 1 NE Z-C	4-Nitrophenol	0.1	U	mg/L	-	NA
100041	Silo 1 NE Z-C	Hexachlorobenzene	0.02	U	mg/L	-	NA
100041	Silo 1 NE Z-C	Hexachlorobutadiene	0.02	U	mg/L	-	NA

TABLE A-1, CHEMICAL CHARACTERIZATION DATA FOR SILO 1 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data, Silo 1							% of TCLP
Sample	Other	Constituent	Result	Lab	Units	Q5	Reg Limits
100041	Silo 1 NE Z-C	Pentachlorophenol	0.1	U	mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

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OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099809	Silo 2 NE Zone A	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	1,2-Dichloroethane	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	2-Butanone	0.002	J	mg/L	-	NA
099809	Silo 2 NE Zone A	2-Hexanone	0.01	U	mg/L	-	NA
099809	Silo 2 NE Zone A	4-Methyl-2-pentanone	0.001	J	mg/L	-	NA
099809	Silo 2 NE Zone A	Acetone	0.01	B	mg/L	U	NA
099809	Silo 2 NE Zone A	Benzene	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Bromodichloromethane	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Bromoform	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Bromomethane	0.01	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Carbon disulfide	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Chlorobenzene	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Chloroethane	0.01	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Chloromethane	0.01	U	mg/L	-	NA
099809	Silo 2 NE Zone A	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Dibromochloromethane	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Ethylbenzene	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Methylene chloride	0.005	B	mg/L	U	NA
099809	Silo 2 NE Zone A	Styrene	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Tetrachlorethene	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Toluene	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Total xylenes	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Trichloroethene	0.005	U	mg/L	-	NA
099809	Silo 2 NE Zone A	Vinyl Acetate	0.01	U	mg/L	-	NA
099810	Silo 2 NE Zone A	Aluminum	2.75		mg/L	-	NA
099810	Silo 2 NE Zone A	Antimony	0.113		mg/L	-	NA
099810	Silo 2 NE Zone A	Arsenic	0.0823		mg/L	-	1.6
099810	Silo 2 NE Zone A	Barium	0.239		mg/L	-	0.2
099810	Silo 2 NE Zone A	Beryllium	0.0055		mg/L	-	NA
099810	Silo 2 NE Zone A	Boron	1.5		mg/L	-	NA
099810	Silo 2 NE Zone A	Cadmium	0.0104	N	mg/L	J	1.0
099810	Silo 2 NE Zone A	Calcium	975		mg/L	-	NA
099810	Silo 2 NE Zone A	Chromium	0.132		mg/L	-	2.6
099810	Silo 2 NE Zone A	Cobalt	6.16		mg/L	-	NA
099810	Silo 2 NE Zone A	Copper	3.86		mg/L	-	NA
099810	Silo 2 NE Zone A	Iron	0.0837	B	mg/L	J	NA
099810	Silo 2 NE Zone A	Lead	117		mg/L	-	2340.0
099810	Silo 2 NE Zone A	Magnesium	29.6		mg/L	-	NA
099810	Silo 2 NE Zone A	Manganese	1.62	N	mg/L	J	NA
099810	Silo 2 NE Zone A	Mercury	0.0002	U	mg/L	-	NA
099810	Silo 2 NE Zone A	Molybdenum	0.0338		mg/L	-	NA
099810	Silo 2 NE Zone A	Nickel	5.77	E	mg/L	J	NA
099810	Silo 2 NE Zone A	Potassium	3.73		mg/L	-	NA
099810	Silo 2 NE Zone A	Selenium	0.0605	S	mg/L	J	6.1
099810	Silo 2 NE Zone A	Silicon	13.8		mg/L	-	NA
099810	Silo 2 NE Zone A	Silver	0.0992	N	mg/L	J	2.0
099810	Silo 2 NE Zone A	Thallium	0.002	U	mg/L	J	NA
099810	Silo 2 NE Zone A	Vanadium	0.0601		mg/L	-	NA
099810	Silo 2 NE Zone A	Zinc	0.563	EN	mg/L	J	NA
099817	Silo 2 NE Zone A	1,2-Dichlorobenzene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	1,2,4-Trichlorobenzene	0.02	U	mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099817	Silo 2 NE Zone A	1,3-Dichlorobenzene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	1,4-Dichlorobenzene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	2-Chloronaphthalene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	2-Chlorophenol	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	2-Methylnaphthalene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	2-Methylphenol	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	2-Nitroaniline	0.1	U	mg/L	-	NA
099817	Silo 2 NE Zone A	2-Nitrophenol	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	2,4-Dichlorophenol	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	2,4-Dimethylphenol	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	2,4-Dinitrophenol	0.1	U	mg/L	-	NA
099817	Silo 2 NE Zone A	2,4-Dinitrotoluene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	2,4,5-Trichlorophenol	0.1	U	mg/L	-	NA
099817	Silo 2 NE Zone A	2,4,6-Trichlorophenol	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	2,6-Dinitrotoluene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	3-Nitroaniline	0.1	U	mg/L	-	NA
099817	Silo 2 NE Zone A	3,3'-Dichlorobenzidine	0.04	U	mg/L	-	NA
099817	Silo 2 NE Zone A	4-Bromophenyl phenyl ether	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	4-Chloro-3-methylphenol	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	4-Chloroaniline	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	4-Chlorophenylphenyl ether	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	4-Methylphenol	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	4-Nitroaniline	0.1	U	mg/L	-	NA
099817	Silo 2 NE Zone A	4-Nitrophenol	0.1	U	mg/L	-	NA
099817	Silo 2 NE Zone A	4,4'-DDE	0.0001	U	mg/L	-	NA
099817	Silo 2 NE Zone A	4,4'-DDT	0.0001	U	mg/L	-	NA
099817	Silo 2 NE Zone A	4,6-Dinitro-2-methylphenol	0.1	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Acenaphthene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Acenaphthylene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Aldrin	0.00005	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Anthracene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Benzoic acid	0.1	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Benzo(a)anthracene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Benzo(a)pyrene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Benzo(b)fluoranthene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Benzo(g,h,i)perylene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Benzo(k)fluoranthene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Benzyl alcohol	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	bis(2-Chloroethoxy)methane	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	bis(2-Chloroethyl)ether	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	bis(2-Ethylhexyl) phthalate	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Butyl benzyl phthalate	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Chrysene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Dibenzofuran	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Dibenzo(a,h)anthracene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Dieldrin	0.0001	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Diethyl phthalate	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Dimethyl phthalate	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Di-n-butyl phthalate	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Di-n-octyl phthalate	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Endrin	0.0001	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Fluoranthene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Fluorene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	gamma-BHC (Lindane)	0.00005	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Heptachlor	0.00005	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Hexachlorobenzene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Hexachlorobutadiene	0.02	U	mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099817	Silo 2 NE Zone A	Hexachlorocyclopentadiene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Hexachloroethane	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Isophorone	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Naphthalene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Nitrobenzene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	N-Nitroso-di-n-propylamine	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	N-Nitrosodiphenylamine	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Pentachlorophenol	0.1	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Phenanthrene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Phenol	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A	Pyrene	0.02	U	mg/L	-	NA
099817	Silo 2 NE Zone A DL	alpha-BHC	0.0001	U	mg/L	-	NA
099817	Silo 2 NE Zone A DL	beta-BHC	0.00059	DX	mg/L	-	NA
099829	Silo 2 NE Zone B	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	2-Butanone	0.005	J	mg/L	U	NA
099829	Silo 2 NE Zone B	2-Hexanone	0.01	U	mg/L	-	NA
099829	Silo 2 NE Zone B	4-Methyl-2-pentanone	0.01	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Acetone	0.01	B	mg/L	U	NA
099829	Silo 2 NE Zone B	Benzene	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Bromodichloromethane	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Bromoform	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Bromomethane	0.01	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Carbon disulfide	0.004	J	mg/L	-	NA
099829	Silo 2 NE Zone B	Chlorobenzene	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Chloroethane	0.01	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Chloromethane	0.01	U	mg/L	-	NA
099829	Silo 2 NE Zone B	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Dibromochloromethane	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Ethylbenzene	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Methylene chloride	0.005	B	mg/L	U	NA
099829	Silo 2 NE Zone B	Styrene	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Tetrachlorethene	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Toluene	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Total xylenes	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Trichloroethene	0.005	U	mg/L	-	NA
099829	Silo 2 NE Zone B	Vinyl Acetate	0.01	U	mg/L	-	NA
099830	Silo 2 NE Zone B	Aluminum	1.62		mg/L	J	NA
099830	Silo 2 NE Zone B	Antimony	0.0897		mg/L	J	NA
099830	Silo 2 NE Zone B	Arsenic	0.0953	S	mg/L	J	1.9
099830	Silo 2 NE Zone B	Barium	1.47		mg/L	J	1.5
099830	Silo 2 NE Zone B	Beryllium	0.0047	B	mg/L	J	NA
099830	Silo 2 NE Zone B	Boron	0.714		mg/L	J	NA
099830	Silo 2 NE Zone B	Cadmium	0.0549	N	mg/L	J	5.5
099830	Silo 2 NE Zone B	Calcium	666		mg/L	J	NA
099830	Silo 2 NE Zone B	Chromium	0.0992		mg/L	J	2.0
099830	Silo 2 NE Zone B	Cobalt	5.85		mg/L	J	NA
099830	Silo 2 NE Zone B	Copper	2.96		mg/L	J	NA
099830	Silo 2 NE Zone B	Iron	0.0732	B	mg/L	J	NA
099830	Silo 2 NE Zone B	Lead	260		mg/L	J	5200.0
099830	Silo 2 NE Zone B	Magnesium	25.5		mg/L	J	NA

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099830	Silo 2 NE Zone B	Manganese	1.24	N	mg/L	J	NA
099830	Silo 2 NE Zone B	Mercury	0.0002	U	mg/L	J	NA
099830	Silo 2 NE Zone B	Molybdenum	0.0448		mg/L	J	NA
099830	Silo 2 NE Zone B	Nickel	4.96		mg/L	J	NA
099830	Silo 2 NE Zone B	Potassium	5.2		mg/L	J	NA
099830	Silo 2 NE Zone B	Selenium	0.0664	S	mg/L	J	6.6
099830	Silo 2 NE Zone B	Silicon	18.6		mg/L	J	NA
099830	Silo 2 NE Zone B	Silver	0.0824		mg/L	J	1.6
099830	Silo 2 NE Zone B	Thallium	0.003	B	mg/L	J	NA
099830	Silo 2 NE Zone B	Vanadium	0.0457	B	mg/L	J	NA
099830	Silo 2 NE Zone B	Zinc	0.555	E	mg/L	J	NA
099836	Silo 2 NE Zone B	1,2-Dichlorobenzene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	1,2,4-Trichlorobenzene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	1,3-Dichlorobenzene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	1,4-Dichlorobenzene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	2-Chloronaphthalene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	2-Chlorophenol	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	2-Methylnaphthalene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	2-Methylphenol	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	2-Nitroaniline	0.1	U	mg/L	-	NA
099836	Silo 2 NE Zone B	2-Nitrophenol	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	2,4-Dichlorophenol	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	2,4-Dimethylphenol	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	2,4-Dinitrophenol	0.1	U	mg/L	-	NA
099836	Silo 2 NE Zone B	2,4-Dinitrotoluene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	2,4,5-Trichlorophenol	0.1	U	mg/L	-	NA
099836	Silo 2 NE Zone B	2,4,6-Trichlorophenol	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	2,6-Dinitrotoluene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	3-Nitroaniline	0.1	U	mg/L	-	NA
099836	Silo 2 NE Zone B	3,3'-Dichlorobenzidine	0.04	U	mg/L	-	NA
099836	Silo 2 NE Zone B	4-Bromophenyl phenyl ether	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	4-Chloro-3-methylphenol	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	4-Chloroaniline	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	4-Chlorophenylphenyl ether	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	4-Methylphenol	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	4-Nitroaniline	0.1	U	mg/L	-	NA
099836	Silo 2 NE Zone B	4-Nitrophenol	0.1	U	mg/L	-	NA
099836	Silo 2 NE Zone B	4,4'-DDD	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B	4,4'-DDE	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B	4,4'-DDT	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B	4,6-Dinitro-2-methylphenol	0.1	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Acenaphthene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Acenaphthylene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Aldrin	0.00005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	alpha-BHC	0.00025	XF	mg/L	-	NA
099836	Silo 2 NE Zone B	alpha-Chlordane	0.0005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Anthracene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Aroclor-1016	0.0005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Aroclor-1221	0.0005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Aroclor-1232	0.0005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Aroclor-1242	0.0005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Aroclor-1248	0.0005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Aroclor-1254	0.001	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Aroclor-1260	0.001	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Benzoic acid	0.1	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Benzo(a)anthracene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Benzo(a)pyrene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Benzo(b)fluoranthene	0.02	U	mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099836	Silo 2 NE Zone B	Benzo(g,h,i)perylene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Benzo(k)fluoranthene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Benzyl alcohol	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	beta-BHC	0.0005	XF	mg/L	-	NA
099836	Silo 2 NE Zone B	bis(2-Chloroethoxy)methane	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	bis(2-Chloroethyl)ether	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	bis(2-Ethylhexyl) phthalate	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Butyl benzyl phthalate	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Chrysene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	delta-BHC	0.00005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Dibenzofuran	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Dibenzo(a,h)anthracene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Dieldrin	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Diethyl phthalate	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Dimethyl phthalate	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Di-n-butyl phthalate	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Di-n-octyl phthalate	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Endosulfan II	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Endosulfan sulfate	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Endosulfan-I	0.00005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Endrin	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Endrin ketone	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Fluoranthene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Fluorene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	gamma-BHC (Lindane)	0.00005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	gamma-Chlordane	0.0005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Heptachlor	0.00005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Heptachlor epoxide	0.00005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Hexachlorobenzene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Hexachlorobutadiene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Hexachlorocyclopentadiene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Hexachloroethane	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Isophorone	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Methoxychlor	0.0005	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Naphthalene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Nitrobenzene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	N-Nitroso-di-n-propylamine	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	N-Nitrosodiphenylamine	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Pentachlorophenol	0.1	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Phenanthrene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Phenol	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Pyrene	0.02	U	mg/L	-	NA
099836	Silo 2 NE Zone B	Toxaphene	0.001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	4,4'-DDD	0.0002	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	4,4'-DDE	0.0002	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	4,4'-DDT	0.0002	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Aldrin	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	alpha-BHC	0.0003	DX	mg/L	-	NA
099836	Silo 2 NE Zone B DL	alpha-Chlordane	0.001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Aroclor-1016	0.001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Aroclor-1221	0.001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Aroclor-1232	0.001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Aroclor-1242	0.001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Aroclor-1248	0.001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Aroclor-1254	0.002	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Aroclor-1260	0.002	U	mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099836	Silo 2 NE Zone B DL	beta-BHC	0.00046	DX	mg/L	-	NA
099836	Silo 2 NE Zone B DL	delta-BHC	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Dieldrin	0.0002	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Endosulfan II	0.0002	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Endosulfan sulfate	0.0002	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Endosulfan-I	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Endrin	0.0002	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Endrin ketone	0.0002	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	gamma-BHC (Lindane)	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	gamma-Chlordane	0.001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Heptachlor	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Heptachlor epoxide	0.0001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Methoxychlor	0.001	U	mg/L	-	NA
099836	Silo 2 NE Zone B DL	Toxaphene	0.002	U	mg/L	-	NA
099355	Silo 2 SE Zone B	Arsenic	0.322		mg/L	J	6.4
099355	Silo 2 SE Zone B	Barium	4.975		mg/L	J	5.0
099355	Silo 2 SE Zone B	Cadmium	0.0757		mg/L	J	7.6
099355	Silo 2 SE Zone B	Chromium	0.207		mg/L	-	4.1
099355	Silo 2 SE Zone B	Mercury	0.0002	U	mg/L	-	NA
099355	Silo 2 SE Zone B	Selenium	0.568		mg/L	J	56.8
099355	Silo 2 SE Zone B	Silver	0.164		mg/L	-	3.3
099844	Silo 2 NE Zone C	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	1,2-Dichloroethane	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	2-Butanone	0.01	BJ	mg/L	U	NA
099844	Silo 2 NE Zone C	2-Hexanone	0.01	U	mg/L	-	NA
099844	Silo 2 NE Zone C	4-Methyl-2-pentanone	0.01	U	mg/L	-	NA
099844	Silo 2 NE Zone C	Acetone	0.21	BE	mg/L	UJ	NA
099844	Silo 2 NE Zone C	Benzene	0.005	U	mg/L	UJ	NA
099844	Silo 2 NE Zone C	Bromodichloromethane	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	Bromoform	0.005	U	mg/L	UJ	NA
099844	Silo 2 NE Zone C	Bromomethane	0.01	U	mg/L	UJ	NA
099844	Silo 2 NE Zone C	Carbon disulfide	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	Carbon Tetrachloride	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	Chlorobenzene	0.005	U	mg/L	UJ	NA
099844	Silo 2 NE Zone C	Chloroethane	0.01	U	mg/L	-	NA
099844	Silo 2 NE Zone C	Chloroform	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	Chloromethane	0.01	U	mg/L	-	NA
099844	Silo 2 NE Zone C	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	Dibromochloromethane	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	Ethylbenzene	0.005	U	mg/L	UJ	NA
099844	Silo 2 NE Zone C	Methylene chloride	0.007	B	mg/L	U	NA
099844	Silo 2 NE Zone C	Styrene	0.005	U	mg/L	UJ	NA
099844	Silo 2 NE Zone C	Tetrachlorethene	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	Toluene	0.005	U	mg/L	UJ	NA
099844	Silo 2 NE Zone C	Total xylenes	0.005	U	mg/L	UJ	NA
099844	Silo 2 NE Zone C	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	Trichloroethene	0.005	U	mg/L	-	NA
099844	Silo 2 NE Zone C	Vinyl Acetate	0.01	U	mg/L	-	NA
099844	Silo 2 NE Zone C	Vinyl chloride	0.01	U	mg/L	-	NA
099845	Silo 2 NE Zone C	Aluminum	0.668		mg/L	J	NA
099845	Silo 2 NE Zone C	Antimony	0.123		mg/L	J	NA
099845	Silo 2 NE Zone C	Arsenic	0.0053	BW	mg/L	J	0.1

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099845	Silo 2 NE Zone C	Barium	6.74		mg/L	J	6.7
099845	Silo 2 NE Zone C	Beryllium	0.0049	B	mg/L	J	NA
099845	Silo 2 NE Zone C	Boron	0.3		mg/L		NA
099845	Silo 2 NE Zone C	Cadmium	0.0657		mg/L	J	6.6
099845	Silo 2 NE Zone C	Calcium	305		mg/L	J	NA
099845	Silo 2 NE Zone C	Chromium	0.123		mg/L	J	2.5
099845	Silo 2 NE Zone C	Cobalt	2.36		mg/L	J	NA
099845	Silo 2 NE Zone C	Copper	0.854		mg/L	J	NA
099845	Silo 2 NE Zone C	Iron	0.0744	B	mg/L	J	NA
099845	Silo 2 NE Zone C	Lead	772		mg/L	J	15440.0
099845	Silo 2 NE Zone C	Magnesium	11.1		mg/L	J	NA
099845	Silo 2 NE Zone C	Manganese	0.594		mg/L	J	NA
099845	Silo 2 NE Zone C	Mercury	0.0002	U	mg/L	J	NA
099845	Silo 2 NE Zone C	Molybdenum	0.0993		mg/L	J	NA
099845	Silo 2 NE Zone C	Nickel	3.34		mg/L	J	NA
099845	Silo 2 NE Zone C	Potassium	3.28	B	mg/L	J	NA
099845	Silo 2 NE Zone C	Selenium	0.0331	S	mg/L	J	3.3
099845	Silo 2 NE Zone C	Silicon	24.3		mg/L	J	NA
099845	Silo 2 NE Zone C	Silver	0.0779		mg/L	J	1.6
099845	Silo 2 NE Zone C	Thallium	0.0148		mg/L	J	NA
099845	Silo 2 NE Zone C	Vanadium	0.0485	B	mg/L	J	NA
099845	Silo 2 NE Zone C	Zinc	0.273	E	mg/L	J	NA
099852	Silo 2 NE Zone C	1,2-Dichlorobenzene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	1,2,4-Trichlorobenzene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	1,3-Dichlorobenzene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	1,4-Dichlorobenzene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	2-Chloronaphthalene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	2-Methylnaphthalene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	2-Nitroaniline	0.1	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	2,4-Dinitrotoluene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	2,6-Dinitrotoluene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	3-Nitroaniline	0.1	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	3,3'-Dichlorobenzidine	0.04	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	4-Bromophenyl phenyl ether	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	4-Chloroaniline	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	4-Chlorophenylphenyl ether	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	4-Nitroaniline	0.1	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	4-Nitrophenol	0.1	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	4,4'-DDD	0.0001	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	4,4'-DDE	0.0001	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	4,4'-DDT	0.0001	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Acenaphthene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Acenaphthylene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Aldrin	0.00005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	alpha-BHC	0.00005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	alpha-Chlordane	0.0005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Anthracene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Aroclor-1016	0.0005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Aroclor-1221	0.0005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Aroclor-1232	0.0005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Aroclor-1242	0.0005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Aroclor-1248	0.0005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Aroclor-1254	0.001	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Aroclor-1260	0.001	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Benzoic acid	0.1	BJ	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Benzo(a)anthracene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Benzo(a)pyrene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Benzo(b)fluoranthene	0.02	U	mg/L	UJ	NA

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099852	Silo 2 NE Zone C	Benzo(g,h,i)perylene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Benzo(k)fluoranthene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Benzyl alcohol	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	beta-BHC	0.00005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	bis(2-Chloroethoxy)methane	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	bis(2-Chloroethyl)ether	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	bis(2-Ethylhexyl) phthalate	0.055		mg/L	J	NA
099852	Silo 2 NE Zone C	Butyl benzyl phthalate	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Chrysene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	delta-BHC	0.00005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Dibenzofuran	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Dibenzo(a,h)anthracene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Dieldrin	0.0001	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Diethyl phthalate	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Dimethyl phthalate	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Di-n-butyl phthalate	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Di-n-octyl phthalate	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Endosulfan II	0.0001	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Endosulfan sulfate	0.0001	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Endosulfan-I	0.00005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Endrin	0.0001	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Endrin ketone	0.0001	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Fluoranthene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Fluorene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	gamma-BHC (Lindane)	0.00005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	gamma-Chlordane	0.0005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Heptachlor	0.00005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Heptachlor epoxide	0.00005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Hexachlorobenzene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Hexachlorobutadiene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Hexachlorocyclopentadiene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Hexachloroethane	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Isophorone	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Methoxychlor	0.0005	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Naphthalene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Nitrobenzene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	N-Nitroso-di-n-propylamine	0.005	J	mg/L	-	NA
099852	Silo 2 NE Zone C	N-Nitrosodiphenylamine	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Pentachlorophenol	0.018	J	mg/L	J	NA
099852	Silo 2 NE Zone C	Phenanthrene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Pyrene	0.02	U	mg/L	UJ	NA
099852	Silo 2 NE Zone C	Toxaphene	0.001	U	mg/L	UJ	NA
099859	Silo 2 NE Zone C	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	1,2-Dichloroethane	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	2-Butanone	0.005	BJ	mg/L	U	NA
099859	Silo 2 NE Zone C	2-Hexanone	0.01	U	mg/L	-	NA
099859	Silo 2 NE Zone C	4-Methyl-2-pentanone	0.01	U	mg/L	-	NA
099859	Silo 2 NE Zone C	Acetone	0.2	B	mg/L	UJ	NA
099859	Silo 2 NE Zone C	Benzene	0.005	U	mg/L	UJ	NA
099859	Silo 2 NE Zone C	Bromodichloromethane	0.005	U	mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099859	Silo 2 NE Zone C	Bromoform	0.005	U	mg/L	UJ	NA
099859	Silo 2 NE Zone C	Bromomethane	0.01	U	mg/L	UJ	NA
099859	Silo 2 NE Zone C	Carbon disulfide	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	Carbon Tetrachloride	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	Chlorobenzene	0.005	U	mg/L	UJ	NA
099859	Silo 2 NE Zone C	Chloroethane	0.01	U	mg/L	-	NA
099859	Silo 2 NE Zone C	Chloroform	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	Chloromethane	0.01	U	mg/L	-	NA
099859	Silo 2 NE Zone C	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	Dibromochloromethane	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	Ethylbenzene	0.005	U	mg/L	UJ	NA
099859	Silo 2 NE Zone C	Methylene chloride	0.009	B	mg/L	U	NA
099859	Silo 2 NE Zone C	Styrene	0.005	U	mg/L	UJ	NA
099859	Silo 2 NE Zone C	Tetrachlorethene	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	Toluene	0.005	U	mg/L	UJ	NA
099859	Silo 2 NE Zone C	Total xylenes	0.005	U	mg/L	UJ	NA
099859	Silo 2 NE Zone C	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	Trichloroethene	0.005	U	mg/L	-	NA
099859	Silo 2 NE Zone C	Vinyl Acetate	0.01	U	mg/L	-	NA
099859	Silo 2 NE Zone C	Vinyl chloride	0.01	U	mg/L	-	NA
099860	Silo 2 NE Zone C	Aluminum	0.462		mg/L	-	NA
099860	Silo 2 NE Zone C	Arsenic	0.0029	B	mg/L	-	0.1
099860	Silo 2 NE Zone C	Barium	8.47		mg/L	J	8.5
099860	Silo 2 NE Zone C	Beryllium	0.0032	B	mg/L	-	NA
099860	Silo 2 NE Zone C	Boron	0.24		mg/L	-	NA
099860	Silo 2 NE Zone C	Calcium	163		mg/L	-	NA
099860	Silo 2 NE Zone C	Chromium	0.0861		mg/L	J	1.7
099860	Silo 2 NE Zone C	Cobalt	2.64		mg/L	-	NA
099860	Silo 2 NE Zone C	Copper	0.964		mg/L	-	NA
099860	Silo 2 NE Zone C	Iron	0.0527	B	mg/L	J	NA
099860	Silo 2 NE Zone C	Lead	744		mg/L	J	14880.0
099860	Silo 2 NE Zone C	Magnesium	8.84		mg/L	-	NA
099860	Silo 2 NE Zone C	Manganese	0.628		mg/L	-	NA
099860	Silo 2 NE Zone C	Mercury	0.0002	U	mg/L	-	NA
099860	Silo 2 NE Zone C	Molybdenum	0.0947		mg/L	-	NA
099860	Silo 2 NE Zone C	Nickel	3.72		mg/L	-	NA
099860	Silo 2 NE Zone C	Potassium	2.64	B	mg/L	-	NA
099860	Silo 2 NE Zone C	Selenium	0.0722		mg/L	-	7.2
099860	Silo 2 NE Zone C	Silver	0.053		mg/L	-	1.1
099860	Silo 2 NE Zone C	Thallium	0.0288		mg/L	-	NA
099860	Silo 2 NE Zone C	Zinc	0.33	E	mg/L	-	NA
099863	Silo 2 NE Zone C	1,2-Dichlorobenzene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	1,2,4-Trichlorobenzene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	1,3-Dichlorobenzene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	1,4-Dichlorobenzene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	2-Chloronaphthalene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	2-Chlorophenol	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	2-Methylnaphthalene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	2-Methylphenol	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	2-Nitroaniline	0.1	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	2-Nitrophenol	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	2,4-Dichlorophenol	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	2,4-Dimethylphenol	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	2,4-Dinitrophenol	0.1	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	2,4-Dinitrotoluene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	2,4,5-Trichlorophenol	0.1	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	2,4,6-Trichlorophenol	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	2,6-Dinitrotoluene	0.02	U	mg/L	UJ	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099863	Silo 2 NE Zone C	3-Nitroaniline	0.1	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	3,3'-Dichlorobenzidine	0.04	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	4-Bromophenyl phenyl ether	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	4-Chloro-3-methylphenol	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	4-Chloroaniline	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	4-Chlorophenylphenyl ether	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	4-Methylphenol	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	4-Nitroaniline	0.1	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	4-Nitrophenol	0.1	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	4,4'-DDD	0.0001	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	4,4'-DDE	0.0001	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	4,4'-DDT	0.0001	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	4,6-Dinitro-2-methylphenol	0.1	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Acenaphthene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Acenaphthylene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Aldrin	0.00005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	alpha-BHC	0.00005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	alpha-Chlordane	0.0005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Anthracene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Aroclor-1016	0.0005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Aroclor-1221	0.0005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Aroclor-1232	0.0005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Aroclor-1242	0.0005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Aroclor-1248	0.0005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Aroclor-1254	0.001	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Aroclor-1260	0.001	U	mg/L	-	NA
099863	Silo 2 NE Zone C	Benzoic acid	0.1	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Benzo(a)anthracene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Benzo(a)pyrene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Benzo(b)fluoranthene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Benzo(g,h,i)perylene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Benzo(k)fluoranthene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Benzyl alcohol	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	beta-BHC	0.00005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	bis(2-Chloroethoxy)methane	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	bis(2-Chloroethyl)ether	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	bis(2-Ethylhexyl) phthalate	0.01	J	mg/L	-	NA
099863	Silo 2 NE Zone C	Butyl benzyl phthalate	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Chrysene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	delta-BHC	0.00005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Dibenzofuran	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Dibenzo(a,h)anthracene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Dieldrin	0.0001	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Diethyl phthalate	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Dimethyl phthalate	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Di-n-butyl phthalate	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Di-n-octyl phthalate	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Endosulfan II	0.0001	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Endosulfan sulfate	0.0001	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Endosulfan-I	0.00005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Endrin	0.0001	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Endrin ketone	0.0001	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Fluoranthene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Fluorene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	gamma-BHC (Lindane)	0.00005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	gamma-Chlordane	0.0005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Heptachlor	0.00005	U	mg/L	UJ	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099863	Silo 2 NE Zone C	Heptachlor epoxide	0.00005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Hexachlorobenzene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Hexachlorobutadiene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Hexachlorocyclopentadiene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Hexachloroethane	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Isophorone	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Methoxychlor	0.0005	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Naphthalene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Nitrobenzene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	N-Nitroso-di-n-propylamine	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	N-Nitrosodiphenylamine	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Pentachlorophenol	0.1	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Phenanthrene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Phenol	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Pyrene	0.02	U	mg/L	UJ	NA
099863	Silo 2 NE Zone C	Toxaphene	0.001	U	mg/L	UJ	NA
099772	Silo 2 NW Zone C	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	1,2-Dichloroethane	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	2-Butanone	0.002	J	mg/L	-	NA
099772	Silo 2 NW Zone C	2-Hexanone	0.01	U	mg/L	-	NA
099772	Silo 2 NW Zone C	4-Methyl-2-pentanone	0.01	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Acetone	0.074	B	mg/L	U	NA
099772	Silo 2 NW Zone C	Benzene	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Bromodichloromethane	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Bromoform	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Bromomethane	0.01	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Carbon disulfide	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Carbon Tetrachloride	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Chlorobenzene	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Chloroethane	0.01	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Chloroform	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Chloromethane	0.01	U	mg/L	-	NA
099772	Silo 2 NW Zone C	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Dibromochloromethane	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Ethylbenzene	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Methylene chloride	0.014	B	mg/L	U	NA
099772	Silo 2 NW Zone C	Styrene	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Tetrachlorethene	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Toluene	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Total xylenes	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Trichloroethene	0.005	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Vinyl Acetate	0.01	U	mg/L	-	NA
099772	Silo 2 NW Zone C	Vinyl chloride	0.01	U	mg/L	-	NA
099773	Silo 2 NW Zone C	Aluminum	1.16		mg/L	-	NA
099773	Silo 2 NW Zone C	Antimony	0.0865		mg/L	J	NA
099773	Silo 2 NW Zone C	Arsenic	0.0031	BWN	mg/L	J	0.1
099773	Silo 2 NW Zone C	Barium	0.247		mg/L	-	0.2
099773	Silo 2 NW Zone C	Beryllium	0.0047	B	mg/L	-	NA
099773	Silo 2 NW Zone C	Cadmium	0.0228		mg/L	-	2.3
099773	Silo 2 NW Zone C	Calcium	332		mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099773	Silo 2 NW Zone C	Chromium	0.129		mg/L	-	2.6
099773	Silo 2 NW Zone C	Cobalt	1.37		mg/L	-	NA
099773	Silo 2 NW Zone C	Copper	0.43		mg/L	-	NA
099773	Silo 2 NW Zone C	Iron	0.0827	B	mg/L	-	NA
099773	Silo 2 NW Zone C	Lead	334		mg/L	-	6680.0
099773	Silo 2 NW Zone C	Magnesium	7.39		mg/L	-	NA
099773	Silo 2 NW Zone C	Manganese	0.469		mg/L	-	NA
099773	Silo 2 NW Zone C	Mercury	0.0002	U	mg/L	J	NA
099773	Silo 2 NW Zone C	Molybdenum	0.0485		mg/L	-	NA
099773	Silo 2 NW Zone C	Nickel	2.04		mg/L	-	NA
099773	Silo 2 NW Zone C	Potassium	2.86	B	mg/L	U	NA
099773	Silo 2 NW Zone C	Selenium	0.0453	S	mg/L	-	4.5
099773	Silo 2 NW Zone C	Silicon	12.1		mg/L	-	NA
099773	Silo 2 NW Zone C	Silver	0.0833		mg/L	-	1.7
099773	Silo 2 NW Zone C	Thallium	0.0027	B	mg/L	-	NA
099773	Silo 2 NW Zone C	Vanadium	0.0527		mg/L	-	NA
099773	Silo 2 NW Zone C	Zinc	0.141		mg/L	-	NA
099780	Silo 2 NW Zone C	1,2-Dichlorobenzene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	1,2,4-Trichlorobenzene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	1,3-Dichlorobenzene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	1,4-Dichlorobenzene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	2-Chloronaphthalene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	2-Chlorophenol	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	2-Methylnaphthalene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	2-Methylphenol	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	2-Nitroaniline	0.1	U	mg/L	-	NA
099780	Silo 2 NW Zone C	2-Nitrophenol	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	2,4-Dichlorophenol	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	2,4-Dimethylphenol	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	2,4-Dinitrophenol	0.1	U	mg/L	-	NA
099780	Silo 2 NW Zone C	2,4-Dinitrotoluene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	2,4,5-Trichlorophenol	0.1	U	mg/L	-	NA
099780	Silo 2 NW Zone C	2,4,6-Trichlorophenol	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	2,6-Dinitrotoluene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	3-Nitroaniline	0.1	U	mg/L	-	NA
099780	Silo 2 NW Zone C	3,3'-Dichlorobenzidine	0.04	U	mg/L	-	NA
099780	Silo 2 NW Zone C	4-Bromophenyl phenyl ether	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	4-Chloro-3-methylphenol	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	4-Chloroaniline	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	4-Chlorophenylphenyl ether	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	4-Methylphenol	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	4-Nitroaniline	0.1	U	mg/L	-	NA
099780	Silo 2 NW Zone C	4-Nitrophenol	0.1	U	mg/L	-	NA
099780	Silo 2 NW Zone C	4,4'-DDD	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C	4,4'-DDE	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C	4,4'-DDT	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C	4,6-Dinitro-2-methylphenol	0.1	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Acenaphthene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Acenaphthylene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Aldrin	0.00005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	alpha-BHC	0.00005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	alpha-Chlordane	0.0005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Anthracene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Aroclor-1016	0.0005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Aroclor-1221	0.0005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Aroclor-1232	0.0005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Aroclor-1242	0.0005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Aroclor-1248	0.0005	U	mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099780	Silo 2 NW Zone C	Aroclor-1254	0.001	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Aroclor-1260	0.001	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Benzoic acid	0.1	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Benzo(a)anthracene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Benzo(a)pyrene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Benzo(b)fluoranthene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Benzo(g,h,i)perylene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Benzo(k)fluoranthene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Benzyl alcohol	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	beta-BHC	0.00018	X	mg/L	-	NA
099780	Silo 2 NW Zone C	bis(2-Chloroethoxy)methane	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	bis(2-Chloroethyl)ether	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	bis(2-Ethylhexyl) phthalate	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Butyl benzyl phthalate	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Chrysene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	delta-BHC	0.00005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Dibenzofuran	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Dibenzo(a,h)anthracene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Dieldrin	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Diethyl phthalate	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Dimethyl phthalate	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Di-n-butyl phthalate	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Di-n-octyl phthalate	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Endosulfan II	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Endosulfan sulfate	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Endosulfan-I	0.00005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Endrin	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Endrin ketone	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Fluoranthene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Fluorene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	gamma-BHC (Lindane)	0.00005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	gamma-Chlordane	0.0005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Heptachlor	0.00005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Heptachlor epoxide	0.00005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Hexachlorobenzene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Hexachlorobutadiene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Hexachlorocyclopentadiene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Hexachloroethane	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Isophorone	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Methoxychlor	0.0005	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Naphthalene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Nitrobenzene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	N-Nitroso-di-n-propylamine	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	N-Nitrosodiphenylamine	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Pentachlorophenol	0.1	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Phenanthrene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Phenol	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Pyrene	0.02	U	mg/L	-	NA
099780	Silo 2 NW Zone C	Toxaphene	0.001	U	mg/L	-	NA
099786	Silo 2 NW Zone C	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	1,2-Dichloropropane	0.005	U	mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099786	Silo 2 NW Zone C	2-Hexanone	0.01	U	mg/L	-	NA
099786	Silo 2 NW Zone C	4-Methyl-2-pentanone	0.01	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Acetone	0.039	B	mg/L	-	NA
099786	Silo 2 NW Zone C	Benzene	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Bromodichloromethane	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Bromoform	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Bromomethane	0.01	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Carbon disulfide	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Chlorobenzene	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Chloroethane	0.01	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Chloromethane	0.01	U	mg/L	-	NA
099786	Silo 2 NW Zone C	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Dibromochloromethane	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Ethylbenzene	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Methylene chloride	0.02	B	mg/L	-	NA
099786	Silo 2 NW Zone C	Styrene	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Toluene	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Total xylenes	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Trichloroethene	0.005	U	mg/L	-	NA
099786	Silo 2 NW Zone C	Vinyl Acetate	0.01	U	mg/L	-	NA
099787	Silo 2 NW Zone C	Aluminum	1.18		mg/L	-	NA
099787	Silo 2 NW Zone C	Antimony	0.0812		mg/L	J	NA
099787	Silo 2 NW Zone C	Arsenic	0.003	BWN	mg/L	J	0.1
099787	Silo 2 NW Zone C	Barium	0.227		mg/L	-	0.2
099787	Silo 2 NW Zone C	Beryllium	0.0046	B	mg/L	-	NA
099787	Silo 2 NW Zone C	Cadmium	0.0254		mg/L	-	2.5
099787	Silo 2 NW Zone C	Calcium	325		mg/L	-	NA
099787	Silo 2 NW Zone C	Chromium	0.126		mg/L	-	2.5
099787	Silo 2 NW Zone C	Cobalt	1.38		mg/L	-	NA
099787	Silo 2 NW Zone C	Copper	0.422		mg/L	-	NA
099787	Silo 2 NW Zone C	Iron	0.0797	B	mg/L	-	NA
099787	Silo 2 NW Zone C	Lead	319		mg/L	-	6380.0
099787	Silo 2 NW Zone C	Magnesium	7.51		mg/L	-	NA
099787	Silo 2 NW Zone C	Manganese	0.456		mg/L	-	NA
099787	Silo 2 NW Zone C	Mercury	0.0002	U	mg/L	J	NA
099787	Silo 2 NW Zone C	Molybdenum	0.0465		mg/L	-	NA
099787	Silo 2 NW Zone C	Nickel	2.03		mg/L	-	NA
099787	Silo 2 NW Zone C	Potassium	2.79	B	mg/L	U	NA
099787	Silo 2 NW Zone C	Selenium	0.0434	+	mg/L	J	4.3
099787	Silo 2 NW Zone C	Silicon	12.2		mg/L	-	NA
099787	Silo 2 NW Zone C	Silver	0.0828		mg/L	-	1.7
099787	Silo 2 NW Zone C	Thallium	0.0035	B	mg/L	-	NA
099787	Silo 2 NW Zone C	Vanadium	0.0516		mg/L	-	NA
099787	Silo 2 NW Zone C	Zinc	0.114		mg/L	-	NA
099794	Silo 2 NW Zone C	1,2-Dichlorobenzene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	1,2,4-Trichlorobenzene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	1,3-Dichlorobenzene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	1,4-Dichlorobenzene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	2-Chloronaphthalene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	2-Chlorophenol	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	2-Methylnaphthalene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	2-Methylphenol	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	2-Nitroaniline	0.1	U	mg/L	-	NA
099794	Silo 2 NW Zone C	2-Nitrophenol	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	2,4-Dichlorophenol	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	2,4-Dimethylphenol	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	2,4-Dinitrophenol	0.1	U	mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099794	Silo 2 NW Zone C	2,4-Dinitrotoluene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	2,4,5-Trichlorophenol	0.1	U	mg/L	-	NA
099794	Silo 2 NW Zone C	2,4,6-Trichlorophenol	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	2,6-Dinitrotoluene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	3-Nitroaniline	0.1	U	mg/L	-	NA
099794	Silo 2 NW Zone C	3,3'-Dichlorobenzidine	0.04	U	mg/L	-	NA
099794	Silo 2 NW Zone C	4-Bromophenyl phenyl ether	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	4-Chloro-3-methylphenol	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	4-Chloroaniline	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	4-Chlorophenylphenyl ether	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	4-Methylphenol	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	4-Nitroaniline	0.1	U	mg/L	-	NA
099794	Silo 2 NW Zone C	4-Nitrophenol	0.1	U	mg/L	-	NA
099794	Silo 2 NW Zone C	4,4'-DDD	0.0001	U	mg/L	-	NA
099794	Silo 2 NW Zone C	4,4'-DDE	0.0001	U	mg/L	-	NA
099794	Silo 2 NW Zone C	4,4'-DDT	0.0001	U	mg/L	-	NA
099794	Silo 2 NW Zone C	4,6-Dinitro-2-methylphenol	0.1	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Acenaphthene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Acenaphthylene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Aldrin	0.00005	U	mg/L	-	NA
099794	Silo 2 NW Zone C	alpha-BHC	0.00005	U	mg/L	-	NA
099794	Silo 2 NW Zone C	alpha-Chlordane	0.0005	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Anthracene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Aroclor-1016	0.0005	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Aroclor-1221	0.0005	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Aroclor-1232	0.0005	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Aroclor-1242	0.0005	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Aroclor-1248	0.0005	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Aroclor-1254	0.001	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Aroclor-1260	0.001	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Benzoic acid	0.1	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Benzo(a)anthracene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Benzo(a)pyrene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Benzo(b)fluoranthene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Benzo(g,h,i)perylene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Benzo(k)fluoranthene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Benzyl alcohol	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	beta-BHC	0.00005	U	mg/L	-	NA
099794	Silo 2 NW Zone C	bis(2-Chloroethoxy)methane	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	bis(2-Chloroethyl)ether	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	bis(2-Ethylhexyl) phthalate	0.006	J	mg/L	J	NA
099794	Silo 2 NW Zone C	Butyl benzyl phthalate	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Chrysene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	delta-BHC	0.00005	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Dibenzofuran	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Dibenzo(a,h)anthracene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Dieldrin	0.0001	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Diethyl phthalate	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Dimethyl phthalate	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Di-n-butyl phthalate	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Di-n-octyl phthalate	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Endosulfan II	0.0001	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Endosulfan sulfate	0.0001	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Endosulfan-I	0.00005	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Endrin	0.0001	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Endrin ketone	0.0001	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Fluoranthene	0.02	U	mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099794	Silo 2 NW Zone C	Fluorene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	gamma-BHC (Lindane)	0.00005	U	mg/L	J	NA
099794	Silo 2 NW Zone C	gamma-Chlordane	0.0005	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Heptachlor	0.00005	U	mg/L	J	NA
099794	Silo 2 NW Zone C	Heptachlor epoxide	0.00005	U	mg/L	J	NA
099794	Silo 2 NW Zone C	Hexachlorobenzene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Hexachlorobutadiene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Hexachlorocyclopentadiene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Hexachloroethane	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Isophorone	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Methoxychlor	0.0005	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Naphthalene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Nitrobenzene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	N-Nitroso-di-n-propylamine	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	N-Nitrosodiphenylamine	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Pentachlorophenol	0.1	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Phenanthrene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Phenol	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Pyrene	0.02	U	mg/L	-	NA
099794	Silo 2 NW Zone C	Toxaphene	0.001	U	mg/L	-	NA
099800	Silo 2 NW Zone C	1,1-Dichloroethane	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	1,1-Dichloroethene	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	1,1,1-Trichloroethane	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	1,1,2-Trichloroethane	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	1,1,2,2-Tetrachloroethane	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	1,2-Dichloroethylene	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	1,2-Dichloropropane	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	2-Hexanone	0.01	U	mg/L	-	NA
099800	Silo 2 NW Zone C	4-Methyl-2-pentanone	0.01	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Acetone	0.015	B	mg/L	-	NA
099800	Silo 2 NW Zone C	Benzene	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Bromodichloromethane	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Bromoform	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Bromomethane	0.01	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Carbon disulfide	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Chlorobenzene	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Chloroethane	0.01	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Chloromethane	0.01	U	mg/L	-	NA
099800	Silo 2 NW Zone C	cis-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Dibromochloromethane	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Ethylbenzene	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Methylene chloride	0.014	B	mg/L	-	NA
099800	Silo 2 NW Zone C	Styrene	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Toluene	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Total xylenes	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	trans-1,3-Dichloropropene	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Trichloroethene	0.005	U	mg/L	-	NA
099800	Silo 2 NW Zone C	Vinyl Acetate	0.01	U	mg/L	-	NA
099801	Silo 2 NW Zone C	Aluminum	1.44		mg/L	-	NA
099801	Silo 2 NW Zone C	Antimony	0.0851		mg/L	J	NA
099801	Silo 2 NW Zone C	Arsenic	0.003	BWN	mg/L	J	0.1
099801	Silo 2 NW Zone C	Barium	0.157	B	mg/L	-	0.2
099801	Silo 2 NW Zone C	Beryllium	0.0049	B	mg/L	-	NA
099801	Silo 2 NW Zone C	Cadmium	0.0237		mg/L	-	2.4
099801	Silo 2 NW Zone C	Calcium	361		mg/L	-	NA
099801	Silo 2 NW Zone C	Chromium	0.138		mg/L	-	2.8
099801	Silo 2 NW Zone C	Cobalt	1.58		mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099801	Silo 2 NW Zone C	Copper	0.525		mg/L	-	NA
099801	Silo 2 NW Zone C	Iron	0.0901	B	mg/L	-	NA
099801	Silo 2 NW Zone C	Magnesium	9.24		mg/L	-	NA
099801	Silo 2 NW Zone C	Manganese	0.469		mg/L	-	NA
099801	Silo 2 NW Zone C	Mercury	0.0002	U	mg/L	J	NA
099801	Silo 2 NW Zone C	Molybdenum	0.0428		mg/L	-	NA
099801	Silo 2 NW Zone C	Nickel	2.4		mg/L	-	NA
099801	Silo 2 NW Zone C	Potassium	3.19	B	mg/L	U	NA
099801	Silo 2 NW Zone C	Selenium	0.0448	S	mg/L	-	4.5
099801	Silo 2 NW Zone C	Silicon	12.7		mg/L	-	NA
099801	Silo 2 NW Zone C	Silver	0.089		mg/L	-	1.8
099801	Silo 2 NW Zone C	Thallium	0.0022	B	mg/L	-	NA
099801	Silo 2 NW Zone C	Vanadium	0.0565		mg/L	-	NA
099801	Silo 2 NW Zone C	Zinc	0.17		mg/L	-	NA
099804	Silo 2 NW Zone C	1,2-Dichlorobenzene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	1,2,4-Trichlorobenzene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	1,3-Dichlorobenzene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	1,4-Dichlorobenzene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	2-Chloronaphthalene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	2-Chlorophenol	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	2-Methylnaphthalene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	2-Methylphenol	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	2-Nitroaniline	0.1	U	mg/L	-	NA
099804	Silo 2 NW Zone C	2-Nitrophenol	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	2,4-Dichlorophenol	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	2,4-Dimethylphenol	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	2,4-Dinitrophenol	0.1	U	mg/L	-	NA
099804	Silo 2 NW Zone C	2,4-Dinitrotoluene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	2,4,5-Trichlorophenol	0.1	U	mg/L	-	NA
099804	Silo 2 NW Zone C	2,4,6-Trichlorophenol	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	2,6-Dinitrotoluene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	3-Nitroaniline	0.1	U	mg/L	-	NA
099804	Silo 2 NW Zone C	3,3'-Dichlorobenzidine	0.04	U	mg/L	-	NA
099804	Silo 2 NW Zone C	4-Bromophenyl phenyl ether	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	4-Chloro-3-methylphenol	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	4-Chloroaniline	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	4-Chlorophenylphenyl ether	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	4-Methylphenol	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	4-Nitroaniline	0.1	U	mg/L	-	NA
099804	Silo 2 NW Zone C	4-Nitrophenol	0.1	U	mg/L	-	NA
099804	Silo 2 NW Zone C	4,4'-DDD	0.0001	U	mg/L	-	NA
099804	Silo 2 NW Zone C	4,4'-DDE	0.0001	U	mg/L	-	NA
099804	Silo 2 NW Zone C	4,4'-DDT	0.0001	U	mg/L	-	NA
099804	Silo 2 NW Zone C	4,6-Dinitro-2-methylphenol	0.1	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Acenaphthene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Acenaphthylene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Aldrin	0.00005	U	mg/L	-	NA
099804	Silo 2 NW Zone C	alpha-BHC	0.00005	U	mg/L	-	NA
099804	Silo 2 NW Zone C	alpha-Chlordane	0.0005	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Anthracene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Aroclor-1016	0.0005	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Aroclor-1221	0.0005	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Aroclor-1232	0.0005	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Aroclor-1242	0.0005	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Aroclor-1248	0.0005	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Aroclor-1254	0.001	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Aroclor-1260	0.001	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Benzoic acid	0.1	U	mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099804	Silo 2 NW Zone C	Benzo(a)anthracene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Benzo(a)pyrene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Benzo(b)fluoranthene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Benzo(g,h,i)perylene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Benzo(k)fluoranthene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Benzyl alcohol	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	beta-BHC	0.00005	U	mg/L	-	NA
099804	Silo 2 NW Zone C	bis(2-Chloroethoxy)methane	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	bis(2-Chloroethyl)ether	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	bis(2-Ethylhexyl) phthalate	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Butyl benzyl phthalate	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Chrysene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	delta-BHC	0.00005	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Dibenzofuran	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Dibenzo(a,h)anthracene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Dieldrin	0.0001	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Diethyl phthalate	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Dimethyl phthalate	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Di-n-butyl phthalate	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Di-n-octyl phthalate	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Endosulfan II	0.0001	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Endosulfan sulfate	0.0001	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Endosulfan-I	0.00005	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Endrin	0.0001	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Endrin ketone	0.0001	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Fluoranthene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Fluorene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	gamma-BHC (Lindane)	0.00005	U	mg/L	J	NA
099804	Silo 2 NW Zone C	gamma-Chlordane	0.0005	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Heptachlor	0.00005	U	mg/L	J	NA
099804	Silo 2 NW Zone C	Heptachlor epoxide	0.00005	U	mg/L	J	NA
099804	Silo 2 NW Zone C	Hexachlorobenzene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Hexachlorobutadiene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Hexachlorocyclopentadiene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Hexachloroethane	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Isophorone	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Methoxychlor	0.0005	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Naphthalene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Nitrobenzene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	N-Nitroso-di-n-propylamine	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	N-Nitrosodiphenylamine	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Pentachlorophenol	0.1	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Phenanthrene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Phenol	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Pyrene	0.02	U	mg/L	-	NA
099804	Silo 2 NW Zone C	Toxaphene	0.001	U	mg/L	-	NA
099773	Silo 2 NW Zone C D	Aluminum	1.144793		mg/L	-	NA
099773	Silo 2 NW Zone C D	Antimony	0.07897		mg/L	-	NA
099773	Silo 2 NW Zone C D	Arsenic	0.002	U	mg/L	-	NA
099773	Silo 2 NW Zone C D	Barium	0.245577		mg/L	-	0.2
099773	Silo 2 NW Zone C D	Beryllium	0.00454	B	mg/L	-	NA
099773	Silo 2 NW Zone C D	Cadmium	0.022804		mg/L	-	2.3
099773	Silo 2 NW Zone C D	Calcium	327.612281		mg/L	-	NA
099773	Silo 2 NW Zone C D	Chromium	0.127419		mg/L	-	2.5
099773	Silo 2 NW Zone C D	Cobalt	1.354702		mg/L	-	NA
099773	Silo 2 NW Zone C D	Copper	0.425572		mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099773	Silo 2 NW Zone C D	Iron	0.078697	B	mg/L	-	NA
099773	Silo 2 NW Zone C D	Lead	329.956281		mg/L	-	6599.1
099773	Silo 2 NW Zone C D	Magnesium	7.35025		mg/L	-	NA
099773	Silo 2 NW Zone C D	Manganese	0.463382		mg/L	-	NA
099773	Silo 2 NW Zone C D	Mercury	0.0002	U	mg/L	-	NA
099773	Silo 2 NW Zone C D	Molybdenum	0.046157		mg/L	-	NA
099773	Silo 2 NW Zone C D	Nickel	2.007504		mg/L	-	NA
099773	Silo 2 NW Zone C D	Potassium	2.816	B	mg/L	-	NA
099773	Silo 2 NW Zone C D	Selenium	0.05354		mg/L	-	5.4
099773	Silo 2 NW Zone C D	Silicon	11.976617		mg/L	-	NA
099773	Silo 2 NW Zone C D	Silver	0.082133		mg/L	-	1.6
099773	Silo 2 NW Zone C D	Thallium	0.00323	B	mg/L	-	NA
099773	Silo 2 NW Zone C D	Vanadium	0.0511		mg/L	-	NA
099773	Silo 2 NW Zone C D	Zinc	0.137597		mg/L	-	NA
099780	Silo 2 NW Zone C DL	4,4'-DDD	0.0002	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	4,4'-DDE	0.0002	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	4,4'-DDT	0.0002	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Aldrin	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	alpha-BHC	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	alpha-Chlordane	0.001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Aroclor-1016	0.001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Aroclor-1221	0.001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Aroclor-1232	0.001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Aroclor-1242	0.001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Aroclor-1248	0.001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Aroclor-1254	0.002	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Aroclor-1260	0.002	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	beta-BHC	0.00012	DX	mg/L	-	NA
099780	Silo 2 NW Zone C DL	delta-BHC	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Dieldrin	0.0002	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Endosulfan II	0.0002	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Endosulfan sulfate	0.0002	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Endosulfan-I	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Endrin	0.0002	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Endrin ketone	0.0002	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	gamma-BHC (Lindane)	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	gamma-Chlordane	0.001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Heptachlor	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Heptachlor epoxide	0.0001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Methoxychlor	0.001	U	mg/L	-	NA
099780	Silo 2 NW Zone C DL	Toxaphene	0.002	U	mg/L	-	NA
099707	Silo 2 SE Zone C	1,1-Dichloroethane	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	1,1-Dichloroethene	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	1,1,1-Trichloroethane	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	1,1,2-Trichloroethane	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	1,1,2,2-Tetrachloroethane	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	1,2-Dichloroethane	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	1,2-Dichloroethylene	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	1,2-Dichloropropane	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	2-Butanone	0.04	U	mg/L	-	NA
099707	Silo 2 SE Zone C	2-Hexanone	0.04	U	mg/L	-	NA
099707	Silo 2 SE Zone C	4-Methyl-2-pentanone	0.04	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Acetone	0.092		mg/L	-	NA
099707	Silo 2 SE Zone C	Benzene	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Bromodichloromethane	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Bromoform	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Bromomethane	0.04	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Carbon disulfide	0.02	U	mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099707	Silo 2 SE Zone C	Carbon Tetrachloride	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Chlorobenzene	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Chloroethane	0.04	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Chloroform	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Chloromethane	0.04	U	mg/L	-	NA
099707	Silo 2 SE Zone C	cis-1,3-Dichloropropene	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Dibromochloromethane	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Ethylbenzene	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Methylene chloride	0.046	B	mg/L	-	NA
099707	Silo 2 SE Zone C	Styrene	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Tetrachlorethene	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Toluene	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Total xylenes	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	trans-1,3-Dichloropropene	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Trichloroethene	0.02	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Vinyl Acetate	0.04	U	mg/L	-	NA
099707	Silo 2 SE Zone C	Vinyl chloride	0.04	U	mg/L	-	NA
099708	Silo 2 SE Zone C	1,2-Dichlorobenzene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	1,2,4-Trichlorobenzene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	1,3-Dichlorobenzene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	1,4-Dichlorobenzene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	2-Chloronaphthalene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	2-Chlorophenol	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	2-Methylnaphthalene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	2-Methylphenol	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	2-Nitroaniline	0.1	U	mg/L	-	NA
099708	Silo 2 SE Zone C	2-Nitrophenol	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	2,4-Dichlorophenol	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	2,4-Dimethylphenol	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	2,4-Dinitrophenol	0.1	U	mg/L	-	NA
099708	Silo 2 SE Zone C	2,4-Dinitrotoluene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	2,4,5-Trichlorophenol	0.1	U	mg/L	-	NA
099708	Silo 2 SE Zone C	2,4,6-Trichlorophenol	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	2,6-Dinitrotoluene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	3-Nitroaniline	0.1	U	mg/L	-	NA
099708	Silo 2 SE Zone C	3,3'-Dichlorobenzidine	0.04	U	mg/L	-	NA
099708	Silo 2 SE Zone C	4-Bromophenyl phenyl ether	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	4-Chloro-3-methylphenol	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	4-Chloroaniline	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	4-Chlorophenylphenyl ether	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	4-Methylphenol	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	4-Nitroaniline	0.1	U	mg/L	-	NA
099708	Silo 2 SE Zone C	4-Nitrophenol	0.1	U	mg/L	-	NA
099708	Silo 2 SE Zone C	4,4'-DDD	0.0001	U	mg/L	-	NA
099708	Silo 2 SE Zone C	4,4'-DDE	0.0001	U	mg/L	-	NA
099708	Silo 2 SE Zone C	4,4'-DDT	0.0001	U	mg/L	-	NA
099708	Silo 2 SE Zone C	4,6-Dinitro-2-methylphenol	0.1	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Acenaphthene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Acenaphthylene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Aldrin	0.00005	U	mg/L	-	NA
099708	Silo 2 SE Zone C	alpha-BHC	0.00005	U	mg/L	-	NA
099708	Silo 2 SE Zone C	alpha-Chlordane	0.0005	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Anthracene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Aroclor-1016	0.0005	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Aroclor-1221	0.0005	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Aroclor-1232	0.0005	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Aroclor-1242	0.0005	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Aroclor-1248	0.0005	U	mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099708	Silo 2 SE Zone C	Aroclor-1254	0.001	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Aroclor-1260	0.001	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Benzoic acid	0.1	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Benzo(a)anthracene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Benzo(a)pyrene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Benzo(b)fluoranthene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Benzo(g,h,i)perylene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Benzo(k)fluoranthene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Benzyl alcohol	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	beta-BHC	0.00056	XF	mg/L	-	NA
099708	Silo 2 SE Zone C	bis(2-Chloroethoxy)methane	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	bis(2-Chloroethyl)ether	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	bis(2-Chloroisopropyl) ether	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	bis(2-Ethylhexyl) phthalate	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Butyl benzyl phthalate	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Chrysene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	delta-BHC	0.00005	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Dibenzofuran	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Dibenzo(a,h)anthracene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Dieldrin	0.0001	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Diethyl phthalate	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Dimethyl phthalate	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Di-n-butyl phthalate	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Di-n-octyl phthalate	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Endosulfan II	0.0001	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Endosulfan sulfate	0.0001	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Endosulfan-I	0.00005	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Endrin	0.0001	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Endrin ketone	0.0001	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Fluoranthene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Fluorene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	gamma-Chlordane	0.0005	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Heptachlor epoxide	0.00005	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Hexachlorobenzene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Hexachlorobutadiene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Hexachlorocyclopentadiene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Hexachloroethane	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Indeno(1,2,3-cd)pyrene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Isophorone	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Methoxychlor	0.0005	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Naphthalene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Nitrobenzene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	N-Nitroso-di-n-propylamine	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	N-Nitrosodiphenylamine	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Pentachlorophenol	0.1	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Phenanthrene	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Phenol	0.02	U	mg/L	-	NA
099708	Silo 2 SE Zone C	Pyrene	0.02	U	mg/L	-	NA
099709	Silo 2 SE Zone C	Aluminum	0.909		mg/L	-	NA
099709	Silo 2 SE Zone C	Antimony	0.0787		mg/L	-	NA
099709	Silo 2 SE Zone C	Arsenic	0.0048	B	mg/L	-	0.1
099709	Silo 2 SE Zone C	Barium	1.35		mg/L	-	1.4
099709	Silo 2 SE Zone C	Beryllium	0.0044	B	mg/L	-	NA
099709	Silo 2 SE Zone C	Cadmium	0.0773		mg/L	-	7.7
099709	Silo 2 SE Zone C	Calcium	581		mg/L	-	NA
099709	Silo 2 SE Zone C	Chromium	0.116		mg/L	-	2.3
099709	Silo 2 SE Zone C	Cobalt	1.18		mg/L	-	NA
099709	Silo 2 SE Zone C	Copper	0.274		mg/L	-	NA

TABLE A-2, CHEMICAL CHARACTERIZATION DATA FOR SILO 2 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 2							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
099709	Silo 2 SE Zone C	Iron	0.0756	B	mg/L	-	NA
099709	Silo 2 SE Zone C	Lead	314		mg/L	-	6280.0
099709	Silo 2 SE Zone C	Magnesium	16.5		mg/L	-	NA
099709	Silo 2 SE Zone C	Manganese	0.409		mg/L	-	NA
099709	Silo 2 SE Zone C	Mercury	0.0002	U	mg/L	-	NA
099709	Silo 2 SE Zone C	Molybdenum	0.041		mg/L	-	NA
099709	Silo 2 SE Zone C	Nickel	2.13		mg/L	-	NA
099709	Silo 2 SE Zone C	Potassium	5.31		mg/L	-	NA
099709	Silo 2 SE Zone C	Selenium	0.0256	N	mg/L	J	2.6
099709	Silo 2 SE Zone C	Silver	0.094		mg/L	-	1.9
099709	Silo 2 SE Zone C	Thallium	0.0041	B	mg/L	-	NA
099709	Silo 2 SE Zone C	Zinc	0.162		mg/L	-	NA
099708	Silo 2 SE Zone C DL	alpha-BHC	0.0001	U	mg/L	-	NA

TABLE A-3, CHEMICAL CHARACTERIZATION DATA FOR SILO 3 COMPARED TO TCLP REGULATORY LIMITS

OU4 Chemical Characterization Data for Silo 3							% of TCLP
Sample	Location	Constituent	Result	Lab	Units	Q5	Reg. Limits
100074	Silo 3	Aluminum	0.03	U	mg/L		NA
100074	Silo 3	Antimony	0.03	UN	mg/L		NA
100074	Silo 3	Arsenic	5.31	S	mg/L		106.2
100074	Silo 3	Barium	0.0585	BN	mg/L		0.1
100074	Silo 3	Beryllium	0.0107	N	mg/L		NA
100074	Silo 3	Cadmium	0.0624	*	mg/L		6.2
100074	Silo 3	Calcium	611	E	mg/L		NA
100074	Silo 3	Chromium	4.55	E	mg/L		91.0
100074	Silo 3	Cobalt	15.6	E*	mg/L		NA
100074	Silo 3	Copper	0.486	*	mg/L		NA
100074	Silo 3	Iron	0.02	U	mg/L		NA
100074	Silo 3	Lead	0.002	UWN	mg/L		NA
100074	Silo 3	Magnesium	1860		mg/L		NA
100074	Silo 3	Manganese	2.87	E*	mg/L		NA
100074	Silo 3	Mercury	0.00044		mg/L		0.2
100074	Silo 3	Nickel	29.4	E	mg/L		NA
100074	Silo 3	Potassium	419		mg/L		NA
100074	Silo 3	Selenium	0.922		mg/L		92.2
100074	Silo 3	Silver	0.01	U	mg/L		0.2
100074	Silo 3	Sodium	1650		mg/L		NA
100074	Silo 3	Thallium	0.0419	+*	mg/L		NA
100074	Silo 3	Vanadium	2.41	E	mg/L		NA
100074	Silo 3	Zinc	0.181	*	mg/L		NA
100074	Silo 3	Molybdenum	14.7	E	mg/L		NA
100074	Silo 3	Boron	10.1	E	mg/L		NA
100074	Silo 3	Lithium	72.2		mg/L		NA
100074	Silo 3	Silicon	69.1		mg/L		NA

TABLE A-4, RADIOLOGICAL CHARACTERIZATION DATA FOR SILO 1

OU4 Radiological Characterization Data						
Sample	Location	Radionuclide	Result	2-Sigma	Units	Q5
100050	Silo 1/Zone A	Ra-226	40150	6050	pCi/L	-
100050	Silo 1/Zone A	Pa-231	< 2800		pCi/L	D
100050	Silo 1/Zone A	Ac-227	7302	1648	pCi/L	-
100050	Silo 1/Zone A	Pb-210	1670000	170000	pCi/L	-
100050	Silo 1/Zone A	Po-210	208000	29100	pCi/L	-
100050	Silo 1/Zone A	Th-228	14.9	5.3	pCi/L	-
100050	Silo 1/Zone A	Th-230	455	105	pCi/L	-
100050	Silo 1/Zone A	Th-232	5.65	2.72	pCi/L	-
100050	Silo 1/Zone A	U-234	320	49	pCi/L	-
100050	Silo 1/Zone A	U-235/236	14.1	3.5	pCi/L	-
100050	Silo 1/Zone A	U-238	332	51	pCi/L	-
100050	Silo 1/Zone A	Gross Beta	1950000	200000	pCi/L	-
100051	Silo 1/Zone B	Ra-226	66370	9811	pCi/L	-
100051	Silo 1/Zone B	Pa-231	< 3100		pCi/L	D
100051	Silo 1/Zone B	Ac-227	7343	2111	pCi/L	-
100051	Silo 1/Zone B	Pb-210	997000	103000	pCi/L	-
100051	Silo 1/Zone B	Po-210	134000	19900	pCi/L	-
100051	Silo 1/Zone B	Th-228	40	14.6	pCi/L	-
100051	Silo 1/Zone B	Th-230	307	91	pCi/L	-
100051	Silo 1/Zone B	Th-232	6.83	3.86	pCi/L	-
100051	Silo 1/Zone B	U-234	238	34	pCi/L	-
100051	Silo 1/Zone B	U-235/236	9.74	2.69	pCi/L	-
100051	Silo 1/Zone B	U-238	246	37	pCi/L	-
100051	Silo 1/Zone B	Gross Beta	953000	96000	pCi/L	-
100052	Silo 1/Zone C	Ra-226	44080	6609	pCi/L	-
100052	Silo 1/Zone C	Pa-231	< 2900		pCi/L	D
100052	Silo 1/Zone C	Ac-227	5014	1371	pCi/L	J
100052	Silo 1/Zone C	Pb-210	509000	54000	pCi/L	J
100052	Silo 1/Zone C	Po-210	71200	17100	pCi/L	-
100052	Silo 1/Zone C	Th-228	49.8	16.4	pCi/L	J
100052	Silo 1/Zone C	Th-230	394	110	pCi/L	J
100052	Silo 1/Zone C	Th-232	8.42	4.34	pCi/L	-
100052	Silo 1/Zone C	U-234	2480	460	pCi/L	-
100052	Silo 1/Zone C	U-235/236	133	81	pCi/L	-
100052	Silo 1/Zone C	U-238	2350	440	pCi/L	-
100052	Silo 1/Zone C	Gross Alpha	227000	54000	pCi/L	J
100052	Silo 1/Zone C	Gross Beta	795000	102000	pCi/L	-

OU4 Radiological Characterization Data						
Sample	Other	Radionuclide	Result	2-Sigma	Units	Q5
100065	Silo 2/Zone A	Ra-226	24410	3773	pCi/L	-
100065	Silo 2/Zone A	Pa-231	< 2000		pCi/L	D
100065	Silo 2/Zone A	Ac-227	4258	1220	pCi/L	J
100065	Silo 2/Zone A	Pb-210	104000	13400	pCi/L	-
100065	Silo 2/Zone A	Po-210	19900	9000	pCi/L	-
100065	Silo 2/Zone A	Th-228	24.7	10	pCi/L	J
100065	Silo 2/Zone A	Th-230	72.8	24	pCi/L	J
100065	Silo 2/Zone A	Th-232	1.87	1.94	pCi/L	-
100065	Silo 2/Zone A	U-234	417	67	pCi/L	-
100065	Silo 2/Zone A	U-235/236	19.2	4.8	pCi/L	-
100065	Silo 2/Zone A	U-238	421	68	pCi/L	-
100065	Silo 2/Zone A	Gross Beta	51600	5400	pCi/L	J
100066	Silo 2/Zone B	Ra-226	81840	12060	pCi/L	-
100066	Silo 2/Zone B	Pa-231	< 3300		pCi/L	D
100066	Silo 2/Zone B	Ac-227	2620	620	pCi/L	-
100066	Silo 2/Zone B	Pb-210	220000	25000	pCi/L	-
100066	Silo 2/Zone B	Po-210	36200	7300	pCi/L	-
100066	Silo 2/Zone B	Ra-228	11	2.1	pCi/L	-
100066	Silo 2/Zone B	Th-228	204	67	pCi/L	-
100066	Silo 2/Zone B	Th-230	110	42	pCi/L	-
100066	Silo 2/Zone B	Th-232	< 50		pCi/L	D
100066	Silo 2/Zone B	U-234	2330	370	pCi/L	-
100066	Silo 2/Zone B	U-235/236	95.6	28.3	pCi/L	-
100066	Silo 2/Zone B	U-238	2400	380	pCi/L	-
100066	Silo 2/Zone B	Gross Beta	1180000	120000	pCi/L	-
100067	Silo 2/Zone C	Ra-226	79430	11700	pCi/L	-
100067	Silo 2/Zone C	Pa-231	< 3300		pCi/L	D
100067	Silo 2/Zone C	Ac-227	3400	780	pCi/L	-
100067	Silo 2/Zone C	Pb-210	119000	15000	pCi/L	-
100067	Silo 2/Zone C	Po-210	18100	4930	pCi/L	-
100067	Silo 2/Zone C	Ra-228	19.7	3.7	pCi/L	-
100067	Silo 2/Zone C	Th-228	113	46	pCi/L	-
100067	Silo 2/Zone C	Th-230	293	84	pCi/L	-
100067	Silo 2/Zone C	Th-232	< 50		pCi/L	D
100067	Silo 2/Zone C	U-234	3860	640	pCi/L	-
100067	Silo 2/Zone C	U-235/236	158	44	pCi/L	-
100067	Silo 2/Zone C	U-238	4000	670	pCi/L	-
100067	Silo 2/Zone C	Gross Beta	1060000	110000	pCi/L	-

TABLE A-6, RADIOLOGICAL CHARACTERIZATION DATA FOR SILO 3

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OU4 Radiological Characterization Data						
Sample	Location	Radionuclide	Result	2-Sigma	Units	Q5
100074	Silo 3	Ra-226	2455	558	pCi/L	-
100074	Silo 3	Pa-231	< 647		pCi/L	-
100074	Silo 3	Ac-227	5.54	1.94	pCi/L	-
100074	Silo 3	Pb-210	87.1	9.2	pCi/L	J
100074	Silo 3	Po-210	245	110	pCi/L	J
100074	Silo 3	Ra-228	< 110		pCi/L	D
100074	Silo 3	Th-228	3.17	1.42	pCi/L	J
100074	Silo 3	Th-230	10.4	2.8	pCi/L	J
100074	Silo 3	Th-232	< 1		pCi/L	U
100074	Silo 3	U-234	92.2	13.8	pCi/L	-
100074	Silo 3	U-235/236	5.09	1.59	pCi/L	-
100074	Silo 3	U-238	86	13	pCi/L	-
100074	Silo 3	Gross Alpha	3150	830	pCi/L	J
100074	Silo 3	Gross Beta	670	340	pCi/L	J

TABLE A-7, TCLP CHEMICAL DATA, SILO 1, CHARACTERIZATION OF UNTREATED WASTE COMPOSITE SAMPLES

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist^c	Mean^d (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coef. of Var. (%)
2-Butanone	9 /11	0.001 - 0.010	N	0.005	0.005	0.003	0.006	52.356
4-Chloro-3-methylphenol	1 /10	0.004 - 0.004	L^1	0.010	0.010	0.008	0.004^i	25.809
4-Methyl-2-pentanone	8 /13	0.001 - 0.010	L	0.004	0.002	0.002	0.010^i	90.652
4-Nitrophenol	1 /11	0.008 - 0.008	L^1	0.045	0.050	0.033	0.008^i	30.532
Acetone	10 /11	0.069 - 0.490	L	0.220	0.170	0.061^i	0.490^i	78.204
Aluminum	12 /12	0.228 - 0.441	L	0.314	0.320	0.278	0.357	21.364
Antimony	12 /12	0.067 - 0.129	N	0.093	0.102	0.083	0.103	20.674
Barium	12 /12	0.348 - 1.830	L	0.868	0.717	0.663	1.149	46.267
Benzoic acid	4 /10	0.006 - 0.100	L^1	0.037	0.053	0.022	0.063	59.468
Beryllium	6 /12	0.002 - 0.003	L^1	0.002	0.002	0.001^i	0.002	46.762
Boron	12 /12	0.168 - 0.384	L	0.249	0.248	0.213	0.293	28.064
Cadmium	12 /12	0.002 - 0.005	L	0.003	0.003	0.003	0.004	30.082
Calcium	12 /12	17.600 -108.00	L	55.433	52.300	34.745	95.149	60.595
Chromium	12 /12	0.045 - 0.081	L	0.059	0.054	0.053	0.066	20.648
Cobalt	12 /12	0.720 - 3.060	N	1.816	1.655	1.356	2.277	48.924
Copper	12 /12	0.068 - 0.404	N	0.208	0.206	0.158	0.259	46.578
Di-n-octyl phthalate	4 /10	0.005 - 0.020	L^1	0.010	0.010	0.007	0.012	41.344
Iron	10 /12	0.018 - 0.100	L	0.042	0.040	0.028	0.067	55.616
Iron^m	9 /11	0.009 - 0.059	N	0.036	0.037	0.028	0.044	40.304
Lead	9 /9	229.00 -841.00	N	585.00	682.00	446.11	723.89	38.302
Magnesium	12 /12	6.120 -13.800	L	8.968	8.990	7.927	10.175	22.310
Magnesium^m	11 /11	6.120 -10.400	N	8.528	8.760	7.784	9.273	15.972
Manganese	12 /12	0.067 - 0.308	L	0.163	0.149	0.123	0.223	43.190
Methylene chloride	11 /13	0.009 - 0.058	L	0.021	0.013	0.011	0.052	80.619
Molybdenum	12 /12	0.036 - 0.108	N	0.072	0.083	0.059	0.086	35.921
N-Nitroso-di-n-propylamine	4 /10	0.018 - 0.280	L^1	0.023	0.010	0.011^i	0.049	158.73
Nickel	12 /12	1.320 - 5.570	L	3.183	2.925	2.388	4.365	43.573
Potassium	12 /12	2.950 -18.300	N	10.333	10.980	7.578	13.089	51.442
Selenium	11 /11	0.015 - 0.306	N	0.135	0.114	0.087	0.183	65.092
Silicon	12 /12	13.500 -42.100	N	31.933	33.250	27.678	36.188	25.701
Silver	12 /12	0.023 - 0.048	L	0.034	0.033	0.029	0.038	22.707
Tetrachlorethene	1 /6	0.001 - 0.001	L^1	0.003	0.003	0.002	0.001^i	57.358
Thallium	9 /12	0.002 - 0.009	N	0.004	0.003	0.003	0.006	70.144
Toluene	7 /12	0.001 - 0.005	N	0.003	0.003	0.002	0.003	39.057
Tributyl phosphate	1 /1	0.064 - 0.064	^h	^h	0.064	0.064^h	0.064^h	.

TABLE A-7, TCLP CHEMICAL DATA, SILO 1, CHARACTERIZATION OF UNTREATED WASTE COMPOSITE SAMPLES (Continued)

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist^c	Mean^d (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coef. of Var. (%)
Vanadium	12 /12	0.017 - 0.032	L	0.023	0.021	0.020	0.026	22.357
Zinc	12 /12	0.020 - 0.323	L	0.128	0.099	0.081	0.222	61.901
Zinc^m	11 /11	0.020 - 0.194	N	0.110	0.094	0.081	0.138	47.228
bis(2-Ethylhexyl) phthalate	2 /10	0.006 - 0.098	L^l	0.013	0.010	0.008	0.020	144.64

^c Distribution: N = Normal; L = Lognormal.

^d If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.

^e If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

^h Not applicable if sample size ≤ 2.

^i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size ≤ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

^j Freqency of detection is less than 5%.

^k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.

^l Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.

^m Statistics for constituent with outliers rejected.

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TABLE A-8, TCLP CHEMICAL DATA, SILO 2, CHARACTERIZATION OF UNTREATED WASTE COMPOSITE SAMPLES

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist^c	Mean^d (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coef. of Var. (%)
2-Butanone	2 /6	0.002 - 0.002	L^1	0.004	0.003	0.002^i	0.002^i	125.49
4-Methyl-2-pentanone	1 /8	0.001 - 0.001	L^1	0.005	0.005	0.003	0.001^i	89.106
Acetone	3 /8	0.015 - 0.092	L^1	0.029	0.038	0.012^i	0.068	86.133
Aluminum	9 /9	0.462 - 2.750	L	1.259	1.160	0.818	2.003	52.690
Aluminum^m	8 /8	0.462 - 1.620	N	1.073	1.152	0.817	1.329	35.617
Antimony	8 /8	0.079 - 0.123	L	0.092	0.086	0.081	0.104	18.130
Arsenic	9 /10	0.003 - 0.322	L	0.052	0.004	0.002^i	0.322^i	193.75
Barium	10 /10	0.157 - 8.470	L	2.412	0.798	0.246	8.470^i	129.62
Beryllium	9 /9	0.003 - 0.005	L	0.005	0.005	0.004	0.005	13.329
Boron	4 /4	0.240 - 1.500	L^1	0.527	0.507	0.196^i	1.418	84.327
Cadmium	9 /9	0.010 - 0.077	L	0.042	0.025	0.023	0.077^i	62.063
Calcium	9 /9	163.00 -975.00	L	448.40	332.00	287.41	718.22	55.489
Carbon disulfide	1 /8	0.004 - 0.004	L^1	0.003	0.003	0.002^i	0.004^i	72.519
Chromium	10 /10	0.086 - 0.207	L	0.128	0.127	0.111	0.149	24.791
Chromium^m	9 /9	0.086 - 0.138	N	0.120	0.126	0.109	0.130	14.005
Cobalt	9 /9	1.180 - 6.160	L	2.653	1.580	1.463	4.823	74.061
Copper	9 /9	0.274 - 3.860	L	1.191	0.525	0.406	3.460	108.95
Iron	9 /9	0.053 - 0.090	N	0.077	0.079	0.070	0.083	13.604
Lead	8 /8	117.00 -772.00	L	398.74	324.48	229.55	734.43	58.402
Magnesium	9 /9	7.350 -29.600	L	13.670	9.240	8.551	22.017	61.672
Manganese	9 /9	0.409 - 1.620	L	0.705	0.469	0.472	1.046	60.586
Methylene chloride	3 /8	0.014 - 0.046	L^1	0.007	0.006	0.004^i	0.015	119.27
Molybdenum	9 /9	0.034 - 0.099	L	0.055	0.046	0.042	0.073	43.510
N-Nitroso-di-n-propylamine	1 /8	0.005 - 0.005	L^1	0.009	0.010	0.008	0.005^i	18.856
Nickel	9 /9	2.008 - 5.770	L	3.155	2.400	2.267	4.437	44.675
Pentachlorophenol	1 /8	0.018 - 0.018	L^1	0.044	0.050	0.035	0.018^i	24.595
Potassium	6 /9	2.640 - 5.310	L^1	2.714	2.816	1.968^i	3.742	49.207
Selenium	10 /10	0.026 - 0.568	L	0.101	0.049	0.038	0.197	162.53
Selenium^m	9 /9	0.026 - 0.072	N	0.049	0.045	0.040	0.059	30.811
Silicon	7 /7	11.977 -24.300	L	15.097	12.700	11.941^i	19.180	31.011
Silver	10 /10	0.053 - 0.164	L	0.091	0.083	0.076	0.109	31.382
Thallium	8 /9	0.002 - 0.029	L	0.007	0.003	0.002^i	0.028	129.52
Vanadium	7 /7	0.046 - 0.060	L	0.052	0.052	0.049	0.056	9.186
Zinc	9 /9	0.114 - 0.563	L	0.272	0.170	0.156	0.486	65.163
alpha-BHC	2 /11	0.000 - 0.000	L^1	0.000	0.000	0.000^i	0.000	128.16

TABLE A-8, TCLP CHEMICAL DATA, SILO 2, CHARACTERIZATION OF UNTREATED WASTE COMPOSITE SAMPLES (Continued)

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist^c	Mean^d (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coef. of Var. (%)
beta-BHC	6 /10	0.000 - 0.001	L^l	0.000	0.000	0.000^i	0.000	97.823
bis(2-Ethylhexyl) phthalate	3 /8	0.006 - 0.055	L^l	0.012	0.010	0.007	0.018	106.93

^c Distribution: N = Normal; L = Lognormal.
^d If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.
^e If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.
^h Not applicable if sample size ≤ 2.
^i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size ≤ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.
^j Freqency of detection is less than 5%.
^k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.
^l Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.
^m Statistics for constituent with outliers rejected.

TABLE A-9, TCLP CHEMICAL DATA, SILO 3, CHARACTERIZATION OF UNTREATED WASTE SAMPLES

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist^c	Mean^d (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coef. of Var. (%)
Arsenic	1 /1	5.310 - 5.310	^h	5.310	^h	^h	^h	^h
Barium	1 /1	0.059 - 0.059	^h	0.059	^h	^h	^h	^h
Beryllium	1 /1	0.011 - 0.011	^h	0.011	^h	^h	^h	^h
Boron	1 /1	10.100 -10.100	^h	10.100	^h	^h	^h	^h
Cadmium	1 /1	0.062 - 0.062	^h	0.062	^h	^h	^h	^h
Calcium	1 /1	611.00 -611.00	^h	611.00	^h	^h	^h	^h
Chromium	1 /1	4.550 - 4.550	^h	4.550	^h	^h	^h	^h
Cobalt	1 /1	15.600 -15.600	^h	15.600	^h	^h	^h	^h
Copper	1 /1	0.486 - 0.486	^h	0.486	^h	^h	^h	^h
Lithium	1 /1	72.200 -72.200	^h	72.200	^h	^h	^h	^h
Magnesium	1 /1	1860.0 -1860.0	^h	1860.0	^h	^h	^h	^h
Manganese	1 /1	2.870 - 2.870	^h	2.870	^h	^h	^h	^h
Mercury	1 /1	0.000 - 0.000	^h	0.000	^h	^h	^h	^h
Molybdenum	1 /1	14.700 -14.700	^h	14.700	^h	^h	^h	^h
Nickel	1 /1	29.400 -29.400	^h	29.400	^h	^h	^h	^h
Potassium	1 /1	419.00 -419.00	^h	419.00	^h	^h	^h	^h
Selenium	1 /1	0.922 - 0.922	^h	0.922	^h	^h	^h	^h
Silicon	1 /1	69.100 -69.100	^h	69.100	^h	^h	^h	^h
Sodium	1 /1	1650.0 -1650.0	^h	1650.0	^h	^h	^h	^h
Thallium	1 /1	0.042 - 0.042	^h	0.042	^h	^h	^h	^h
Vanadium	1 /1	2.410 - 2.410	^h	2.410	^h	^h	^h	^h
Zinc	1 /1	0.181 - 0.181	^h	0.181	^h	^h	^h	^h

^c Distribution: N = Normal; L = Lognormal.

^d If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.

^e If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

^h Not applicable if sample size ≤ 2.

TABLE A-9, TCLP CHEMICAL DATA, SILO 3, CHARACTERIZATION OF UNTREATED WASTE SAMPLES (Continued)

^j Freqency of detection is less than 5%.
^k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.
^l Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.
^m Statistics for constituent with outliers rejected.

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TABLE A-10, TCLP RADIOLOGICAL DATA, SILO 1, CHARACTERIZATION OF UNTREATED COMPOSITE SAMPLES

Radionuclide	Frequency of Detection	Range of Detection (pCi/L)	Dist^c	Mean^d (pCi/L)	Median (pCi/L)	Lower 95% CI on Mean (pCi/L)	Upper 95% CI on Mean (pCi/L)	Coef. of Var. (%)
Ac-227	3 /3	5014.0 -7343.0	L^l	6454.1	7302.0	4464.1^i	7343.0^i	20.341
Gross Alpha	3 /3	159000 -435000	L^l	250402	227000	105922^i	435000^i	52.544
Gross Beta	3 /3	795000 -1.95E6	L^l	1.14E6	953000	511846^i	1.95E6^i	50.803
Pb-210	3 /3	509000 -1.67E6	L^l	946331	997000	346608^i	1.67E6^i	55.065
Po-210	3 /3	71200 -208000	L^l	125665	134000	50659^i	208000^i	49.717
Ra-226	3 /3	40150 - 66370	L^l	48974	44080	31205^i	66370^i	28.169
Ra-228	2 /3	75.600 -91.800	L^l	47.042	75.600	8.796^i	91.800^i	66.583
Th-228	3 /3	14.900 -49.800	L^l	30.962	40.000	10.476^i	49.800^i	51.577
Th-230	3 /3	307.00 -455.00	L^l	380.38	394.00	271.93^i	455.00^i	19.303
Th-232	3 /3	5.650 - 8.420	L^l	6.875	6.830	4.911^i	8.420^i	19.953
U-234	3 /3	238.00 -2480.0	L^l	573.75	320.00	66.721^i	2480.0^i	125.55
U-235/236	3 /3	9.740 -133.00	L^l	26.336	14.100	2.426^i	133.00^i	133.78
U-238	3 /3	246.00 -2350.0	L^l	576.83	332.00	73.061^i	2350.0^i	122.00

^c Distribution: N = Normal; L = Lognormal.

^d If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.

^e If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

^h Not applicable if sample size ≤ 2.

^i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size ≤ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

^j Freqency of detection is less than 5%.

^k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.

^l Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.

^m Statistics for constituent with outliers rejected.

TABLE A-11, TCLP RADIOLOGICAL DATA, SILO 2, CHARACTERIZATION OF UNTREATED COMPOSITE SAMPLES

Radionuclide	Frequency of Detection	Range of Detection (pCi/L)	Dist^c	Mean^d (pCi/L)	Median (pCi/L)	Lower 95% CI on Mean (pCi/L)	Upper 95% CI on Mean (pCi/L)	Coef. of Var. (%)
Ac-227	3 /3	2620.0 -4258.0	L^l	3359.9	3400.0	2230.5^i	4258.0^i	23.914
Gross Alpha	3 /3	29400 -296000	L^l	122066	209000	14963^i	296000^i	76.321
Gross Beta	3 /3	51600 -1.18E6	L^l	401125	1.06E6	20062^i	1.18E6^i	81.134
Pb-210	3 /3	104000 -220000	L^l	139637	119000	71216^i	220000^i	42.725
Po-210	3 /3	18100 - 36200	L^l	23537	19900	12491^i	36200^i	40.315
Ra-226	3 /3	24410 - 81840	L^l	54138	79430	16917^i	81840^i	52.484
Ra-228	2 /3	11.000 -19.700	L^l	14.813	15.000	9.061^i	19.700^i	28.587
Th-228	3 /3	24.700 -204.00	L^l	82.884	113.00	13.212^i	204.00^i	78.712
Th-230	3 /3	72.800 -293.00	L^l	132.88	110.00	39.794^i	293.00^i	74.319
Th-232	1 /3	1.870 - 1.870	L^l	10.534	25.000	0.844^i	1.870^i	77.236
U-234	3 /3	417.00 -3860.0	L^l	1553.7	2330.0	217.34^i	3860.0^i	78.328
U-235/236	3 /3	19.200 -158.00	L^l	66.192	95.600	10.346^i	158.00^i	76.449
U-238	3 /3	421.00 -4000.0	L^l	1592.9	2400.0	217.76^i	4000.0^i	78.852

^c Distribution: N = Normal; L = Lognormal.

^d If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.

^e If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

^h Not applicable if sample size ≤ 2.

^i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size ≤ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

^j Freqency of detection is less than 5%.

^k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.

^l Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.

^m Statistics for constituent with outliers rejected.

TABLE A-12, TCLP RADIOLOGICAL DATA, SILO 3, CHARACTERIZATION OF UNTREATED SAMPLES

Radionuclide	Frequency of Detection	Range of Detection (pCi/L)	Dist^c	Mean^d (pCi/L)	Median (pCi/L)	Lower 95% CI on Mean (pCi/L)	Upper 95% CI on Mean (pCi/L)	Coef. of Var. (%)
Ac-227	1 /1	5.540 - 5.540	^h	5.540	^h	^h	^h	^h
Gross Alpha	1 /1	3150.0 -3150.0	^h	3150.0	^h	^h	^h	^h
Gross Beta	1 /1	670.00 -670.00	^h	670.00	^h	^h	^h	^h
Pb-210	1 /1	87.100 -87.100	^h	87.100	^h	^h	^h	^h
Po-210	1 /1	245.00 -245.00	^h	245.00	^h	^h	^h	^h
Ra-226	1 /1	2455.0 -2455.0	^h	2455.0	^h	^h	^h	^h
Th-228	1 /1	3.170 - 3.170	^h	3.170	^h	^h	^h	^h
Th-230	1 /1	10.400 -10.400	^h	10.400	^h	^h	^h	^h
U-234	1 /1	92.200 -92.200	^h	92.200	^h	^h	^h	^h
U-235/236	1 /1	5.090 - 5.090	^h	5.090	^h	^h	^h	^h
U-238	1 /1	86.000 -86.000	^h	86.000	^h	^h	^h	^h

^c Distribution: N = Normal; L = Lognormal.

^d If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.

^e If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

^h Not applicable if sample size ≤ 2.

^j Freqency of detection is less than 5%.

^k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.

^l Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.

^m Statistics for constituent with outliers rejected.

TABLE A-13, TCLP CHEMICAL DATA, SILO 1, CHARACTERIZATION OF UNTREATED ZONE A SAMPLES

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist^c	Mean^d (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coef. of Var. (%)
2-Butanone	2 /3	0.005 - 0.010	L^1	0.006	0.005	0.003^i	0.010^i	43.301
4-Methyl-2-pentanone	2 /3	0.001 - 0.010	L^1	0.004	0.005	0.001^i	0.010^i	84.548
Acetone	2 /2	0.110 - 0.150	^h	^h	0.130	0.110^h	0.150^h	21.757
Aluminum	3 /3	0.326 - 0.441	L^1	0.383	0.390	0.296^i	0.441^i	14.941
Antimony	1 /3	- 0.108	L^1	0.105	0.103	0.100^i	0.108^i	2.758
Barium	3 /3	0.603 - 1.400	L^1	0.880	0.808	0.428^i	1.400^i	44.169
Benzoic acid	1 /3	0.100 - 0.100	L^1	0.053	0.060	0.016^i	0.100^i	60.856
Beryllium	3 /3	0.002 - 0.003	L^1	0.003	0.003	0.002^i	0.003^i	14.786
Boron	3 /3	0.179 - 0.199	L^1	0.186	0.182	0.169^i	0.199^i	5.778
Cadmium	3 /3	0.004 - 0.005	L^1	0.004	0.004	0.003^i	0.005^i	14.723
Calcium	3 /3	83.400 -108.00	L^1	91.697	85.600	72.137^i	108.00^i	14.743
Chromium	3 /3	0.071 - 0.081	L^1	0.077	0.078	0.068^i	0.081^i	6.708
Cobalt	3 /3	0.820 - 1.390	L^1	1.101	1.170	0.699^i	1.390^i	25.514
Copper	3 /3	0.163 - 0.197	L^1	0.182	0.189	0.154^i	0.197^i	9.714
Di-n-octyl phthalate	1 /3	0.020 - 0.020	L^1	0.014	0.013	0.007^i	0.020^i	36.735
Iron	3 /3	0.047 - 0.059	L^1	0.051	0.049	0.042^i	0.059^i	12.204
Lead	3 /3	564.00 -698.00	L^1	645.12	682.00	529.68^i	698.00^i	11.294
Magnesium	3 /3	7.160 -13.800	L^1	9.694	9.220	5.549^i	13.800^i	33.785
Manganese	3 /3	0.136 - 0.171	L^1	0.150	0.145	0.123^i	0.171^i	12.063
Methylene chloride	2 /3	0.013 - 0.029	L^1	0.010	0.013	0.001^i	0.029^i	89.965
Molybdenum	3 /3	0.077 - 0.089	L^1	0.085	0.089	0.074^i	0.089^i	8.059
N-Nitroso-di-n-propylamine	1 /3	0.060 - 0.060	L^1	0.018	0.010	0.003^i	0.060^i	108.25
Nickel	3 /3	1.320 - 3.050	L^1	2.063	2.180	1.014^i	3.050^i	39.619
Potassium	3 /3	6.220 -16.100	L^1	10.748	12.400	4.694^i	16.100^i	43.130
Selenium	3 /3	0.015 - 0.088	L^1	0.048	0.084	0.009^i	0.088^i	66.174
Silicon	3 /3	13.500 -31.300	L^1	22.650	27.500	10.557^i	31.300^i	38.898
Silver	3 /3	0.041 - 0.048	L^1	0.044	0.043	0.038^i	0.048^i	7.699
Thallium	2 /3	0.002 - 0.006	L^1	0.002	0.002	0.001^i	0.006^i	84.944
Toluene	1 /2	0.005 - 0.005	^h	^h	0.004	0.005^h	0.005^h	47.140
Vanadium	3 /3	0.029 - 0.032	L^1	0.030	0.029	0.027^i	0.032^i	5.548
Zinc	3 /3	0.067 - 0.084	L^1	0.078	0.084	0.063^i	0.084^i	12.214
bis(2-Ethylhexyl) phthalate	1 /3	0.098 - 0.098	L^1	0.023	0.013	0.003^i	0.098^i	124.73

TABLE A-13, TCLP CHEMICAL DATA, SILO 1, CHARACTERIZATION OF UNTREATED ZONE A SAMPLES (Continued)

^c Distribution: N = Normal; L = Lognormal.

^d If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.

^e If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

^h Not applicable if sample size ≤ 2.

^i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size ≤ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

^j Freqency of detection is less than 5%.

^k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.

^l Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.

^m Statistics for constituent with outliers rejected.

TABLE A-14, CHEMICAL CHARACTERIZATION DATA, SILO 1, ZONE B

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist^c	Mean^d (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coef. of Var. (%)
2-Butanone	4 /5	0.002 - 0.005	L^1	0.003	0.005	0.002	0.005^i	43.241
4-Methyl-2-pentanone	4 /5	0.001 - 0.002	L^1	0.002	0.002	0.001^i	0.002^i	119.81
Acetone	4 /5	0.069 - 0.430	L^1	0.089	0.170	0.017^i	0.430^i	91.533
Aluminum	5 /5	0.228 - 0.370	L^1	0.279	0.278	0.230	0.340	20.900
Antimony	5 /5	0.074 - 0.129	L^1	0.094	0.100	0.075	0.118	23.698
Barium	5 /5	0.650 - 1.830	L^1	0.871	0.728	0.581^i	1.305	52.557
Benzoic acid	2 /4	0.006 - 0.079	L^1	0.034	0.053	0.009	0.079^i	64.052
Beryllium	2 /5	0.002 - 0.002	L^1	0.001	0.001	0.001^i	0.002	44.666
Boron	5 /5	0.168 - 0.384	L^1	0.260	0.284	0.183	0.369	34.631
Cadmium	5 /5	0.002 - 0.004	L^1	0.003	0.003	0.002	0.004	27.326
Calcium	5 /5	21.600 -85.300	L^1	40.571	31.100	21.171^i	77.747	66.671
Chromium	5 /5	0.050 - 0.065	L^1	0.055	0.053	0.050^i	0.061	11.090
Cobalt	5 /5	0.720 - 3.060	L^1	1.501	1.670	0.771	2.924	61.621
Copper	5 /5	0.068 - 0.404	L^1	0.166	0.215	0.076	0.359	68.627
Di-n-octyl phthalate	1 /4	0.008 - 0.008	L^1	0.010	0.010	0.008	0.008^i	12.906
Iron	4 /5	0.034 - 0.100	L^1	0.046	0.042	0.029^i	0.071	56.006
Lead	4 /4	348.00 -841.00	L^1	542.77	594.50	301.29^i	841.00^i	47.107
Magnesium	5 /5	6.120 - 9.680	L^1	8.388	8.760	7.045	9.680^i	16.493
Manganese	5 /5	0.067 - 0.242	L^1	0.112	0.111	0.067	0.188	56.852
Methylene chloride	4 /5	0.009 - 0.058	L^1	0.013	0.013	0.004^i	0.039	105.81
Molybdenum	5 /5	0.050 - 0.108	L^1	0.076	0.088	0.053	0.108	34.245
N-Nitroso-di-n-propylamine	2 /4	0.018 - 0.150	L^1	0.023	0.014	0.005^i	0.104	146.32
Nickel	5 /5	1.670 - 4.560	L^1	2.703	2.560	1.703	4.291	47.151
Potassium	5 /5	9.560 -18.300	L^1	13.782	14.000	11.036	17.211	22.026
Selenium	5 /5	0.076 - 0.306	L^1	0.161	0.143	0.091	0.284	56.079
Silicon	5 /5	26.000 -37.900	L^1	30.413	27.600	25.597^i	36.135	18.516
Silver	5 /5	0.028 - 0.039	L^1	0.032	0.032	0.029	0.036	12.464
Tetrachlorethene	1 /5	0.001 - 0.001	L^1	0.002	0.003	0.001	0.001^i	53.351
Thallium	5 /5	0.004 - 0.009	L^1	0.006	0.006	0.004	0.009	37.876
Toluene	1 /5	0.003 - 0.003	L^1	0.003	0.003	0.002^i	0.003	8.600
Vanadium	5 /5	0.018 - 0.027	L^1	0.022	0.022	0.019	0.025	15.363
Zinc	5 /5	0.020 - 0.323	L^1	0.114	0.170	0.041	0.317	71.770

TABLE A-14, TCLP CHEMICAL DATA, SILO 1, CHARACTERIZATION OF UNTREATED ZONE B SAMPLES (Continued)

^c Distribution: N = Normal; L = Lognormal.

^d If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.

^e If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

^h Not applicable if sample size ≤ 2.

^i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size ≤ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

^j Freqency of detection is less than 5%.

^k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.

^l Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.

^m Statistics for constituent with outliers rejected.

TABLE A-15, TCLP CHEMICAL DATA, SILO 1, CHARACTERIZATION OF UNTREATED ZONE C SAMPLES

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist^c	Mean^d (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coef. of Var. (%)
2-Butanone	3 /3	0.001 - 0.007	L^1	0.003	0.006	0.001^i	0.007^i	68.883
4-Chloro-3-methylphenol	1 /3	0.004 - 0.004	L^1	0.008	0.010	0.003^i	0.004^i	45.431
4-Methyl-2-pentanone	2 /4	0.001 - 0.002	L^1	0.003	0.004	0.001	0.002^i	63.432
4-Nitrophenol	1 /4	0.008 - 0.008	L^1	0.032	0.050	0.011	0.008^i	53.890
Acetone	3 /3	0.072 - 0.490	L^1	0.198	0.220	0.039^i	0.490^i	81.309
Aluminum	3 /3	0.269 - 0.349	L^1	0.315	0.334	0.249^i	0.349^i	13.401
Antimony	4 /4	0.067 - 0.104	L^1	0.079	0.074	0.063^i	0.099	20.512
Barium	4 /4	0.348 - 1.130	L^1	0.662	0.698	0.374	1.130^i	44.545
Benzoic acid	1 /3	0.010 - 0.010	L^1	0.030	0.050	0.006^i	0.010^i	64.342
Beryllium	1 /4	0.002 - 0.002	L^1	0.001	0.001	0.001^i	0.002	46.154
Boron	4 /4	0.231 - 0.283	L^1	0.264	0.274	0.237	0.283^i	9.071
Cadmium	4 /4	0.002 - 0.003	L^1	0.002	0.002	0.002^i	0.003^i	14.334
Calcium	4 /4	17.600 -73.500	L^1	30.543	26.350	14.547^i	64.126	71.359
Chromium	4 /4	0.045 - 0.056	L^1	0.050	0.050	0.044^i	0.056^i	10.023
Cobalt	4 /4	1.640 - 2.970	L^1	2.298	2.405	1.691	2.970^i	24.693
Copper	4 /4	0.120 - 0.298	L^1	0.214	0.242	0.134	0.298^i	33.323
Di-n-octyl phthalate	2 /3	0.005 - 0.005	L^1	0.007	0.005	0.003^i	0.005^i	49.487
Iron	3 /4	0.018 - 0.037	L^1	0.020	0.022	0.010^i	0.037^i	53.368
Lead	2 /2	229.00 -714.00	^h	^h	471.50	229.00^h	714.00^h	72.735
Magnesium	4 /4	6.790 -10.400	L^1	8.619	8.885	6.856	10.400^i	18.878
Manganese	4 /4	0.153 - 0.308	L^1	0.210	0.205	0.146^i	0.302	31.507
Methylene chloride	4 /4	0.011 - 0.038	L^1	0.018	0.016	0.009^i	0.034	62.583
Molybdenum	4 /4	0.036 - 0.091	L^1	0.049	0.042	0.030^i	0.081	49.129
N-Nitroso-di-n-propylamine	1 /3	0.280 - 0.280	L^1	0.030	0.010	0.001^i	0.280^i	155.88
Nickel	4 /4	2.800 - 5.570	L^1	4.068	4.225	2.851	5.570^i	28.905
Potassium	4 /4	2.950 - 8.800	L^1	4.269	3.585	2.387^i	7.633	57.867
Selenium	3 /3	0.086 - 0.161	L^1	0.122	0.131	0.072^i	0.161^i	29.710
Silicon	4 /4	35.200 -42.100	L^1	39.092	39.750	35.321	42.100^i	8.514
Silver	4 /4	0.023 - 0.034	L^1	0.027	0.026	0.022^i	0.034	18.863
Thallium	2 /4	0.003 - 0.003	L^1	0.002	0.002	0.001^i	0.003^i	52.247
Toluene	5 /5	0.001 - 0.004	L^1	0.002	0.002	0.001	0.003	49.793
Tributyl phosphate	1 /1	0.064 - 0.064	^h	^h	0.064	0.064^h	0.064^h	.
Vanadium	4 /4	0.017 - 0.021	L^1	0.019	0.019	0.016^i	0.021^i	11.005
Zinc	4 /4	0.094 - 0.172	L^1	0.121	0.116	0.088^i	0.166	27.930
bis(2-Ethylhexyl) phthalate	1 /3	0.006 - 0.006	L^1	0.008	0.010	0.005^i	0.006^i	26.647

TABLE A-15, TCLP CHEMICAL DATA, SILO 1, CHARACTERIZATION OF UNTREATED ZONE C SAMPLES (Continued)

^c Distribution: N = Normal; L = Lognormal.

^d If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean isgiven.

normal^e If the distribution is or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

^h Not applicable if sample size ≤ 2.

^i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size ≤ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

^j Freqency of detection is less than 5%.

^k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.

^l Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.

^m Statistics for constituent with outliers rejected.

TABLE A-16, TCLP CHEMICAL DATA, SILO 2, CHARACTERIZATION OF UNTREATED ZONE A SAMPLES

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist^c	Mean^d (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coef. of Var. (%)
2-Butanone	1 /1	0.002 - 0.002	^h	0.002	^h	^h	^h	^h
4-Methyl-2-pentanone	1 /1	0.001 - 0.001	^h	0.001	^h	^h	^h	^h
Aluminum	1 /1	2.750 - 2.750	^h	2.750	^h	^h	^h	^h
Antimony	1 /1	0.113 - 0.113	^h	0.113	^h	^h	^h	^h
Arsenic	1 /1	0.082 - 0.082	^h	0.082	^h	^h	^h	^h
Barium	1 /1	0.239 - 0.239	^h	0.239	^h	^h	^h	^h
Beryllium	1 /1	0.005 - 0.005	^h	0.005	^h	^h	^h	^h
Boron	1 /1	1.500 - 1.500	^h	1.500	^h	^h	^h	^h
Cadmium	1 /1	0.010 - 0.010	^h	0.010	^h	^h	^h	^h
Calcium	1 /1	975.00 -975.00	^h	975.00	^h	^h	^h	^h
Chromium	1 /1	0.132 - 0.132	^h	0.132	^h	^h	^h	^h
Cobalt	1 /1	6.160 - 6.160	^h	6.160	^h	^h	^h	^h
Copper	1 /1	3.860 - 3.860	^h	3.860	^h	^h	^h	^h
Iron	1 /1	0.084 - 0.084	^h	0.084	^h	^h	^h	^h
Lead	1 /1	117.00 -117.00	^h	117.00	^h	^h	^h	^h
Magnesium	1 /1	29.600 -29.600	^h	29.600	^h	^h	^h	^h
Manganese	1 /1	1.620 - 1.620	^h	1.620	^h	^h	^h	^h
Molybdenum	1 /1	0.034 - 0.034	^h	0.034	^h	^h	^h	^h
Nickel	1 /1	5.770 - 5.770	^h	5.770	^h	^h	^h	^h
Potassium	1 /1	3.730 - 3.730	^h	3.730	^h	^h	^h	^h
Selenium	1 /1	0.060 - 0.060	^h	0.060	^h	^h	^h	^h
Silicon	1 /1	13.800 -13.800	^h	13.800	^h	^h	^h	^h
Silver	1 /1	0.099 - 0.099	^h	0.099	^h	^h	^h	^h
Vanadium	1 /1	0.060 - 0.060	^h	0.060	^h	^h	^h	^h
Zinc	1 /1	0.563 - 0.563	^h	0.563	^h	^h	^h	^h
beta-BHC	1 /1	0.001 - 0.001	^h	0.001	^h	^h	^h	^h

TABLE A-16, TCLP CHEMICAL DATA, SILO A, CHARACTERIZATION OF UNTREATED ZONE A SAMPLES (Continued)

^c Distribution: N = Normal; L = Lognormal.

^d If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.

^e If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

^h Not applicable if sample size ≤ 2.

^j Freqency of detection is less than 5%.

^k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.

^l Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.

^m Statistics for constituent with outliers rejected.

465X TABLE A-17, TCLP CHEMICAL DATA, SILO 2, CHARACTERIZATION OF UNTREATED ZONE B SAMPLES

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist^c	Mean^d (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coef. of Var. (%)
Aluminum	1 /1	1.620 - 1.620	^h	1.620	^h	^h	^h	^h
Antimony	1 /1	0.090 - 0.090	^h	0.090	^h	^h	^h	^h
Arsenic	2 /2	0.095 - 0.322	^h	0.209	^h	^h	^h	^h
Barium	2 /2	1.470 - 4.975	^h	3.222	^h	^h	^h	^h
Beryllium	1 /1	0.005 - 0.005	^h	0.005	^h	^h	^h	^h
Boron	1 /1	0.714 - 0.714	^h	0.714	^h	^h	^h	^h
Cadmium	2 /2	0.055 - 0.076	^h	0.065	^h	^h	^h	^h
Calcium	1 /1	666.00 -666.00	^h	666.00	^h	^h	^h	^h
Carbon disulfide	1 /1	0.004 - 0.004	^h	0.004	^h	^h	^h	^h
Chromium	2 /2	0.099 - 0.207	^h	0.153	^h	^h	^h	^h
Cobalt	1 /1	5.850 - 5.850	^h	5.850	^h	^h	^h	^h
Copper	1 /1	2.960 - 2.960	^h	2.960	^h	^h	^h	^h
Iron	1 /1	0.073 - 0.073	^h	0.073	^h	^h	^h	^h
Lead	1 /1	260.00 -260.00	^h	260.00	^h	^h	^h	^h
Magnesium	1 /1	25.500 -25.500	^h	25.500	^h	^h	^h	^h
Manganese	1 /1	1.240 - 1.240	^h	1.240	^h	^h	^h	^h
Molybdenum	1 /1	0.045 - 0.045	^h	0.045	^h	^h	^h	^h
Nickel	1 /1	4.960 - 4.960	^h	4.960	^h	^h	^h	^h
Potassium	1 /1	5.200 - 5.200	^h	5.200	^h	^h	^h	^h
Selenium	2 /2	0.066 - 0.568	^h	0.317	^h	^h	^h	^h
Silicon	1 /1	18.600 -18.600	^h	18.600	^h	^h	^h	^h
Silver	2 /2	0.082 - 0.164	^h	0.123	^h	^h	^h	^h
Thallium	1 /1	0.003 - 0.003	^h	0.003	^h	^h	^h	^h
Vanadium	1 /1	0.046 - 0.046	^h	0.046	^h	^h	^h	^h
Zinc	1 /1	0.555 - 0.555	^h	0.555	^h	^h	^h	^h
alpha-BHC	2 /2	0.000 - 0.000	^h	0.000	^h	^h	^h	^h
beta-BHC	2 /2	0.000 - 0.001	^h	0.000	^h	^h	^h	^h

^c Distribution: N = Normal; L = Lognormal.

^d If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.

TABLE A-17, TCLP CHEMICAL DATA, SILO 2, CHARACTERIZATION OF UNTREATED ZONE B SAMPLES (Continued)

^e If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

^h Not applicable if sample size ≤ 2.

^j Freqency of detection is less than 5%.

^k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.

^l Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.

^m Statistics for constituent with outliers rejected.

TABLE A-18, TCLP CHEMICAL DATA, SILO 2, CHARACTERIZATION OF UNTREATED ZONE C SAMPLES

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist^c	Mean^d (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coef. of Var. (%)
2-Butanone	1 /4	0.002 - 0.002	L^1	0.005	0.004	0.001^i	0.002^i	115.50
Acetone	3 /6	0.015 - 0.092	L^1	0.052	0.066	0.028	0.092^i	59.945
Aluminum	7 /7	0.462 - 1.440	N	0.995	1.145	0.748	1.242	33.848
Antimony	6 /6	0.079 - 0.123	L^1	0.088	0.083	0.076^i	0.101	19.120
Arsenic	6 /7	0.003 - 0.005	L^1	0.003	0.003	0.002^i	0.004	42.712
Barium	7 /7	0.157 - 8.470	L	2.491	0.247	0.052^i	8.470^i	142.65
Beryllium	7 /7	0.003 - 0.005	L	0.004	0.005	0.004	0.005^i	13.136
Boron	2 /2	0.240 - 0.300	^h	^h	0.270	0.240^h	0.300^h	15.713
Cadmium	5 /5	0.023 - 0.077	L^1	0.030	0.024	0.018^i	0.050	69.780
Calcium	7 /7	163.00 -581.00	L	342.09	327.61	244.97	489.68	36.097
Chromium	7 /7	0.086 - 0.138	L	0.121	0.126	0.107	0.137	13.795
Cobalt	7 /7	1.180 - 2.640	L	1.695	1.380	1.278	2.267	33.499
Copper	7 /7	0.274 - 0.964	L	0.556	0.430	0.362	0.876	45.624
Iron	7 /7	0.053 - 0.090	N	0.076	0.079	0.068	0.085	15.232
Lead	6 /6	314.00 -772.00	L^1	430.22	331.98	299.73^i	617.50	47.840
Magnesium	7 /7	7.350 -16.500	L	9.704	8.840	7.542	12.549	33.866
Manganese	7 /7	0.409 - 0.628	L	0.498	0.469	0.440	0.566	16.112
Methylene chloride	3 /6	0.014 - 0.046	L^1	0.011	0.011	0.005^i	0.024	101.42
Molybdenum	7 /7	0.041 - 0.099	L	0.060	0.047	0.042	0.086	42.660
N-Nitroso-di-n-propylamine	1 /6	0.005 - 0.005	L^1	0.009	0.010	0.007	0.005^i	22.268
Nickel	7 /7	2.008 - 3.720	L	2.524	2.130	2.024	3.166	28.072
Pentachlorophenol	1 /6	0.018 - 0.018	L^1	0.042	0.050	0.030	0.018^i	29.248
Potassium	4 /7	2.640 - 5.310	L^1	2.363	2.640	1.639^i	3.408	52.880
Selenium	7 /7	0.026 - 0.072	L	0.045	0.045	0.034	0.062	32.807
Silicon	5 /5	11.977 -24.300	L^1	14.040	12.200	10.473^i	18.823	36.837
Silver	7 /7	0.053 - 0.094	L	0.080	0.083	0.069	0.094	16.340
Thallium	7 /7	0.002 - 0.029	L	0.008	0.004	0.002^i	0.029^i	117.71
Vanadium	5 /5	0.049 - 0.057	L^1	0.052	0.052	0.049	0.055	5.592
Zinc	7 /7	0.114 - 0.330	L	0.190	0.162	0.133	0.274	42.289
beta-BHC	3 /7	0.000 - 0.001	L^1	0.000	0.000	0.000^i	0.000	143.15
bis(2-Ethylhexyl) phthalate	3 /6	0.006 - 0.055	L^1	0.012	0.010	0.007	0.023	111.48

TABLE A-18, TCLP CHEMICAL DATA, SILO 2, CHARACTERIZATION OF UNTREATED ZONE C SAMPLES (Continued)

^c Distribution: N = Normal; L = Lognormal.

^d If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.

^e If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

^h Not applicable if sample size ≤ 2.

^i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size ≤ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

^j Freqency of detection is less than 5%.

^k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.

^l Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.

^m Statistics for constituent with outliers rejected.

APPENDIX B

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EXPLANATION OF THE TREATABILITY CLIPPER PROGRAM

The data base package was created with Clipper Software. The data base is divided into several sets. These are as follows:

- General Sample Information - This section contains information on the cement stabilization treatability.
- Chemical Extraction Data - This section contains information on the chemical extraction experiments.
- Reagent Addition Data - This section contains information on precipitation experiments.
- Extraction Studies Data - This section contains data on time and temperature studies and washing studies.
- Vitrification General Sample Information - This section contains information on vitrification samples.

General Sample Information - Cement Stabilization

- Composite Sample - The entries in this column are either "Y" or "N." "Y" indicates that a sample is a composite (i.e., waste from more than one raw waste sample) was used in mixing the treatability sample. "N" indicates that only one waste sample was used (or in the case of the raw materials [play sand] samples, no waste).
- Fernald Sample # - These are six digit numbers, which the Fernald sample tracking system uses. If a sample is a composite, a new Fernald number is assigned by the treatability laboratory. If a sample is not a composite, the sample number assigned to the untreated waste sample at Fernald is used.
- Treatability Sample # - Each treatability sample is assigned a unique number. The first four digits represent the laboratory notebook. The next two digits represent the page in the notebook on which the sample formulation data is entered. The last two digits represent the containers in which the sample is cured.
- ETDC Sample # - Each sample container that is logged into the treatability laboratory is assigned a unique number, even if a sample is shipped in several containers.
- Comment - Self explanatory.
- ETDC #1 through ETDC #8 Waste - If more than on ETDC sample is used in a sample, then the ETDC sample number for each is entered as appropriate.
- ETDC #1 Flyash - If flyash is used in a sample, the ETDC number from the sample container is entered.
- ETDC #2 Flyash - If flyash from two containers is used, the second container number is entered.

- Fernald #1 Waste - If more than one Fernald sample was used, the Fernald sample number from the first waste is entered.
- Fernald #2 Waste - If two fernald waste samples were used, the sample number for the second sample is entered.
- Fernald #1 Flyash - This column lists the Fernald sample numbers of the flyash used in the sample.
- Mold Mix Date - This represents the date on which a sample was mixed with reagents and placed in the containers to begin the curing process.
- Planned Days to Cure - These dates are 28 days after the mold mix date.
- UCS Date - the date on which the sample was confined compressive strength (UCS) tested. This date should be the same as the "Planned Days to Cure" date.
- Mold Crush Date - The date on which the cured treatability samples were crushed to a particle size meeting the requirements of the TCLP.
- MTCLP Extract Date - The date on which the MTCLP extraction was started.
- MTCLP Ship Date - The date on which the MTCLP extract was shipped to the analytical laboratory.
- MTCLP Analysis Date - The date on which the metals analysis was completed.
- TCLP Extract Date - The date on which the analytical laboratory performed the TCLP extraction.
- TCLP Ship Date - The date on which the crushed samples were shipped from the treatability laboratory to the analytical laboratory.
- TCLP Analysis Date - The date on which the TCLP analysis was completed for metals and organics.
- PCT Ship Date - Not applicable to cement stabilization.
- PCT Analysis Date - Not applicable to cement stabilization.
- PCT Extract Date - Not applicable to cement stabilization.
- Static Extract Date - The date on which the 5-day static leach test is completed.
- Static Ship Date - The date on which 5-day static leachate is sent to the analytical laboratory.
- Static Analysis Date - The date on which 5-day static samples were analyzed.
- Radon E. Extract Date - Superseded by radon-7 and radon-30 extract dates.

- Radon E. Ship Date - Superseded by radon-7 and radon-30 ship dates.
- Radon E. Analysis Date - Superseded by radon-7 and radon-30 analysis dates.
- Radon-7 Extract Date - The date on which 7-day radon leaching samples are collected.
- Radon-7 Ship Date - The date on which radon-7 extract samples are shipped to the analytical laboratory.
- Radon-7 Analysis Date - The date on which radon-7 samples are analyzed for radon concentration.
- Radon-30 Extract Date - The date on which 30-day radon leaching samples are collected.
- Radon-30 Analysis Date - Date 30-day radon leach samples were analyzed.
- Amount of Waste - The mass of waste, in grams, used in mixing the treatability samples.
- Amount of Soil - Not applicable to cement stabilization.
- Soil Origin - Not applicable to cement stabilization.
- Type of Cement - Either Type I of Type II portland cement was used.
- Amount of Cement - The mass of cement, in grams, used in the treatability sample.
- Flyash Origin - Site flyash from the Operable Unit 2 or commercial flyash was used in the treatability study.
- Amount of Flyash - The mass of flyash, in grams, used in the treatability study.
- Amount of Sodium - The mass of sodium silicate, in grams, used in the treatability sample.
- Amount of Attapulg - The mass of attapulgite, in grams, used in the sample.
- Amount of Clinopti - The mass of clinoptilolite, in grams, used in the sample.
- Amount of H2O - The amount of water, in grams, used in the sample.
- Amount of Sodium H. - Not applicable to cement stabilization.
- Hand Mix - An "N" indicates that a mechanical mixer was used to mix the sample.
- Bentonite - The amount of bentonite, in grams, used in the sample.
- Sieve Size - Typically, the waste was passed through a sieve before it was used to make treatability samples. This column lists the size of the openings in the sieve.
- Weight Not Passing Sieve - This column reports the mass of material in the raw sample that would not pass through the sieve.

- Percent Not Passing Sieve - The percentage of the raw sample that would not pass through the sieve.
- Temperature of Oven - Not applicable to cement stabilization.
- Time of Sample Heating (min) - Not applicable to cement stabilization.
- $FeCl_2$ - The mass of ferrous chloride, in grams, added to the formulation.
- BFS - The mass of blast furnace slag, in grams, added to the formulation.
- $Ca(OH)_2$ - Not applicable to cement stabilization.
- Normalized Waste - To make it easier to compare the various formulations, all of the reagents were adjusted to a normalized waste quantity of 100 grams.
- Percent of H_2O in Waste - Percent of raw waste that is water.
- Normalized Water - The mass of water, in grams, used for each 100 grams of waste to mix the samples.
- Normalized Na Silicate - The mass of sodium silicate, in grams, used for each 100 grams of waste to make the treatability sample.
- Dry Blend - The sum, in grams, of normalized cement, normalized flyash, normalized attapulgite, and normalized clinoptilolite, used in the sample.
- Normalized Cement - The mass of cement in grams, used for each 100 grams of waste.
- Normalized Flyash - The mass of attapulgite, in grams, is used for each 100 grams of waste.
- Normalized Clinoptil - The mass of clinoptilolite, in grams, used for each 100 grams of waste.
- Normalized Soil - Not applicable to cement stabilization.
- Normalized N. Hydro - Not applicable to cement stabilization.
- Normal $FeCl_2$ - The mass of ferrous chloride, in grams, used for each 100 grams of waste.
- Normal BFS - The mass of blast furnace slag, in grams, used for each 100 grams of waste.
- Normal Bentonite - The mass of bentonite, in grams, used for each 100 grams of waste.
- Percent of Waste - The mass of waste used to make the treatability sample divided by the mass of the mixed treatability sample, multiplied by 100.
- Percent of Cement - The mass of cement used to make the treatability sample, divided by the mass of sample, multiplied by 100.

- Percent of Flyash - The mass of flyash used to make the treatability sample, divided by the mass of the sample, multiplied by 100.

- Percent of Sodium Silicate - The mass of sodium silicate used to make the treatability sample, divided by the mass of sample, multiplied by 100.

- Percent of Attapulg - The mass of attapulgite used to make the treatability sample, divided by the mass of the sample, multiplied by 100.

- Percent of Clinoptil - The mass of clinoptilolite used to make the treatability sample, divided by the mass of the sample, multiplied by 100.

- Percent of H_2O - The mass of water added to make the treatability sample, divided by the mass of the sample, multiplied by 100.

- Percent of $FeCl_2$ - The mass of ferrous chloride, in grams, used for each 100 grams of waste.

- Percent of BFS - The mass of blast furnace slag, in grams, used for each 100 grams of waste.

- Percent of Bentonite - The mass of bentonite, in grams, used for each 100 grams of waste.

- General Description of Waste (Before and After Mixing) - Self explanatory.

- pH of Waste - This measurement is made on a mixture of raw waste and water.

- Eh of Waste (mV) - The oxidation/reduction potential, measured in millivolts, on a mixture of raw waste and water.

- pH of Flyash - This measurement is made on a mixture of raw waste and water.

- Eh of Flyash - The oxidation/reduction potential, measured in millivolts, on a mixture of raw waste and water.

- pH of Mixture - This measurement is made on the newly mixed treatability sample after all reagents have been added.

- Eh of Mixture - The oxidation/reduction potential, measured in millivolts, in the same manner as the pH of the mixture.

- Waste Moisture Content - This is the percent moisture of the raw waste used in mixing the treatability sample.

- Flyash Moisture Content - The percent moisture in the raw flyash.

- Mixture Moisture Content - The percent moisture of the newly mixed, wet treatability sample.

- Temp Rise - The amount that the temperature of the mixture rises, in degrees centigrade, approximately 10 minutes after the sample has been mixed.

- Time Between Mix and Temperature Measurement - The time elapsed between completion of mixing sample and temperature reading.

- Crushed Moisture Content - The percent moisture of the sample after it has cured at least 28 days.

- Shear Strength - Preliminary process data in tons per square foot.

- Pocket Penet - A measurement of the penetration resistance of the sample with a pocket penetrometer in tons per square foot.

- Gross Alpha (dpm) - The number given represents the alpha activity of radionuclides in disintegrations per minute in a 4 milliliter sample of MTCLP extraction fluid. The number has been corrected for background and counter efficiency.

- Gross Beta (dpm) - The number given represents the beta activity of radionuclides in disintegration per minute in a 4 milliliter sample of MTCLP extraction fluid. The number has been corrected for background and instrument efficiency.

- Gross Alpha (pCi/L) - Gross alpha activity of MTCLP extraction fluid expressed in picoCuries per liter.

- Gross Beta (pCi/L) - Gross beta activity of the MTCLP extraction fluid expressed in picoCuries per liter.

- Total Uranium - The concentration of uranium, in parts per million (ppm), in the MTCLP extraction fluid.

- UCS - The unconfined compressive strength, in pounds per square inch, of a treatability sample that has cured for 28 days.

- Bulking Factor - The percent increase in volume of the waste due to treatment.

- Bulking Density - The density of the treated sample in grams per cubic centimeter.

- Permeability - A measurement of the ability of water to seep through a treatability sample. Units are centimeters per second.

- pH of MTCLP Deter Test - There are two TCLP extraction fluids - Type 1 and Type 2. A test is performed on each sample to determine which type of fluid is used. The pH of the determination test solution, which is given in this column, is the basis for the decision.

- pH of MTCLP - The pH of the MTCLP extraction fluid upon completion of the treatability sample extraction.

- Type (1/2) - Type of extraction fluid used to perform the MTCLP extraction.

- Comment - Self explanatory.

- Arsenic - Concentration of arsenic, in ppm, in the MTCLP extraction fluid.

- Silver - Concentration of silver, in ppm, in the MTCLP extraction fluid.
- Barium - Concentration of barium, in ppm, in the MTCLP extraction fluid.
- Cadmium - Concentration of cadmium, in ppm, in the MTCLP extraction fluid.
- Chromium - Concentration of chromium, in ppm, in the MTCLP extraction fluid.
- Lead - Concentration of lead, in ppm, in the MTCLP extraction fluid.
- Selenium - Concentration of selenium, in ppm, in the MTCLP extraction fluid.

Chemical Extraction Data

- Treatability Sample # - Each treatability sample is assigned a unique number. The first four digits represent the laboratory notebook. The next two digits represent the page in the notebook on which the sample formulation data is entered. The last two digits are used to distinguish samples when more than one are on the same page.
- Fernald Sample #1 - If more than one Fernald sample was used, the Fernald sample number from the first waste is entered.
- Fernald Sample #2 - If two Fernald samples were used, the sample number for the second sample is entered.
- Composite Fernald Sample # - These are six digit numbers, which the Fernald sample tracking system uses. If a sample is a composite, a new Fernald number is assigned by the treatability laboratory. If a sample is not a composite, the sample number assigned to the untreated waste sample at Fernald is used.
- ETDC Sample #1 - If more than one ETDC sample is used in a sample, then the first waste appears in this column.
- ETDC Sample #2 - If waste from two sample containers is used, the ETDC sample number from the second container is entered in this column.
- Silo Number - Waste used in the chemical extraction tests came from Silos 1 and 2. This column indicates which of the two.
- Phase - the "1" indicates that the sample resulted from preliminary phase test, and an "ADV" indicates advanced phase.
- Stage - There were two stages of testing associated with the preliminary phase, and one with the advanced phase.
- Batch - This is applicable only to advanced phase extractions. There were four advanced phase extracted samples generated. Each was processed in four separate batches.
- Bentonite - The mass of bentonite, in grams, added to the waste before the extractions were performed.

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- Sample net weight - The mass of waste, in grams, used in the extraction experiment.

- pH - The pH of the extraction fluid at the end of the extraction. Generally was not recorded.

- Acid Net Weight - The mass of acid, in grams, used for the sample.

- Extraction Fluid 1 - Two extractions were performed on some solids. The following are conditions for the first extraction.

  - Name - The type of acid used in the extraction experiment.

  - Conc. - Concentration of the acid in normality, molarity, or percent.

  - Liquid/Solid Ratio - The mass of extractant liquid to mass of waste used in the experiment.

  - Time - The number of hours the extraction was allowed to occur.

  - Temperature - The temperature at which the chemical extraction was performed.

  - # of Ext. - This indicates the number of extractions that were performed on the waste.

  - H_2O/Solid Ratio - The mass of rinse water to the mass of waste before it was extracted.

  - Temp. - The temperature of the rinse water.

- Extraction Fluid 2 - This is the second extraction of two performed on some solids. Refer to extraction fluid 1 for explanation of the conditions.

- Lead - Not applicable - analysis not done.

- Uranium - Not applicable - analysis not done.

- Alpha Solid - The gross alpha activity of the extracted solids in µCi/g.

- Beta Solid - The gross beta activity of the extracted solids in µCi/g.

- Comment - Self explanatory.

- Leachate 1st Extraction - From 1 to 6 extractions were performed on the waste samples.

  - Gross Alpha - The gross alpha activity of the extraction fluid in µCi/mL.

  - Gross Beta - The gross beta activity of the extraction fluid in µCi/mL.

  - Lead - The concentration of lead, in ppm, in the extraction fluid.

  - Uranium - The concentration of uranium, in ppm, in the extraction fluid.

- Leachate 2nd Extraction - Refer to Leachate 1st Extraction for explanation.

- Leachate 3rd Extraction - Refer to Leachate 1st Extraction for explanation.

- Leachate 6th Extraction - Refer to Leachate 1st Extraction for explanation.

Reagent Addition Data - Precipitation Experiments

- Fernald Sample # - If more than one Fernald sample was used, the Fernald sample number from the first waste is entered.

- Treatability Sample # - Each treatability sample is assigned a unique number. The first four digits represent the laboratory notebook. The next two digits represent the page in the notebook on which the sample formulation data is entered. The last two digits are used to distinguish samples from each other when more than one are on the same page.

- ETDC Sample #1 - If more than one ETDC sample is used in a sample, then the first waste appears in this column.

- ETDC Sample #2 - If waste from two sample containers is used, the ETDC sample number from the second container is entered in this column.

- Stage - This indicates Stage 1 or 2 testing.

- Test - This is a test number assigned to each experiment during the course of testing.

- Feed Sample # - This is the sample number assigned to the spent extractant used in the experiment.

- Description - This is a description of the feed sample.

- pH Before Reagent #1 - This is the pH of the feed before addition of the first reagent.

- Sample Wt. - The weight of the feed used in the experiment.

- Sample density - Was not measured.

- Reagent #1 - The first reagent added to the feed.

- Conc. (% wgt) Reagent #1 - The concentration in weight percent of the first reagent.

- Amount of Reagent #1 - The amount of liquid reagent added to the feed.

- Dose Reagent #1 - The dry weight of reagent in grams added per gram of liquid feed.

- Time of Reagent #1 - The time allowed for reagent #1 to react.

- Turbidity of Reagent #1 - The turbidity of the treated sample in FTU (formazin turbidity units).

- Comments - Self explanatory.

NOTE: The explanations for reagents #2, #3, and #4 are the same as for reagent #1. The sample weight for each of these refers to the sample before reagent #1 was added.

- Alpha Solid - Not measured.

- Beta Solid - Not measured.

- Alpha Liquid - Not measured.

- Beta Liquid - Not measured.

- Lead - The lead concentration in the precipitate in ppm.

- Uranium - The uranium concentration is the precipitate in ppm.

Extraction Studies Data

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- Study - Indicates type of test or experiment.

- Run - A run number was assigned so that samples could be followed through the various steps. For example, there are three samples with run #4. The first #4 is an EDTA extraction. The second #4 is a second EDTA extraction on the same silo waste. The third run #4 is a KCl extraction. The fourth run #4 is the residual solids left after the extractions were completed.

- Fernald Sample # - Sample number assigned at Fernald.

- Book # - Laboratory notebook number. Also the first four digits in the treatability sample number.

- Page # - Page in the notebook where information on the sample is found. Also the fifth and sixth digits in the treatability sample number.

- Sample Number - The seventh and eighth digits in the treatability sample number.

- Silo # - Indicates Silo 1 or Silo 2.

- Time (hrs) - The number of hours at which extraction was run.

- Temp - Temperature in degrees C at which extraction was run.

- # of Ext. - Number of extractions run on the sample.

- # of Rins. - Number of water rinses.

- Sample Size - Amount of waste material, in grams, tested.

- Reaction Vessel - Size and type of vessel in which extractions were performed.

- Extract Liq/Solid Ratio - Weight of liquid in grams per unit weight of solid in grams.

- Rinse Liq/Solid Ratio - Weight of rinse water in grams per unit weight of solid (before it was extracted) in grams.

- Process Step - Refers to extraction number.

- Description - Self explanatory.

- Pb-ICP - Lead concentration by inductively coupled plasma, in ppm, of the solid waste.

- Th-ICP - Thorium concentration by inductively coupled plasma, in ppm, of the solid waste.

- U-ICP - Uranium concentration by inductively coupled plasma, in ppm, of the solid waste.

- U-IC - Uranium concentration by ion chromatography, in ppm, of the solid waste.

- Gross Alpha - Gross alpha activity in microCurie per gram of the solid waste.

- Gross Beta - Gross beta activity in microCurie per gram of the solid waste.

Vitrification - General Sample Information

- Comp. Sample - Y indicates that the sample was a composite.

- Fernald Sample # - See previous general sample information.

- Treatability Sample # - See previous general sample information.

- ETDC Sample # - See previous general sample information.

- Comment - Self explanatory

- Fernald #1 Flyash - This column lists the Fernald sample number if Fernald flyash was used in the sample.

- Fernald #2 Flyash - Not used.

- MTCLP Sample # - Each glass was tested by two leach procedures - MTCLP and PCT. To avoid confusion, a new sample number was assigned to the leachate.

- PCT Sample # - Refer to explanation for MTCLP Sample #.
- Sample melt date - The date on which the samples were melted. 5448
- PCT grind date - Date on which samples were processed through the grinder.
- MTCLP Crush date - Date samples were crushed for MTCLP.
- MTCLP Extract date - Date MTCLP extract was run.
- MTCLP ship date - Date MTCLP leachate was sent for analysis.
- MTCLP analysis date - Date MTCLP extract was analyzed.
- TCLP Crush Date - Not applicable.
- TCLP Extract Date - Not applicable.
- TCLP Ship Date - Not applicable.
- TCLP Analysis Date - Not applicable.
- PCT Ext. Start Date - Date on which PCT leach was started.
- PCT Ext. Finish Date - Date PCT leach was completed.
- PCT Ship Date - Date PCT leachate was submitted for analysis.
- PCT Analysis Date - Date PCT leachate was analyzed.
- Radon-7 Extract Start Date - Date radon leaching in water was started.
- Radon-7 Extract Finish Date - Date 7-day radon water samples were collected.
- Radon-7 Ship Date - Date 7-day radon water samples were shipped.
- Radon-30 Extract Start Date - Date 30-day radon water samples were shipped.
- Radon-30 Extract Finish Date - Date 30-day radon water samples were shipped.

- Radon-30 Extract Date - Date 30-day radon water sample was collected. (Same as Radon-30 extract finish date).

- Radon-30 Ship Date - Date 30-day radon water sample were shipped.

- Comment - Self explanatory.

- Amount of waste - Mass of roasted waste, in grams, waste used in sample.

- Amount of soil - Amount of soil, in grams, used in sample.

- Amount of site flyash - Amount of flyash, in grams, used in the sample.

- Amount of $Na2CO_3$ - Amount of sodium carbonate, in grams, added to the sample.

- General Description - Description of waste before and after vitrification.

- Times at temperature ranges:

  - Amb. - 750 degrees C - Time in hours taken to increase the oven temperature from ambient to 750 degrees C.

  - 750 degrees C - Time in hours at 750 degrees centigrade.

  - 750 degrees C - 1250 C - Time taken to increase oven temperature from 750°C to 1250°C.

  - 1250 C - Time in hours that the sample was heated at 1250°C.

  - 1250 C -- Amb. - Time in hours that the sample was given to cool.

- Normalized Waste - The normalized waste, in grams, was chosen to be 100 grams for comparison with reagents. This is not the actual amount used.

- Normalized Flyash - The amount of flyash, in grams, added for each 100 grams of normalized waste.

- Normalized Soil - The amount of soil, in grams, added for each 100 grams of normalized waste.

- Normalized Na. Carbonate - The amount of sodium carbonate, in grams, used for each 100 grams of normalized waste.

- Normalized Na. Carbonate as Na_2O - The amount of sodium carbonate expressed as sodium oxide, in grams, used for each 100 grams of normalized waste.

- % of waste - The amount of waste in the sample mixture, expressed as a percentage.

- % of flyash - The amount of flyash in the sample mixture, expressed as a percentage.

- % of soil - The amount of soil in the sample mixture, expressed as a percentage.

- % of sodium - The amount of sodium in the sample mixture, expressed as a percentage.

- PCT Gross Alpha (dpm) - The gross alpha count of the PCT leachate expressed in disintegrations per minute.

- PCT Gross Alpha (pCi/l) - The gross alpha count of the PCT leachate, expressed in picocuries per liter.

- PCT Gross Beta (dpm) - The gross beta count of the PCT leachate, expressed in disintegrations per liter.

- PCT Gross Beta (pCi/l) - The gross beta count of the PCT leachate, expressed in picocuries per liter.

- MTCLP Gross Alpha (dpm) - The gross alpha count of the MTCLP leachate from this treatability sample, expressed in disintegrations per minute.

- MTCLP Gross Alpha (pCi/l) - The gross alpha count of the MTCLP leachate from this treatability sample, expressed in picocuries per liter.

- MTCLP Gross Alpha (dpm) - The gross beta count of the MTCLP leachate from this treatability sample, expressed in disintegrations per minute.

- MTCLP Gross Beta (pCi/l) - The gross beta count of the MTCLP leachate from this treatability sample, expressed in picocuries per liter.

- PCT Uranium (ppm) - The amount of Uranium in the PCT leachate, expressed in part per million.

- MTCLP Uranium (ppm) - The amount of Uranium in the MTCLP leachate from this PCT treatability sample, expressed in part per million.

- PCT Chloride - The amount of chloride in the PCT leachate sample, expressed in part per million.

- PCT Nitrate - The amount of nitrate in the PCT leachate sample, expressed in part per million.

- PCT Sulfate - The amount of sulfate in the PCT leachate sample, expressed in part per million.

- Moisture Content of Waste - The amount of water in the waste, expressed as a percentage.

- Bulk Density Raw Waste - The bulk density of the raw waste, in grams per cubic centimeter.

- Bulk Density Treated Waste - The bulk density of the vitrified waste, after reagents, in g/cc.

- Bulking Factor - The expansion factor due to the increased volume when reagents are added. Bulking factors for vitrification are negative, indication volume reduction.

- Final Weight of Vitrified Material - Weight of the material, after vitrification.

- Density of Vitrified Waste - Density of the vitrified waste, in grams per cubic centimeter.

- Weight of glass for MTCLP - Weight of crushed glass used for the TCLP test on this treatability sample.

- Weight of glass for TCLP - Weight of crushed glass used for the TCLP test on this treatability sample.

- Size Fraction for MTCLP - The size fraction of the crushed glass used for the MTCLP test on this treatability sample.

- Weight of glass ground for PCT - The weight of the glass ground up (for the PCT).
- Weight of glass > 150 microns - The weight of ground glass with a size greater than 150 micros (after sieving).
- Weight of glass 75-150 microns - The weight of ground glass with a size between 75 and 150 microns (after sieving).
- Weight of glass <75 microns - The weight of ground glass with a particle size less than 75 microns (after sieving).
- pH of Leachate - pH of the leachate from the PCT.
- Fluoride conc. of leachate - The concentration of fluoride ions in the leachate from the PCT.
- Weight of glass and Volume of H_2O in each container for PCT - Self explanatory.
- Gross weight of glass - The gross weights (initial and final) of ground glass in each container.
- Comments - Self explanatory.

B-1

Cement Stabilization

OU-4

GENERAL SAMPLE INFORMATION

03/30/93

COMP. SAMPLE	FERNALD SAMPLE #	TREAT. SAMPLE #	ETDC SAMPLE #	COMMENT	ETDC #1 WASTE	ETDC #2 WASTE	ETDC #3 WASTE	ETDC #4 WASTE	ETDC #5 WASTE	ETDC #6 WASTE	ETDC #7 WASTE	ETDC #8 WASTE	ETDC #1 FLYASH	FERN. #1 WASTE	FERN. #2 WASTE	FERN. #1 FLYASH
N	100078	10330601	921	SILO 1, STAGE I	921	922										
N	100078	10330801	922	SILO 1, STAGE I	922	923										
N	100078	10331001	924	SILO 1, STAGE I												
N	100078	10331201	925	SILO 1, STAGE I	925	926										
N	100078	10331401	927	SILO 1, STAGE I												
N	100078	10331601	928	SILO 1, STAGE I												
N	100078	10331801	929	SILO 1, STAGE I												
N	100078	10332001	930	SILO 1, STAGE I												
N	100078	10332201	931	SILO 1, STAGE I												
N	100078	10332401	932	SILO 1, STAGE I												
N	100078	10332601	933	SILO 1, STAGE I	933	934										
Y	75301	10332801	0	SILO 1, STAGE I	934	934							767	100078		67436
Y	75301	10333001	936	SILO 1, STAGE I	936								767	100078		67436
N	100043	10333201	888	SILO 2, STAGE I	888	889										
N	100043	10333401	890	SILO 2, STAGE I												
N	100043	10333601	891	SILO 2, STAGE I												
N	100043	10333801	892	SILO 2, STAGE I												
N	100043	10334001	893	SILO 2, STAGE I	893	894										
N	100043	10334201	895	SILO 2, STAGE I												
N	100043	10334401	896	SILO 2, STAGE I												
N	100043	10334601	897	SILO 2, STAGE I	897	898										
N	100043	10334801	899	SILO 2, STAGE I												
Y	75302	10335001	0	SILO 2, STAGE I	885	886							767	100043		67436
Y	75302	10335201	887	SILO 2, STAGE I	887								767	100043		67436
N	100074	10338001	1290	SILO 3, STAGE II												
N	100074	10338201	1290	SILO 3, STAGE II												
N	100074	10338401	1290	SILO 3, STAGE II												
N	100074	10338601	1291	SILO 3, STAGE II												
N	100074	10338801	1291	SILO 3, STAGE II												
N	100074	10339001	1291	SILO 3, STAGE II												
N	100074	10339201	1291	SILO 3, STAGE II	1291	1292										
N	100074	10339401	1292	SILO 3, STAGE II												
N	100074	10339601	1292	SILO 3, STAGE II												
N	100074	10339801	1292	SILO 3, STAGE II												
Y	75303	10430301	0	SILO 3, STAGE II	1292	1293							767	100074		67436
Y	75303	10430501	1293	SILO 3, STAGE II	1293								767	100074		67436
N	100074	10430701	1293	SILO 3, STAGE II												
N	100074	10430901	1293	SILO 3, STAGE II	1293	1294										
N	100057	10431101	1047	SILO 1, STAGE II												
N	100057	10431301	1048	SILO 1, STAGE II												
N	100057	10431501	1049	SILO 1, STAGE II												
N	100057	10431701	1050	SILO 1, STAGE II	1050	1051										
N	100057	10431901	1052	SILO 1, STAGE II												
N	100057	10432101	1052	SILO 1, STAGE II	1052	1053										
N	100057	10432301	1054	SILO 1, STAGE II	1054	1055										
N	100057	10432501	1056	SILO 1, STAGE II	1056	1058										
N	100057	10432701	1059	SILO 1, STAGE II	1059	1060										
N	100056	10432901	1086	SILO 1, STAGE II	1086	1061										
N	100056	10433101	1087	SILO 1, STAGE II												
N	100056	10433301	1061	SILO 1, STAGE II	1061	1086										
N	100056	10433501	1086	SILO 1, STAGE II	1086	1087										

000365

5448

COMP. SAMPLE	FERNALD SAMPLE #	TREAT. SAMPLE #	ETDC SAMPLE #	COMMENT	ETDC #1 WASTE	ETDC #2 WASTE	ETDC #3 WASTE	ETDC #4 WASTE	ETDC #5 WASTE	ETDC #6 WASTE	ETDC #7 WASTE	ETDC #8 WASTE	ETDC #1 FLYASH	FERN. #1 WASTE	FERN. #2 WASTE	FERN. #1 FLYASH
N	100056	10433701	1089	SILO 1, STAGE II	1089	1088										
N	100056	10433901	1090	SILO 1, STAGE II	1090	1089										
N	100072	10434101	1152	SILO 2, STAGE II	1152	1162	1163									
N	100072	10434301	1153	SILO 2, STAGE II	1153	1162	1163									
N	100072	10434501	1154	SILO 2, STAGE II	1154	1162	1163									
N	100072	10434701	1155	SILO 2, STAGE II	1155	1162	1163									
N	100072	10434901	1156	SILO 2, STAGE II	1156	1162	1163									
N	100072	10435101	1157	SILO 2, STAGE II	1157	1162	1163									
N	100072	10435301	1158	SILO 2, STAGE II	1158	1162	1163									
N	100072	10435501	1159	SILO 2, STAGE II	1159	1162	1163									
N	100072	10435701	1160	SILO 2, STAGE II	1160	1171										
N	100072	10435901	1164	SILO 2, STAGE II	1164	1171										
N	100072	10436101	1165	SILO 2, STAGE II	1165	1171										
N	100072	10436301	1166	SILO 2, STAGE II	1166	1171										
N	100072	10436501	1167	SILO 2, STAGE II	1167	1171										
N	100072	10436701	1168	SILO 2, STAGE II	1168	1171										
N	100072	10436901	1169	SILO 2, STAGE II	1169	1170										
N	100074	10480701	1295	SILO 3, STAGE III												
N	100074	10480702	1295	SILO 3, STAGE III												
N	100074	10480901	1294	SILO 3, STAGE III												
N	100074	10480902	1294	SILO 3, STAGE III												
N	100074	10481101	1295	SILO 3, STAGE III												
N	100074	10481102	1295	SILO 3, STAGE III												
N	100074	10481301	1296	SILO 3, STAGE III												
N	100074	10481302	1296	SILO 3, STAGE III												
N	100074	10481501	1295	SILO 3, STAGE III												
N	100074	10481502	1295	SILO 3, STAGE III												
N	100074	10481701	1294	SILO 3, STAGE III												
N	100074	10481702	1294	SILO 3, STAGE III												
N	100056	10482501	1091	SILO 1, STAGE III	1091	1094										
N	100056	10482701	1092	SILO 1, STAGE III	1092	1094	1095									
N	100056	10482901	1093	SILO 1, STAGE III	1093	1095										
N	100072	10483101	1172	SILO 2, STAGE III	1172	1175										
N	100072	10483301	1173	SILO 2, STAGE III	1173	1175	1177									
N	100072	10483501	1174	SILO 2, STAGE III	1174	1177	1178									
Y	75393	10538001	0	SILO 1/2, PRELIM. PH ASE CHEM EXT PRECIP	1435	1436	1437	1438	1439-1440	1441-1445	1408	1409-1417		100058	100073	
Y	75393	10538002	0	SILO 1/2, PRELIM. PH ASE CHEM EXT PRECIP	1435	1436	1437	1438	1439-1440	1441-1445	1408	1409-1417		100058	100073	
Y	75393	10538201	0	SILO 1/2, PRELIM. PH ASE CHEM EXT PRECIP	1435	1436	1437	1438	1439-1440	1441-1445	1408	1409-1417		100058	100073	
N	100047	10563101	996	SILO 1, ADV. PHASE, STRATA A	996	997	998	999	1000	1001	1002	1003				
N	100047	10563102	996	SILO 1, ADV. PHASE, STRATA A	996	997	998	999	1000	1001	1002	1003				
N	100047	10563103	996	SILO 1, ADV. PHASE, STRATA A	996	997	998	999	1000	1001	1002	1003				
N	100047	10563104	996	SILO 1, ADV. PHASE, STRATA A	996	997	998	999	1000	1001	1002	1003				
N	100047	10563105	996	SILO 1, ADV. PHASE, STRATA A	996	997	998	999	1000	1001	1002	1003				
N	100047	10563106	996	SILO 1, ADV. PHASE, STRATA A	996	997	998	999	1000	1001	1002	1003				

COMP. SAMPLE	FERNALD SAMPLE #	TREAT. SAMPLE #	ETDC SAMPLE #	COMMENT	ETDC #1 WASTE	ETDC #2 WASTE	ETDC #3 WASTE	ETDC #4 WASTE	ETDC #5 WASTE	ETDC #6 WASTE	ETDC #7 WASTE	ETDC #8 WASTE	ETDC #1 FLYASH	FERN. #1 WASTE	FERN. #2 WASTE	FERN. #1 FLYASH
N	100047	10563301	989	SILO 1, ADV. PHASE, STRATA A DUP.	989	990	991	992	993	994	995					
N	100047	10563302	989	SILO 1, ADV. PHASE, STRATA A DUP.	989	990	991	992	993	994	995					
N	100047	10563303	989	SILO 1, ADV. PHASE, STRATA A DUP.	989	990	991	992	993	994	995					
N	100047	10563304	989	SILO 1, ADV. PHASE, STRATA A DUP.	989	990	991	992	993	994	995					
N	100047	10563305	989	SILO 1, ADV. PHASE, STRATA A DUP.	989	990	991	992	993	994	995					
N	100047	10563306	989	SILO 1, ADV. PHASE, STRATA A DUP.	989	990	991	992	993	994	995					
N	100048	10563501	950	SILO 1, ADV. PHASE, STRATA B	950	951	952	953	954	955	956	957/958				
N	100048	10563502	950	SILO 1, ADV. PHASE, STRATA B	950	951	952	953	954	955	956	957/958				
N	100048	10563503	950	SILO 1, ADV. PHASE, STRATA B	950	951	952	953	954	955	956	957/958				
N	100048	10563504	950	SILO 1, ADV. PHASE, STRATA B	950	951	952	953	954	955	956	957/958				
N	100048	10563505	950	SILO 1, ADV. PHASE, STRATA B	950	951	952	953	954	955	956	957/958				
N	100048	10563506	950	SILO 1, ADV. PHASE, STRATA B	950	951	952	953	954	955	956	957/958				
N	100049	10563701	977	SILO 1, ADV. PHASE, STRATA C	977	978	979	980	981	982	983	984/985/986				
N	100049	10563702	977	SILO 1, ADV. PHASE, STRATA C	977	978	979	980	981	982	983	984/985/986				
N	100049	10563703	977	SILO 1, ADV. PHASE, STRATA C	977	978	979	980	981	982	983	984/985/986				
N	100049	10563704	977	SILO 1, ADV. PHASE, STRATA C	977	978	979	980	981	982	983	984/985/986				
N	100049	10563705	977	SILO 1, ADV. PHASE, STRATA C	977	978	979	980	981	982	983	984/985/986				
N	100049	10563706	977	SILO 1, ADV. PHASE, STRATA C	977	978	979	980	981	982	983	984/985/986				
N	100063	10563901	1242	SILO 2, ADV. PHASE, STRATA B	1242	1243	1244	1245	1246	1247	1248	1249/1250				
N	100063	10563902	1242	SILO 2, ADV. PHASE, STRATA B	1242	1243	1244	1245	1246	1247	1248	1249/1250				
N	100063	10563903	1242	SILO 2, ADV. PHASE, STRATA B	1242	1243	1244	1245	1246	1247	1248	1249/1250				
N	100063	10563904	1242	SILO 2, ADV. PHASE, STRATA B	1242	1243	1244	1245	1246	1247	1248	1249/1250				
N	100063	10563905	1242	SILO 2, ADV. PHASE, STRATA B	1242	1243	1244	1245	1246	1247	1248	1249/1250				
N	100063	10563906	1242	SILO 2, ADV. PHASE, STRATA B	1242	1243	1244	1245	1246	1247	1248	1249/1250				
N	100064	10564101	1188	SILO 2, ADV. PHASE, STRATA C	1188	1189	1190	1191	1192	1193	1194	1195/1196/7				
N	100064	10564102	1188	SILO 2, ADV. PHASE, STRATA C	1188	1189	1190	1191	1192	1193	1194	1195/1196/7				
N	100064	10564103	1188	SILO 2, ADV. PHASE,	1188	1189	1190	1191	1192	1193	1194	1195/1196/7				

COMP. SAMPLE	FERNALD SAMPLE #	TREAT. SAMPLE #	ETDC SAMPLE #	COMMENT	ETDC #1 WASTE	ETDC #2 WASTE	ETDC #3 WASTE	ETDC #4 WASTE	ETDC #5 WASTE	ETDC #6 WASTE	ETDC #7 WASTE	ETDC #8 WASTE	ETDC #1 FLYASH	FERN. #1 WASTE	FERN. #2 WASTE	FERN. #1 FLYASH
N	100064	10564104	1188	STRATA C SILO 2, ADV. PHASE,	1188	1189	1190	1191	1192	1193	1194	1195/1196/7				
N	100064	10564105	1188	STRATA C SILO 2, ADV. PHASE,	1188	1189	1190	1191	1192	1193	1194	1195/1196/7				
N	100064	10564106	1188	STRATA C SILO 2, ADV. PHASE,	1188	1189	1190	1191	1192	1193	1194	1195/1196/7				
Y	75304	10565101	0	STRATA C SILO 1, ADV. PHASE,	1004	1005	1006	1007	1008	989-1003				100044	100047	
Y	75304	10565102	0	STRATA A SILO 1, ADV. PHASE,	1004	1005	1006	1007	1008	989-1003				100044	100047	
Y	75304	10565103	0	STRATA A SILO 1, ADV. PHASE,	1004	1005	1006	1007	1008	989-1003				100044	100047	
Y	75304	10565104	0	STRATA A SILO 1, ADV. PHASE,	1004	1005	1006	1007	1008	989-1003				100044	100047	
Y	75304	10565105	0	STRATA A SILO 1, ADV. PHASE,	1004	1005	1006	1007	1008	989-1003				100044	100047	
Y	75304	10565106	0	STRATA A SILO 1, ADV. PHASE,	1004	1005	1006	1007	1008	989-1003				100044	100047	
Y	75305	10565301	0	STRATA A SILO 1, ADV. PHASE,	959	960	961	962	963	964	965	966		100048	100045	
Y	75305	10565302	0	STRATA B SILO 1, ADV. PHASE,	959	960	961	962	963	964	965	966		100048	100045	
Y	75305	10565303	0	STRATA B SILO 1, ADV. PHASE,	959	960	961	962	963	964	965	966		100048	100045	
Y	75305	10565304	0	STRATA B SILO 1, ADV. PHASE,	959	960	961	962	963	964	965	966		100048	100045	
Y	75305	10565305	0	STRATA B SILO 1, ADV. PHASE,	959	960	961	962	963	964	965	966		100048	100045	
Y	75305	10565306	0	STRATA B SILO 1, ADV. PHASE,	959	960	961	962	963	964	965	966		100048	100045	
Y	75306	10565501	0	STRATA B SILO 1, ADV. PHASE,	987	988	1015	1016	1075	1076	1077			100049	100046	
Y	75306	10565502	0	STRATA C SILO 1, ADV. PHASE,	987	988	1015	1016	1075	1076	1077			100049	100046	
Y	75306	10565503	0	STRATA C SILO 1, ADV. PHASE,	987	988	1015	1016	1075	1076	1077			100049	100046	
Y	75306	10565504	0	STRATA C SILO 1, ADV. PHASE,	987	988	1015	1016	1075	1076	1077			100049	100046	
Y	75306	10565505	0	STRATA C SILO 1, ADV. PHASE,	987	988	1015	1016	1075	1076	1077			100049	100046	
Y	75306	10565506	0	STRATA C SILO 1, ADV. PHASE,	987	988	1015	1016	1075	1076	1077			100049	100046	
Y	75307	10565701	0	STRATA C SILO 2, ADV. PHASE,	1235	1236	1229	1230	1232					100059	100062	
Y	75307	10565702	0	STRATA A SILO 2, ADV. PHASE,	1235	1236	1229	1230	1232					100059	100062	
Y	75307	10565703	0	STRATA A SILO 2, ADV. PHASE,	1235	1236	1229	1230	1232					100059	100062	
Y	75307	10565704	0	STRATA A SILO 2, ADV. PHASE,	1235	1236	1229	1230	1232					100059	100062	
Y	75307	10565705	0	STRATA A SILO 2, ADV. PHASE,	1235	1236	1229	1230	1232					100059	100062	
				STRATA A												

COMP. SAMPLE	FERNALD SAMPLE #	TREAT. SAMPLE #	ETDC SAMPLE #	COMMENT	ETDC #1 WASTE	ETDC #2 WASTE	ETDC #3 WASTE	ETDC #4 WASTE	ETDC #5 WASTE	ETDC #6 WASTE	ETDC #7 WASTE	ETDC #8 WASTE	ETDC #1 FLYASH	FERN. #1 WASTE	FERN. #2 WASTE	FERN. #1 FLYASH
Y	75307	10565706	0	SILO 2, ADV. PHASE, STRATA A	1235	1236	1229	1230	1232					100059	100062	
Y	75307	10565901	0	SILO 2, ADV. PHASE, STRATA A DUP.	1237	1238	1231	1232	1233	1234				100059	100062	
Y	75307	10565902	0	SILO 2, ADV. PHASE, STRATA A DUP.	1237	1238	1231	1232	1233	1234				100059	100062	
Y	75307	10565903	0	SILO 2, ADV. PHASE, STRATA A DUP.	1237	1238	1231	1232	1233	1234				100059	100062	
Y	75307	10565904	0	SILO 2, ADV. PHASE, STRATA A DUP.	1237	1238	1231	1232	1233	1234				100059	100062	
Y	75307	10565905	0	SILO 2, ADV. PHASE, STRATA A DUP.	1237	1238	1231	1232	1233	1234				100059	100062	
Y	75307	10565906	0	SILO 2, ADV. PHASE, STRATA A DUP.	1237	1238	1231	1232	1233	1234				100059	100062	
N	100063	10566101	1251	SILO 2, ADV. PHASE, STRATA B	1251	1252	1253	1254	1255	1256	1257	1242-1250				
N	100063	10566102	1251	SILO 2, ADV. PHASE, STRATA B	1251	1252	1253	1254	1255	1256	1257	1242-1250				
N	100063	10566103	1251	SILO 2, ADV. PHASE, STRATA B	1251	1252	1253	1254	1255	1256	1257	1242-1250				
N	100063	10566104	1251	SILO 2, ADV. PHASE, STRATA B	1251	1252	1253	1254	1255	1256	1257	1242-1250				
N	100063	10566105	1251	SILO 2, ADV. PHASE, STRATA B	1251	1252	1253	1254	1255	1256	1257	1242-1250				
N	100063	10566106	1251	SILO 2, ADV. PHASE, STRATA B	1251	1252	1253	1254	1255	1256	1257	1242-1250				
Y	75308	10566301	0	SILO 2, ADV. PHASE, STRATA C	1110	1111	1112	1113	1114	1115				100061	100064	
Y	75308	10566302	0	SILO 2, ADV. PHASE, STRATA C	1110	1111	1112	1113	1114	1115				100061	100064	
Y	75308	10566303	0	SILO 2, ADV. PHASE, STRATA C	1110	1111	1112	1113	1114	1115				100061	100064	
Y	75308	10566304	0	SILO 2, ADV. PHASE, STRATA C	1110	1111	1112	1113	1114	1115				100061	100064	
Y	75308	10566305	0	SILO 2, ADV. PHASE, STRATA C	1110	1111	1112	1113	1114	1115				100061	100064	
Y	75308	10566306	0	SILO 2, ADV. PHASE, STRATA C	1110	1111	1112	1113	1114	1115				100061	100064	
N	100062	10566501	1229	SILO 2, ADV. PHASE, STRATA A	1229	1230	1232									
N	100062	10566502	1229	SILO 2, ADV. PHASE, STRATA A	1229	1230	1232									
N	100062	10566503	1229	SILO 2, ADV. PHASE, STRATA A	1229	1230	1232									
N	100062	10566504	1229	SILO 2, ADV. PHASE, STRATA A	1229	1230	1232									
N	100062	10566505	1229	SILO 2, ADV. PHASE, STRATA A	1229	1230	1232									
N	100062	10566506	1229	SILO 2, ADV. PHASE, STRATA A	1229	1230	1232									
N	100062	10566701	1231	SILO 2, ADV. PHASE, STRATA A DUP.	1231	1233	1234									
N	100062	10566702	1231	SILO 2, ADV. PHASE,	1231	1233	1234									

COMP. SAMPLE	FERNALD SAMPLE #	TREAT. SAMPLE #	ETDC SAMPLE #	COMMENT	ETDC #1 WASTE	ETDC #2 WASTE	ETDC #3 WASTE	ETDC #4 WASTE	ETDC #5 WASTE	ETDC #6 WASTE	ETDC #7 WASTE	ETDC #8 WASTE	ETDC #1 FLYASH	FERN. #1 WASTE	FERN. #2 WASTE	FERN. #1 FLYASH
N	100062	10566703	1231	STRATA A DUP. SILO 2, ADV. PHASE,	1231	1233	1234									
N	100062	10566704	1231	STRATA A DUP. SILO 2, ADV. PHASE,	1231	1233	1234									
N	100062	10566705	1231	STRATA A DUP. SILO 2, ADV. PHASE,	1231	1233	1234									
N	100062	10566706	1231	STRATA A DUP. SILO 2, ADV. PHASE,	1231	1233	1234									
N	100074	10567901	1299	STRATA A DUP. SILO 3, ADV. PHASE	1299	1300	1301									
N	100074	10567902	1299	SILO 3, ADV. PHASE	1299	1300	1301									
N	100074	10567903	1299	SILO 3, ADV. PHASE	1299	1300	1301									
N	100074	10567904	1299	SILO 3, ADV. PHASE	1299	1300	1301									
N	100074	10567905	1299	SILO 3, ADV. PHASE	1299	1300	1301									
N	100074	10567906	1299	SILO 3, ADV. PHASE	1299	1300	1301									
N	100074	10568101	1301	SILO 3, ADV. PHASE	1301	1302	1351	1352								
N	100074	10568102	1301	SILO 3, ADV. PHASE	1301	1302	1351	1352								
N	100074	10568103	1301	SILO 3, ADV. PHASE	1301	1302	1351	1352								
N	100074	10568104	1301	SILO 3, ADV. PHASE	1301	1302	1351	1352								
N	100074	10568105	1301	SILO 3, ADV. PHASE	1301	1302	1351	1352								
N	100074	10568106	1301	SILO 3, ADV. PHASE	1301	1302	1351	1352								
N	100074	10568301	1297	SILO 3, ADV. PHASE	1297	1298	1299									
N	100074	10568302	1297	SILO 3, ADV. PHASE	1297	1298	1299									
N	100074	10568303	1297	SILO 3, ADV. PHASE	1297	1298	1299									
N	100074	10568304	1297	SILO 3, ADV. PHASE	1297	1298	1299									
N	100074	10568305	1297	SILO 3, ADV. PHASE	1297	1298	1299									
N	100074	10568306	1297	SILO 3, ADV. PHASE	1297	1298	1299									

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DATE INFORMATION (PART 1 OF 2)

FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #	COMMENT	MOLD MIX DATE	PLANNED DAYS TO CURE	UCS DATE	MOLD CRUSH DATE	MTCLP EXTRACT DATE	MTCLP SHIP DATE	MTCLP ANALYSIS DATE	TCLP EXTRACT DATE	TCLP SHIP DATE	TCLP ANALYSIS DATE	PCT SHIP DATE
100078	10330601	921		10/18/91	11/15/91	11/19/91	11/22/91	11/22/91	12/04/91	12/10/91				
100078	10330801	922		10/21/91	11/18/91	11/19/91	11/22/91	11/22/91	12/04/91	12/10/91				
100078	10331001	924		10/21/91	11/18/91	11/19/91	11/22/91	11/22/91	12/04/91	12/10/91				
100078	10331201	925		10/21/91	11/18/91	11/19/91	11/22/91	11/22/91	12/04/91	12/10/91				
100078	10331401	927		10/21/91	11/18/91	11/19/91	11/22/91	11/22/91	12/04/91	12/10/91				
100078	10331601	928		10/22/91	11/19/91	11/19/91	11/22/91	11/22/91	12/04/91	12/10/91				
100078	10331801	929		10/22/91	11/19/91	11/19/91	11/22/91	11/22/91	12/04/91	12/10/91				
100078	10332001	930		10/22/91	11/19/91	11/19/91	11/22/91	11/22/91	12/04/91	12/10/91				
100078	10332201	931		10/22/91	11/19/91	11/19/91	11/22/91	11/22/91	12/04/91	12/10/91				
100078	10332401	932		10/22/91	11/19/91	11/19/91	11/22/91	11/22/91	12/04/91	12/06/91				
100078	10332601	933		10/22/91	11/19/91	11/19/91	11/22/91	11/22/91	12/04/91	12/10/91				
75301	10332801	0		10/23/91	11/20/91	11/20/91	11/22/91	11/22/91	12/04/91	12/10/91				
75301	10333001	936		10/23/91	11/20/91	11/20/91	11/22/91	11/22/91	12/04/91	12/10/91				
100043	10333201	888		10/23/91	11/20/91	11/20/91	11/22/91	11/22/91	12/04/91	12/06/91				
100043	10333401	890		10/23/91	11/20/91	11/20/91	11/22/91	11/22/91	12/04/91	12/06/91				
100043	10333601	891		10/23/91	11/20/91	11/20/91	11/22/91	11/22/91	12/04/91	12/06/91				
100043	10333801	892		10/23/91	11/20/91	11/20/91	11/22/91	11/22/91	12/04/91	12/06/91				
100043	10334001	893		10/24/91	11/21/91	11/21/91	11/22/91	11/22/91	12/04/91	12/06/91				
100043	10334201	895		10/24/91	11/21/91	11/21/91	11/22/91	11/22/91	12/04/91	12/06/91				
100043	10334401	896		10/24/91	11/21/91	11/21/91	11/22/91	11/22/91	12/04/91	12/06/91				
100043	10334601	897		10/24/91	11/21/91	11/21/91	11/22/91	11/22/91	12/04/91	12/06/91				
100043	10334801	899		10/24/91	11/21/91	11/21/91	11/22/91	11/22/91	12/04/91	12/06/91				
75302	10335001	0		10/23/91	11/20/91	11/20/91	11/22/91	11/22/91	12/04/91	12/06/91				
75302	10335201	887		10/23/91	11/20/91	11/20/91	11/22/91	11/22/91	12/04/91	12/06/91				
100074	10338001	1290		12/11/91	01/08/92	01/08/92	01/14/92	01/16/92	01/21/92	02/11/92				
100074	10338201	1290		12/11/91	01/08/92	01/08/92	01/14/92	01/16/92	01/21/92	02/11/92				
100074	10338401	1290		12/11/91	01/08/92	01/08/92	01/14/92	01/16/92	01/21/92	02/11/92				
100074	10338601	1291		12/12/91	01/09/92	01/09/92	01/14/92	01/16/92	01/21/92	02/11/92				
100074	10338801	1291		12/12/91	01/09/92	01/09/92	01/14/92	01/16/92	01/21/92	02/11/92				
100074	10339001	1291		12/12/91	01/09/92	01/09/92	01/14/92	01/16/92	01/21/92	02/11/92				
100074	10339201	1291		12/12/91	01/09/92	01/09/92	01/14/92	01/16/92	01/21/92	02/11/92				
100074	10339401	1292		12/12/91	01/09/92	01/09/92	01/14/92	01/16/92	01/21/92	02/11/92				
100074	10339601	1292		12/18/91	01/15/92	01/13/92	01/14/92	01/16/92	01/21/92	02/11/92				
100074	10339801	1292		12/18/91	01/15/92	01/13/92	01/14/92	01/16/92	01/21/92	02/11/92				
75303	10430301	0		12/18/91	01/15/92	01/13/92	01/14/92	01/16/92	01/21/92	02/11/92				
75303	10430501	1293		12/18/91	01/15/92	01/13/92	01/14/92	01/16/92	01/21/92	02/11/92				
100074	10430701	1293		01/14/92	02/11/92	02/11/92	02/13/92	02/13/92	02/14/92	03/05/92				
100074	10430901	1293		01/14/92	02/11/92	02/11/92	02/13/92	02/13/92	02/14/92	03/05/92				
100057	10431101	1047		12/31/91	01/28/92	01/28/92	01/29/92	01/29/92	02/04/92	03/03/92				
100057	10431301	1048		12/31/91	01/28/92	01/28/92	01/29/92	01/29/92	02/04/92	03/03/92				
100057	10431501	1049		12/31/91	01/28/92	01/28/92	01/29/92	01/29/92	02/04/92	03/03/92				
100057	10431701	1050		12/31/91	01/28/92	01/28/92	01/29/92	01/29/92	02/04/92	03/03/92				
100057	10431901	1052		12/31/91	01/28/92	01/28/92	01/29/92	01/29/92	02/04/92	03/03/92				
100057	10432101	1052		12/31/91	01/28/92	01/28/92	01/29/92	01/29/92	02/04/92	03/03/92				
100057	10432301	1054		01/02/92	01/30/92	01/30/92	02/04/92	02/04/92	02/05/92	03/03/92				
100057	10432501	1056		01/02/92	01/30/92	01/30/92	02/04/92	02/04/92	02/05/92	03/03/92				
100057	10432701	1059		01/02/92	01/30/92	01/30/92	02/07/92	02/07/92	02/10/92	03/05/92				
100056	10432901	1086		01/02/92	01/30/92	01/30/92	02/07/92	02/07/92	02/10/92	03/05/92				
100056	10433101	1087		01/02/92	01/30/92	01/30/92	02/04/92	02/04/92	02/05/92	03/03/92				
100056	10433301	1061		01/02/92	01/30/92	01/30/92	02/04/92	02/04/92	02/05/92	03/03/92				

FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #	COMMENT	MOLD MIX DATE	PLANNED DAYS TO CURE	UCS DATE	MOLD CRUSH DATE	MTCLP EXTRACT DATE	MTCLP SHIP DATE	MTCLP ANALYSIS DATE	TCLP EXTRACT DATE	TCLP SHIP DATE	TCLP ANALYSIS DATE	PCT SHIP DATE
100056	10433501	1086		01/03/92	01/31/92	01/31/92	02/04/92	02/04/92	02/05/92	03/03/92				
100056	10433701	1089		01/03/92	01/31/92	01/31/92	02/04/92	02/04/92	02/05/92	03/03/92				
100056	10433901	1090		01/03/92	01/31/92	01/31/92	02/04/92	02/04/92	02/05/92	03/03/92				
100072	10434101	1152		01/06/92	02/03/92	02/03/92	02/04/92	02/04/92	02/05/92	03/03/92				
100072	10434301	1153		01/06/92	02/03/92	02/03/92	02/04/92	02/04/92	02/05/92	03/03/92				
100072	10434501	1154		01/06/92	02/03/92	02/03/92	02/07/92	02/07/92	02/10/92	03/05/92				
100072	10434701	1155		01/06/92	02/03/92	02/03/92	02/07/92	02/07/92	02/10/92	03/05/92				
100072	10434901	1156		01/06/92	02/03/92	02/03/92	02/07/92	02/07/92	02/10/92	03/05/92				
100072	10435101	1157		01/06/92	02/03/92	02/03/92	02/07/92	02/07/92	02/10/92	03/05/92				
100072	10435301	1158		01/06/92	02/03/92	02/03/92	02/07/92	02/07/92	02/10/92	03/05/92				
100072	10435501	1159		01/06/92	02/03/92	02/03/92	02/07/92	02/07/92	02/10/92	03/05/92				
100072	10435701	1160		01/08/92	02/05/92	02/05/92	02/11/92	02/11/92	02/11/92	03/05/92				
100072	10435901	1164		01/08/92	02/05/92	02/05/92	02/11/92	02/11/92	02/11/92	03/05/92				
100072	10436101	1165		01/08/92	02/05/92	02/05/92	02/11/92	02/11/92	02/11/92	03/05/92				
100072	10436301	1166		01/08/92	02/05/92	02/05/92	02/11/92	02/11/92	02/11/92	03/05/92				
100072	10436501	1167		01/08/92	02/05/92	02/05/92	02/11/92	02/11/92	02/11/92	03/05/92				
100072	10436701	1168		01/08/92	02/05/92	02/05/92	02/11/92	02/11/92	02/11/92	03/05/92				
100072	10436901	1169		01/08/92	02/05/92	02/05/92	02/11/92	02/11/92	02/11/92	03/05/92				
100074	10480701	1295		02/26/92	03/25/92	03/25/92	03/26/92	03/26/92	03/26/92	04/03/92				
100074	10480702	1295		02/26/92	03/25/92	03/25/92								
100074	10480901	1294		02/26/92	03/25/92	03/25/92	03/26/92	03/26/92	03/26/92	04/03/92				
100074	10480902	1294		02/26/92	03/25/92	03/25/92								
100074	10481101	1295		02/26/92	03/25/92	03/25/92	03/26/92	03/26/92	03/26/92	04/03/92				
100074	10481102	1295		02/26/92	03/25/92	03/25/92								
100074	10481301	1296		02/26/92	03/25/92	03/25/92	03/26/92	03/26/92	03/26/92	04/03/92				
100074	10481302	1296		02/26/92	03/25/92	03/25/92								
100074	10481501	1295		02/26/92	03/25/92	03/25/92	03/26/92	03/26/92	03/26/92	04/03/92				
100074	10481502	1295		02/26/92	03/25/92	03/25/92								
100074	10481701	1294		02/26/92	03/25/92	03/25/92	03/26/92	03/26/92	03/26/92	04/03/92				
100074	10481702	1294		02/26/92	03/25/92	03/25/92								
100056	10482501	1091		03/13/92	04/10/92	04/10/92	04/13/92	04/14/92	04/14/92	04/16/92				
100056	10482701	1092		03/13/92	04/10/92	04/10/92	04/13/92	04/14/92	04/14/92	04/16/92				
100056	10482901	1093		03/13/92	04/10/92	04/10/92	04/13/92	04/14/92	04/14/92	04/16/92				
100072	10483101	1172		03/13/92	04/10/92	04/10/92	04/13/92	04/14/92	04/14/92	04/16/92				
100072	10483301	1173		03/13/92	04/10/92	04/10/92	04/13/92	04/14/92	04/14/92	04/16/92				
100072	10483501	1174		03/13/92	04/10/92	04/10/92	04/13/92	04/14/92	04/14/92	04/22/92				
75393	10538001	0		08/18/92	09/15/92	09/15/92		09/22/92		09/24/92				
75393	10538002	0		08/18/92	09/15/92	09/15/92		09/22/92		09/24/92				
75393	10538201	0		08/20/92	09/17/92	09/17/92		09/22/92		09/24/92				
100047	10563101	996		05/08/92	06/05/92	06/05/92	06/10/92							
100047	10563102	996		05/08/92	06/05/92									
100047	10563103	996		05/08/92	06/05/92									
100047	10563104	996		05/08/92	06/05/92									
100047	10563105	996		05/08/92	06/05/92									
100047	10563106	996		05/08/92	06/05/92									
100047	10563301	989		05/08/92	06/05/92	06/05/92	06/10/92							
100047	10563302	989		05/08/92	06/05/92									
100047	10563303	989		05/08/92	06/05/92									
100047	10563304	989		05/08/92	06/05/92									
100047	10563305	989		05/08/92	06/05/92									
100047	10563306	989		05/08/92	06/05/92									
100048	10563501	950		05/08/92	06/05/92	06/05/92	06/10/92							

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FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #	COMMENT	MOLD MIX DATE	PLANNED DAYS TO CURE	UCS DATE	MOLD CRUSH DATE	MTCLP EXTRACT DATE	MTCLP SHIP DATE	MTCLP ANALYSIS DATE	TCLP EXTRACT DATE	TCLP SHIP DATE	TCLP ANALYSIS DATE	PCT* SHIP DATE
100048	10563502	950		05/08/92	06/05/92									
100048	10563503	950		05/08/92	06/05/92									
100048	10563504	950		05/08/92	06/05/92									
100048	10563505	950		05/08/92	06/05/92									
100048	10563506	950		05/08/92	06/05/92									
100049	10563701	977		05/08/92	06/05/92	06/05/92	06/10/92							
100049	10563702	977		05/08/92	06/05/92									
100049	10563703	977		05/08/92	06/05/92									
100049	10563704	977		05/08/92	06/05/92									
100049	10563705	977		05/08/92	06/05/92									
100049	10563706	977		05/08/92	06/05/92									
100063	10563901	1242		05/08/92	06/05/92	06/05/92	06/10/92							
100063	10563902	1242		05/08/92	06/05/92									
100063	10563903	1242		05/08/92	06/05/92									
100063	10563904	1242		05/08/92	06/05/92									
100063	10563905	1242		05/08/92	06/05/92									
100063	10563906	1242		05/08/92	06/05/92									
100064	10564101	1188		05/08/92	06/05/92	06/05/92	06/10/92							
100064	10564102	1188		05/08/92	06/05/92									
100064	10564103	1188		05/08/92	06/05/92									
100064	10564104	1188		05/08/92	06/05/92									
100064	10564105	1188		05/08/92	06/05/92									
100064	10564106	1188		05/08/92	06/05/92									
75304	10565101	0		05/12/92	06/09/92	06/09/92	06/11/92							
75304	10565102	0		05/12/92	06/09/92									
75304	10565103	0		05/12/92	06/09/92									
75304	10565104	0		05/12/92	06/09/92									
75304	10565105	0		05/12/92	06/09/92									
75304	10565106	0		05/12/92	06/09/92									
75305	10565301	0		05/12/92	06/09/92	06/09/92	06/11/92							
75305	10565302	0		05/12/92	06/09/92									
75305	10565303	0		05/12/92	06/09/92									
75305	10565304	0		05/12/92	06/09/92									
75305	10565305	0		05/12/92	06/09/92									
75305	10565306	0		05/12/92	06/09/92									
75306	10565501	0	RADON 7-DAY LEACH SAMPLE BROKE/NO ANALYS	05/12/92	06/09/92	06/09/92	06/11/92							
75306	10565502	0		05/12/92	06/09/92									
75306	10565503	0		05/12/92	06/09/92									
75306	10565504	0		05/12/92	06/09/92									
75306	10565505	0		05/12/92	06/09/92									
75306	10565506	0		05/12/92	06/09/92									
75307	10565701	0		05/12/92	06/09/92	06/09/92	06/11/92							
75307	10565702	0		05/12/92	06/09/92									
75307	10565703	0		05/12/92	06/09/92									
75307	10565704	0		05/12/92	06/09/92									
75307	10565705	0		05/12/92	06/09/92									
75307	10565706	0		05/12/92	06/09/92									
75307	10565901	0		05/12/92	06/09/92	06/09/92	06/11/92							
75307	10565902	0		05/12/92	06/09/92									
75307	10565903	0		05/12/92	06/09/92									
75307	10565904	0		05/12/92	06/09/92									
75307	10565905	0		05/12/92	06/09/92									

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FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #	COMMENT	MOLD MIX DATE	PLANNED DAYS TO CURE	UCS DATE	MOLD CRUSH DATE	MTCLP EXTRACT DATE	MTCLP SHIP DATE	MTCLP ANALYSIS DATE	TCLP EXTRACT DATE	TCLP SHIP DATE	TCLP ANALYSIS DATE	PCT SHIP DATE
75307	10565906	0		05/12/92	06/09/92									
100063	10566101	1251		05/12/92	06/09/92	06/09/92	06/11/92							
100063	10566102	1251		05/12/92	06/09/92									
100063	10566103	1251		05/12/92	06/09/92									
100063	10566104	1251		05/12/92	06/09/92									
100063	10566105	1251		05/12/92	06/09/92									
100063	10566106	1251		05/12/92	06/09/92									
75308	10566301	0		05/12/92	06/09/92	06/09/92	06/11/92							
75308	10566302	0		05/12/92	06/09/92									
75308	10566303	0		05/12/92	06/09/92									
75308	10566304	0		05/12/92	06/09/92									
75308	10566305	0		05/12/92	06/09/92									
75308	10566306	0		05/12/92	06/09/92									
100062	10566501	1229		05/12/92	06/09/92	06/09/92	06/11/92							
100062	10566502	1229		05/12/92	06/09/92									
100062	10566503	1229		05/12/92	06/09/92									
100062	10566504	1229		05/12/92	06/09/92									
100062	10566505	1229		05/12/92	06/09/92									
100062	10566506	1229		05/12/92	06/09/92									
100062	10566701	1231	EXTRA SAMPLE-NOT REQUIRED-CANCELLED	05/12/92	06/09/92	06/09/92								
100062	10566702	1231		05/12/92	06/09/92									
100062	10566703	1231		05/12/92	06/09/92									
100062	10566704	1231		05/12/92	06/09/92									
100062	10566705	1231		05/12/92	06/09/92									
100062	10566706	1231		05/12/92	06/09/92									
100074	10567901	1299	RADON 7-DAY LEACH SAMPLE BROKE/NO ANALYS	05/13/92	06/10/92	06/10/92	06/12/92							
100074	10567902	1299		05/13/92	06/10/92									
100074	10567903	1299		05/13/92	06/10/92									
100074	10567904	1299		05/13/92	06/10/92									
100074	10567905	1299		05/13/92	06/10/92									
100074	10567906	1299		05/13/92	06/10/92									
100074	10568101	1301		05/13/92	06/10/92	06/10/92	06/12/92							
100074	10568102	1301		05/13/92	06/10/92									
100074	10568103	1301		05/13/92	06/10/92									
100074	10568104	1301		05/13/92	06/10/92									
100074	10568105	1301		05/13/92	06/10/92									
100074	10568106	1301		05/13/92	06/10/92									
100074	10568301	1297		05/13/92	06/10/92	06/10/92	06/12/92							
100074	10568302	1297		05/13/92	06/10/92									
100074	10568303	1297		05/13/92	06/10/92									
100074	10568304	1297		05/13/92	06/10/92									
100074	10568305	1297		05/13/92	06/10/92									
100074	10568306	1297		05/13/92	06/10/92									

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FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #	PCT ANALYSIS DATE	PCT EXTRACT DATE	STATIC EXTRACT DATE	STATIC SHIP DATE	STATIC ANALYSIS DATE	RADON E. EXTRACT DATE	RADON E. SHIP DATE	RADON E. ANALYSIS DATE	RADON-7 EXTRACT DATE	RADON-7 SHIP DATE	RADON-7 ANALYSIS DATE	RADON-30 EXTRACT DATE	RADON-30 SHIP DATE	RADON-30 ANALYSIS DATE
100078	10330601	921	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100078	10330801	922	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100078	10331001	924	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100078	10331201	925	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100078	10331401	927	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100078	10331601	928	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100078	10331801	929	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100078	10332001	930	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100078	10332201	931	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100078	10332401	932	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100078	10332601	933	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75301	10332801	0	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75301	10333001	936	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100043	10333201	888	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100043	10333401	890	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100043	10333601	891	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100043	10333801	892	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100043	10334001	893	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100043	10334201	895	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100043	10334401	896	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100043	10334601	897	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100043	10334801	899	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75302	10335001	0	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75302	10335201	887	01/03/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10338001	1290	02/25/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10338201	1290	02/25/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10338401	1290	02/25/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10338601	1291	02/25/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10338801	1291	02/25/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10339001	1291	02/25/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10339201	1291	02/25/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10339401	1292	02/25/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10339601	1292	02/25/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10339801	1292	02/25/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75303	10430301	0	02/25/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75303	10430501	1293	02/25/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10430701	1293	03/26/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10430901	1293	03/26/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100057	10431101	1047	03/11/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100057	10431301	1048	03/11/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100057	10431501	1049	03/11/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100057	10431701	1050	03/11/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100057	10431901	1052	03/11/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100057	10432101	1052	03/11/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100057	10432301	1054	03/17/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100057	10432501	1056	03/17/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100057	10432701	1059	03/20/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100056	10432901	1086	03/20/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100056	10433101	1087	03/17/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100056	10433301	1061	03/17/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /

FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #	PCT ANALYSIS DATE	PCT EXTRACT DATE	STATIC EXTRACT DATE	STATIC SHIP DATE	STATIC ANALYSIS DATE	RADON E. EXTRACT DATE	RADON E. SHIP DATE	RADON E. ANALYSIS DATE	RADON-7 EXTRACT DATE	RADON-7 SHIP DATE	RADON-7 ANALYSIS DATE	RADON-30 EXTRACT DATE	RADON-30 SHIP DATE	RADON-30 ANALYSIS DATE
100056	10433501	1086	03/17/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100056	10433701	1089	03/17/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100056	10433901	1090	03/17/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10434101	1152	03/17/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10434301	1153	03/17/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10434501	1154	03/20/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10434701	1155	03/20/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10434901	1156	03/20/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10435101	1157	03/20/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10435301	1158	03/20/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10435501	1159	03/20/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10435701	1160	03/24/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10435901	1164	03/24/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10436101	1165	03/24/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10436301	1166	03/24/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10436501	1167	03/24/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10436701	1168	03/24/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10436901	1169	03/24/92	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10480701	1295	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10480702	1295	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10480901	1294	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10480902	1294	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10481101	1295	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10481102	1295	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10481301	1296	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10481302	1296	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10481501	1295	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10481502	1295	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10481701	1294	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10481702	1294	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100056	10482501	1091	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100056	10482701	1092	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100056	10482901	1093	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10483101	1172	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10483301	1173	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100072	10483501	1174	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75393	10538001	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/26/93	01/26/93	/ /	02/22/93	/ /	/ /
75393	10538002	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75393	10538201	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/26/93	01/26/93	/ /	02/22/93	/ /	/ /
100047	10563101	996	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/05/93	01/05/93	01/06/93	01/28/93	/ /	/ /
100047	10563102	996	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100047	10563103	996	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100047	10563104	996	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100047	10563105	996	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100047	10563106	996	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100047	10563301	989	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	12/02/92	12/02/92	12/03/92	12/28/92	12/28/92	12/30/92
100047	10563302	989	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100047	10563303	989	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100047	10563304	989	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100047	10563305	989	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100047	10563306	989	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100048	10563501	950	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/05/93	01/05/93	01/06/93	01/28/93	01/28/93	/ /

FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #	PCT ANALYSIS DATE	PCT EXTRACT DATE	STATIC EXTRACT DATE	STATIC SHIP DATE	STATIC ANALYSIS DATE	RADON E. EXTRACT DATE	RADON E. SHIP DATE	RADON E. ANALYSIS DATE	RADON-7 EXTRACT DATE	RADON-7 SHIP DATE	RADON-7 ANALYSIS DATE	RADON-30 EXTRACT DATE	RADON-30 SHIP DATE	RADON-30 ANALYSIS DATE
100048	10563502	950	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100048	10563503	950	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100048	10563504	950	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100048	10563505	950	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100048	10563506	950	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100049	10563701	977	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/05/93	01/05/93	01/06/93	01/28/93	01/28/93	/ /
100049	10563702	977	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100049	10563703	977	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100049	10563704	977	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100049	10563705	977	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100049	10563706	977	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100063	10563901	1242	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/05/93	01/05/93	01/06/93	01/28/93	01/28/93	/ /
100063	10563902	1242	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100063	10563903	1242	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100063	10563904	1242	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100063	10563905	1242	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100063	10563906	1242	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100064	10564101	1188	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/07/93	01/07/93	01/09/93	02/01/93	02/01/93	/ /
100064	10564102	1188	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100064	10564103	1188	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100064	10564104	1188	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100064	10564105	1188	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100064	10564106	1188	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75304	10565101	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/13/93	01/13/93	/ /	02/08/93	02/08/93	/ /
75304	10565102	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75304	10565103	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75304	10565104	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75304	10565105	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75304	10565106	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75305	10565301	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/05/93	01/05/93	01/06/93	01/28/93	01/28/93	/ /
75305	10565302	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75305	10565303	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75305	10565304	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75305	10565305	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75305	10565306	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75306	10565501	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/07/93	01/07/93	/ /	02/01/93	02/01/93	/ /
75306	10565502	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75306	10565503	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75306	10565504	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75306	10565505	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75306	10565506	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75307	10565701	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/20/93	01/20/93	/ /	/ /	/ /	/ /
75307	10565702	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75307	10565703	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75307	10565704	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75307	10565705	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75307	10565706	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75307	10565901	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/07/93	01/07/93	01/09/93	02/01/93	02/01/93	/ /
75307	10565902	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75307	10565903	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75307	10565904	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75307	10565905	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /

FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #	PCT ANALYSIS DATE	PCT EXTRACT DATE	STATIC EXTRACT DATE	STATIC SHIP DATE	STATIC ANALYSIS DATE	RADON E. EXTRACT DATE	RADON E. SHIP DATE	RADON E. ANALYSIS DATE	RADON-7 EXTRACT DATE	RADON-7 SHIP DATE	RADON-7 ANALYSIS DATE	RADON-30 EXTRACT DATE	RADON-30 SHIP DATE	RADON-30 ANALYSIS DATE
75307	10565906	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100063	10566101	1251	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/07/93	01/07/93	01/09/93	02/01/93	02/01/93	/ /
100063	10566102	1251	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100063	10566103	1251	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100063	10566104	1251	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100063	10566105	1251	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100063	10566106	1251	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75308	10566301	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	12/02/92	12/02/92	12/03/92	12/28/92	12/28/92	12/30/92
75308	10566302	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75308	10566303	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75308	10566304	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75308	10566305	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
75308	10566306	0	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100062	10566501	1229	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	12/23/92	12/28/92	12/30/92	01/15/93	01/15/93	/ /
100062	10566502	1229	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100062	10566503	1229	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100062	10566504	1229	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100062	10566505	1229	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100062	10566506	1229	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100062	10566701	1231	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100062	10566702	1231	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100062	10566703	1231	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100062	10566704	1231	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100062	10566705	1231	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100062	10566706	1231	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10567901	1299	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	12/23/92	12/28/92	/ /	01/15/93	01/15/93	/ /
100074	10567902	1299	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10567903	1299	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10567904	1299	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10567905	1299	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10567906	1299	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10568101	1301	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	01/07/93	01/07/93	01/09/93	/ /	/ /	/ /
100074	10568102	1301	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10568103	1301	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10568104	1301	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10568105	1301	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10568106	1301	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10568301	1297	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	12/02/92	12/02/92	12/03/92	12/28/92	12/28/92	12/30/92
100074	10568302	1297	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10568303	1297	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10568304	1297	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10568305	1297	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /
100074	10568306	1297	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /	/ /

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FORMULATION INFORMATION (PART 1 OF 5)

FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #	COMMENT	AMOUNT OF WASTE(g)	AMOUNT OF SOIL(g)	SOIL ORIGIN	TYPE OF CEMENT	AMOUNT OF CEMENT(g)	FLYASH ORIGIN	AMOUNT OF FLYASH(g)	AMOUNT OF SODIUM S.(g)	AMOUNT OF ATTAPULG.(g)
100078	10330601	921	PHASE I, STAGE I, GROUP I, RUN 1	108	0		2	64	COMM	64	0	6
100078	10330801	922	PHASE I, STAGE I, GROUP I, RUN 2	100	0		2	68	COMM	68	0	6
100078	10331001	924	PHASE I, STAGE I, GROUP I, RUN 3	100	0		2	51	COMM	31	0	6
100078	10331201	925	PHASE I, STAGE I, GROUP I, RUN 4	101	0		2	54	COMM	33	0	6
100078	10331401	927	PHASE I, STAGE I, GROUP I, RUN 5	102	0		2	31	COMM	51	0	6
100078	10331601	928	PHASE I, STAGE I, GROUP I, RUN 6	102	0		2	33	COMM	54	0	6
100078	10331801	929	PHASE I, STAGE I, GROUP I, RUN 7	100	0		2	26	COMM	26	0	6
100078	10332001	930	PHASE I, STAGE I, GROUP I, RUN 8	101	0		2	27	COMM	27	0	6
100078	10332201	931	PHASE I, STAGE I, GROUP I, RUN 9	100	0		2	43	COMM	43	0	6
100078	10332401	932	PHASE I, STAGE I, GROUP II, RUN M10	100	0		2	43	COMM	44	0	6
100078	10332601	933	PHASE I, STAGE I, GROUP I, RUN 9 DUP.	101	0		2	43	COMM	43	0	6
75301	10332801	0	PHASE I, STAGE I, GROUP II, RUN 10	101	0		2	43	SITE	43	0	6
75301	10333001	936	PHASE I, STAGE I, GROUP II, RUN 11	100	0		2	43	SITE	43	0	6
100043	10333201	888	PHASE I, STAGE I, GROUP I, RUN 1	100	0		2	64	COMM	64	0	6
100043	10333401	890	PHASE I, STAGE I, GROUP I, RUN 2	101	0		2	68	COMM	68	0	6
100043	10333601	891	PHASE I, STAGE I, GROUP I, RUN 3	101	0		2	51	COMM	32	0	6
100043	10333801	892	PHASE I, STAGE I, GROUP I, RUN 4	100	0		2	54	COMM	33	0	6
100043	10334001	893	PHASE I, STAGE I, GROUP I, RUN 5	100	0		2	31	COMM	51	0	6
100043	10334201	895	PHASE I, STAGE I, GROUP I, RUN 6	100	0		2	33	COMM	54	0	6
100043	10334401	896	PHASE I, STAGE I, GROUP I, RUN 7	101	0		2	26	COMM	26	0	6
100043	10334601	897	PHASE I, STAGE I, GROUP I, RUN 8	100	0		2	27	COMM	27	0	6
100043	10334801	899	PHASE I, STAGE I, GROUP I, RUN 9	101	0		2	43	COMM	43	0	6
75302	10335001	0	PHASE I, STAGE I, GROUP II, RUN 10	100	0		2	43	SITE	43	0	6
75302	10335201	887	PHASE I, STAGE I, GROUP II, RUN 11	100	0		2	43	SITE	43	0	6
100074	10338001	1290	PHASE I, STAGE II, GROUP I, RUN 1	100	0		2	64	COMM	64	0	6
100074	10338201	1290	PHASE I, STAGE II, GROUP I, RUN 2	100	0		2	68	COMM	68	0	6
100074	10338401	1290	PHASE I, STAGE II, GROUP I, RUN 3	100	0		2	51	COMM	31	0	6
100074	10338601	1291	PHASE I, STAGE II, GROUP I, RUN 4	100	0		2	54	COMM	33	0	6
100074	10338801	1291	PHASE I, STAGE II, GROUP I, RUN 4 DUP	100	0		2	54	COMM	33	0	6
100074	10339001	1291	PHASE I, STAGE II, GROUP I, RUN 5	100	0		2	31	COMM	52	0	6
100074	10339201	1291	PHASE I, STAGE II, GROUP I, RUN 6	100	0		2	33	COMM	54	0	6
100074	10339401	1292	PHASE I, STAGE II, GROUP I, RUN 7	100	0		2	26	COMM	26	0	6
100074	10339601	1292	PHASE I, STAGE II, GROUP I, RUN 8	100	0		2	27	COMM	27	0	6
100074	10339801	1292	PHASE I, STAGE II, GROUP I, RUN 9	100	0		2	43	COMM	43	0	6
75303	10430301	0	PHASE I, STAGE II, GROUP II, RUN 10	100	0		2	43	SITE	43	0	6
75303	10430501	1293	PHASE I, STAGE II, GROUP II, RUN 11	100	0		2	43	SITE	43	0	6
100074	10430701	1293	PHASE I, STAGE II, GROUP III, RUN 13	100	0		2	43	COMM	43	4	12
100074	10430901	1293	PHASE I, STAGE II, GROUP III, RUN 12	101	0		2	43	COMM	43	4	0
100057	10431101	1047	PHASE I, STAGE II, GROUP I, RUN 1	100	0		2	64	COMM	64	0	6
100057	10431301	1048	PHASE I, STAGE II, GROUP I, RUN 2	100	0		2	68	COMM	68	7	6
100057	10431501	1049	PHASE I, STAGE II, GROUP I, RUN 3	100	0		2	51	COMM	31	0	6
100057	10431701	1050	PHASE I, STAGE II, GROUP I, RUN 4	101	0		2	54	COMM	33	7	6
100057	10431901	1052	PHASE I, STAGE II, GROUP I, RUN 5	100	0		2	31	COMM	51	0	6
100057	10432101	1052	PHASE I, STAGE II, GROUP I, RUN 6	101	0		2	33	COMM	54	7	6
100057	10432301	1054	PHASE I, STAGE II, GROUP I, RUN 7	101	0		2	26	COMM	26	0	6
100057	10432501	1056	PHASE I, STAGE II, GROUP I, RUN 7 DUP.	101	0		2	26	COMM	26	0	6
100057	10432701	1059	PHASE I, STAGE II, GROUP I, RUN 8	100	0		2	27	COMM	27	7	6
100056	10432901	1086	PHASE I, STAGE II, GROUP I, RUN 9	101	0		2	43	COMM	43	4	6
100056	10433101	1087	PHASE I, STAGE II, GROUP III, RUN 12	100	0		2	43	COMM	43	4	12
100056	10433301	1061	PHASE I, STAGE II, GROUP III, RUN 13	100	0		2	43	COMM	43	4	0
100056	10433501	1086	PHASE I, STAGE II, GROUP III, RUN 14	101	0		2	64	COMM	64	7	0

000379

5448

FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #	COMMENT	AMOUNT OF WASTE(g)	AMOUNT OF SOIL(g)	SOIL ORIGIN	TYPE OF CEMENT	AMOUNT OF CEMENT(g)	FLYASH ORIGIN	AMOUNT OF FLYASH(g)	AMOUNT OF SODIUM S.(g)	AMOUNT OF ATTAPULG.(g)
100056	10433701	1089	PHASE I, STAGE II, GROUP III, RUN 15	100	0		2	27	COMM	27	7	0
100056	10433901	1090	PHASE I, STAGE II, GROUP III, RUN 16	101	0		2	43	COMM	43	7	0
100072	10434101	1152	PHASE I, STAGE II, GROUP I, RUN 1	100	0		2	65	COMM	65	0	6
100072	10434301	1153	PHASE I, STAGE II, GROUP I, RUN 2	101	0		2	68	COMM	68	7	6
100072	10434501	1154	PHASE I, STAGE II, GROUP I, RUN 3	101	0		2	51	COMM	31	0	6
100072	10434701	1155	PHASE I, STAGE II, GROUP I, RUN 4	100	0		2	54	COMM	33	7	6
100072	10434901	1156	PHASE I, STAGE II, GROUP I, RUN 5	100	0		2	31	COMM	51	0	6
100072	10435101	1157	PHASE I, STAGE II, GROUP I, RUN 6	101	0		2	33	COMM	54	7	6
100072	10435301	1158	PHASE I, STAGE II, GROUP I, RUN 7	101	0		2	26	COMM	26	0	6
100072	10435501	1159	PHASE I, STAGE II, GROUP I, RUN 8	101	0		2	27	COMM	27	7	6
100072	10435701	1160	PHASE I, STAGE II, GROUP I, RUN 9	101	0		2	43	COMM	43	4	6
100072	10435901	1164	PHASE I, STAGE II, GROUP III, RUN 12	101	0		2	43	COMM	43	4	12
100072	10436101	1165	PHASE I, STAGE II, GROUP III, RUN 13	100	0		2	43	COMM	43	4	0
100072	10436301	1166	PHASE I, STAGE II, GROUP III , RUN 14	100	0		2	64	COMM	64	7	0
100072	10436501	1167	PHASE I, STAGE II, GROUP III, RUN 15	101	0		2	27	COMM	27	7	0
100072	10436701	1168	PHASE I, STAGE II, GROUP III, RUN 15 DUP	101	0		2	27	COMM	27	7	0
100072	10436901	1169	PHASE I, STAGE II, GROUP III, RUN 16	100	0		2	43	COMM	43	4	0
100074	10480701	1295	P I, STAGE III, GROUP I, RUN 1	120	0		2	60	BFS	0	0	0
100074	10480702	1295	P I, STAGE III, GROUP I, RUN 1	120	0		2	60	BFS	0	0	0
100074	10480901	1294	P I, STAGE III, GROUP I, RUN 2	150	0		2	60	BFS	0	0	0
100074	10480902	1294	P I, STAGE III, GROUP I, RUN 2	150	0		2	60	BFS	0	0	0
100074	10481101	1295	P I, STAGE III, GROUP I, RUN 3	150	0		2	60	BFS	0	0	0
100074	10481102	1295	P I, STAGE III, GROUP I, RUN 3	150	0		2	60	BFS	0	0	0
100074	10481301	1296	P I, STAGE III, GROUP I, RUN 4	150	0		2	75	COMM	23	0	0
100074	10481302	1296	P I, STAGE III, GROUP I, RUN 4	150	0		2	75	COMM	23	0	0
100074	10481501	1295	P I, STAGE III, GROUP I, RUN 5	150	0		2	77	COMM	47	0	0
100074	10481502	1295	P I, STAGE III, GROUP I, RUN 5	150	0		2	77	COMM	47	0	0
100074	10481701	1294	P I, STAGE III, GROUP I, RUN 6	150	0		2	77	COMM	47	0	0
100074	10481702	1294	P I, STAGE III, GROUP I, RUN 6	150	0		2	77	COMM	47	0	0
100056	10482501	1091	P I, STAGE III, GROUP I, RUN 1	100	0		2	50	BFS	0	0	0
100056	10482701	1092	P I, STAGE III, GROUP I, RUN 2	100	0		2	50	COMM	15	0	0
100056	10482901	1093	PHASE I, STAGE III, GROUP I, RUN 3	100	0		2	51	COMM	31	10	0
100072	10483101	1172	P I, STAGE III, GROUP I, RUN 1	100	0		2	50	BFS	0	0	0
100072	10483301	1173	P I, STAGE III, GROUP I, RUN 2	100	0		2	50	COMM	15	0	0
100072	10483501	1174	PHASE I, STAGE III, GROUP I, RUN 3	101	0		2	51	COMM	31	11	0
75393	10538001	0	PRELIM. PHASE	100	0		2	53	COMM	15	0	0
75393	10538002	0	PRELIM. PHASE	100	0		2	53	COMM	15	0	0
75393	10538201	0	PRELIM. PHASE, CEMENT ADDED AS A SLURRY	70	0		2	42	COMM	13	0	0
100047	10563101	996	ADV. PHASE, STRATA A, RUN 1	560	0		2	357	COMM	217	0	42
100047	10563102	996	ADV. PHASE, STRATA A, RUN 1	560	0		2	357	COMM	217	0	42
100047	10563103	996	ADV. PHASE, STRATA A, RUN 1	560	0		2	357	COMM	217	0	42
100047	10563104	996	ADV. PHASE, STRATA A, RUN 1	560	0		2	357	COMM	217	0	42
100047	10563105	996	ADV. PHASE, STRATA A, RUN 1	560	0		2	357	COMM	217	0	42
100047	10563106	996	ADV. PHASE, STRATA A, RUN 1	560	0		2	357	COMM	217	0	42
100047	10563301	989	ADV. PHASE, STRATA A DUP, RUN 1	560	0		2	357	COMM	217	0	42
100047	10563302	989	ADV. PHASE, STRATA A DUP, RUN 1	560	0		2	357	COMM	217	0	42
100047	10563303	989	ADV. PHASE, STRATA A DUP, RUN 1	560	0		2	357	COMM	217	0	42
100047	10563304	989	ADV. PHASE, STRATA A DUP, RUN 1	560	0		2	357	COMM	217	0	42
100047	10563305	989	ADV. PHASE, STRATA A DUP, RUN 1	560	0		2	357	COMM	217	0	42
100047	10563306	989	ADV. PHASE, STRATA A DUP, RUN 1	560	0		2	357	COMM	217	0	42
100048	10563501	950	ADV. PHASE, STRATA B, RUN 1	630	0		2	357	COMM	217	0	42
100048	10563502	950	ADV. PHASE, STRATA B, RUN 1	630	0		2	357	COMM	217	0	42
100048	10563503	950	ADV. PHASE, STRATA B, RUN 1	630	0		2	357	COMM	217	0	42

FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #	COMMENT	AMOUNT OF WASTE(g)	AMOUNT OF SOIL(g)	SOIL ORIGIN	TYPE OF CEMENT	AMOUNT OF CEMENT(g)	FLYASH ORIGIN	AMOUNT OF FLYASH(g)	AMOUNT OF SODIUM S.(g)	AMOUNT OF ATTAPULG.(g)
100048	10563504	950	ADV. PHASE, STRATA B, RUN 1	630	0		2	357	COMM	217	0	42
100048	10563505	950	ADV. PHASE, STRATA B, RUN 1	630	0		2	357	COMM	217	0	42
100048	10563506	950	ADV. PHASE, STRATA B, RUN 1	630	0		2	357	COMM	217	0	42
100049	10563701	977	ADV. PHASE, STRATA C, RUN 1	700	0		2	357	COMM	217	0	42
100049	10563702	977	ADV. PHASE, STRATA C, RUN 1	700	0		2	357	COMM	217	0	42
100049	10563703	977	ADV. PHASE, STRATA C, RUN 1	700	0		2	357	COMM	217	0	42
100049	10563704	977	ADV. PHASE, STRATA C, RUN 1	700	0		2	357	COMM	217	0	42
100049	10563705	977	ADV. PHASE, STRATA C, RUN 1	700	0		2	357	COMM	217	0	42
100049	10563706	977	ADV. PHASE, STRATA C, RUN 1	700	0		2	357	COMM	217	0	42
100063	10563901	1242	ADV. PHASE, STRATA B, RUN 2	630	0		2	350	COMM	105	0	0
100063	10563902	1242	ADV. PHASE, STRATA B, RUN 2	630	0		2	350	COMM	105	0	0
100063	10563903	1242	ADV. PHASE, STRATA B, RUN 2	630	0		2	350	COMM	105	0	0
100063	10563904	1242	ADV. PHASE, STRATA B, RUN 2	630	0		2	350	COMM	105	0	0
100063	10563905	1242	ADV. PHASE, STRATA B, RUN 2	630	0		2	350	COMM	105	0	0
100063	10563906	1242	ADV. PHASE, STRATA B, RUN 2	630	0		2	350	COMM	105	0	0
100064	10564101	1188	ADV. PHASE, STRATA C, RUN 2	700	0		2	350	COMM	105	0	0
100064	10564102	1188	ADV. PHASE, STRATA C, RUN 2	700	0		2	350	COMM	105	0	0
100064	10564103	1188	ADV. PHASE, STRATA C, RUN 2	700	0		2	350	COMM	105	0	0
100064	10564104	1188	ADV. PHASE, STRATA C, RUN 2	700	0		2	350	COMM	105	0	0
100064	10564105	1188	ADV. PHASE, STRATA C, RUN 2	700	0		2	350	COMM	105	0	0
100064	10564106	1188	ADV. PHASE, STRATA C, RUN 2	700	0		2	350	COMM	105	0	0
75304	10565101	0	ADV. PHASE, STRATA A, RUN 2	560	0		2	350	COMM	105	0	0
75304	10565102	0	ADV. PHASE, STRATA A, RUN 2	560	0		2	350	COMM	105	0	0
75304	10565103	0	ADV. PHASE, STRATA A, RUN 2	560	0		2	350	COMM	105	0	0
75304	10565104	0	ADV. PHASE, STRATA A, RUN 2	560	0		2	350	COMM	105	0	0
75304	10565105	0	ADV. PHASE, STRATA A, RUN 2	560	0		2	350	COMM	105	0	0
75304	10565106	0	ADV. PHASE, STRATA A, RUN 2	560	0		2	350	COMM	105	0	0
75305	10565301	0	ADV. PHASE, STRATA B, RUN 2	630	0		2	350	COMM	105	0	0
75305	10565302	0	ADV. PHASE, STRATA B, RUN 2	630	0		2	350	COMM	105	0	0
75305	10565303	0	ADV. PHASE, STRATA B, RUN 2	630	0		2	350	COMM	105	0	0
75305	10565304	0	ADV. PHASE, STRATA B, RUN 2	630	0		2	350	COMM	105	0	0
75305	10565305	0	ADV. PHASE, STRATA B, RUN 2	630	0		2	350	COMM	105	0	0
75305	10565306	0	ADV. PHASE, STRATA B, RUN 2	630	0		2	350	COMM	105	0	0
75306	10565501	0	ADV. PHASE, STRATA C, RUN 2	700	0		2	350	COMM	105	0	0
75306	10565502	0	ADV. PHASE, STRATA C, RUN 2	700	0		2	350	COMM	105	0	0
75306	10565503	0	ADV. PHASE, STRATA C, RUN 2	700	0		2	350	COMM	105	0	0
75306	10565504	0	ADV. PHASE, STRATA C, RUN 2	700	0		2	350	COMM	105	0	0
75306	10565505	0	ADV. PHASE, STRATA C, RUN 2	700	0		2	350	COMM	105	0	0
75306	10565506	0	ADV. PHASE, STRATA C, RUN 2	700	0		2	350	COMM	105	0	0
75307	10565701	0	ADV. PHASE, STRATA A, RUN 1	560	0		2	357	COMM	217	0	42
75307	10565702	0	ADV. PHASE, STRATA A, RUN 1	560	0		2	357	COMM	217	0	42
75307	10565703	0	ADV. PHASE, STRATA A, RUN 1	560	0		2	357	COMM	217	0	42
75307	10565704	0	ADV. PHASE, STRATA A, RUN 1	560	0		2	357	COMM	217	0	42
75307	10565705	0	ADV. PHASE, STRATA A, RUN 1	560	0		2	357	COMM	217	0	42
75307	10565706	0	ADV. PHASE, STRATA A, RUN 1	560	0		2	357	COMM	217	0	42
75307	10565901	0	ADV. PHASE, STRATA A DUP, RUN 1	560	0		2	357	COMM	217	0	42
75307	10565902	0	ADV. PHASE, STRATA A DUP, RUN 1	560	0		2	357	COMM	217	0	42
75307	10565903	0	ADV. PHASE, STRATA A DUP, RUN 1	560	0		2	357	COMM	217	0	42
75307	10565904	0	ADV. PHASE, STRATA A DUP, RUN 1	560	0		2	357	COMM	217	0	42
75307	10565905	0	ADV. PHASE, STRATA A DUP, RUN 1	560	0		2	357	COMM	217	0	42
75307	10565906	0	ADV. PHASE, STRATA A DUP, RUN 1	560	0		2	357	COMM	217	0	42
100063	10566101	1251	ADV. PHASE, STRATA B, RUN 1	630	0		2	357	COMM	217	0	42
100063	10566102	1251	ADV. PHASE, STRATA B, RUN 1	630	0		2	357	COMM	217	0	42

FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #	COMMENT	AMOUNT OF WASTE(g)	AMOUNT OF SOIL(g)	SOIL ORIGIN	TYPE OF CEMENT	AMOUNT OF CEMENT(g)	FLYASH ORIGIN	AMOUNT OF FLYASH(g)	AMOUNT OF SODIUM S.(g)	AMOUNT OF ATTAPULG.(g)
100063	10566103	1251	ADV. PHASE, STRATA B, RUN 1	630	0		2	357	COMM	217	0	42
100063	10566104	1251	ADV. PHASE, STRATA B, RUN 1	630	0		2	357	COMM	217	0	42
100063	10566105	1251	ADV. PHASE, STRATA B, RUN 1	630	0		2	357	COMM	217	0	42
100063	10566106	1251	ADV. PHASE, STRATA B, RUN 1	630	0		2	357	COMM	217	0	42
75308	10566301	0	ADV. PHASE, STRATA C, RUN 1	700	0		2	357	COMM	217	0	42
75308	10566302	0	ADV. PHASE, STRATA C, RUN 1	700	0		2	357	COMM	217	0	42
75308	10566303	0	ADV. PHASE, STRATA C, RUN 1	700	0		2	357	COMM	217	0	42
75308	10566304	0	ADV. PHASE, STRATA C, RUN 1	700	0		2	357	COMM	217	0	42
75308	10566305	0	ADV. PHASE, STRATA C, RUN 1	700	0		2	357	COMM	217	0	42
75308	10566306	0	ADV. PHASE, STRATA C, RUN 1	700	0		2	357	COMM	217	0	42
100062	10566501	1229	ADV. PHASE, STRATA A, RUN 2	560	0		2	350	COMM	105	0	0
100062	10566502	1229	ADV. PHASE, STRATA A, RUN 2	560	0		2	350	COMM	105	0	0
100062	10566503	1229	ADV. PHASE, STRATA A, RUN 2	560	0		2	350	COMM	105	0	0
100062	10566504	1229	ADV. PHASE, STRATA A, RUN 2	560	0		2	350	COMM	105	0	0
100062	10566505	1229	ADV. PHASE, STRATA A, RUN 2	560	0		2	350	COMM	105	0	0
100062	10566506	1229	ADV. PHASE, STRATA A, RUN 2	560	0		2	350	COMM	105	0	0
100062	10566701	1231	ADV.PHASE, STRATA A DUP, RUN 2	560	0		2	350	COMM	105	0	0
100062	10566702	1231	ADV.PHASE, STRATA A DUP, RUN 2	560	0		2	350	COMM	105	0	0
100062	10566703	1231	ADV.PHASE, STRATA A DUP, RUN 2	560	0		2	350	COMM	105	0	0
100062	10566704	1231	ADV.PHASE, STRATA A DUP, RUN 2	560	0		2	350	COMM	105	0	0
100062	10566705	1231	ADV.PHASE, STRATA A DUP, RUN 2	560	0		2	350	COMM	105	0	0
100062	10566706	1231	ADV.PHASE, STRATA A DUP, RUN 2	560	0		2	350	COMM	105	0	0
100074	10567901	1299	ADV. PHASE, RUN 2	800	0		2	320	BFS	0	0	0
100074	10567902	1299	ADV. PHASE, RUN 2	800	0		2	320	BFS	0	0	0
100074	10567903	1299	ADV. PHASE, RUN 2	800	0		2	320	BFS	0	0	0
100074	10567904	1299	ADV. PHASE, RUN 2	800	0		2	320	BFS	0	0	0
100074	10567905	1299	ADV. PHASE, RUN 2	800	0		2	320	BFS	0	0	0
100074	10567906	1299	ADV. PHASE, RUN 2	800	0		2	320	BFS	0	0	0
100074	10568101	1301	ADV. PHASE, RUN 2 DUP	800	0		2	320	BFS	0	0	0
100074	10568102	1301	ADV. PHASE, RUN 2 DUP	800	0		2	320	BFS	0	0	0
100074	10568103	1301	ADV. PHASE, RUN 2 DUP	800	0		2	320	BFS	0	0	0
100074	10568104	1301	ADV. PHASE, RUN 2 DUP	800	0		2	320	BFS	0	0	0
100074	10568105	1301	ADV. PHASE, RUN 2 DUP	800	0		2	320	BFS	0	0	0
100074	10568106	1301	ADV. PHASE, RUN 2 DUP	800	0		2	320	BFS	0	0	0
100074	10568301	1297	ADV. PHASE, RUN 1	800	0		2	408	COMM	248	0	0
100074	10568302	1297	ADV. PHASE, RUN 1	800	0		2	408	COMM	248	0	0
100074	10568303	1297	ADV. PHASE, RUN 1	800	0		2	408	COMM	248	0	0
100074	10568304	1297	ADV. PHASE, RUN 1	800	0		2	408	COMM	248	0	0
100074	10568305	1297	ADV. PHASE, RUN 1	800	0		2	408	COMM	248	0	0
100074	10568306	1297	ADV. PHASE, RUN 1	800	0		2	408	COMM	248	0	0

OU-4
FORMULATION INFORMATION (PART 2 OF 5)

TREATABILITY SAMPLE #	AMOUNT OF CLINOPTI.(g)	AMOUNT OF H20	AMOUNT OF SODIUM H.(g)	HAND MIX	BENTONITE	SIEVE SIZE(in.)	WEIGHT NOT PASSING SEIVE(g)	PERCENT NOT PASSING SEIVE(%)	TEMPERATURE OF OVEN(C)	TIME OF SAMPLE HEATING(min.)	FeCl2	BFS	Ca(OH)2
10330601	6	74	0	Y	0	0.111	1.0	1.0			0.0	0.0	0.0
10330801	6	67	0	Y	0	0.111	0.5	0.5			0.0	0.0	0.0
10331001	6	54	0	Y	0	0.111	0.6	0.6			0.0	0.0	0.0
10331201	6	56	0	Y	0	0.111	1.4	1.4			0.0	0.0	0.0
10331401	6	54	0	Y	0	0.111	0.6	0.6			0.0	0.0	0.0
10331601	6	61	0	Y	0	0.111	0.4	0.4			0.0	0.0	0.0
10331801	6	46	0	Y	0	0.111	0.5	0.5			0.0	0.0	0.0
10332001	6	46	0	Y	0	0.111	1.2	1.2			0.0	0.0	0.0
10332201	6	59	0	Y	0	0.111	0.5	0.5			0.0	0.0	0.0
10332401	6	55	0	Y	0	0.111	0.4	0.4			0.0	0.0	0.0
10332601	6	56	0	Y	0	0.111	0.6	0.6			0.0	0.0	0.0
10332801	6	46	0	Y	0	0.111	0.6	0.6			0.0	0.0	0.0
10333001	6	46	0	Y	0	0.111	0.6	0.6			0.0	0.0	0.0
10333201	6	65	0	Y	0	0.111	1.2	1.2			0.0	0.0	0.0
10333401	6	65	0	Y	0	0.111	0.7	0.7			0.0	0.0	0.0
10333601	6	56	0	Y	0	0.111	1.1	1.1			0.0	0.0	0.0
10333801	6	56	0	Y	0	0.111	0.1	0.1			0.0	0.0	0.0
10334001	6	54	0	Y	0	0.111	0.9	0.9			0.0	0.0	0.0
10334201	6	59	0	Y	0	0.111	0.5	0.5			0.0	0.0	0.0
10334401	6	45	0	Y	0	0.111	0.5	0.5			0.0	0.0	0.0
10334601	6	42	0	Y	0	0.111	0.8	0.8			0.0	0.0	0.0
10334801	6	54	0	Y	0	0.111	0.4	0.4			0.0	0.0	0.0
10335001	6	47	0	Y	0	0.111	4.3	4.1			0.0	0.0	0.0
10335201	6	0	0	Y	0	0.111	0.1	0.1			0.0	0.0	0.0
10338001	6	140	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10338201	6	136	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10338401	6	113	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10338601	6	120	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10338801	6	119	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10339001	6	116	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10339201	6	117	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10339401	6	100	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10339601	6	103	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10339801	6	110	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10430301	6	107	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10430501	6	105	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10430701	0	123	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10430901	12	110	0	Y	0	N/A	0.0	0.0			0.0	0.0	0.0
10431101	6	74	0	Y	0	0.111	1.2	1.2			0.0	0.0	0.0
10431301	6	75	0	Y	0	0.111	1.2	1.2			0.0	0.0	0.0
10431501	6	54	0	Y	0	0.111	0.0	0.0			0.0	0.0	0.0
10431701	6	55	0	Y	0	0.111	0.0	0.0			0.0	0.0	0.0
10431901	6	54	0	Y	0	0.111	0.0	0.0			0.0	0.0	0.0
10432101	6	60	0	Y	0	0.111	0.0	0.0			0.0	0.0	0.0
10432301	6	41	0	Y	0	0.111	1.7	1.7			0.0	0.0	0.0
10432501	6	41	0	Y	0	0.111	0.3	0.3			0.0	0.0	0.0
10432701	6	41	0	Y	0	0.111	0.0	0.0			0.0	0.0	0.0
10432901	6	50	0	Y	0	0.111	0.0	0.0			0.0	0.0	0.0
10433101	0	60	0	Y	0	0.111	0.0	0.0			0.0	0.0	0.0
10433301	12	56	0	Y	0	0.111	0.0	0.0			0.0	0.0	0.0
10433501	0	60	0	Y	0	0.111	0.0	0.0			0.0	0.0	0.0

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1.0 5448

TREATABILITY SAMPLE #	AMOUNT OF CLINOPTI.(g)	AMOUNT OF H20	AMOUNT OF SODIUM H.(g)	HAND MIX	BENTONITE	SIEVE SIZE(in.)	WEIGHT NOT PASSING SEIVE(g)	PERCENT NOT PASSING SEIVE(%)	TEMPERATURE OF OVEN(C)	TIME OF SAMPLE HEATING(min.)	FeCl2	BFS	Ca(OH)2
10433701	0	24	0	Y	0	0.111	0.0	0.0			0.0	0.0	0.0
10433901	0	40	0	Y	0	0.111	0.0	0.0			0.0	0.0	0.0
10434101	6	65	0	Y	0	0.111	0.7	0.7			0.0	0.0	0.0
10434301	6	65	0	Y	0	0.111	0.7	0.7			0.0	0.0	0.0
10434501	6	55	0	Y	0	0.111	0.7	0.7			0.0	0.0	0.0
10434701	6	56	0	Y	0	0.111	0.7	0.7			0.0	0.0	0.0
10434901	6	54	0	Y	0	0.111	0.7	0.7			0.0	0.0	0.0
10435101	6	59	0	Y	0	0.111	0.7	0.7			0.0	0.0	0.0
10435301	6	44	0	Y	0	0.111	0.7	0.7			0.0	0.0	0.0
10435501	6	42	0	Y	0	0.111	0.7	0.7			0.0	0.0	0.0
10435701	6	54	0	Y	0	0.111	0.7	0.7			0.0	0.0	0.0
10435901	0	58	0	Y	0	0.111	0.9	0.9			0.0	0.0	0.0
10436101	12	49	0	Y	0	0.111	0.9	0.9			0.0	0.0	0.0
10436301	0	64	0	Y	0	0.111	0.9	0.9			0.0	0.0	0.0
10436501	0	27	0	Y	0	0.111	0.9	0.9			0.0	0.0	0.0
10436701	0	27	0	Y	0	0.111	0.9	0.9			0.0	0.0	0.0
10436901	0	43	0	Y	0	0.111	0.9	0.9			0.0	0.0	0.0
10480701	0	130	0	Y	0	N/A	0.0	0.0			0.0	60.0	0.0
10480702	0	130	0	Y	0	N/A	0.0	0.0			0.0	60.0	0.0
10480901	0	152	0	Y	0	N/A	0.0	0.0			1.1	60.0	0.0
10480902	0	152	0	Y	0	N/A	0.0	0.0			1.1	60.0	0.0
10481101	0	142	0	Y	0	N/A	0.0	0.0			0.0	60.0	0.0
10481102	0	142	0	Y	0	N/A	0.0	0.0			0.0	60.0	0.0
10481301	0	150	0	Y	0	N/A	0.0	0.0			0.0	38.0	0.0
10481302	0	150	0	Y	0	N/A	0.0	0.0			0.0	38.0	0.0
10481501	6	162	0	Y	0	N/A	0.0	0.0			1.1	0.0	0.0
10481502	6	162	0	Y	0	N/A	0.0	0.0			1.1	0.0	0.0
10481701	0	162	0	Y	0	N/A	0.0	0.0			1.1	0.0	0.0
10481702	0	162	0	Y	0	N/A	0.0	0.0			1.1	0.0	0.0
10482501	0	46	0	Y	0	0.111	0.0	0.0			0.0	50.0	0.0
10482701	0	40	0	Y	0	0.111	0.0	0.0			0.0	25.0	0.0
10482901	0	40	0	Y	0	0.111	1.6	1.6			0.0	0.0	0.0
10483101	0	51	0	Y	0	0.111	0.0	0.0			0.0	50.0	0.0
10483301	0	46	0	Y	0	0.111	1.4	1.4			0.0	25.0	0.0
10483501	0	40	0	Y	0	0.111	0.0	0.0			0.0	0.0	0.0
10538001	5	61	0	Y	0	N/A	0.0	0.0			0.0	31.1	0.0
10538002	5	61	0	Y	0	N/A	0.0	0.0			0.0	31.1	0.0
10538201	7	20	0	Y	0	N/A	0.0	0.0			0.0	21.7	0.0
10563101	42	539	0	Y	140	0.111	24.5	4.2			0.0	0.0	0.0
10563102	42	539	0	Y	140	0.111	24.5	4.2			0.0	0.0	0.0
10563103	42	539	0	Y	140	0.111	24.5	4.2			0.0	0.0	0.0
10563104	42	539	0	Y	140	0.111	24.5	4.2			0.0	0.0	0.0
10563105	42	539	0	Y	140	0.111	24.5	4.2			0.0	0.0	0.0
10563106	42	539	0	Y	140	0.111	24.5	4.2			0.0	0.0	0.0
10563301	42	568	0	Y	140	0.111	15.0	2.6			0.0	0.0	0.0
10563302	42	568	0	Y	140	0.111	15.0	2.6			0.0	0.0	0.0
10563303	42	568	0	Y	140	0.111	15.0	2.6			0.0	0.0	0.0
10563304	42	568	0	Y	140	0.111	15.0	2.6			0.0	0.0	0.0
10563305	42	568	0	Y	140	0.111	15.0	2.6			0.0	0.0	0.0
10563306	42	568	0	Y	140	0.111	15.0	2.6			0.0	0.0	0.0
10563501	42	475	0	Y	70	0.111	3.5	0.6			0.0	0.0	0.0
10563502	42	475	0	Y	70	0.111	3.5	0.6			0.0	0.0	0.0
10563503	42	475	0	Y	70	0.111	3.5	0.6			0.0	0.0	0.0

TREATABILITY SAMPLE #	AMOUNT OF CLINOPTI.(g)	AMOUNT OF H20	AMOUNT OF SODIUM H.(g)	HAND MIX	BENTONITE	SIEVE SIZE(in.)	WEIGHT NOT PASSING SEIVE(g)	PERCENT NOT PASSING SEIVE(%)	TEMPERATURE OF OVEN(C)	TIME OF SAMPLE HEATING(min.)	FeCl2	BFS	Ca(OH)2
10563504	42	475	0	Y	70	0.111	3.5	0.6			0.0	0.0	0.0
10563505	42	475	0	Y	70	0.111	3.5	0.6			0.0	0.0	0.0
10563506	42	475	0	Y	70	0.111	3.5	0.6			0.0	0.0	0.0
10563701	42	376	0	Y	0	0.111	5.6	0.8			0.0	0.0	0.0
10563702	42	376	0	Y	0	0.111	5.6	0.8			0.0	0.0	0.0
10563703	42	376	0	Y	0	0.111	5.6	0.8			0.0	0.0	0.0
10563704	42	376	0	Y	0	0.111	5.6	0.8			0.0	0.0	0.0
10563705	42	376	0	Y	0	0.111	5.6	0.8			0.0	0.0	0.0
10563706	42	376	0	Y	0	0.111	5.6	0.8			0.0	0.0	0.0
10563901	0	332	0	Y	70	0.111	7.1	1.1			0.0	175.0	0.0
10563902	0	332	0	Y	70	0.111	7.1	1.1			0.0	175.0	0.0
10563903	0	332	0	Y	70	0.111	7.1	1.1			0.0	175.0	0.0
10563904	0	332	0	Y	70	0.111	7.1	1.1			0.0	175.0	0.0
10563905	0	332	0	Y	70	0.111	7.1	1.1			0.0	175.0	0.0
10563906	0	332	0	Y	70	0.111	7.1	1.1			0.0	175.0	0.0
10564101	0	254	0	Y	0	0.111	8.0	1.1			0.0	175.0	0.0
10564102	0	254	0	Y	0	0.111	8.0	1.1			0.0	175.0	0.0
10564103	0	254	0	Y	0	0.111	8.0	1.1			0.0	175.0	0.0
10564104	0	254	0	Y	0	0.111	8.0	1.1			0.0	175.0	0.0
10564105	0	254	0	Y	0	0.111	8.0	1.1			0.0	175.0	0.0
10564106	0	254	0	Y	0	0.111	8.0	1.1			0.0	175.0	0.0
10565101	0	447	0	Y	140	0.111	7.3	1.3			0.0	175.0	0.0
10565102	0	447	0	Y	140	0.111	7.3	1.3			0.0	175.0	0.0
10565103	0	447	0	Y	140	0.111	7.3	1.3			0.0	175.0	0.0
10565104	0	447	0	Y	140	0.111	7.3	1.3			0.0	175.0	0.0
10565105	0	447	0	Y	140	0.111	7.3	1.3			0.0	175.0	0.0
10565106	0	447	0	Y	140	0.111	7.3	1.3			0.0	175.0	0.0
10565301	0	406	0	Y	70	0.111	3.5	0.6			0.0	175.0	0.0
10565302	0	406	0	Y	70	0.111	3.5	0.6			0.0	175.0	0.0
10565303	0	406	0	Y	70	0.111	3.5	0.6			0.0	175.0	0.0
10565304	0	406	0	Y	70	0.111	3.5	0.6			0.0	175.0	0.0
10565305	0	406	0	Y	70	0.111	3.5	0.6			0.0	175.0	0.0
10565306	0	406	0	Y	70	0.111	3.5	0.6			0.0	175.0	0.0
10565501	0	292	0	Y	0	0.111	2.3	0.3			0.0	175.0	0.0
10565502	0	292	0	Y	0	0.111	2.3	0.3			0.0	175.0	0.0
10565503	0	292	0	Y	0	0.111	2.3	0.3			0.0	175.0	0.0
10565504	0	292	0	Y	0	0.111	2.3	0.3			0.0	175.0	0.0
10565505	0	292	0	Y	0	0.111	2.3	0.3			0.0	175.0	0.0
10565506	0	292	0	Y	0	0.111	2.3	0.3			0.0	175.0	0.0
10565701	42	492	0	Y	140	0.111	6.7	1.2			0.0	0.0	0.0
10565702	42	492	0	Y	140	0.111	6.7	1.2			0.0	0.0	0.0
10565703	42	492	0	Y	140	0.111	6.7	1.2			0.0	0.0	0.0
10565704	42	492	0	Y	140	0.111	6.7	1.2			0.0	0.0	0.0
10565705	42	492	0	Y	140	0.111	6.7	1.2			0.0	0.0	0.0
10565706	42	492	0	Y	140	0.111	6.7	1.2			0.0	0.0	0.0
10565901	42	485	0	Y	140	0.111	5.1	0.9			0.0	0.0	0.0
10565902	42	485	0	Y	140	0.111	5.1	0.9			0.0	0.0	0.0
10565903	42	485	0	Y	140	0.111	5.1	0.9			0.0	0.0	0.0
10565904	42	485	0	Y	140	0.111	5.1	0.9			0.0	0.0	0.0
10565905	42	485	0	Y	140	0.111	5.1	0.9			0.0	0.0	0.0
10565906	42	485	0	Y	140	0.111	5.1	0.9			0.0	0.0	0.0
10566101	42	449	0	Y	70	0.111	13.9	2.2			0.0	0.0	0.0
10566102	42	449	0	Y	70	0.111	13.9	2.2			0.0	0.0	0.0

TREATABILITY SAMPLE #	AMOUNT OF CLINOPTI.(g)	AMOUNT OF H20	AMOUNT OF SODIUM H.(g)	HAND MIX	BENTONITE	SIEVE SIZE(in.)	WEIGHT NOT PASSING SEIVE(g)	PERCENT NOT PASSING SEIVE(%)	TEMPERATURE OF OVEN(C)	TIME OF SAMPLE HEATING(min.)	FeCl2	BFS	Ca(OH)2
10566103	42	449	0	Y	70	0.111	13.9	2.2			0.0	0.0	0.0
10566104	42	449	0	Y	70	0.111	13.9	2.2			0.0	0.0	0.0
10566105	42	449	0	Y	70	0.111	13.9	2.2			0.0	0.0	0.0
10566106	42	449	0	Y	70	0.111	13.9	2.2			0.0	0.0	0.0
10566301	42	339	0	Y	0	0.111	7.6	1.1			0.0	0.0	0.0
10566302	42	339	0	Y	0	0.111	7.6	1.1			0.0	0.0	0.0
10566303	42	339	0	Y	0	0.111	7.6	1.1			0.0	0.0	0.0
10566304	42	339	0	Y	0	0.111	7.6	1.1			0.0	0.0	0.0
10566305	42	339	0	Y	0	0.111	7.6	1.1			0.0	0.0	0.0
10566306	42	339	0	Y	0	0.111	7.6	1.1			0.0	0.0	0.0
10566501	0	397	0	Y	140	0.111	15.1	2.6			0.0	175.0	0.0
10566502	0	397	0	Y	140	0.111	15.1	2.6			0.0	175.0	0.0
10566503	0	397	0	Y	140	0.111	15.1	2.6			0.0	175.0	0.0
10566504	0	397	0	Y	140	0.111	15.1	2.6			0.0	175.0	0.0
10566505	0	397	0	Y	140	0.111	15.1	2.6			0.0	175.0	0.0
10566506	0	397	0	Y	140	0.111	15.1	2.6			0.0	175.0	0.0
10566701	0	404	0	Y	140	0.111	14.0	2.4			0.0	175.0	0.0
10566702	0	404	0	Y	140	0.111	14.0	2.4			0.0	175.0	0.0
10566703	0	404	0	Y	140	0.111	14.0	2.4			0.0	175.0	0.0
10566704	0	404	0	Y	140	0.111	14.0	2.4			0.0	175.0	0.0
10566705	0	404	0	Y	140	0.111	14.0	2.4			0.0	175.0	0.0
10566706	0	404	0	Y	140	0.111	14.0	2.4			0.0	175.0	0.0
10567901	0	693	0	Y	0	N/S	0.0	0.0			0.0	320.0	0.0
10567902	0	693	0	Y	0	N/S	0.0	0.0			0.0	320.0	0.0
10567903	0	693	0	Y	0	N/S	0.0	0.0			0.0	320.0	0.0
10567904	0	693	0	Y	0	N/S	0.0	0.0			0.0	320.0	0.0
10567905	0	693	0	Y	0	N/S	0.0	0.0			0.0	320.0	0.0
10567906	0	693	0	Y	0	N/S	0.0	0.0			0.0	320.0	0.0
10568101	0	727	0	Y	0	N/S	0.0	0.0			0.0	320.0	0.0
10568102	0	727	0	Y	0	N/S	0.0	0.0			0.0	320.0	0.0
10568103	0	727	0	Y	0	N/S	0.0	0.0			0.0	320.0	0.0
10568104	0	727	0	Y	0	N/S	0.0	0.0			0.0	320.0	0.0
10568105	0	727	0	Y	0	N/S	0.0	0.0			0.0	320.0	0.0
10568106	0	727	0	Y	0	N/S	0.0	0.0			0.0	320.0	0.0
10568301	32	753	0	Y	0	N/S	0.0	0.0			6.0	0.0	0.0
10568302	32	753	0	Y	0	N/S	0.0	0.0			6.0	0.0	0.0
10568303	32	753	0	Y	0	N/S	0.0	0.0			6.0	0.0	0.0
10568304	32	753	0	Y	0	N/S	0.0	0.0			6.0	0.0	0.0
10568305	32	753	0	Y	0	N/S	0.0	0.0			6.0	0.0	0.0
10568306	32	753	0	Y	0	N/S	0.0	0.0			6.0	0.0	0.0

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FORMULATION INFORMATION (PART 3 OF 5)

TREATABILITY SAMPLE #	NORMALIZED WASTE	% OF H2O IN WASTE	NORMALIZED WATER	NORMALIZED NA SILICATE	DRY BLEND	NORMALIZED CEMENT	NORMALIZED FLYASH	NORMALIZED ATTAPULG.	NORMALIZED CLINOPTI.	NORMALIZED SOIL	NORMALIZED NA. HYDRO.	NORMAL. FeCl2	NORMAL. BFS	NORMAL. BENTONITE
10330601	100	30	69	0	130	59	59	6	6	0	0	0	0	0
10330801	100	30	66	0	148	68	68	6	6	0	0	0	0	0
10331001	100	29	54	0	94	51	31	6	6	0	0	0	0	0
10331201	100	29	55	0	98	54	33	6	6	0	0	0	0	0
10331401	100	29	53	0	93	31	50	6	6	0	0	0	0	0
10331601	100	28	60	0	98	33	53	6	6	0	0	0	0	0
10331801	100	29	46	0	64	26	26	6	6	0	0	0	0	0
10332001	100	30	46	0	66	27	27	6	6	0	0	0	0	0
10332201	100	30	59	0	98	43	43	6	6	0	0	0	0	0
10332401	100	30	55	0	99	43	43	6	6	0	0	0	0	0
10332601	100	31	55	0	98	43	43	6	6	0	0	0	0	0
10332801	100	31	46	0	97	43	43	6	6	0	0	0	0	0
10333001	100	28	46	0	98	43	43	6	6	0	0	0	0	0
10333201	100	33	65	0	140	64	64	6	6	0	0	0	0	0
10333401	100	31	65	0	148	68	68	6	6	0	0	0	0	0
10333601	100	31	55	0	95	51	31	6	6	0	0	0	0	0
10333801	100	32	56	0	99	54	33	6	6	0	0	0	0	0
10334001	100	30	53	0	95	31	51	6	6	0	0	0	0	0
10334201	100	33	59	0	100	33	54	6	6	0	0	0	0	0
10334401	100	31	44	0	64	26	26	6	6	0	0	0	0	0
10334601	100	32	42	0	66	27	27	6	6	0	0	0	0	0
10334801	100	33	54	0	98	43	43	6	6	0	0	0	0	0
10335001	100	32	46	0	98	43	43	6	6	0	0	0	0	0
10335201	100	32	0	0	98	43	43	6	6	0	0	0	0	0
10338001	100	-9.99	140	0	140	64	64	6	6	0	0	0	0	0
10338201	100	-9.99	136	0	148	68	68	6	6	0	0	0	0	0
10338401	100	-9.99	113	0	94	51	31	6	6	0	0	0	0	0
10338601	100	-9.99	119	0	99	54	33	6	6	0	0	0	0	0
10338801	100	-9.99	119	0	100	54	33	6	6	0	0	0	0	0
10339001	100	-9.99	115	0	95	31	51	6	6	0	0	0	0	0
10339201	100	-9.99	117	0	99	33	54	6	6	0	0	0	0	0
10339401	100	-9.99	100	0	64	26	26	6	6	0	0	0	0	0
10339601	100	-9.99	102	0	66	27	27	6	6	0	0	0	0	0
10339801	100	-9.99	110	0	99	43	43	6	6	0	0	0	0	0
10430301	100	-9.99	106	0	99	43	43	6	6	0	0	0	0	0
10430501	100	-9.99	105	0	98	43	43	6	6	0	0	0	0	0
10430701	100	-9.99	123	4	98	43	43	12	0	0	0	0	0	0
10430901	100	-9.99	110	4	98	43	43	0	12	0	0	0	0	0
10431101	100	33	74	0	140	64	64	6	6	0	0	0	0	0
10431301	100	32	74	7	148	68	68	6	6	0	0	0	0	0
10431501	100	32	54	0	94	51	31	6	6	0	0	0	0	0
10431701	100	31	55	7	99	54	33	6	6	0	0	0	0	0
10431901	100	31	54	0	94	31	51	6	6	0	0	0	0	0
10432101	100	32	60	7	99	33	54	6	6	0	0	0	0	0
10432301	100	29	40	0	64	26	26	6	6	0	0	0	0	0
10432501	100	31	41	0	64	26	26	6	6	0	0	0	0	0
10432701	100	30	41	7	66	27	27	6	6	0	0	0	0	0
10432901	100	30	50	4	98	43	43	6	6	0	0	0	0	0
10433101	100	29	59	4	98	43	43	12	0	0	0	0	0	0
10433301	100	29	55	4	98	43	43	0	12	0	0	0	0	0
10433501	100	30	60	7	128	64	64	0	0	0	0	0	0	0

TREATABILITY SAMPLE #	NORMALIZED WASTE	% OF H2O IN WASTE	NORMALIZED WATER	NORMALIZED NA SILICATE	DRY BLEND	NORMALIZED CEMENT	NORMALIZED FLYASH	NORMALIZED ATTAPULG.	NORMALIZED CLINOPTI.	NORMALIZED SOIL	NORMALIZED NA. HYDRO.	NORMAL. FeCl2	NORMAL. BFS	NORMAL. BENTONITE
10433701	100	32	24	7	54	27	27	0	0	0	0	0	0	0
10433901	100	32	40	7	86	43	43	0	0	0	0	0	0	0
10434101	100	32	65	0	141	65	64	6	6	0	0	0	0	0
10434301	100	29	65	7	148	68	68	6	6	0	0	0	0	0
10434501	100	31	55	0	94	51	31	6	6	0	0	0	0	0
10434701	100	30	56	7	100	54	33	6	6	0	0	0	0	0
10434901	100	31	54	0	95	31	51	6	6	0	0	0	0	0
10435101	100	30	59	7	99	33	54	6	6	0	0	0	0	0
10435301	100	31	44	0	64	26	26	6	6	0	0	0	0	0
10435501	100	-9.99	42	7	66	27	27	6	6	0	0	0	0	0
10435701	100	29	54	4	98	43	43	6	6	0	0	0	0	0
10435901	100	31	57	4	98	43	43	12	0	0	0	0	0	0
10436101	100	31	49	4	98	43	43	0	12	0	0	0	0	0
10436301	100	29	64	7	128	64	64	0	0	0	0	0	0	0
10436501	100	31	27	7	54	27	27	0	0	0	0	0	0	0
10436701	100	-9.99	27	7	54	27	27	0	0	0	0	0	0	0
10436901	100	30	43	4	86	43	43	0	0	0	0	0	0	0
10480701	100	-9.99	108	0	100	50	0	0	0	0	0	0	50	0
10480702	100	-9.99	108	0	100	50	0	0	0	0	0	0	50	0
10480901	100	-9.99	101	0	81	40	0	0	0	0	0	1	40	0
10480902	100	-9.99	101	0	81	40	0	0	0	0	0	1	40	0
10481101	100	-9.99	95	0	80	40	0	0	0	0	0	0	40	0
10481102	100	-9.99	95	0	80	40	0	0	0	0	0	0	40	0
10481301	100	-9.99	100	0	90	50	15	0	0	0	0	0	25	0
10481302	100	-9.99	100	0	90	50	15	0	0	0	0	0	25	0
10481501	100	-9.99	108	0	87	51	31	0	4	0	0	1	0	0
10481502	100	-9.99	108	0	87	51	31	0	4	0	0	1	0	0
10481701	100	-9.99	108	0	83	51	31	0	0	0	0	1	0	0
10481702	100	-9.99	108	0	83	51	31	0	0	0	0	1	0	0
10482501	100	29	46	0	100	50	0	0	0	0	0	0	50	0
10482701	100	29	39	0	90	50	15	0	0	0	0	0	25	0
10482901	100	30	40	10	82	51	31	0	0	0	0	0	0	0
10483101	100	24	51	0	100	50	0	0	0	0	0	0	50	0
10483301	100	21	46	0	90	50	15	0	0	0	0	0	25	0
10483501	100	25	40	11	82	51	31	0	0	0	0	0	0	0
10538001	100	80	61	0	104	53	15	0	5	0	0	0	31	0
10538002	100	80	61	0	104	53	15	0	5	0	0	0	31	0
10538201	100	78	29	0	119	60	18	0	10	0	0	0	31	0
10563101	100	22	96	0	143	64	39	8	8	0	0	0	0	25
10563102	100	22	96	0	143	64	39	8	8	0	0	0	0	25
10563103	100	22	96	0	143	64	39	8	8	0	0	0	0	25
10563104	100	22	96	0	143	64	39	8	8	0	0	0	0	25
10563105	100	22	96	0	143	64	39	8	8	0	0	0	0	25
10563106	100	22	96	0	143	64	39	8	8	0	0	0	0	25
10563301	100	25	101	0	143	64	39	8	8	0	0	0	0	25
10563302	100	25	101	0	143	64	39	8	8	0	0	0	0	25
10563303	100	25	101	0	143	64	39	8	8	0	0	0	0	25
10563304	100	25	101	0	143	64	39	8	8	0	0	0	0	25
10563305	100	25	101	0	143	64	39	8	8	0	0	0	0	25
10563306	100	25	101	0	143	64	39	8	8	0	0	0	0	25
10563501	100	33	75	0	116	57	34	7	7	0	0	0	0	11
10563502	100	33	75	0	116	57	34	7	7	0	0	0	0	11
10563503	100	33	75	0	116	57	34	7	7	0	0	0	0	11

TREATABILITY SAMPLE #	NORMALIZED WASTE	% OF H2O IN WASTE	NORMALIZED WATER	NORMALIZED NA SILICATE	DRY BLEND	NORMALIZED CEMENT	NORMALIZED FLYASH	NORMALIZED ATTAPULG.	NORMALIZED CLINOPTI.	NORMALIZED SOIL	NORMALIZED NA. HYDRO.	NORMAL. FeCl2	NORMAL. BFS	NORMAL. BENTONITE
10563504	100	33	75	0	116	57	34	7	7	0	0	0	0	11
10563505	100	33	75	0	116	57	34	7	7	0	0	0	0	11
10563506	100	33	75	0	116	57	34	7	7	0	0	0	0	11
10563701	100	35	54	0	94	51	31	6	6	0	0	0	0	0
10563702	100	35	54	0	94	51	31	6	6	0	0	0	0	0
10563703	100	35	54	0	94	51	31	6	6	0	0	0	0	0
10563704	100	35	54	0	94	51	31	6	6	0	0	0	0	0
10563705	100	35	54	0	94	51	31	6	6	0	0	0	0	0
10563706	100	35	54	0	94	51	31	6	6	0	0	0	0	0
10563901	100	33	53	0	111	56	17	0	0	0	0	0	28	11
10563902	100	33	53	0	111	56	17	0	0	0	0	0	28	11
10563903	100	33	53	0	111	56	17	0	0	0	0	0	28	11
10563904	100	33	53	0	111	56	17	0	0	0	0	0	28	11
10563905	100	33	53	0	111	56	17	0	0	0	0	0	28	11
10563906	100	33	53	0	111	56	17	0	0	0	0	0	28	11
10564101	100	30	36	0	90	50	15	0	0	0	0	0	25	0
10564102	100	30	36	0	90	50	15	0	0	0	0	0	25	0
10564103	100	30	36	0	90	50	15	0	0	0	0	0	25	0
10564104	100	30	36	0	90	50	15	0	0	0	0	0	25	0
10564105	100	30	36	0	90	50	15	0	0	0	0	0	25	0
10564106	100	30	36	0	90	50	15	0	0	0	0	0	25	0
10565101	100	22	80	0	138	63	19	0	0	0	0	0	31	25
10565102	100	22	80	0	138	63	19	0	0	0	0	0	31	25
10565103	100	22	80	0	138	63	19	0	0	0	0	0	31	25
10565104	100	22	80	0	138	63	19	0	0	0	0	0	31	25
10565105	100	22	80	0	138	63	19	0	0	0	0	0	31	25
10565106	100	22	80	0	138	63	19	0	0	0	0	0	31	25
10565301	100	33	64	0	111	56	17	0	0	0	0	0	28	11
10565302	100	33	64	0	111	56	17	0	0	0	0	0	28	11
10565303	100	33	64	0	111	56	17	0	0	0	0	0	28	11
10565304	100	33	64	0	111	56	17	0	0	0	0	0	28	11
10565305	100	33	64	0	111	56	17	0	0	0	0	0	28	11
10565306	100	33	64	0	111	56	17	0	0	0	0	0	28	11
10565501	100	35	42	0	90	50	15	0	0	0	0	0	25	0
10565502	100	35	42	0	90	50	15	0	0	0	0	0	25	0
10565503	100	35	42	0	90	50	15	0	0	0	0	0	25	0
10565504	100	35	42	0	90	50	15	0	0	0	0	0	25	0
10565505	100	35	42	0	90	50	15	0	0	0	0	0	25	0
10565506	100	35	42	0	90	50	15	0	0	0	0	0	25	0
10565701	100	21	88	0	143	64	39	8	8	0	0	0	0	25
10565702	100	21	88	0	143	64	39	8	8	0	0	0	0	25
10565703	100	21	88	0	143	64	39	8	8	0	0	0	0	25
10565704	100	21	88	0	143	64	39	8	8	0	0	0	0	25
10565705	100	21	88	0	143	64	39	8	8	0	0	0	0	25
10565706	100	21	88	0	143	64	39	8	8	0	0	0	0	25
10565901	100	22	87	0	143	64	39	8	8	0	0	0	0	25
10565902	100	22	87	0	143	64	39	8	8	0	0	0	0	25
10565903	100	22	87	0	143	64	39	8	8	0	0	0	0	25
10565904	100	22	87	0	143	64	39	8	8	0	0	0	0	25
10565905	100	22	87	0	143	64	39	8	8	0	0	0	0	25
10565906	100	22	87	0	143	64	39	8	8	0	0	0	0	25
10566101	100	33	71	0	116	57	34	7	7	0	0	0	0	11
10566102	100	33	71	0	116	57	34	7	7	0	0	0	0	11

TREATABILITY SAMPLE #	NORMALIZED WASTE	% OF H2O IN WASTE	NORMALIZED WATER	NORMALIZED NA SILICATE	DRY BLEND	NORMALIZED CEMENT	NORMALIZED FLYASH	NORMALIZED ATTAPULG.	NORMALIZED CLINOPTI.	NORMALIZED SOIL	NORMALIZED NA. HYDRO.	NORMAL. FeCl2	NORMAL. BFS	NORMAL. BENTONITE
10566103	100	33	71	0	116	57	34	7	7	0	0	0	0	11
10566104	100	33	71	0	116	57	34	7	7	0	0	0	0	11
10566105	100	33	71	0	116	57	34	7	7	0	0	0	0	11
10566106	100	33	71	0	116	57	34	7	7	0	0	0	0	11
10566301	100	30	48	0	94	51	31	6	6	0	0	0	0	0
10566302	100	30	48	0	94	51	31	6	6	0	0	0	0	0
10566303	100	30	48	0	94	51	31	6	6	0	0	0	0	0
10566304	100	30	48	0	94	51	31	6	6	0	0	0	0	0
10566305	100	30	48	0	94	51	31	6	6	0	0	0	0	0
10566306	100	30	48	0	94	51	31	6	6	0	0	0	0	0
10566501	100	21	71	0	138	63	19	0	0	0	0	0	31	25
10566502	100	21	71	0	138	63	19	0	0	0	0	0	31	25
10566503	100	21	71	0	138	63	19	0	0	0	0	0	31	25
10566504	100	21	71	0	138	63	19	0	0	0	0	0	31	25
10566505	100	21	71	0	138	63	19	0	0	0	0	0	31	25
10566506	100	21	71	0	138	63	19	0	0	0	0	0	31	25
10566701	100	22	72	0	138	63	19	0	0	0	0	0	31	25
10566702	100	22	72	0	138	63	19	0	0	0	0	0	31	25
10566703	100	22	72	0	138	63	19	0	0	0	0	0	31	25
10566704	100	22	72	0	138	63	19	0	0	0	0	0	31	25
10566705	100	22	72	0	138	63	19	0	0	0	0	0	31	25
10566706	100	22	72	0	138	63	19	0	0	0	0	0	31	25
10567901	100	-9.99	87	0	80	40	0	0	0	0	0	0	40	0
10567902	100	-9.99	87	0	80	40	0	0	0	0	0	0	40	0
10567903	100	-9.99	87	0	80	40	0	0	0	0	0	0	40	0
10567904	100	-9.99	87	0	80	40	0	0	0	0	0	0	40	0
10567905	100	-9.99	87	0	80	40	0	0	0	0	0	0	40	0
10567906	100	-9.99	87	0	80	40	0	0	0	0	0	0	40	0
10568101	100	-9.99	91	0	80	40	0	0	0	0	0	0	40	0
10568102	100	-9.99	91	0	80	40	0	0	0	0	0	0	40	0
10568103	100	-9.99	91	0	80	40	0	0	0	0	0	0	40	0
10568104	100	-9.99	91	0	80	40	0	0	0	0	0	0	40	0
10568105	100	-9.99	91	0	80	40	0	0	0	0	0	0	40	0
10568106	100	-9.99	91	0	80	40	0	0	0	0	0	0	40	0
10568301	100	-9.99	94	0	87	51	31	0	4	0	0	1	0	0
10568302	100	-9.99	94	0	87	51	31	0	4	0	0	1	0	0
10568303	100	-9.99	94	0	87	51	31	0	4	0	0	1	0	0
10568304	100	-9.99	94	0	87	51	31	0	4	0	0	1	0	0
10568305	100	-9.99	94	0	87	51	31	0	4	0	0	1	0	0
10568306	100	-9.99	94	0	87	51	31	0	4	0	0	1	0	0

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FORMULATION INFORMATION (PART 4 OF 5)

TREATABILITY SAMPLE #	% OF WASTE	% OF CEMENT	% OF FLYASH	% OF SODIUM SILICATE	% OF ATTAPULG	% OF CLINOPTI	% OF H20	% OF FeCl2	% OF BFS	% OF BENTONITE
10330601	33.5	19.9	19.8	0.0	1.9	2.0	23.0	0.0	0.0	0.0
10330801	31.8	21.7	21.6	0.0	1.9	1.9	21.1	0.0	0.0	0.0
10331001	40.3	20.6	12.5	0.0	2.5	2.5	21.7	0.0	0.0	0.0
10331201	39.5	21.2	12.9	0.0	2.3	2.3	21.8	0.0	0.0	0.0
10331401	40.7	12.5	20.5	0.0	2.5	2.4	21.5	0.0	0.0	0.0
10331601	38.8	12.6	20.6	0.0	2.4	2.3	23.2	0.0	0.0	0.0
10331801	47.6	12.5	12.4	0.0	2.9	2.8	21.8	0.0	0.0	0.0
10332001	47.1	12.8	12.6	0.0	2.9	2.8	21.7	0.0	0.0	0.0
10332201	38.9	16.8	16.8	0.0	2.3	2.4	22.8	0.0	0.0	0.0
10332401	39.4	16.9	17.1	0.0	2.4	2.5	21.6	0.0	0.0	0.0
10332601	39.5	16.9	16.9	0.0	2.4	2.4	21.8	0.0	0.0	0.0
10332801	41.1	17.5	17.6	0.0	2.5	2.5	18.8	0.0	0.0	0.0
10333001	41.0	17.6	17.7	0.0	2.5	2.5	18.8	0.0	0.0	0.0
10333201	32.7	20.9	21.0	0.0	2.0	2.0	21.3	0.0	0.0	0.0
10333401	32.0	21.7	21.7	0.0	2.0	2.0	20.7	0.0	0.0	0.0
10333601	40.0	20.3	12.5	0.0	2.5	2.5	22.2	0.0	0.0	0.0
10333801	39.1	21.1	12.9	0.0	2.4	2.4	22.0	0.0	0.0	0.0
10334001	40.4	12.6	20.5	0.0	2.5	2.5	21.5	0.0	0.0	0.0
10334201	38.6	12.9	20.8	0.0	2.4	2.4	22.8	0.0	0.0	0.0
10334401	48.0	12.5	12.5	0.0	2.9	2.9	21.2	0.0	0.0	0.0
10334601	47.9	12.9	13.1	0.0	3.0	2.9	20.2	0.0	0.0	0.0
10334801	39.8	17.0	17.0	0.0	2.5	2.4	21.3	0.0	0.0	0.0
10335001	40.8	17.6	17.7	0.0	2.5	2.4	19.0	0.0	0.0	0.0
10335201	50.4	21.7	21.7	0.0	3.1	3.1	0.1	0.0	0.0	0.0
10338001	26.2	16.9	16.8	0.0	1.6	1.6	36.9	0.0	0.0	0.0
10338201	26.0	17.7	17.7	0.0	1.6	1.6	35.3	0.0	0.0	0.0
10338401	32.5	16.6	10.1	0.0	2.0	2.0	36.9	0.0	0.0	0.0
10338601	31.4	16.9	10.3	0.0	1.9	1.9	37.5	0.0	0.0	0.0
10338801	31.4	17.0	10.4	0.0	1.9	1.9	37.4	0.0	0.0	0.0
10339001	32.3	10.0	16.6	0.0	1.9	1.9	37.2	0.0	0.0	0.0
10339201	31.6	10.4	17.0	0.0	2.0	1.9	37.0	0.0	0.0	0.0
10339401	37.9	9.9	9.8	0.0	2.3	2.3	37.8	0.0	0.0	0.0
10339601	37.2	10.1	10.0	0.0	2.2	2.3	38.1	0.0	0.0	0.0
10339801	32.4	14.0	13.9	0.0	2.0	2.1	35.6	0.0	0.0	0.0
10430301	32.8	14.2	14.2	0.0	2.1	2.0	34.8	0.0	0.0	0.0
10430501	33.0	14.1	14.1	0.0	2.1	2.0	34.6	0.0	0.0	0.0
10430701	30.8	13.3	13.3	1.2	3.7	0.0	37.7	0.0	0.0	0.0
10430901	32.1	13.8	13.8	1.3	0.0	3.9	35.2	0.0	0.0	0.0
10431101	31.8	20.3	20.4	0.0	1.9	1.9	23.6	0.0	0.0	0.0
10431301	30.4	20.6	20.6	2.1	1.8	1.8	22.6	0.0	0.0	0.0
10431501	40.2	20.5	12.5	0.0	2.5	2.5	21.9	0.0	0.0	0.0
10431701	38.4	20.6	12.6	2.7	2.3	2.3	21.0	0.0	0.0	0.0
10431901	40.3	12.5	20.5	0.0	2.5	2.5	21.8	0.0	0.0	0.0
10432101	37.7	12.4	20.2	2.7	2.2	2.3	22.5	0.0	0.0	0.0
10432301	48.9	12.6	12.7	0.0	3.0	3.0	19.8	0.0	0.0	0.0
10432501	48.9	12.6	12.7	0.0	2.9	3.0	19.9	0.0	0.0	0.0
10432701	46.6	12.6	12.6	3.4	2.8	2.8	19.1	0.0	0.0	0.0
10432901	39.7	17.1	17.0	1.6	2.4	2.4	19.8	0.0	0.0	0.0
10433101	38.2	16.4	16.4	1.6	4.6	0.0	22.7	0.0	0.0	0.0
10433301	38.8	16.7	16.7	1.6	0.0	4.7	21.5	0.0	0.0	0.0
10433501	34.0	21.7	21.7	2.4	0.0	0.0	20.3	0.0	0.0	0.0

TREATABILITY SAMPLE #	% OF WASTE	% OF CEMENT	% OF FLYASH	% OF SODIUM SILICATE	% OF ATTAPULG	% OF CLINOPTI	% OF H2O	% OF FeCl2	% OF BFS	% OF BENTONITE
10433701	54.0	14.6	14.6	3.8	0.0	0.0	13.0	0.0	0.0	0.0
10433901	43.0	18.4	18.4	3.0	0.0	0.0	17.1	0.0	0.0	0.0
10434101	32.6	21.1	21.0	0.0	2.0	2.0	21.3	0.0	0.0	0.0
10434301	31.3	21.2	21.2	2.2	1.9	1.9	20.2	0.0	0.0	0.0
10434501	40.2	20.4	12.4	0.0	2.4	2.4	22.1	0.0	0.0	0.0
10434701	38.1	20.7	12.6	2.7	2.3	2.3	21.3	0.0	0.0	0.0
10434901	40.2	12.6	20.6	0.0	2.4	2.4	21.7	0.0	0.0	0.0
10435101	37.7	12.4	20.3	2.7	2.3	2.3	22.2	0.0	0.0	0.0
10435301	48.2	12.5	12.5	0.0	2.9	2.9	21.1	0.0	0.0	0.0
10435501	46.7	12.5	12.5	3.3	2.8	2.8	19.4	0.0	0.0	0.0
10435701	39.2	16.8	16.8	1.6	2.3	2.3	21.0	0.0	0.0	0.0
10435901	38.6	16.6	16.6	1.6	4.6	0.0	22.1	0.0	0.0	0.0
10436101	39.7	17.1	17.1	1.6	0.0	4.8	19.6	0.0	0.0	0.0
10436301	33.5	21.4	21.4	2.4	0.0	0.0	21.4	0.0	0.0	0.0
10436501	53.1	14.4	14.3	3.8	0.0	0.0	14.4	0.0	0.0	0.0
10436701	53.2	14.3	14.3	3.8	0.0	0.0	14.4	0.0	0.0	0.0
10436901	42.8	18.4	18.5	1.8	0.0	0.0	18.5	0.0	0.0	0.0
10480701	32.4	16.2	0.0	0.0	0.0	0.0	35.1	0.0	16.2	0.0
10480702	32.4	16.2	0.0	0.0	0.0	0.0	35.1	0.0	16.2	0.0
10480901	35.5	14.2	0.0	0.0	0.0	0.0	35.9	0.3	14.2	0.0
10480902	35.5	14.2	0.0	0.0	0.0	0.0	35.9	0.3	14.2	0.0
10481101	36.4	14.6	0.0	0.0	0.0	0.0	34.4	0.0	14.6	0.0
10481102	36.4	14.6	0.0	0.0	0.0	0.0	34.4	0.0	14.6	0.0
10481301	34.4	17.2	5.2	0.0	0.0	0.0	34.4	0.0	8.7	0.0
10481302	34.4	17.2	5.2	0.0	0.0	0.0	34.4	0.0	8.7	0.0
10481501	33.9	17.3	10.5	0.0	0.0	1.4	36.6	0.2	0.0	0.0
10481502	33.9	17.3	10.5	0.0	0.0	1.4	36.6	0.2	0.0	0.0
10481701	34.4	17.5	10.7	0.0	0.0	0.0	37.1	0.3	0.0	0.0
10481702	34.4	17.5	10.7	0.0	0.0	0.0	37.1	0.3	0.0	0.0
10482501	40.7	20.3	0.0	0.0	0.0	0.0	18.6	0.0	20.3	0.0
10482701	43.6	21.8	6.5	0.0	0.0	0.0	17.2	0.0	10.9	0.0
10482901	43.1	21.9	13.3	4.4	0.0	0.0	17.3	0.0	0.0	0.0
10483101	39.8	19.9	0.0	0.0	0.0	0.0	20.4	0.0	19.9	0.0
10483301	42.4	21.2	6.4	0.0	0.0	0.0	19.4	0.0	10.6	0.0
10483501	43.1	21.8	13.3	4.5	0.0	0.0	17.2	0.0	0.0	0.0
10538001	37.7	20.0	5.7	0.0	0.0	1.9	23.1	0.0	11.7	0.0
10538002	37.7	20.0	5.7	0.0	0.0	1.9	23.0	0.0	11.7	0.0
10538201	40.4	24.3	7.3	0.0	0.0	4.0	11.5	0.0	12.5	0.0
10563101	29.5	18.8	11.4	0.0	2.2	2.2	28.4	0.0	0.0	7.4
10563102	29.5	18.8	11.4	0.0	2.2	2.2	28.4	0.0	0.0	7.4
10563103	29.5	18.8	11.4	0.0	2.2	2.2	28.4	0.0	0.0	7.4
10563104	29.5	18.8	11.4	0.0	2.2	2.2	28.4	0.0	0.0	7.4
10563105	29.5	18.8	11.4	0.0	2.2	2.2	28.4	0.0	0.0	7.4
10563106	29.5	18.8	11.4	0.0	2.2	2.2	28.4	0.0	0.0	7.4
10563301	29.1	18.5	11.3	0.0	2.2	2.2	29.5	0.0	0.0	7.3
10563302	29.1	18.5	11.3	0.0	2.2	2.2	29.5	0.0	0.0	7.3
10563303	29.1	18.5	11.3	0.0	2.2	2.2	29.5	0.0	0.0	7.3
10563304	29.1	18.5	11.3	0.0	2.2	2.2	29.5	0.0	0.0	7.3
10563305	29.1	18.5	11.3	0.0	2.2	2.2	29.5	0.0	0.0	7.3
10563306	29.1	18.5	11.3	0.0	2.2	2.2	29.5	0.0	0.0	7.3
10563501	34.4	19.5	11.8	0.0	2.3	2.3	25.9	0.0	0.0	3.8
10563502	34.4	19.5	11.8	0.0	2.3	2.3	25.9	0.0	0.0	3.8
10563503	34.4	19.5	11.8	0.0	2.3	2.3	25.9	0.0	0.0	3.8

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TREATABILITY SAMPLE #	% OF WASTE	% OF CEMENT	% OF FLYASH	% OF SODIUM SILICATE	% OF ATTAPULG	% OF CLINOPTI	% OF H20	% OF FeCl2	% OF BFS	% OF BENTONITE
10563504	34.4	19.5	11.8	0.0	2.3	2.3	25.9	0.0	0.0	3.8
10563505	34.4	19.5	11.8	0.0	2.3	2.3	25.9	0.0	0.0	3.8
10563506	34.4	19.5	11.8	0.0	2.3	2.3	25.9	0.0	0.0	3.8
10563701	40.4	20.6	12.5	0.0	2.4	2.4	21.7	0.0	0.0	0.0
10563702	40.4	20.6	12.5	0.0	2.4	2.4	21.7	0.0	0.0	0.0
10563703	40.4	20.6	12.5	0.0	2.4	2.4	21.7	0.0	0.0	0.0
10563704	40.4	20.6	12.5	0.0	2.4	2.4	21.7	0.0	0.0	0.0
10563705	40.4	20.6	12.5	0.0	2.4	2.4	21.7	0.0	0.0	0.0
10563706	40.4	20.6	12.5	0.0	2.4	2.4	21.7	0.0	0.0	0.0
10563901	37.9	21.1	6.3	0.0	0.0	0.0	20.0	0.0	10.5	4.2
10563902	37.9	21.1	6.3	0.0	0.0	0.0	20.0	0.0	10.5	4.2
10563903	37.9	21.1	6.3	0.0	0.0	0.0	20.0	0.0	10.5	4.2
10563904	37.9	21.1	6.3	0.0	0.0	0.0	20.0	0.0	10.5	4.2
10563905	37.9	21.1	6.3	0.0	0.0	0.0	20.0	0.0	10.5	4.2
10563906	37.9	21.1	6.3	0.0	0.0	0.0	20.0	0.0	10.5	4.2
10564101	44.2	22.1	6.6	0.0	0.0	0.0	16.1	0.0	11.0	0.0
10564102	44.2	22.1	6.6	0.0	0.0	0.0	16.1	0.0	11.0	0.0
10564103	44.2	22.1	6.6	0.0	0.0	0.0	16.1	0.0	11.0	0.0
10564104	44.2	22.1	6.6	0.0	0.0	0.0	16.1	0.0	11.0	0.0
10564105	44.2	22.1	6.6	0.0	0.0	0.0	16.1	0.0	11.0	0.0
10564106	44.2	22.1	6.6	0.0	0.0	0.0	16.1	0.0	11.0	0.0
10565101	31.5	19.7	5.9	0.0	0.0	0.0	25.1	0.0	9.9	7.9
10565102	31.5	19.7	5.9	0.0	0.0	0.0	25.1	0.0	9.9	7.9
10565103	31.5	19.7	5.9	0.0	0.0	0.0	25.1	0.0	9.9	7.9
10565104	31.5	19.7	5.9	0.0	0.0	0.0	25.1	0.0	9.9	7.9
10565105	31.5	19.7	5.9	0.0	0.0	0.0	25.1	0.0	9.9	7.9
10565106	31.5	19.7	5.9	0.0	0.0	0.0	25.1	0.0	9.9	7.9
10565301	36.3	20.2	6.0	0.0	0.0	0.0	23.4	0.0	10.1	4.0
10565302	36.3	20.2	6.0	0.0	0.0	0.0	23.4	0.0	10.1	4.0
10565303	36.3	20.2	6.0	0.0	0.0	0.0	23.4	0.0	10.1	4.0
10565304	36.3	20.2	6.0	0.0	0.0	0.0	23.4	0.0	10.1	4.0
10565305	36.3	20.2	6.0	0.0	0.0	0.0	23.4	0.0	10.1	4.0
10565306	36.3	20.2	6.0	0.0	0.0	0.0	23.4	0.0	10.1	4.0
10565501	43.2	21.6	6.5	0.0	0.0	0.0	18.0	0.0	10.8	0.0
10565502	43.2	21.6	6.5	0.0	0.0	0.0	18.0	0.0	10.8	0.0
10565503	43.2	21.6	6.5	0.0	0.0	0.0	18.0	0.0	10.8	0.0
10565504	43.2	21.6	6.5	0.0	0.0	0.0	18.0	0.0	10.8	0.0
10565505	43.2	21.6	6.5	0.0	0.0	0.0	18.0	0.0	10.8	0.0
10565506	43.2	21.6	6.5	0.0	0.0	0.0	18.0	0.0	10.8	0.0
10565701	30.3	19.3	11.7	0.0	2.3	2.3	26.6	0.0	0.0	7.6
10565702	30.3	19.3	11.7	0.0	2.3	2.3	26.6	0.0	0.0	7.6
10565703	30.3	19.3	11.7	0.0	2.3	2.3	26.6	0.0	0.0	7.6
10565704	30.3	19.3	11.7	0.0	2.3	2.3	26.6	0.0	0.0	7.6
10565705	30.3	19.3	11.7	0.0	2.3	2.3	26.6	0.0	0.0	7.6
10565706	30.3	19.3	11.7	0.0	2.3	2.3	26.6	0.0	0.0	7.6
10565901	30.4	19.4	11.8	0.0	2.3	2.3	26.3	0.0	0.0	7.6
10565902	30.4	19.4	11.8	0.0	2.3	2.3	26.3	0.0	0.0	7.6
10565903	30.4	19.4	11.8	0.0	2.3	2.3	26.3	0.0	0.0	7.6
10565904	30.4	19.4	11.8	0.0	2.3	2.3	26.3	0.0	0.0	7.6
10565905	30.4	19.4	11.8	0.0	2.3	2.3	26.3	0.0	0.0	7.6
10565906	30.4	19.4	11.8	0.0	2.3	2.3	26.3	0.0	0.0	7.6
10566101	34.9	19.8	12.0	0.0	2.3	2.3	24.8	0.0	0.0	3.9
10566102	34.9	19.8	12.0	0.0	2.3	2.3	24.8	0.0	0.0	3.9

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TREATABILITY SAMPLE #	% OF WASTE	% OF CEMENT	% OF FLYASH	% OF SODIUM SILICATE	% OF ATTAPULG	% OF CLINOPTI	% OF H2O	% OF FeCl2	% OF BFS	% OF BENTONITE
10566103	34.9	19.8	12.0	0.0	2.3	2.3	24.8	0.0	0.0	3.9
10566104	34.9	19.8	12.0	0.0	2.3	2.3	24.8	0.0	0.0	3.9
10566105	34.9	19.8	12.0	0.0	2.3	2.3	24.8	0.0	0.0	3.9
10566106	34.9	19.8	12.0	0.0	2.3	2.3	24.8	0.0	0.0	3.9
10566301	41.2	21.0	12.8	0.0	2.5	2.5	20.0	0.0	0.0	0.0
10566302	41.2	21.0	12.8	0.0	2.5	2.5	20.0	0.0	0.0	0.0
10566303	41.2	21.0	12.8	0.0	2.5	2.5	20.0	0.0	0.0	0.0
10566304	41.2	21.0	12.8	0.0	2.5	2.5	20.0	0.0	0.0	0.0
10566305	41.2	21.0	12.8	0.0	2.5	2.5	20.0	0.0	0.0	0.0
10566306	41.2	21.0	12.8	0.0	2.5	2.5	20.0	0.0	0.0	0.0
10566501	32.4	20.3	6.1	0.0	0.0	0.0	23.0	0.0	10.1	8.1
10566502	32.4	20.3	6.1	0.0	0.0	0.0	23.0	0.0	10.1	8.1
10566503	32.4	20.3	6.1	0.0	0.0	0.0	23.0	0.0	10.1	8.1
10566504	32.4	20.3	6.1	0.0	0.0	0.0	23.0	0.0	10.1	8.1
10566505	32.4	20.3	6.1	0.0	0.0	0.0	23.0	0.0	10.1	8.1
10566506	32.4	20.3	6.1	0.0	0.0	0.0	23.0	0.0	10.1	8.1
10566701	32.3	20.2	6.1	0.0	0.0	0.0	23.3	0.0	10.1	8.1
10566702	32.3	20.2	6.1	0.0	0.0	0.0	23.3	0.0	10.1	8.1
10566703	32.3	20.2	6.1	0.0	0.0	0.0	23.3	0.0	10.1	8.1
10566704	32.3	20.2	6.1	0.0	0.0	0.0	23.3	0.0	10.1	8.1
10566705	32.3	20.2	6.1	0.0	0.0	0.0	23.3	0.0	10.1	8.1
10566706	32.3	20.2	6.1	0.0	0.0	0.0	23.3	0.0	10.1	8.1
10567901	37.5	15.0	0.0	0.0	0.0	0.0	32.5	0.0	15.0	0.0
10567902	37.5	15.0	0.0	0.0	0.0	0.0	32.5	0.0	15.0	0.0
10567903	37.5	15.0	0.0	0.0	0.0	0.0	32.5	0.0	15.0	0.0
10567904	37.5	15.0	0.0	0.0	0.0	0.0	32.5	0.0	15.0	0.0
10567905	37.5	15.0	0.0	0.0	0.0	0.0	32.5	0.0	15.0	0.0
10567906	37.5	15.0	0.0	0.0	0.0	0.0	32.5	0.0	15.0	0.0
10568101	36.9	14.8	0.0	0.0	0.0	0.0	33.6	0.0	14.8	0.0
10568102	36.9	14.8	0.0	0.0	0.0	0.0	33.6	0.0	14.8	0.0
10568103	36.9	14.8	0.0	0.0	0.0	0.0	33.6	0.0	14.8	0.0
10568104	36.9	14.8	0.0	0.0	0.0	0.0	33.6	0.0	14.8	0.0
10568105	36.9	14.8	0.0	0.0	0.0	0.0	33.6	0.0	14.8	0.0
10568106	36.9	14.8	0.0	0.0	0.0	0.0	33.6	0.0	14.8	0.0
10568301	35.6	18.2	11.0	0.0	0.0	1.4	33.5	0.3	0.0	0.0
10568302	35.6	18.2	11.0	0.0	0.0	1.4	33.5	0.3	0.0	0.0
10568303	35.6	18.2	11.0	0.0	0.0	1.4	33.5	0.3	0.0	0.0
10568304	35.6	18.2	11.0	0.0	0.0	1.4	33.5	0.3	0.0	0.0
10568305	35.6	18.2	11.0	0.0	0.0	1.4	33.5	0.3	0.0	0.0
10568306	35.6	18.2	11.0	0.0	0.0	1.4	33.5	0.3	0.0	0.0

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FORMULATION INFORMATION (PART 5 OF 5)

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TREATABILITY SAMPLE #	COMMENT	GENERAL DESCRIPTION OF WASTE(before and after mixing)
10330601	PHASE I, STAGE I, GROUP I, RUN 1	Before: grayish tan, moist, tacky w/red & white clumps After: no description
10330801	PHASE I, STAGE I, GROUP I, RUN 2	No description
10331001	PHASE I, STAGE I, GROUP I, RUN 3	No description
10331201	PHASE I, STAGE I, GROUP I, RUN 4	Before: clump of debris After: no description
10331401	PHASE I, STAGE I, GROUP I, RUN 5	No description
10331601	PHASE I, STAGE I, GROUP I, RUN 6	No description
10331801	PHASE I, STAGE I, GROUP I, RUN 7	No description
10332001	PHASE I, STAGE I, GROUP I, RUN 8	No description
10332201	PHASE I, STAGE I, GROUP I, RUN 9	No description
10332401	PHASE I, STAGE I, GROUP II, RUN M10	No description
10332601	PHASE I, STAGE I, GROUP I, RUN 9 DUP.	No description
10332801	PHASE I, STAGE I, GROUP II, RUN 10	No description
10333001	PHASE I, STAGE I, GROUP II, RUN 11	No description
10333201	PHASE I, STAGE I, GROUP I, RUN 1	Before: light brown, moist, non-glistening, red, black & greenish yellow clay clumps like yellow cake After: no description
10333401	PHASE I, STAGE I, GROUP I, RUN 2	No description
10333601	PHASE I, STAGE I, GROUP I, RUN 3	Before: 1 small cream colored clump After: no description
10333801	PHASE I, STAGE I, GROUP I, RUN 4	Before: green spec appeared fluorescent After: no description
10334001	PHASE I, STAGE I, GROUP I, RUN 5	No description
10334201	PHASE I, STAGE I, GROUP I, RUN 6	No description
10334401	PHASE I, STAGE I, GROUP I, RUN 7	No description
10334601	PHASE I, STAGE I, GROUP I, RUN 8	No description
10334801	PHASE I, STAGE I, GROUP I, RUN 9	No description
10335001	PHASE I, STAGE I, GROUP II, RUN 10	Before: brown, clay-like soil w/sm. red clay-like & black clumps After: no description
10335201	PHASE I, STAGE I, GROUP II, RUN 11	No description
10338001	PHASE I, STAGE II, GROUP I, RUN 1	Before: very fine powder w/brown tan appearance; sm. white/yellow specks After: smooth dk. brown homog.; very stiff w/H2O
10338201	PHASE I, STAGE II, GROUP I, RUN 2	Same as 10338001
10338401	PHASE I, STAGE II, GROUP I, RUN 3	Same as 10338001
10338601	PHASE I, STAGE II, GROUP I, RUN 4	Same as 10338001
10338801	PHASE I, STAGE II, GROUP I, RUN 4 DUP	Same as 10338001
10339001	PHASE I, STAGE II, GROUP I, RUN 5	Same as 10338001
10339201	PHASE I, STAGE II, GROUP I, RUN 6	Same as 10338001
10339401	PHASE I, STAGE II, GROUP I, RUN 7	Before: same as 10338001 After: same as 10338001 but very firm
10339601	PHASE I, STAGE II, GROUP I, RUN 8	Before: very fine, dry, brown & loose texture w/white/yellow specks After: silo matter not mixed w/dry cement mix; homog.diff
10339801	PHASE I, STAGE II, GROUP I, RUN 9	Before: same as 10339601 After: silo material not mixed w/cement/fly ash mix in dry form
10430301	PHASE I, STAGE II, GROUP II, RUN 10	Same as 10339801
10430501	PHASE I, STAGE II, GROUP II, RUN 11	Same as 10339801
10430701	PHASE I, STAGE II, GROUP III, RUN 13	Same as 10339801
10430901	PHASE I, STAGE II, GROUP III, RUN 12	Same as 10339801
10431101	PHASE I, STAGE II, GROUP I, RUN 1	Before: dk gray w/brn, yellow, orange & green matter After:smooth homog. gray, lightly viscous, mud-like w/brnt orange streak
10431301	PHASE I, STAGE II, GROUP I, RUN 2	Same as 10431101
10431501	PHASE I, STAGE II, GROUP I, RUN 3	Same as 10431101
10431701	PHASE I, STAGE II, GROUP I, RUN 4	Same as 10431101
10431901	PHASE I, STAGE II, GROUP I, RUN 5	Same as 10431101
10432101	PHASE I, STAGE II, GROUP I, RUN 6	Same as 10431101
10432301	PHASE I, STAGE II, GROUP I, RUN 7	Before: same as 10431101 After: increased viscosity w/shear strength
10432501	PHASE I, STAGE II, GROUP I, RUN 7 DUP.	Same as 10432301
10432701	PHASE I, STAGE II, GROUP I, RUN 8	Before: same as 10432501 After: more fluid
10432901	PHASE I, STAGE II, GROUP I, RUN 9	Same as 10432701
10433101	PHASE I, STAGE II, GROUP III, RUN 12	Same as 10432701
10433301	PHASE I, STAGE II, GROUP III, RUN 13	Same as 10432701 After: very light and thin to watery paste
10433501	PHASE I, STAGE II, GROUP III, RUN 14	Same as 10432701 After: smooth creamy texture w/thick consistency

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TREATABILITY SAMPLE #	COMMENT	GENERAL DESCRIPTION OF WASTE(before and after mixing)
10433701	PHASE I, STAGE II, GROUP III, RUN 15	Same as 10432701
10433901	PHASE I, STAGE II, GROUP III, RUN 16	Same as 10432701
10434101	PHASE I, STAGE II, GROUP I, RUN 1	No description
10434301	PHASE I, STAGE II, GROUP I, RUN 2	No description
10434501	PHASE I, STAGE II, GROUP I, RUN 3	No description
10434701	PHASE I, STAGE II, GROUP I, RUN 4	No description
10434901	PHASE I, STAGE II, GROUP I, RUN 5	No description
10435101	PHASE I, STAGE II, GROUP I, RUN 6	No description
10435301	PHASE I, STAGE II, GROUP I, RUN 7	No description
10435501	PHASE I, STAGE II, GROUP I, RUN 8	No description
10435701	PHASE I, STAGE II, GROUP I, RUN 9	No description
10435901	PHASE I, STAGE II, GROUP III, RUN 12	No description
10436101	PHASE I, STAGE II, GROUP III, RUN 13	Before: no description After: slightly thin consistency
10436301	PHASE I, STAGE II, GROUP III , RUN 14	Same as 10436101
10436501	PHASE I, STAGE II, GROUP III, RUN 15	Before: no description After: very thick
10436701	PHASE I, STAGE II, GROUP III, RUN 15 DUP	No description
10436901	PHASE I, STAGE II, GROUP III, RUN 16	No description
10480701	P I, STAGE III, GROUP I, RUN 1	Before: very fine talc-like powder; brown, homogeneous After: brown paste, homogeneous, pretty thick fluidity
10480702	P I, STAGE III, GROUP I, RUN 1	Same as 10480701
10480901	P I, STAGE III, GROUP I, RUN 2	Before: very fine talc-like powder; brown, very homogeneous After: thick homogeneous brown paste
10480902	P I, STAGE III, GROUP I, RUN 2	Same as 10480901
10481101	P I, STAGE III, GROUP I, RUN 3	Before: very fine talc-like powder; brown, very homogeneous After: thick homogeneous brown paste
10481102	P I, STAGE III, GROUP I, RUN 3	Same as 10481101
10481301	P I, STAGE III, GROUP I, RUN 4	Before: very fine talc-like powder; brown, homogeneous After: no water added; paste was very homogeneous, pretty thick, brown
10481302	P I, STAGE III, GROUP I, RUN 4	Same as 10481301
10481501	P I, STAGE III, GROUP I, RUN 5	Before: very fine talc-like powder; brown, very homogeneous After: brown homog. paste; mixing difficult (added more water)
10481502	P I, STAGE III, GROUP I, RUN 5	Same as 10481501
10481701	P I, STAGE III, GROUP I, RUN 6	Before: very fine talc-like powder; brown, very homogeneous After: fluid but not soupy; brown homogeneous paste
10481702	P I, STAGE III, GROUP I, RUN 6	Same as 10481701
10482501	P I, STAGE III, GROUP I, RUN 1	Before: gray/brown soil, homogeneous & wet After: gray/light brown homogeneous paste
10482701	P I, STAGE III, GROUP I, RUN 2	Before: gray/brown homogeneous soil; wet After: gray/light brown homogeneous paste; a bit thicker than Run 1
10482901	PHASE I, STAGE III, GROUP I, RUN 3	Before: gray/brown homogeneous soil; wet After: gray/brown homogeneous paste
10483101	P I, STAGE III, GROUP I, RUN 1	Before: gray/brown homogeneous soil After: gray/brown homongeneous paste
10483301	P I, STAGE III, GROUP I, RUN 2	Before: gray/brown homogeneous soil; dryer than ETDC 1177 After: gray/brown homogeneous paste
10483501	PHASE I, STAGE III, GROUP I, RUN 3	Before: gray/brown humid, homogeneous soil; dryer than ETDC 1178 After: gray/brown homogeneous paste
10538001	PRELIM. PHASE	Before: soft, brown, moist, mud-like (approx. 80% H2O) After: brown, paste-like mixture
10538002	PRELIM. PHASE	Before: soft, brown, moist, mud-like (approx. 80% H2O) After: brown, paste-like mixture
10538201	PRELIM. PHASE, CEMENT ADDED AS A SLURRY	Before: soft, moist, lt brown, mud-like (approx. 78% H2O); no debris After: soft, brown, addlom. lump to soft thck brn mixtur
10563101	ADV. PHASE, STRATA A, RUN 1	Before: light brown, not very wet, not cohesive After: gray/brown homogeneous paste
10563102	ADV. PHASE, STRATA A, RUN 1	Before: light brown, not very wet, not cohesive After: gray/brown homogeneous paste
10563103	ADV. PHASE, STRATA A, RUN 1	Before: light brown, not very wet, not cohesive After: gray/brown homogeneous paste
10563104	ADV. PHASE, STRATA A, RUN 1	Before: light brown, not very wet, not cohesive After: gray/brown homogeneous paste
10563105	ADV. PHASE, STRATA A, RUN 1	Before: light brown, not very wet, not cohesive After: gray/brown homogeneous paste
10563106	ADV. PHASE, STRATA A, RUN 1	Before: light brown, not very wet, not cohesive After: gray/brown homogeneous paste
10563301	ADV. PHASE, STRATA A DUP, RUN 1	Before: no description After: gray/brown homogeneous paste
10563302	ADV. PHASE, STRATA A DUP, RUN 1	Before: no description After: gray/brown homogeneous paste
10563303	ADV. PHASE, STRATA A DUP, RUN 1	Before: no description After: gray/brown homogeneous paste
10563304	ADV. PHASE, STRATA A DUP, RUN 1	Before: no description After: gray/brown homogeneous paste
10563305	ADV. PHASE, STRATA A DUP, RUN 1	Before: no description After: gray/brown homogeneous paste
10563306	ADV. PHASE, STRATA A DUP, RUN 1	Before: no description After: gray/brown homogeneous paste
10563501	ADV. PHASE, STRATA B, RUN 1	Before: no description After: gray/brown homogeneous paste
10563502	ADV. PHASE, STRATA B, RUN 1	Before: no description After: gray/brown homogeneous paste
10563503	ADV. PHASE, STRATA B, RUN 1	Before: no description After: gray/brown homogeneous paste

TREATABILITY SAMPLE #	COMMENT	GENERAL DESCRIPTION OF WASTE(before and after mixing)
10563504	ADV. PHASE, STRATA B, RUN 1	Before: no description After: gray/brown homogeneous paste
10563505	ADV. PHASE, STRATA B, RUN 1	Before: no description After: gray/brown homogeneous paste
10563506	ADV. PHASE, STRATA B, RUN 1	Before: no description After: gray/brown homogeneous paste
10563701	ADV. PHASE, STRATA C, RUN 1	Before: no description After: gray/brown homogeneous paste
10563702	ADV. PHASE, STRATA C, RUN 1	Before: no description After: gray/brown homogeneous paste
10563703	ADV. PHASE, STRATA C, RUN 1	Before: no description After: gray/brown homogeneous paste
10563704	ADV. PHASE, STRATA C, RUN 1	Before: no description After: gray/brown homogeneous paste
10563705	ADV. PHASE, STRATA C, RUN 1	Before: no description After: gray/brown homogeneous paste
10563706	ADV. PHASE, STRATA C, RUN 1	Before: no description After: gray/brown homogeneous paste
10563901	ADV. PHASE, STRATA B, RUN 2	Before: no description After: gray/brown homogeneous paste
10563902	ADV. PHASE, STRATA B, RUN 2	Before: no description After: gray/brown homogeneous paste
10563903	ADV. PHASE, STRATA B, RUN 2	Before: no description After: gray/brown homogeneous paste
10563904	ADV. PHASE, STRATA B, RUN 2	Before: no description After: gray/brown homogeneous paste
10563905	ADV. PHASE, STRATA B, RUN 2	Before: no description After: gray/brown homogeneous paste
10563906	ADV. PHASE, STRATA B, RUN 2	Before: no description After: gray/brown homogeneous paste
10564101	ADV. PHASE, STRATA C, RUN 2	Before: no description After: dark gray/brown homogeneous paste
10564102	ADV. PHASE, STRATA C, RUN 2	Before: no description After: dark gray/brown homogeneous paste
10564103	ADV. PHASE, STRATA C, RUN 2	Before: no description After: dark gray/brown homogeneous paste
10564104	ADV. PHASE, STRATA C, RUN 2	Before: no description After: dark gray/brown homogeneous paste
10564105	ADV. PHASE, STRATA C, RUN 2	Before: no description After: dark gray/brown homogeneous paste
10564106	ADV. PHASE, STRATA C, RUN 2	Before: no description After: dark gray/brown homogeneous paste
10565101	ADV. PHASE, STRATA A, RUN 2	Before: no description After: light brown homogeneous paste
10565102	ADV. PHASE, STRATA A, RUN 2	Before: no description After: light brown homogeneous paste
10565103	ADV. PHASE, STRATA A, RUN 2	Before: no description After: light brown homogeneous paste
10565104	ADV. PHASE, STRATA A, RUN 2	Before: no description After: light brown homogeneous paste
10565105	ADV. PHASE, STRATA A, RUN 2	Before: no description After: light brown homogeneous paste
10565106	ADV. PHASE, STRATA A, RUN 2	Before: no description After: light brown homogeneous paste
10565301	ADV. PHASE, STRATA B, RUN 2	Before: no description After: light brown homogeneous paste
10565302	ADV. PHASE, STRATA B, RUN 2	Before: no description After: light brown homogeneous paste
10565303	ADV. PHASE, STRATA B, RUN 2	Before: no description After: light brown homogeneous paste
10565304	ADV. PHASE, STRATA B, RUN 2	Before: no description After: light brown homogeneous paste
10565305	ADV. PHASE, STRATA B, RUN 2	Before: no description After: light brown homogeneous paste
10565306	ADV. PHASE, STRATA B, RUN 2	Before: no description After: light brown homogeneous paste
10565501	ADV. PHASE, STRATA C, RUN 2	Before: beige/light brown soil; humid After: light brown homogeneous paste
10565502	ADV. PHASE, STRATA C, RUN 2	Before: beige/light brown soil; humid After: light brown homogeneous paste
10565503	ADV. PHASE, STRATA C, RUN 2	Before: beige/light brown soil; humid After: light brown homogeneous paste
10565504	ADV. PHASE, STRATA C, RUN 2	Before: beige/light brown soil; humid After: light brown homogeneous paste
10565505	ADV. PHASE, STRATA C, RUN 2	Before: beige/light brown soil; humid After: light brown homogeneous paste
10565506	ADV. PHASE, STRATA C, RUN 2	Before: beige/light brown soil; humid After: light brown homogeneous paste
10565701	ADV. PHASE, STRATA A, RUN 1	Before: no description After: light brown homogeneous paste
10565702	ADV. PHASE, STRATA A, RUN 1	Before: no description After: light brown homogeneous paste
10565703	ADV. PHASE, STRATA A, RUN 1	Before: no description After: light brown homogeneous paste
10565704	ADV. PHASE, STRATA A, RUN 1	Before: no description After: light brown homogeneous paste
10565705	ADV. PHASE, STRATA A, RUN 1	Before: no description After: light brown homogeneous paste
10565706	ADV. PHASE, STRATA A, RUN 1	Before: no description After: light brown homogeneous paste
10565901	ADV. PHASE, STRATA A DUP, RUN 1	Before: light brown soil After: light brown homogeneous paste
10565902	ADV. PHASE, STRATA A DUP, RUN 1	Before: light brown soil After: light brown homogeneous paste
10565903	ADV. PHASE, STRATA A DUP, RUN 1	Before: light brown soil After: light brown homogeneous paste
10565904	ADV. PHASE, STRATA A DUP, RUN 1	Before: light brown soil After: light brown homogeneous paste
10565905	ADV. PHASE, STRATA A DUP, RUN 1	Before: light brown soil After: light brown homogeneous paste
10565906	ADV. PHASE, STRATA A DUP, RUN 1	Before: light brown soil After: light brown homogeneous paste
10566101	ADV. PHASE, STRATA B, RUN 1	Before: light brown soil After: light brown homogeneous paste
10566102	ADV. PHASE, STRATA B, RUN 1	Before: light brown soil After: light brown homogeneous paste

TREATABILITY SAMPLE #	COMMENT	GENERAL DESCRIPTION OF WASTE(before and after mixing)
10566103	ADV. PHASE, STRATA B, RUN 1	Before: light brown soil After: light brown homogeneous paste
10566104	ADV. PHASE, STRATA B, RUN 1	Before: light brown soil After: light brown homogeneous paste
10566105	ADV. PHASE, STRATA B, RUN 1	Before: light brown soil After: light brown homogeneous paste
10566106	ADV. PHASE, STRATA B, RUN 1	Before: light brown soil After: light brown homogeneous paste
10566301	ADV. PHASE, STRATA C, RUN 1	Before: no description After: light brown homogeneous paste
10566302	ADV. PHASE, STRATA C, RUN 1	Before: no description After: light brown homogeneous paste
10566303	ADV. PHASE, STRATA C, RUN 1	Before: no description After: light brown homogeneous paste
10566304	ADV. PHASE, STRATA C, RUN 1	Before: no description After: light brown homogeneous paste
10566305	ADV. PHASE, STRATA C, RUN 1	Before: no description After: light brown homogeneous paste
10566306	ADV. PHASE, STRATA C, RUN 1	Before: no description After: light brown homogeneous paste
10566501	ADV. PHASE, STRATA A, RUN 2	Before: Strata A is the dryest in Silo 2 After: light brown homogeneous paste
10566502	ADV. PHASE, STRATA A, RUN 2	Before: Strata A is the dryest in Silo 2 After: light brown homogeneous paste
10566503	ADV. PHASE, STRATA A, RUN 2	Before: Strata A is the dryest in Silo 2 After: light brown homogeneous paste
10566504	ADV. PHASE, STRATA A, RUN 2	Before: Strata A is the dryest in Silo 2 After: light brown homogeneous paste
10566505	ADV. PHASE, STRATA A, RUN 2	Before: Strata A is the dryest in Silo 2 After: light brown homogeneous paste
10566506	ADV. PHASE, STRATA A, RUN 2	Before: Strata A is the dryest in Silo 2 After: light brown homogeneous paste
10566701	ADV.PHASE, STRATA A DUP, RUN 2	Before: Strata A is the dryest in Silo 2 After: light brown homogeneous paste
10566702	ADV.PHASE, STRATA A DUP, RUN 2	Before: Strata A is the dryest in Silo 2 After: light brown homogeneous paste
10566703	ADV.PHASE, STRATA A DUP, RUN 2	Before: Strata A is the dryest in Silo 2 After: light brown homogeneous paste
10566704	ADV.PHASE, STRATA A DUP, RUN 2	Before: Strata A is the dryest in Silo 2 After: light brown homogeneous paste
10566705	ADV.PHASE, STRATA A DUP, RUN 2	Before: Strata A is the dryest in Silo 2 After: light brown homogeneous paste
10566706	ADV.PHASE, STRATA A DUP, RUN 2	Before: Strata A is the dryest in Silo 2 After: light brown homogeneous paste
10567901	ADV. PHASE, RUN 2	Before: red/brown talc-like powder After: red/brown homogeneous paste
10567902	ADV. PHASE, RUN 2	Before: red/brown talc-like powder After: red/brown homogeneous paste
10567903	ADV. PHASE, RUN 2	Before: red/brown talc-like powder After: red/brown homogeneous paste
10567904	ADV. PHASE, RUN 2	Before: red/brown talc-like powder After: red/brown homogeneous paste
10567905	ADV. PHASE, RUN 2	Before: red/brown talc-like powder After: red/brown homogeneous paste
10567906	ADV. PHASE, RUN 2	Before: red/brown talc-like powder After: red/brown homogeneous paste
10568101	ADV. PHASE, RUN 2 DUP	Before: red/brown talc-like powder After: red/brown homogeneous paste
10568102	ADV. PHASE, RUN 2 DUP	Before: red/brown talc-like powder After: red/brown homogeneous paste
10568103	ADV. PHASE, RUN 2 DUP	Before: red/brown talc-like powder After: red/brown homogeneous paste
10568104	ADV. PHASE, RUN 2 DUP	Before: red/brown talc-like powder After: red/brown homogeneous paste
10568105	ADV. PHASE, RUN 2 DUP	Before: red/brown talc-like powder After: red/brown homogeneous paste
10568106	ADV. PHASE, RUN 2 DUP	Before: red/brown talc-like powder After: red/brown homogeneous paste
10568301	ADV. PHASE, RUN 1	Before: red/brown talc-like powder After: red/brown homogeneous paste
10568302	ADV. PHASE, RUN 1	Before: red/brown talc-like powder After: red/brown homogeneous paste
10568303	ADV. PHASE, RUN 1	Before: red/brown talc-like powder After: red/brown homogeneous paste
10568304	ADV. PHASE, RUN 1	Before: red/brown talc-like powder After: red/brown homogeneous paste
10568305	ADV. PHASE, RUN 1	Before: red/brown talc-like powder After: red/brown homogeneous paste
10568306	ADV. PHASE, RUN 1	Before: red/brown talc-like powder After: red/brown homogeneous paste

OU-4
TDL ANALYTICAL INFORMATION (PART 1 OF 3)

TREATABILITY SAMPLE #		COMMENT	pH OF WASTE	Eh OF WASTE (mV)	pH OF FLYASH	Eh OF FLYASH (mV)	pH OF MIXTURE	Eh OF MIXTURE (mV)	WASTE MOISTURE CONTENT	FLYASH MOISTURE CONTENT	MIXTURE MOISTURE CONTENT	TEMP RISE (C)	TIME BETWEEN MIX & TEMP. MEASUR.(MIN.)	CRUSHED MOISTURE CONTENT	SHEAR STRENGTH (t/sq.ft.)	POCKET PENET. (t/sq.ft.)
10330601	SILO 1	(START OF STAGE I)	9.1	201	7.0	375	12.1	155	30.02	-9.99	32.7	2.0	6.0	22.6	-9.99	-99.9
10330801	SILO 1		9.2	214	7.0	375	12.0	185	29.91	-9.99	29.7	1.0	0.0	21.1	0.3	1.6
10331001	SILO 1		9.2	360	7.0	375	11.9	390	29.18	-9.99	33.2	1.0	3.0	26.2	0.2	0.8
10331201	SILO 1		9.2	335	7.0	375	12.1	175	29.21	-9.99	34.0	0.0	1.0	25.5	0.2	0.6
10331401	SILO 1		9.2	123	7.0	375	11.1	39	29.09	-9.99	33.6	0.0	1.0	3.2	0.2	0.9
10331601	SILO 1		9.1	170	7.0	375	12.0	87	27.92	-9.99	34.8	0.0	0.0	27.6	0.2	2.6
10331801	SILO 1		9.1	70	7.0	375	12.0	-8	28.80	-9.99	36.2	1.0	1.0	30.1	0.1	3.7
10332001	SILO 1		9.0	199	7.0	375	12.0	129	30.07	-9.99	36.3	1.0	0.0	28.6	0.1	3.3
10332201	SILO 1		9.1	285	7.0	375	11.9	80	30.12	-9.99	34.7	1.0	1.0	26.9	0.1	2.3
10332401	SILO 1		9.2	195	7.0	375	11.9	119	29.96	-9.99	33.5	2.0	3.0	19.3	0.2	2.1
10332601	SILO 1		9.2	185	7.0	375	11.9	102	31.33	-9.99	34.6	1.0	1.0	26.6	0.2	2.3
10332801	SILO 1		9.2	175	-9.99	-9999	12.0	85	30.64	-9.99	35.0	0.0	0.0	28.7	0.4	3.1
10333001	SILO 1		9.2	105	-9.99	-9999	11.8	82	28.26	-9.99	36.3	0.0	1.0	28.2	0.3	2.3
10333201	SILO 2		7.5	119	7.0	375	11.9	44	32.91	-9.99	32.0	0.0	1.0	22.8	0.1	0.8
10333401	SILO 2		7.5	250	7.0	375	11.9	-18	30.66	-9.99	31.4	1.0	6.0	23.8	0.3	0.5
10333601	SILO 2		7.7	278	7.0	375	11.8	113	31.17	-9.99	34.6	0.0	2.0	27.8	0.6	0.0
10333801	SILO 2		7.6	275	7.0	375	11.8	153	31.56	-9.99	34.1	2.0	1.0	24.8	0.6	0.0
10334001	SILO 2		7.5	470	7.0	375	11.8	209	30.08	-9.99	33.6	0.0	1.0	28.0	0.6	2.3
10334201	SILO 2		7.1	260	7.0	375	11.9	120	32.64	-9.99	34.7	0.0	1.0	30.6	0.6	2.9
10334401	SILO 2		7.6	240	7.0	375	11.8	128	30.92	-9.99	38.4	1.0	0.0	30.5	0.4	2.6
10334601	SILO 2		7.6	230	7.0	375	11.9	90	31.52	-9.99	37.5	1.0	1.0	29.9	0.1	2.9
10334801	SILO 2		7.6	237	7.0	375	11.8	64	32.61	-9.99	33.9	2.0	1.0	23.7	0.6	4.4
10335001	SILO 2		7.6	120	-9.99	-9999	12.0	55	32.15	-9.99	36.4	0.0	3.0	24.2	0.3	0.7
10335201	SILO 2		7.7	130	-9.99	-9999	11.9	-7	32.32	-9.99	35.0	1.0	0.0	20.3	0.2	-99.9
10338001	SILO 3	(START STAGE II)NO WASTE MOISTURE	8.9	153	7.0	375	11.9	12	-9.99	-9.99	37.8	4.0	-99.99	26.4	-9.99	>4.5
10338201	SILO 3	NO WASTE MOISTURE/TOO DRY	8.9	153	7.0	375	11.9	14	-9.99	-9.99	39.9	7.0	-99.99	24.5	-9.99	>4.5
10338401	SILO 3	NO WASTE MOISTURE/TOO DRY	8.9	153	7.0	375	11.8	12	-9.99	-9.99	38.4	8.0	-99.99	29.7	-9.99	>4.5
10338601	SILO 3	NO WASTE MOISTURE/TOO DRY	9.0	148	7.0	375	11.8	42	-9.99	-9.99	37.6	8.0	-99.99	30.4	-9.99	>4.5
10338801	SILO 3	NO WASTE MOISTURE/TOO DRY	9.0	148	7.0	375	11.7	54	-9.99	-9.99	37.1	8.5	-99.99	31.6	0.1	>4.5
10339001	SILO 3	NO WASTE MOISTURE/TOO DRY	9.0	148	7.0	375	11.6	54	-9.99	-9.99	36.6	7.5	-99.99	33.9	0.1	>4.5
10339201	SILO 3	NO WASTE MOISTURE/TOO DRY	-10.0	-9999	7.0	375	11.9	27	-9.99	-9.99	37.4	8.0	-99.99	32.3	0.1	>4.5
10339401	SILO 3	NO WASTE MOISTURE/TOO DRY	9.3	128	7.0	375	11.7	52	-9.99	-9.99	37.5	9.5	-99.99	33.8	0.1	>4.5
10339601	SILO 3	NO WASTE MOISTURE/TOO DRY	9.3	128	7.0	375	11.6	14	-9.99	-9.99	45.0	7.0	-99.99	35.5	0.1	>4.5
10339801	SILO 3	NO WASTE MOISTURE/TOO DRY	9.3	128	7.0	375	11.8	58	-9.99	-9.99	38.8	8.0	-99.99	34.0	0.1	>4.5
10430301	SILO 3	NO WASTE MOISTURE/TOO DRY	9.1	141	-9.99	-9999	11.7	55	-9.99	-9.99	47.2	7.0	-99.99	34.9	0.1	-99.9
10430501	SILO 3	NO WASTE MOISTURE/TOO DRY	9.1	141	-9.99	-9999	11.8	49	-9.99	-9.99	45.7	7.0	-99.99	32.7	0.1	-99.9
10430701	SILO 3	NO WASTE MOISTURE/TOO DRY	9.1	145	7.0	375	12.0	80	-9.99	-9.99	43.1	7.0	3.0	37.3	-9.99	>4.5
10430901	SILO 3	NO WASTE MOISTURE/TOO DRY	9.1	145	7.0	375	11.7	90	-9.99	-9.99	42.2	7.5	6.0	39.2	-9.99	>4.5
10431101	SILO 1		9.4	272	7.0	375	11.9	221	33.01	-9.99	33.7	2.0	0.0	11.7	0.1	0.6
10431301	SILO 1		9.4	279	7.0	375	11.7	219	31.89	-9.99	33.8	2.0	4.5	24.6	0.1	4.3
10431501	SILO 1		9.4	275	7.0	375	12.0	-28	32.38	-9.99	33.6	2.0	7.0	26.4	0.1	1.0
10431701	SILO 1		9.5	164	7.0	375	11.7	-56	30.68	-9.99	34.7	2.0	5.2	28.5	0.1	>4.5
10431901	SILO 1		9.4	42	7.0	375	11.9	-62	31.04	-9.99	34.9	1.0	5.8	32.0	0.1	1.0
10432101	SILO 1		9.8	35	7.0	375	11.9	-64	31.68	-9.99	36.0	2.0	4.4	27.7	0.1	>4.5
10432301	SILO 1		9.7	170	7.0	375	11.6	182	29.19	-9.99	34.3	2.5	2.0	30.2	0.1	1.6
10432501	SILO 1		9.3	162	7.0	375	11.8	-34	31.02	-9.99	34.4	2.0	1.1	31.7	0.1	1.8
10432701	SILO 1		9.4	46	7.0	375	11.9	-66	29.81	-9.99	35.4	2.0	5.2	32.9	0.1	>4.5
10432901	SILO 1		9.7	33	7.0	375	11.9	-56	29.99	-9.99	31.1	2.5	3.6	29.4	0.4	>4.5
10433101	SILO 1		9.4	63	7.0	375	12.0	-2	29.45	-9.99	35.8	4.0	4.3	31.1	0.4	3.5
10433301	SILO 1		9.5	69	7.0	375	11.8	-28	29.06	-9.99	35.5	2.5	4.7	-9.99	0.0	1.8

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TREATABILITY SAMPLE #	COMMENT	pH OF WASTE	Eh OF WASTE (mV)	pH OF FLYASH	Eh OF FLYASH (mV)	pH OF MIXTURE	Eh OF MIXTURE (mV)	WASTE MOISTURE CONTENT	FLYASH MOISTURE CONTENT	MIXTURE MOISTURE CONTENT	TEMP RISE (C)	TIME BETWEEN MIX & TEMP. MEASUR.(MIN.)	CRUSHED MOISTURE CONTENT	SHEAR STRENGTH (t/sq.ft.)	POCKET PENET. (t/sq.ft.
10433501	SILO 1	9.4	230	7.0	375	11.9	221	30.44	-9.99	31.4	2.0	7.1	29.1	0.1	>4.5
10433701	SILO 1	9.3	230	7.0	375	11.8	119	31.87	-9.99	32.2	1.0	7.4	29.0	0.3	-99.9
10433901	SILO 1	9.3	213	7.0	375	11.7	191	32.28	-9.99	31.4	2.5	6.7	27.3	0.1	-99.9
10434101	SILO 2	9.1	193	7.0	375	11.9	207	31.79	-9.99	30.6	1.0	6.0	25.7	0.3	>4.5
10434301	SILO 2	11.3	109	7.0	375	11.9	153	28.69	-9.99	30.5	1.5	7.2	26.4	0.4	>4.5
10434501	SILO 2	9.1	151	7.0	375	12.0	104	30.65	-9.99	33.8	1.0	7.7	27.6	0.1	>4.5
10434701	SILO 2	9.0	172	7.0	375	11.8	60	30.13	-9.99	34.3	1.0	7.0	31.1	0.2	>4.5
10434901	SILO 2	9.0	176	7.0	375	12.0	47	31.02	-9.99	33.7	0.5	7.6	30.4	0.2	2.9
10435101	SILO 2	9.0	135	7.0	375	11.9	38	30.26	-9.99	35.3	1.0	8.0	31.7	0.1	>4.5
10435301	SILO 2	9.0	141	7.0	375	11.8	31	31.20	-9.99	34.9	0.5	8.1	31.2	0.2	3.4
10435501	SILO 2	9.0	168	7.0	375	11.8	26	-9.99	-9.99	35.5	0.5	7.7	31.3	0.2	>4.5
10435701	SILO 2	9.1	129	7.0	375	11.9	240	28.80	-9.99	33.4	0.0	8.0	26.5	0.2	3.3
10435901	SILO 2	9.0	162	7.0	375	12.0	218	31.03	-9.99	34.0	2.0	0.8	20.5	0.4	4.3
10436101	SILO 2	9.1	178	7.0	375	11.9	24	30.67	-9.99	32.6	1.5	7.2	25.7	0.2	2.8
10436301	SILO 2	8.9	151	7.0	375	11.8	-61	29.18	-9.99	32.4	2.0	2.1	22.2	0.1	2.5
10436501	SILO 2	8.9	197	7.0	375	11.9	-62	30.67	-9.99	32.0	0.0	5.9	29.1	0.3	>4.5
10436701	SILO 2	9.0	176	7.0	375	12.0	180	-9.99	-9.99	32.1	1.5	4.0	29.5	0.4	>4.5
10436901	SILO 2	9.0	171	7.0	375	12.0	129	30.38	-9.99	31.6	0.5	6.0	26.1	0.2	2.8
10480701	SILO 3(START STAGE III)NO WASTE MOIST	8.2	275	-9.99	-9999	11.3	191	-9.99	-9.99	31.8	8.0	1.0	27.6	0.3	>4.5
10480702	SILO 3 NO WASTE MOISTURE/TOO DRY	8.2	275	-9.99	-99999	11.3	191	-9.99	-9.99	31.8	8.0	1.0	27.6	0.3	>4.5
10480901	SILO 3 NO WASTE MOISTURE/DRY	8.2	275	-9.99	-9999	11.1	128	-9.99	-9.99	35.3	8.0	1.0	30.9	0.3	3.5
10480902	SILO 3 NO WASTE MOISTURE/DRY	8.2	275	-9.99	-99999	11.1	128	-9.99	-9.99	35.3	8.0	1.0	30.9	0.3	3.5
10481101	SILO 3 NO WASTE MOISTURE/TOO DRY	8.2	275	-9.99	-9999	11.3	89	-9.99	-9.99	33.0	9.0	0.0	30.2	0.4	>4.5
10481102	SILO 3 NO WASTE MOISTURE/TOO DRY	8.2	275	-9.99	-99999	11.3	89	-9.99	-9.99	33.0	9.0	0.0	30.2	0.4	>4.5
10481301	SILO 3 NO WASTE MOISTURE/TOO DRY	8.2	275	7.0	375	11.3	75	-9.99	-9.99	37.8	7.0	1.0	30.4	0.3	>4.5
10481302	SILO 3 NO WASTE MOISTURE/TOO DRY	8.2	275	7.0	375	11.3	75	-9.99	-9.99	37.8	7.0	1.0	30.4	0.3	>4.5
10481501	SILO 3 NO WASTE MOISTURE/TOO DRY	8.2	275	7.0	375	11.7	49	-9.99	-9.99	38.7	8.0	0.1	33.4	0.2	>4.5
10481502	SILO 3 NO WASTE MOISTURE/TOO DRY	8.2	275	7.0	375	11.7	49	-9.99	-9.99	38.7	8.0	0.1	33.4	0.2	>4.5
10481701	SILO 3 NO WASTE MOISTURE/TOO DRY	8.2	275	7.0	375	11.4	64	-9.99	-9.99	42.7	7.0	1.0	33.8	0.2	1.0
10481702	SILO 3 NO WASTE MOISTURE/TOO DRY	8.2	275	7.0	375	11.4	64	-9.99	-9.99	42.7	7.0	1.0	33.8	0.2	1.0
10482501	SILO 1	9.0	228	-9.99	-9999	12.1	169	28.59	-9.99	27.6	1.0	1.0	26.0	0.3	0.5
10482701	SILO 1	9.3	137	7.0	375	12.2	151	28.70	-9.99	27.3	1.0	0.0	25.3	0.4	1.0
10482901	SILO 1	9.3	129	7.0	375	12.4	103	30.14	-9.99	29.1	1.5	0.0	27.8	0.4	>4.5
10483101	SILO 2	8.1	207	-9.99	-9999	12.2	157	24.40	-9.99	26.7	0.0	0.0	25.4	0.2	1.7
10483301	SILO 2	8.2	213	7.0	375	12.2	81	20.66	-9.99	26.4	1.0	0.0	25.4	0.2	1.8
10483501	SILO 2	8.1	208	7.0	375	12.2	37	24.74	-9.99	28.9	0.5	0.0	28.0	0.4	>4.5
10538001	SILO 1&2, PRELIM. PHASE CHEM EXT PRECIP	7.2	150	7.0	375	11.4	15	80.02	-9.99	50.4	0.5	2.0	43.7	0.1	1.0
10538002	SILO 1&2, PRELIM. PHASE CHEM EXT PRECIP	7.2	150	7.0	375	11.4	15	80.02	-9.99	50.4	0.5	2.0	42.4	0.1	1.0
10538201	SILO 1&2, PRELIM. PHASE CHEM EXT PRECIP	7.2	150	7.0	375	11.2	-10	78.25	-9.99	33.9	0.0	2.0	34.6	0.1	-99.9
10563101	SILO 1 (START OF ADV. PHASE)	9.2	-145	7.0	375	12.4	-234	22.39	-9.99	35.8	0.5	2.0	33.6	0.3	-99.9
10563102	SILO 1	9.2	-145	7.0	375	12.4	-234	22.39	-9.99	35.8	0.5	2.0	-9.99	0.3	-99.9
10563103	SILO 1	9.2	-145	7.0	375	12.4	-234	22.39	-9.99	35.8	0.5	2.0	-9.99	0.3	-99.9
10563104	SILO 1	9.2	-145	7.0	375	12.4	-234	22.39	-9.99	35.8	0.5	2.0	-9.99	0.3	-99.9
10563105	SILO 1	9.2	-145	7.0	375	12.4	-234	22.39	-9.99	35.8	0.5	2.0	-9.99	0.3	-99.9
10563106	SILO 1	9.2	-145	7.0	375	12.4	-234	22.39	-9.99	35.8	0.5	2.0	-9.99	0.3	-99.9
10563301	SILO 1	9.5	-165	7.0	375	12.2	-245	25.34	-9.99	37.0	0.0	2.0	34.5	0.3	-99.9
10563302	SILO 1	9.5	-165	7.0	375	12.2	-245	25.34	-9.99	37.0	0.0	2.0	-9.99	0.3	-99.9
10563303	SILO 1	9.5	-165	7.0	375	12.2	-245	25.34	-9.99	37.0	0.0	2.0	-9.99	0.3	-99.9
10563304	SILO 1	9.5	-165	7.0	375	12.2	-245	25.34	-9.99	37.0	0.0	2.0	-9.99	0.3	-99.9
10563305	SILO 1	9.5	-165	7.0	375	12.2	-245	25.34	-9.99	37.0	0.0	2.0	-9.99	0.3	-99.9
10563306	SILO 1	9.5	-165	7.0	375	12.2	-245	25.34	-9.99	37.0	0.0	2.0	-9.99	0.3	-99.9
10563501	SILO 1	9.8	205	7.0	375	12.3	89	32.99	-9.99	37.1	2.0	2.0	35.0	0.2	-99.9

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TREATABILITY SAMPLE #	COMMENT	pH OF WASTE	Eh OF WASTE (mV)	pH OF FLYASH	Eh OF FLYASH (mV)	pH OF MIXTURE	Eh OF MIXTURE (mV)	WASTE MOISTURE CONTENT	FLYASH MOISTURE CONTENT	MIXTURE MOISTURE CONTENT	TEMP RISE (C)	TIME BETWEEN MIX & TEMP. MEASUR.(MIN.)	CRUSHED MOISTURE CONTENT	SHEAR STRENGTH (t/sq.ft.)	POCKET PENET. (t/sq.ft.)
10563502 SILO 1		9.8	205	7.0	375	12.3	89	32.99	-9.99	37.1	2.0	2.0	-9.99	0.2	-99.9
10563503 SILO 1		9.8	205	7.0	375	12.3	89	32.99	-9.99	37.1	2.0	2.0	-9.99	0.2	-99.9
10563504 SILO 1		9.8	205	7.0	375	12.3	89	32.99	-9.99	37.1	2.0	2.0	-9.99	0.2	-99.9
10563505 SILO 1		9.8	205	7.0	375	12.3	89	32.99	-9.99	37.1	2.0	2.0	-9.99	0.2	-99.9
10563506 SILO 1		9.8	205	7.0	375	12.3	89	32.99	-9.99	37.1	2.0	2.0	-9.99	0.2	-99.9
10563701 SILO 1	43.86 OUTLIER(MIX MOISTURE %)	10.1	134	7.0	375	12.4	218	35.30	-9.99	35.0	0.0	1.0	33.2	0.3	-99.9
10563702 SILO 1	43.86 OUTLIER(MIXTURE MOISTURE %)	10.1	134	7.0	375	12.4	218	35.30	-9.99	35.0	0.0	1.0	-9.99	0.3	-99.9
10563703 SILO 1	43.86 OUTLIER(MIXTURE MOISTURE %)	10.1	134	7.0	375	12.4	218	35.30	-9.99	35.0	0.0	1.0	-9.99	0.3	-99.9
10563704 SILO 1	43.86 OUTLIER(MIXTURE MOISTURE %)	10.1	134	7.0	375	12.4	218	35.30	-9.99	35.0	0.0	1.0	-9.99	0.3	-99.9
10563705 SILO 1	43.86 OUTLIER(MIXTURE MOISTURE %)	10.1	134	7.0	375	12.4	218	35.30	-9.99	35.0	0.0	1.0	-9.99	0.3	-99.9
10563706 SILO 1	43.86 OUTLIER(MIXTURE MOISTURE %)	10.1	134	7.0	375	12.4	218	35.30	-9.99	35.0	0.0	1.0	-9.99	0.3	-99.9
10563901 SILO 2		7.8	-167	7.0	375	12.2	-229	32.80	-9.90	32.5	0.0	2.0	29.5	0.2	-99.9
10563902 SILO 2		7.8	-167	7.0	375	12.2	-229	32.80	-9.99	32.5	0.0	2.0	-9.99	0.2	-99.9
10563903 SILO 2		7.8	-167	7.0	375	12.2	-229	32.80	-9.99	32.5	0.0	2.0	-9.99	0.2	-99.9
10563904 SILO 2		7.8	-167	7.0	375	12.2	-229	32.80	-9.99	32.5	0.0	2.0	-9.99	0.2	-99.9
10563905 SILO 2		7.8	-167	7.0	375	12.2	-229	32.80	-9.99	32.5	0.0	2.0	-9.99	0.2	-99.9
10563906 SILO 2		7.8	-167	7.0	375	12.2	-229	32.80	-9.99	32.5	0.0	2.0	-9.99	0.2	-99.9
10564101 SILO 2		10.5	-197	7.0	375	12.4	-230	30.31	-9.99	29.3	0.0	1.0	26.1	0.2	-99.9
10564102 SILO 2		10.5	-197	7.0	375	12.4	-230	30.31	-9.99	29.3	0.0	1.0	-9.99	0.2	-99.9
10564103 SILO 2		10.5	-197	7.0	375	12.4	-230	30.31	-9.99	29.3	0.0	1.0	-9.99	0.2	-99.9
10564104 SILO 2		10.5	-197	7.0	375	12.4	-230	30.31	-9.99	29.3	0.0	1.0	-9.99	0.2	-99.9
10564105 SILO 2		10.5	-197	7.0	375	12.4	-230	30.31	-9.99	29.3	0.0	1.0	-9.99	0.2	-99.9
10564106 SILO 2		10.5	-197	7.0	375	12.4	-230	30.31	-9.99	29.3	0.0	1.0	-9.99	0.2	-99.9
10565101 SILO 1		10.7	-216	7.0	375	12.0	244	22.39	-9.99	33.3	4.0	1.0	28.1	0.2	1.8
10565102 SILO 1		10.7	-216	7.0	375	12.0	244	22.39	-9.99	33.3	4.0	1.0	-9.99	0.2	1.8
10565103 SILO 1		10.7	-216	7.0	375	12.0	244	22.39	-9.99	33.3	4.0	1.0	-9.99	0.2	1.8
10565104 SILO 1		10.7	-216	7.0	375	12.0	244	22.39	-9.99	33.3	4.0	1.0	-9.99	0.2	1.8
10565105 SILO 1		10.7	-216	7.0	375	12.0	244	22.39	-9.99	33.3	4.0	1.0	-9.99	0.2	1.8
10565106 SILO 1		10.7	-216	7.0	375	12.0	244	22.39	-9.99	33.3	4.0	1.0	-9.99	0.2	1.8
10565301 SILO 1		10.2	-202	7.0	375	12.0	-243	32.99	-9.99	34.5	4.0	1.0	29.5	0.2	1.3
10565302 SILO 1		10.2	-202	7.0	375	12.0	-243	32.99	-9.99	34.5	4.0	1.0	-9.99	0.2	1.3
10565303 SILO 1		10.2	-202	7.0	375	12.0	-243	32.99	-9.99	34.5	4.0	1.0	-9.99	0.2	1.3
10565304 SILO 1		10.2	-202	7.0	375	12.0	-243	32.99	-9.99	34.5	4.0	1.0	-9.99	0.2	1.3
10565305 SILO 1		10.2	-202	7.0	375	12.0	-243	32.99	-9.99	34.5	4.0	1.0	-9.99	0.2	1.3
10565306 SILO 1		10.2	-202	7.0	375	12.0	-243	32.99	-9.99	34.5	4.0	1.0	-9.99	0.2	1.3
10565501 SILO 1		10.1	-167	7.0	375	12.1	252	35.30	-9.99	32.3	3.5	1.0	27.7	0.2	2.0
10565502 SILO 1		10.1	-167	7.0	375	12.1	252	35.30	-9.99	32.3	3.5	1.0	-9.99	0.2	2.0
10565503 SILO 1		10.1	-167	7.0	375	12.1	252	35.30	-9.99	32.3	3.5	1.0	-9.99	0.2	2.0
10565504 SILO 1		10.1	-167	7.0	375	12.1	252	35.30	-9.99	32.3	3.5	1.0	-9.99	0.2	2.0
10565505 SILO 1		10.1	-167	7.0	375	12.1	252	35.30	-9.99	32.3	3.5	1.0	-9.99	0.2	2.0
10565506 SILO 1		10.1	-167	7.0	375	12.1	252	35.30	-9.99	32.3	3.5	1.0	-9.99	0.2	2.0
10565701 SILO 2		8.4	-185	7.0	375	11.9	-257	20.79	-9.99	33.3	0.0	1.0	28.6	0.3	>4.5
10565702 SILO 2		8.4	-185	7.0	375	11.9	-257	20.79	-9.99	33.3	0.0	1.0	-9.99	0.3	>4.5
10565703 SILO 2		8.4	-185	7.0	375	11.9	-257	20.79	-9.99	33.3	0.0	1.0	-9.99	0.3	>4.5
10565704 SILO 2		8.4	-185	7.0	375	11.9	-257	20.79	-9.99	33.3	0.0	1.0	-9.99	0.3	>4.5
10565705 SILO 2		8.4	-185	7.0	375	11.9	-257	20.79	-9.99	33.3	0.0	1.0	-9.99	0.3	>4.5
10565706 SILO 2		8.4	-185	7.0	375	11.9	-257	20.79	-9.99	33.3	0.0	1.0	-9.99	0.3	>4.5
10565901 SILO 2		8.4	-193	7.0	375	12.0	-262	22.46	-9.99	33.2	2.0	1.0	27.6	0.4	>4.5
10565902 SILO 2		8.4	-193	7.0	375	12.0	-262	22.46	-9.99	33.2	2.0	1.0	-9.99	0.4	>4.5
10565903 SILO 2		8.4	-193	7.0	375	12.0	-262	22.46	-9.99	33.2	2.0	1.0	-9.99	0.4	>4.5
10565904 SILO 2		8.4	-193	7.0	375	12.0	-262	22.46	-9.99	33.2	2.0	1.0	-9.99	0.4	>4.5
10565905 SILO 2		8.4	-193	7.0	375	12.0	-262	22.46	-9.99	33.2	2.0	1.0	-9.99	0.4	>4.5

000401

P. 548

TREATABILITY SAMPLE #		COMMENT	pH OF WASTE	Eh OF WASTE (mV)	pH OF FLYASH	Eh OF FLYASH (mV)	pH OF MIXTURE	Eh OF MIXTURE (mV)	WASTE MOISTURE CONTENT	FLYASH MOISTURE CONTENT	MIXTURE MOISTURE CONTENT	TEMP RISE (C)	TIME BETWEEN MIX & TEMP. MEASUR.(MIN.)	CRUSHED MOISTURE CONTENT	SHEAR STRENGTH (t/sq.ft.)	POCKET PENET. (t/sq.ft.
10565906	SILO 2		8.4	-193	7.0	375	12.0	-262	22.46	-9.99	33.2	2.0	1.0	-9.99	0.4	>4.5
10566101	SILO 2		8.5	-173	7.0	375	12.0	-235	32.80	-9.99	36.0	3.0	1.0	31.4	0.4	3.0
10566102	SILO 2		8.5	-173	7.0	375	12.0	-235	32.80	-9.99	36.0	3.0	1.0	-9.99	0.4	3.0
10566103	SILO 2		8.5	-173	7.0	375	12.0	-235	32.80	-9.99	36.0	3.0	1.0	-9.99	0.4	3.0
10566104	SILO 2		8.5	-173	7.0	375	12.0	-235	32.80	-9.99	36.0	3.0	1.0	-9.99	0.4	3.0
10566105	SILO 2		8.5	-173	7.0	375	12.0	-235	32.80	-9.99	36.0	3.0	1.0	-9.99	0.4	3.0
10566106	SILO 2		8.5	-173	7.0	375	12.0	-235	32.80	-9.99	36.0	3.0	1.0	-9.99	0.4	3.0
10566301	SILO 2		8.6	-166	7.0	375	12.0	-253	30.31	-9.99	32.1	2.0	0.0	27.8	0.3	1.0
10566302	SILO 2		8.6	-166	7.0	375	12.0	-253	30.31	-9.99	32.1	2.0	0.0	-9.99	0.3	1.0
10566303	SILO 2		8.6	-166	7.0	375	12.0	-253	30.31	-9.99	32.1	2.0	0.0	-9.99	0.3	1.0
10566304	SILO 2		8.6	-166	7.0	375	12.0	-253	30.31	-9.99	32.1	2.0	0.0	-9.99	0.3	1.0
10566305	SILO 2		8.6	-166	7.0	375	12.0	-253	30.31	-9.99	32.1	2.0	0.0	-9.99	0.3	1.0
10566306	SILO 2		8.6	-166	7.0	375	12.0	-253	30.31	-9.99	32.1	2.0	0.0	-9.99	0.3	1.0
10566501	SILO 2		8.2	-151	7.0	375	11.8	-235	20.79	-9.99	30.1	0.0	2.0	24.1	0.2	>4.5
10566502	SILO 2		8.2	-151	7.0	375	11.8	-235	20.79	-9.99	30.1	0.0	2.0	-9.99	0.2	>4.5
10566503	SILO 2		8.2	-151	7.0	375	11.8	-235	20.79	-9.99	30.1	0.0	2.0	-9.99	0.2	>4.5
10566504	SILO 2		8.2	-151	7.0	375	11.8	-235	20.79	-9.99	30.1	0.0	2.0	-9.99	0.2	>4.5
10566505	SILO 2		8.2	-151	7.0	375	11.8	-235	20.79	-9.99	30.1	0.0	2.0	-9.99	0.2	>4.5
10566506	SILO 2		8.2	-151	7.0	375	11.8	-235	20.79	-9.99	30.1	0.0	2.0	-9.99	0.2	>4.5
10566701	SILO 2		8.1	-154	7.0	375	11.9	-244	22.46	-9.99	30.0	0.5	2.0	-9.99	0.2	>4.5
10566702	SILO 2		8.1	-154	7.0	375	11.9	-244	22.46	-9.99	30.0	0.5	2.0	-9.99	0.2	>4.5
10566703	SILO 2		8.1	-154	7.0	375	11.9	-244	22.46	-9.99	30.0	0.5	2.0	-9.99	0.2	>4.5
10566704	SILO 2		8.1	-154	7.0	375	11.9	-244	22.46	-9.99	30.0	0.5	2.0	-9.99	0.2	>4.5
10566705	SILO 2		8.1	-154	7.0	375	11.9	-244	22.46	-9.99	30.0	0.5	2.0	-9.99	0.2	>4.5
10566706	SILO 2		8.1	-154	7.0	375	11.9	-244	22.46	-9.99	30.0	0.5	2.0	-9.99	0.2	>4.5
10567901	SILO 3	NO WASTE MOISTURE/TOO DRY	8.7	-69	-9.99	-99999	11.9	-188	-9.99	-9.99	35.5	13.0	1.0	30.4	0.2	-99.9
10567902	SILO 3	NO WASTE MOISTURE/TOO DRY	8.7	-69	-9.99	-99999	11.9	-188	-9.99	-9.99	35.5	13.0	1.0	-9.99	0.2	-99.9
10567903	SILO 3	NO WASTE MOISTURE/TOO DRY	8.7	-69	-9.99	-99999	11.9	-188	-9.99	-9.99	35.5	13.0	1.0	-9.99	0.2	-99.9
10567904	SILO 3	NO WASTE MOISTURE/TOO DRY	8.7	-69	-9.99	-99999	11.9	-188	-9.99	-9.99	35.5	13.0	1.0	-9.99	0.2	-99.9
10567905	SILO 3	NO WASTE MOISTURE/TOO DRY	8.7	-69	-9.99	-99999	11.9	-188	-9.99	-9.99	35.5	13.0	1.0	-9.99	0.2	-99.9
10567906	SILO 3	NO WASTE MOISTURE/TOO DRY	8.7	-69	-9.99	-99999	11.9	-188	-9.99	-9.99	35.5	13.0	1.0	-9.99	0.2	-99.9
10568101	SILO 3	NO WASTE MOISTURE/TOO DRY	8.8	-75	-9.99	-99999	11.9	-189	-9.99	-9.99	36.8	10.5	1.0	31.7	0.3	-99.9
10568102	SILO 3	NO WASTE MOISTURE/TOO DRY	8.8	-75	-9.99	-99999	11.9	-189	-9.99	-9.99	36.8	10.5	1.0	-9.99	0.3	-99.9
10568103	SILO 3	NO WASTE MOISTURE/TOO DRY	8.8	-75	-9.99	-99999	11.9	-189	-9.99	-9.99	36.8	10.5	1.0	-9.99	0.3	-99.9
10568104	SILO 3	NO WASTE MOISTURE/TOO DRY	8.8	-75	-9.99	-99999	11.9	-189	-9.99	-9.99	36.8	10.5	1.0	-9.99	0.3	-99.9
10568105	SILO 3	NO WASTE MOISTURE/TOO DRY	8.8	-75	-9.99	-99999	11.9	-189	-9.99	-9.99	36.8	10.5	1.0	-9.99	0.3	-99.9
10568106	SILO 3	NO WASTE MOISTURE/TOO DRY	8.8	-75	-9.99	-99999	11.9	-189	-9.99	-9.99	36.8	10.5	1.0	-9.99	0.3	-99.9
10568301	SILO 3	NO WASTE MOISTURE/TOO DRY	8.9	-76	7.0	375	12.1	-146	-9.99	-9.99	37.6	9.5	1.0	32.4	0.1	-99.9
10568302	SILO 3	NO WASTE MOISTURE/TOO DRY	8.9	-76	7.0	375	12.1	-146	-9.99	-9.99	37.6	9.5	1.0	-9.99	0.1	-99.9
10568303	SILO 3	NO WASTE MOISTURE/TOO DRY	8.9	-76	7.0	375	12.1	-146	-9.99	-9.99	37.6	9.5	1.0	-9.99	0.1	-99.9
10568304	SILO 3	NO WASTE MOISTURE/TOO DRY	8.9	-76	7.0	375	12.1	-146	-9.99	-9.99	37.6	9.5	1.0	-9.99	0.1	-99.9
10568305	SILO 3	NO WASTE MOISTURE/TOO DRY	8.9	-76	7.0	375	12.1	-146	-9.99	-9.99	37.6	9.5	1.0	-9.99	0.1	-99.9
10568306	SILO 3	NO WASTE MOISTURE/TOO DRY	8.9	-76	7.0	375	12.1	-146	-9.99	-9.99	37.6	9.5	1.0	-9.99	0.1	-99.9

OU-4
TDL ANALYTICAL INFORMATION (PART 2 OF 3)

TREATABILITY SAMPLE #	GROSS ALPHA (dpm)	GROSS BETA (dpm)	GROSS ALPHA (pCi/l)	GROSS BETA (pCi/l)	TOTAL URANIUM (ppm)	UCS (psi)	BULKING FACTOR(%)	BULK DENSITY(g/cc)	PERMEABILITY	pH OF MTCLP DETER. TEST	pH OF MTCLP	TYPE (1/2)
10330601	510.7	286.7	57504.8	32282.4	ND	745.0	195.8	1.7	-99.99	10.3	8.85	2
10330801	293.6	203.3	33059.4	22891.6	ND	866.0	201.4	1.8	-99.99	10.9	9.63	2
10331001	454.4	276.5	51165.4	31133.9	ND	824.0	148.4	1.7	-99.99	10.3	9.44	2
10331201	265.5	186.8	29895.3	21033.7	ND	891.0	145.3	1.8	-99.99	10.5	9.43	2
10331401	373.0	291.2	41999.8	32789.1	ND	872.0	144.8	1.7	-99.99	7.3	7.13	2
10331601	479.8	454.9	54025.5	51221.7	0.3760	866.0	156.5	1.7	-99.99	5.9	6.70	2
10331801	505.9	297.2	56964.3	33464.7	0.2275	864.0	111.4	1.7	-99.99	6.7	7.10	2
10332001	486.7	260.5	54802.4	29332.3	0.2002	730.0	111.6	1.7	-99.99	5.1	7.12	2
10332201	152.3	122.4	17149.0	13782.2	0.0708	692.0	156.4	1.7	-99.99	8.9	7.89	2
10332401	174.6	117.2	19660.0	13196.7	0.0145	866.0	152.0	1.7	-99.99	8.3	8.67	2
10332601	166.4	92.5	18736.6	10415.5	ND	836.0	153.4	1.7	-99.99	4.8	11.03	1
10332801	184.0	122.3	20718.4	13771.0	0.0119	830.0	141.5	1.7	-99.99	5.9	8.86	2
10333001	291.3	107.6	32800.4	12115.8	0.0136	881.0	146.4	1.7	-99.99	8.6	8.68	2
10333201	177.7	65.1	20009.0	7330.3	ND	858.0	178.6	1.7	-99.99	10.2	10.05	2
10333401	273.3	92.8	30773.6	10449.3	ND	881.0	182.8	1.7	-99.99	11.3	9.96	2
10333601	469.3	111.4	52843.2	12543.6	ND	474.0	132.8	1.7	-99.99	11.3	10.02	2
10333801	319.6	101.7	35987.0	11451.4	ND	880.0	135.9	1.7	-99.99	10.8	11.10	2
10334001	171.7	69.9	19333.4	7870.7	ND	769.0	133.8	1.7	-99.99	4.4	10.64	1
10334201	187.1	73.3	21067.5	8253.6	ND	527.0	146.7	1.7	-99.99	4.1	10.82	1
10334401	136.0	69.3	15313.6	7803.2	ND	525.0	96.4	1.7	-99.99	4.3	10.13	1
10334601	104.4	59.5	11755.4	6699.7	ND	873.0	96.6	1.7	-99.99	3.6	10.65	1
10334801	147.5	83.9	16608.5	9447.1	ND	881.0	135.1	1.7	-99.99	5.0	11.35	1
10335001	511.2	99.7	57561.1	11226.2	0.4086	780.0	132.5	1.7	-99.99	5.6	7.98	2
10335201	597.0	175.5	67222.2	19761.3	ND	846.0	88.5	1.7	-99.99	4.5	11.47	1
10338001	17.4	9.2	1959.2	1035.9	0.1183	704.0	131.8	1.6	-99.99	10.2	7.20	2
10338201	17.2	4.9	1936.7	551.7	0.0807	820.0	131.4	1.7	-99.99	10.4	7.23	2
10338401	22.0	7.1	2477.2	799.5	0.0718	742.0	86.0	1.6	-99.99	10.1	7.20	2
10338601	10.1	7.1	1137.3	799.5	0.0672	554.0	95.1	1.6	-99.99	10.0	7.07	2
10338801	22.0	5.6	2477.2	630.6	0.0693	714.0	95.5	1.6	-99.99	10.2	6.24	2
10339001	11.8	11.2	1328.7	1261.1	0.1240	131.0	90.4	1.6	-99.99	9.2	5.62	2
10339201	21.0	11.2	2364.6	1261.1	0.0819	235.0	93.8	1.6	-99.99	9.3	5.59	2
10339401	19.0	3.5	2139.4	394.1	0.0852	110.0	61.8	1.6	-99.99	8.9	5.59	2
10339601	19.2	11.2	2161.9	1261.1	0.1591	114.0	63.5	1.6	-99.99	8.7	5.58	2
10339801	16.7	8.4	1880.4	945.8	0.0482	315.0	87.7	1.6	-99.99	9.3	6.07	2
10430301	24.3	12.0	2736.2	1351.2	0.1198	348.0	87.8	1.6	-99.99	9.6	6.85	2
10430501	21.7	9.8	2443.4	1103.5	0.2539	328.0	87.1	1.6	-99.99	9.7	8.22	2
10430701	19.0	7.2	2139.4	810.7	0.8503	443.1	100.6	1.6	-99.99	7.0	2.00	2
10430901	22.8	5.0	2567.3	563.0	0.1044	456.4	100.7	1.5	-99.99	7.0	2.00	2
10431101	365.0	113.3	41099.0	12757.6	0.4606	695.7	220.3	1.7	-99.99	10.3	8.40	2
10431301	237.6	69.0	26753.8	7769.4	ND	886.0	233.1	1.7	-99.99	11.4	10.44	2
10431501	398.9	112.5	44916.1	12667.5	ND	900.0	150.1	1.7	-99.99	11.4	10.26	2
10431701	227.9	63.5	25661.5	7150.1	ND	813.0	164.0	1.7	-99.99	10.9	9.79	2
10431901	1365.0	783.0	153699.0	88165.8	0.4855	652.0	157.8	1.6	-99.99	11.4	6.58	2
10432101	815.6	303.1	91836.6	34129.1	0.5245	396.8	173.2	1.6	-99.99	10.6	6.86	2
10432301	299.7	179.0	33746.2	20155.4	0.1896	946.0	109.1	1.7	-99.99	10.7	4.02	2
10432501	205.4	90.1	23128.0	10145.3	0.1737	609.0	109.2	1.7	-99.99	10.4	3.60	2
10432701	310.9	274.4	35007.3	30897.4	ND	925.3	121.5	1.6	-99.99	4.3	5.09	2
10432901	283.9	208.0	31967.1	23420.8	ND	895.5	154.4	1.7	-99.99	3.5	5.14	2
10433101	210.0	89.7	23646.0	10100.2	ND	805.0	166.8	1.7	-99.99	11.0	5.93	2
10433301	176.3	63.6	19851.4	7161.4	ND	865.1	168.1	1.6	-99.99	11.0	5.38	2

TREATABILITY SAMPLE #	GROSS ALPHA (dpm)	GROSS BETA (dpm)	GROSS ALPHA (pCi/l)	GROSS BETA (pCi/l)	TOTAL URANIUM (ppm)	UCS (psi)	BULKING FACTOR(%)	BULK DENSITY(g/cc)	PERMEABILITY	pH OF MTCLP DETER. TEST	pH OF MTCLP	TYPE (1/2)
10433501	230.5	76.9	25954.3	8658.9	ND	543.0	192.2	1.7	-99.99	11.4	5.84	2
10433701	280.9	116.0	31629.3	13061.6	0.3922	633.0	83.3	1.7	-99.99	10.9	5.96	2
10433901	151.8	56.5	17092.7	6361.9	ND	695.0	128.4	1.7	-99.99	11.0	5.27	2
10434101	506.5	184.6	57031.9	20786.0	0.0917	528.3	181.4	1.7	-99.99	11.3	3.85	2
10434301	187.5	88.0	21112.5	9908.8	ND	675.0	204.2	1.7	-99.99	6.2	4.05	2
10434501	724.2	243.8	81544.9	27451.9	ND	662.0	137.7	1.7	-99.99	7.0	3.87	2
10434701	213.4	96.7	24028.8	10888.4	ND	602.0	150.0	1.7	-99.99	8.4	3.92	2
10434901	358.8	173.6	40400.9	19547.4	ND	507.0	136.3	1.7	-99.99	3.5	5.24	2
10435101	154.6	16.3	17408.0	1835.4	ND	532.0	165.5	1.6	-99.99	3.3	5.22	2
10435301	350.0	181.3	39410.0	20414.4	ND	623.0	101.5	1.6	-99.99	2.6	5.23	2
10435501	70.9	30.7	7983.3	3456.8	ND	660.0	107.1	1.6	-99.99	3.5	5.16	2
10435701	168.7	0.0	18995.6	0.0	ND	689.0	142.0	1.7	-99.99	9.7	9.18	2
10435901	95.2	44.6	10719.5	5022.0	ND	634.0	148.7	1.7	-99.99	9.3	9.62	2
10436101	119.2	43.9	13421.9	4943.1	ND	531.5	136.1	1.7	-99.99	11.0	9.47	2
10436301	250.4	79.7	28195.0	8974.2	ND	521.7	181.9	1.7	-99.99	10.5	10.77	2
10436501	167.3	60.9	18838.0	6857.3	1.6600	622.0	74.5	1.7	-99.99	8.5	7.75	2
10436701	209.5	73.7	23589.7	8298.6	1.8936	704.0	74.4	1.7	-99.99	8.6	7.92	2
10436901	259.3	68.7	29197.2	7735.6	ND	738.0	116.6	1.7	-99.99	10.1	9.65	2
10480701	4.4	3.8	495.4	427.9	ND	> 781.7	79.5	1.7	-99.99	10.7	9.65	2
10480702	-9999.9	-9999.9	-99999.9	-99999.9	-999.99	> 790.3	76.8	1.7	-99.99	-9.99	-9.99	
10480901	7.4	1.9	833.2	213.9	ND	> 669.5	64.0	1.7	-99.99	10.8	8.34	2
10480902	-9999.9	-9999.9	-99999.9	-99999.9	-999.99	> 666.3	63.7	1.7	-99.99	-9.99	-9.99	
10481101	5.0	2.6	563.0	292.8	ND	> 674.6	60.3	1.7	-99.99	10.5	8.82	2
10481102	-9999.9	-9999.9	-99999.9	-99999.9	-999.99	> 639.2	59.6	1.7	-99.99	-9.99	-9.99	
10481301	7.6	3.9	855.8	439.1	0.1376	> 683.6	72.6	1.7	-99.99	10.6	8.42	2
10481302	-9999.9	-9999.9	-99999.9	-99999.9	-999.99	> 648.3	70.6	1.7	-99.99	-9.99	-9.99	
10481501	0.0	7.0	0.0	788.2	0.0972	> 657.2	77.4	1.7	-99.99	10.6	7.52	2
10481502	-9999.9	-9999.9	-99999.9	-99999.9	-999.99	> 630.3	76.1	1.7	-99.99	-9.99	-9.99	
10481701	6.9	3.2	776.9	360.3	ND	> 583.2	77.2	1.6	-99.99	10.6	7.49	2
10481702	-9999.9	-9999.9	-99999.9	-99999.9	-999.99	> 657.2	77.1	1.6	-99.99	-9.99	-9.99	
10482501	781.6	501.9	88008.2	56513.9	0.4366	> 671.0	126.5	1.8	-99.99	10.6	11.08	2
10482701	776.9	625.4	87478.9	70420.0	0.0901	> 660.0	111.4	1.8	-99.99	11.3	11.52	2
10482901	477.4	318.3	53755.2	35840.6	ND	> 746.0	125.0	1.7	-99.99	11.3	11.49	2
10483101	388.0	206.8	43688.8	23285.7	ND	> 728.0	115.2	1.8	-99.99	11.4	11.56	2
10483301	589.0	364.1	66321.4	40997.7	0.0870	> 648.0	105.4	1.8	-99.99	11.4	11.60	2
10483501	319.7	213.9	35998.2	24085.1	ND	> 700.0	111.6	1.7	-99.99	11.5	11.63	2
10538001	68.5	102.1	7713.1	11496.5	ND	381.4	19.6	1.4		-9.99	-9.99	
10538002	68.5	102.1	7713.1	11496.5	ND	372.3	19.6	1.4		-9.99	-9.99	
10538201	64.2	80.4	7228.9	9053.0	ND	1165.9	4.3	1.5		-9.99	-9.99	
10563101	48.0	16.0	5404.8	1801.6	-999.99	1399.0	246.4	1.7		-9.99	-9.99	
10563102	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	4.3 E-8	-9.99	-9.99	
10563103	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563104	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563105	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563106	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563301	-9999.9	-9999.9	-99999.9	-99999.9	-999.99	1087.2	252.7	1.7		-9.99	-9.99	
10563302	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	3.7 E-8	-9.99	-9.99	
10563303	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563304	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563305	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563306	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563501	48.0	14.0	5404.8	1576.4	-999.99	1612.3	196.2	1.7		-9.99	-9.99	

TREATABILITY SAMPLE #	GROSS ALPHA (dpm)	GROSS BETA (dpm)	GROSS ALPHA (pCi/l)	GROSS BETA (pCi/l)	TOTAL URANIUM (ppm)	UCS (psi)	BULKING FACTOR(%)	BULK DENSITY(g/cc)	PERMEABILITY	pH OF MTCLP DETER. TEST	pH OF MTCLP	TYPE (1/2)
10563502	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	2.9 E-8	-9.99	-9.99	
10563503	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563504	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563505	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563506	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563701	30.0	10.0	3378.0	1126.0	-999.99 >	1487.1	149.8	1.7		-9.99	-9.99	
10563702	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	2.0 E-8	-9.99	-9.99	
10563703	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563704	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563705	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563706	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563901	44.0	7.0	4954.4	788.2	-999.99 >	1460.7	141.3	1.7		-9.99	-9.99	
10563902	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	6.0 E-9	-9.99	-9.99	
10563903	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563904	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563905	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10563906	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10564101	49.0	22.0	5517.4	2477.2	-999.99 >	1528.5	94.2	1.8		-9.99	-9.99	
10564102	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	1.4 E-8	-9.99	-9.99	
10564103	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10564104	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10564105	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10564106	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565101	42.0	14.0	4729.2	1576.4	-999.99 >	1399.4	208.7	1.7		-9.99	-9.99	
10565102	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	3.6 E-8	-9.99	-9.99	
10565103	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565104	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565105	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565106	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565301	28.0	9.0	3152.8	1013.4	-999.99 >	1436.7	169.5	1.7		-9.99	-9.99	
10565302	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	4.1 E-8	-9.99	-9.99	
10565303	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565304	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565305	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565306	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565501	18.0	4.0	2026.8	450.4	-999.99 >	1506.3	122.4	1.8		-9.99	-9.99	
10565502	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	2.1 E-8	-9.99	-9.99	
10565503	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565504	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565505	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565506	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565701	86.0	32.0	9683.6	3603.2	-999.99	851.9	207.9	1.7		-9.99	-9.99	
10565702	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	6.3 E-8	-9.99	-9.99	
10565703	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565704	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565705	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565706	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565901	60.0	27.0	6756.0	3040.2	-999.99	1164.0	207.4	1.7		-9.99	-9.99	
10565902	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	5.6 E-8	-9.99	-9.99	
10565903	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565904	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10565905	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	

TREATABILITY SAMPLE #	GROSS ALPHA (dpm)	GROSS BETA (dpm)	GROSS ALPHA (pCi/l)	GROSS BETA (pCi/l)	TOTAL URANIUM (ppm)	UCS (psi)	BULKING FACTOR(%)	BULK DENSITY(g/cc)	PERMEABILITY	pH OF MTCLP DETER. TEST	pH OF MTCLP	TYPE (1/2)
10565906	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566101	84.0	33.0	9458.4	3715.8	-999.99	> 1424.8	173.6	1.7		-9.99	-9.99	
10566102	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	5.2 E-8	-9.99	-9.99	
10566103	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566104	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566105	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566106	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566301	102.0	25.0	11485.2	2815.0	-999.99	> 1453.8	121.7	1.7		-9.99	-9.99	
10566302	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	4.7 E-8	-9.99	-9.99	
10566303	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566304	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566305	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566306	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566501	82.0	23.0	9233.2	2589.8	-999.99	> 1404.5	172.7	1.8		-9.99	-9.99	
10566502	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	3.8 E-8	-9.99	-9.99	
10566503	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566504	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566505	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566506	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566701	-9999.9	-9999.9	0.0	0.0	-999.99	> 1457.2	173.9	1.8		-9.99	-9.99	
10566702	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566703	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566704	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566705	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10566706	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10567901	10.0	4.0	1126.0	450.4	-999.99	> 1387.2	50.0	1.8		-9.99	-9.99	
10567902	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	1.6 E-7	-9.99	-9.99	
10567903	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10567904	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10567905	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10567906	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10568101	0.0	4.0	0.0	450.4	-999.99	> 1447.2	55.1	1.7		-9.99	-9.99	
10568102	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	4.9 E-8	-9.99	-9.99	
10568103	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10568104	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10568105	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10568106	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10568301	7.0	7.0	788.2	788.2	-999.99	> 1414.3	63.1	1.7		-9.99	-9.99	
10568302	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999	3.4 E-7	-9.99	-9.99	
10568303	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10568304	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10568305	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	
10568306	-9999.9	-9999.9	0.0	0.0	-999.99	0.0	-99.9	-99.9999		-9.99	-9.99	

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TDL INFORMATION (PART 3 OF 3)

TREATABILITY SAMPLE #	COMMENT	DESCRIPTION
10330601	SILO 1 (START OF STAGE I)	
10330801	SILO 1	
10331001	SILO 1	
10331201	SILO 1	
10331401	SILO 1	
10331601	SILO 1	
10331801	SILO 1	
10332001	SILO 1	
10332201	SILO 1	
10332401	SILO 1	
10332601	SILO 1	
10332801	SILO 1	
10333001	SILO 1	
10333201	SILO 2	
10333401	SILO 2	
10333601	SILO 2	
10333801	SILO 2	
10334001	SILO 2	
10334201	SILO 2	
10334401	SILO 2	
10334601	SILO 2	
10334801	SILO 2	
10335001	SILO 2	
10335201	SILO 2	
10338001	SILO 3 (START STAGE II)NO WASTE MOISTURE	
10338201	SILO 3 NO WASTE MOISTURE/TOO DRY	
10338401	SILO 3 NO WASTE MOISTURE/TOO DRY	
10338601	SILO 3 NO WASTE MOISTURE/TOO DRY	
10338801	SILO 3 NO WASTE MOISTURE/TOO DRY	
10339001	SILO 3 NO WASTE MOISTURE/TOO DRY	
10339201	SILO 3 NO WASTE MOISTURE/TOO DRY	
10339401	SILO 3 NO WASTE MOISTURE/TOO DRY	
10339601	SILO 3 NO WASTE MOISTURE/TOO DRY	
10339801	SILO 3 NO WASTE MOISTURE/TOO DRY	
10430301	SILO 3 NO WASTE MOISTURE/TOO DRY	
10430501	SILO 3 NO WASTE MOISTURE/TOO DRY	
10430701	SILO 3 NO WASTE MOISTURE/TOO DRY	Several small voids on outside; one end uneven.
10430901	SILO 3 NO WASTE MOISTURE/TOO DRY	One end uneven.
10431101	SILO 1	Mold had a few cracks at the bottom.
10431301	SILO 1	
10431501	SILO 1	
10431701	SILO 1	
10431901	SILO 1	
10432101	SILO 1	A small piece was missing from the mold and small voids.
10432301	SILO 1	Some small voids.
10432501	SILO 1	
10432701	SILO 1	Small cracks at the bottom; top not smooth, small voids.
10432901	SILO 1	Top not smooth; voids.
10433101	SILO 1	A few voids; surface not level.
10433301	SILO 1	
10433501	SILO 1	

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TREATABILITY SAMPLE #	COMMENT	DESCRIPTION
10433701	SILO 1	
10433901	SILO 1	
10434101	SILO 2	A few small voids.
10434301	SILO 2	
10434501	SILO 2	
10434701	SILO 2	
10434901	SILO 2	Uneven top.
10435101	SILO 2	Uneven top.
10435301	SILO 2	
10435501	SILO 2	
10435701	SILO 2	
10435901	SILO 2	
10436101	SILO 2	Large void in one end.
10436301	SILO 2	Uneven top.
10436501	SILO 2	
10436701	SILO 2	Both ends are sloped.
10436901	SILO 2	
10480701	SILO 3(START STAGE III)NO WASTE MOIST	Brown color monolith; a few very tiny holes.
10480702	SILO 3 NO WASTE MOISTURE/TOO DRY	Very tiny air hole toward the top of the monolith.
10480901	SILO 3 NO WASTE MOISTURE/DRY	A few holes; brown homogeneous color.
10480902	SILO 3 NO WASTE MOISTURE/DRY	A few air holes; brown homogeneous color.
10481101	SILO 3 NO WASTE MOISTURE/TOO DRY	Very tiny air bubbles; a few white spots on the sides.
10481102	SILO 3 NO WASTE MOISTURE/TOO DRY	A few white spots on the side.
10481301	SILO 3 NO WASTE MOISTURE/TOO DRY	A few air bubbles; a few white spots on the side.
10481302	SILO 3 NO WASTE MOISTURE/TOO DRY	Very few air bubbles (very tiny).
10481501	SILO 3 NO WASTE MOISTURE/TOO DRY	Very smooth surface.
10481502	SILO 3 NO WASTE MOISTURE/TOO DRY	
10481701	SILO 3 NO WASTE MOISTURE/TOO DRY	A few air bubbles.
10481702	SILO 3 NO WASTE MOISTURE/TOO DRY	
10482501	SILO 1	
10482701	SILO 1	
10482901	SILO 1	
10483101	SILO 2	
10483301	SILO 2	
10483501	SILO 2	
10538001	SILO 1&2, PRELIM. PHASE CHEM EXT PRECIP	Tan exterior, gray interior, black agrigate, crumbly on top, the rest solid.
10538002	SILO 1&2, PRELIM. PHASE CHEM EXT PRECIP	Tan exterior, black agrigate, in gray solid.
10538201	SILO 1&2, PRELIM. PHASE CHEM EXT PRECIP	Tan exterior, gray interior with black agrigate, solid, no flaws.
10563101	SILO 1 (START OF ADV. PHASE)	A few air voids on the surface.
10563102	SILO 1	
10563103	SILO 1	
10563104	SILO 1	
10563105	SILO 1	
10563106	SILO 1	
10563301	SILO 1	No crack or void; beautiful sample.
10563302	SILO 1	
10563303	SILO 1	
10563304	SILO 1	
10563305	SILO 1	
10563306	SILO 1	
10563501	SILO 1	No exterior defect crack or void.
10563502	SILO 1	
10563503	SILO 1	

TREATABILITY SAMPLE #		COMMENT	DESCRIPTION
10563504	SILO 1		
10563505	SILO 1		
10563506	SILO 1		
10563701	SILO 1	43.86 outlier(mix moisture %)	A few air voids, especially toward the bottom.
10563702	SILO 1	43.86 outlier(mixture moisture %)	
10563703	SILO 1	43.86 outlier(mixture moisture %)	
10563704	SILO 1	43.86 outlier(mixture moisture %)	
10563705	SILO 1	43.86 outlier(mixture moisture %)	
10563706	SILO 1	43.86 outlier(mixture moisture %)	
10563901	SILO 2		A few voids (rare).
10563902	SILO 2		
10563903	SILO 2		
10563904	SILO 2		
10563905	SILO 2		
10563906	SILO 2		
10564101	SILO 2		No defects; perfect sample.
10564102	SILO 2		
10564103	SILO 2		
10564104	SILO 2		
10564105	SILO 2		
10564106	SILO 2		
10565101	SILO 1		A few air bubbles on the sides.
10565102	SILO 1		
10565103	SILO 1		
10565104	SILO 1		
10565105	SILO 1		
10565106	SILO 1		
10565301	SILO 1		Perfect sample outside.
10565302	SILO 1		
10565303	SILO 1		
10565304	SILO 1		
10565305	SILO 1		
10565306	SILO 1		
10565501	SILO 1		No defect.
10565502	SILO 1		
10565503	SILO 1		
10565504	SILO 1		
10565505	SILO 1		
10565506	SILO 1		
10565701	SILO 2		No defect.
10565702	SILO 2		
10565703	SILO 2		
10565704	SILO 2		
10565705	SILO 2		
10565706	SILO 2		
10565901	SILO 2		No defect.
10565902	SILO 2		
10565903	SILO 2		
10565904	SILO 2		
10565905	SILO 2		
10565906	SILO 2		
10566101	SILO 2		No defect.
10566102	SILO 2		

OU-4
MTCLP METALS

TREATABILITY SAMPLE #		COMMENT	DESCRIPTION
10566103	SILO 2		
10566104	SILO 2		
10566105	SILO 2		
10566106	SILO 2		
10566301	SILO 2		No defect.
10566302	SILO 2		
10566303	SILO 2		
10566304	SILO 2		
10566305	SILO 2		
10566306	SILO 2		
10566501	SILO 2		A few air bubbles (small).
10566502	SILO 2		
10566503	SILO 2		
10566504	SILO 2		
10566505	SILO 2		
10566506	SILO 2		
10566701	SILO 2		No defect.
10566702	SILO 2		
10566703	SILO 2		
10566704	SILO 2		
10566705	SILO 2		
10566706	SILO 2		
10567901	SILO 3	NO WASTE MOISTURE/TOO DRY	A few very small air bubbles in the bottom part.
10567902	SILO 3	NO WASTE MOISTURE/TOO DRY	
10567903	SILO 3	NO WASTE MOISTURE/TOO DRY	
10567904	SILO 3	NO WASTE MOISTURE/TOO DRY	
10567905	SILO 3	NO WASTE MOISTURE/TOO DRY	
10567906	SILO 3	NO WASTE MOISTURE/TOO DRY	
10568101	SILO 3	NO WASTE MOISTURE/TOO DRY	Some air bubbles.
10568102	SILO 3	NO WASTE MOISTURE/TOO DRY	
10568103	SILO 3	NO WASTE MOISTURE/TOO DRY	
10568104	SILO 3	NO WASTE MOISTURE/TOO DRY	
10568105	SILO 3	NO WASTE MOISTURE/TOO DRY	
10568106	SILO 3	NO WASTE MOISTURE/TOO DRY	
10568301	SILO 3	NO WASTE MOISTURE/TOO DRY	A few air bubbles.
10568302	SILO 3	NO WASTE MOISTURE/TOO DRY	
10568303	SILO 3	NO WASTE MOISTURE/TOO DRY	
10568304	SILO 3	NO WASTE MOISTURE/TOO DRY	
10568305	SILO 3	NO WASTE MOISTURE/TOO DRY	
10568306	SILO 3	NO WASTE MOISTURE/TOO DRY	

TREATABILITY

SAMPLE #	ARSENIC	SILVER	BARIUM	CADMIUM	CHROMIUM	LEAD	SELENIUM
10330601			0.3700				
10330801			0.3010				
10331001			0.2740				
10331201			0.2800				
10331401			0.2720			2.3300	
10331601			0.3070			16.2000	
10331801			0.1930			6.4800	
10332001			0.2110			5.1100	
10332201			0.3320				
10332401	2.2300	0.1420	2.1700	0.0497	0.3040	0.5930	2.3200
10332601			0.3550				
10332801			0.2200				
10333001			0.2190				
10333201		0.1010	1.1700		0.1770	0.1200	0.2650
10333401		0.1020	1.3100	0.0152	0.1840	0.1240	0.2450
10333601		0.1010	1.6400		0.1730	0.1260	0.2660
10333801		0.1010	1.8300		0.2060	0.1160	0.2310
10334001		0.0697	0.8140		0.1300	0.0426	0.2350
10334201		0.0700	1.0900		0.1400	0.0505	0.2200
10334401		0.0696	0.6390		0.1220	0.0414	0.2350
10334601		0.0709	0.5680		0.1270	0.0466	0.2430
10334801		0.0702	1.8300		0.1350	0.2790	0.1880
10335001		0.1010	1.3200		0.1500	0.3010	0.2930
10335201		0.0698	1.9800		0.1280	0.1890	0.1840
10338001			0.0800		1.6000		
10338201	0.2100		0.0800		1.6500		
10338401	0.3000		0.1300		2.2000		
10338601	0.2400		0.1100		1.8900		
10338801	0.3600		0.1100		1.8400		
10339001	1.6600		0.1100		2.1700		
10339201	1.5100		0.1100		2.0700		
10339401	2.3600		0.0900		2.4100		
10339601	2.4900		0.0800		2.4700		
10339801	1.0100		0.1100		2.1700		
10430301	0.6400		0.1200		2.0600		
10430501	0.5900		0.1100		2.1400		
10430701	0.5600		0.1330		1.8510		
10430901	0.8800		0.1150		1.8150		
10431101			0.4753			1.4960	
10431301			0.2910				
10431501			0.4190			0.0030	
10431701			0.2080			0.0240	
10431901			0.5200			81.3700	
10432101			0.6560			27.4700	
10432301			0.1720			252.8000	
10432501			0.2323			236.5000	
10432701			0.1580		0.0400	282.4000	
10432901			0.2620		0.0480	86.3000	
10433101			0.4205		0.0636	41.1000	0.5406
10433301			0.2023			86.4000	
10433501			0.2519		0.0610	30.4500	

TREATABILITY SAMPLE #	ARSENIC	SILVER	BARIUM	CADMIUM	CHROMIUM	LEAD	SELENIUM
10433701			0.2126			182.4000	
10433901			0.1980			90.7400	
10434101			1.0570		0.0920	0.0090	
10434301			0.4547		0.0860		
10434501			1.2140		0.0900		
10434701			0.4830		0.0940		
10434901			0.8090		0.0800		
10435101			0.2410		0.0790		
10435301			0.6410		0.0680		
10435501			0.1320		0.0440		
10435701			0.5150		0.0550		
10435901			0.2900		0.0840		
10436101			0.3610		0.0770		
10436301			0.5740		0.0950		
10436501			0.1990		0.0330	0.5200	
10436701			0.2040		0.0240	0.9700	
10436901			0.5330		0.0640		
10480701			0.1500				
10480901			0.1400				
10481101			0.1300				
10481301			0.1200				
10481501			0.1200		0.4300		
10481701			0.1300		0.5400		
10482501			0.4740			17.8000	
10482701			0.3140				
10482901			0.1180				
10483101			0.6210				
10483301			0.6620				
10483501			0.1710				
10538001			1.2000				
10538002			1.1300				
10538201			1.1900				

OU-4
RADON LEACHING DATA

TREATABILITY SAMPLE #	5 OR 7 DAY SAMPLE #	VOLUME OF H2O(mL)	SAMPLE WT.(g)	# OF DAYS LEACHED	Rn CONC. (pCI/l)	Rn RATE (pCi/g/d)	30 DAY SAMPLE #	SAMPLE WT.(g)	# OF DAYS LEACHED	Rn CONC. (pCi/l)	Rn RATE (pCi/g/d)
10330601		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10330801		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10331001		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10331201		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10331401		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10331601		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10331801		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10332001		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10332201		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10332401		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10332601		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10332801		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10333001		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10333201		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10333401		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10333601		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10333801		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10334001		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10334201		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10334401		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10334601		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10334801		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10335001		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10335201		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10338001		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10338201		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10338401		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10338601		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10338801		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10339001		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10339201		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10339401		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10339601		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10339801		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10430301		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10430501		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10430701		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10430901		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10431101		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10431301		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10431501		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10431701		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10431901		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10432101		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10432301		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10432501		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10432701		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10432901		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10433101		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10433301		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10433501		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000

TREATABILITY SAMPLE #	5 OR 7 DAY SAMPLE #	VOLUME OF H2O(mL)	SAMPLE WT.(g)	# OF DAYS LEACHED	Rn CONC. (pCi/l)	Rn RATE (pCi/g/d)	30 DAY SAMPLE #	SAMPLE WT.(g)	# OF DAYS LEACHED	Rn CONC. (pCi/l)	Rn RATE (pCi/g/d)
10433701		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10433901		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10434101		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10434301		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10434501		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10434701		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10434901		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10435101		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10435301		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10435501		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10435701		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10435901		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10436101		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10436301		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10436501		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10436701		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10436901		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10480701		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10480702		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10480901		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10480902		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10481101		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10481102		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10481301		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10481302		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10481501		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10481502		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10481701		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10481702		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10482501		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10482701		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10482901		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10483101		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10483301		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10483501		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10538001	10538002	1944.0	55.3	6.76	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10538002		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10538201	10538201	1961.0	38.8	6.80	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563101	10563103	1875.8	122.2	6.82	424000.0	1663.37063879	10563114	122.2	30.00	0.0	0.00000000
10563102		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563103		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563104		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563105		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563106		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563301	10563306	1876.0	119.7	6.75	449000.0	1807.87323866	10563308	119.7	33.00	519000.0	1479.23156410
10563302		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563303		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563304		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563305		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563306		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563501	10563501	1877.0	120.5	6.78	507000.0	2024.36161121	10563512	120.5	30.00	0.0	0.00000000
10563502		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563503		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000

TREATABILITY SAMPLE #	5 OR 7 DAY SAMPLE #	VOLUME OF H2O(mL)	SAMPLE WT.(g)	# OF DAYS LEACHED	Rn CONC. (pCI/l)	Rn RATE (pCi/g/d)	30 DAY SAMPLE #	SAMPLE WT.(g)	# OF DAYS LEACHED	Rn CONC. (pCi/l)	Rn RATE (pCi/g/d)
10563504		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563505		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563506		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563701	10563703	1877.0	121.0	6.82	473000.0	1875.20128542	10563714	121.0	30.00	0.0	0.00000000
10563702		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563703		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563704		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563705		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563706		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563901	10563903	1869.0	128.6	6.82	127000.0	471.71523484	10563914	128.6	30.00	0.0	0.00000000
10563902		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563903		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563904		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563905		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10563906		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10564101	10564103	1850.0	135.9	6.99	97500.0	335.04691372		0.0	0.00	0.0	0.00000000
10564102		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10564103		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10564104		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10564105		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10564106		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565101	10565103	1981.0	126.2	7.02	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565102		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565103		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565104		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565105		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565106		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565301	10565303	1872.0	126.1	6.85	196000.0	741.97972371	10565314	126.1	30.00	0.0	0.00000000
10565302		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565303		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565304		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565305		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565306		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565501	10565503	1870.0	127.9	6.96	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565502		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565503		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565504		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565505		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565506		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565701	10565707	1881.8	118.2	6.68	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565702		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565703		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565704		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565705		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565706		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565901	10565903	1871.0	126.8	6.94	165000.0	616.79308301		0.0	0.00	0.0	0.00000000
10565902		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565903		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565904		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565905		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10565906		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566101	10566103	1876.0	122.5	7.00	321000.0	1240.05915268		0.0	0.00	0.0	0.00000000
10566102		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000

TREATABILITY SAMPLE #	5 OR 7 DAY SAMPLE #	VOLUME OF H2O(mL)	SAMPLE WT.(g)	# OF DAYS LEACHED	Rn CONC. (pCI/l)	Rn RATE (pCi/g/d)	30 DAY SAMPLE #	SAMPLE WT.(g)	# OF DAYS LEACHED	Rn CONC. (pCi/l)	Rn RATE (pCi/g/d)
10566103		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566104		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566105		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566106		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566301	10566306	1870.0	126.1	6.76	129000.0	491.10195361	10566308	126.1	33.00	352000.0	949.29087717
10566302		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566303		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566304		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566305		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566306		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566501	10566509	1864.0	133.0	6.83	30800.0	110.23795107	10566519	133.0	30.00	0.0	0.00000000
10566502		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566503		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566504		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566505		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566506		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566701		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566702		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566703		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566704		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566705		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10566706		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10567901	10567909	1867.0	129.9	6.84	0.0	0.00000000	10567919	129.9	30.00	0.0	0.00000000
10567902		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10567903		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10567904		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10567905		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10567906		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10568101	10568103	1873.0	125.9	6.99	3580.0	13.44447377		0.0	0.00	0.0	0.00000000
10568102		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10568103		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10568104		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10568105		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10568106		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10568301	10568306	1870.0	122.9	6.73	13200.0	51.67781901	10568308	122.9	33.00	17200.0	47.59357130
10568302		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10568303		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10568304		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10568305		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000
10568306		0.0	0.0	0.00	0.0	0.00000000		0.0	0.00	0.0	0.00000000

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TREATABILITY SAMPLE #	SAMPLE #	WEIGHT(g)	LONG PATH AIR FLOW(lpm)	LONG PATH COUNTS/HR	SHORT PATH AIR FLOW(lpm)	SHORT PATH COUNTS/HR	BACKGROUND COUNTS/MIN	BACKGROUND LONG PATH EMISSION RATE(pCi/g/day)	BACKGROUND SHORT PATH EMISSION RATE(pCi/g/day)
10330601		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10330801		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10331001		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10331201		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10331401		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10331601		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10331801		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10332001		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10332201		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10332401		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10332601		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10332801		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10333001		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10333201		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10333401		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10333601		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10333801		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10334001		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10334201		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10334401		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10334601		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10334801		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10335001		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10335201		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10338001		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10338201		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10338401		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10338601		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10338801		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10339001		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10339201		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10339401		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10339601		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10339801		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10430301		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10430501		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10430701		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10430901		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10431101		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10431301		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10431501		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10431701		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10431901		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10432101		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10432301		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10432501		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10432701		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10432901		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10433101		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10433301		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000

TREATABILITY SAMPLE #	SAMPLE #	WEIGHT(g)	LONG PATH AIR FLOW(lpm)	LONG PATH COUNTS/HR	SHORT PATH AIR FLOW(lpm)	SHORT PATH COUNTS/HR	BACKGROUND COUNTS/MIN	BACKGROUND LONG PATH EMISSION RATE(pCi/g/day)	BACKGROUND SHORT PATH EMISSION RATE(pCi/g/day)
10433501		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10433701		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10433901		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10434101		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10434301		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10434501		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10434701		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10434901		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10435101		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10435301		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10435501		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10435701		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10435901		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10436101		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10436301		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10436501		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10436701		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10436901		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10480701		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10480702		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10480901		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10480902		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10481101		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10481102		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10481301		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10481302		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10481501		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10481502		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10481701		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10481702		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10482501		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10482701		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10482901		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10483101		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10483301		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10483501		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10538001	10538001	96.5	0.25	321	0.25	371	1.20	4.967098446	5.964507772
10538002		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10538201	10538201	105.8	0.23	587	0.25	567	1.70	8.118478261	8.460538752
10563101	10563103	122.2	0.20	153962	0.20	196036	0.70	1939.744680851	2469.973486088
10563102		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563103		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563104		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563105		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563106		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563301	10563303	119.7	0.20	165818	0.20	163922	1.80	2131.941520468	2107.548538012
10563302	10563303D	94.2	0.21	201384	0.21	171565	3.00	3453.788407643	2941.927229299
10563303		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563304		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563305		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563306		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563501	10563501	105.3	0.20	412933	0.20	451643	2.40	6036.990123457	6603.119278253

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TREATABILITY SAMPLE #	SAMPLE #	WEIGHT(g)	LONG PATH AIR FLOW(lpm)	LONG PATH COUNTS/HR	SHORT PATH AIR FLOW(lpm)	SHORT PATH COUNTS/HR	BACKGROUND COUNTS/MIN	BACKGROUND LONG PATH EMISSION RATE(pCi/g/day)	BACKGROUND SHORT PATH EMISSION RATE(pCi/g/day)
10563502		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563503		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563504		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563505		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563506		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563701	10563703	127.2	0.20	305733	0.20	469836	1.20	3700.612735849	5687.394339623
10563702	10563703D	120.0	0.21	456076	0.21	489449	3.50	6142.794350000	6592.495525000
10563703		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563704		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563705		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563706		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563901	10563903	127.2	0.21	411428	0.21	609766	5.90	5225.681273585	7747.006320755
10563902		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563903		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563904		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563905		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10563906		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10564101	10564103	134.2	0.24	668375	0.24	893980	2.40	9201.869508197	12308.561311475
10564102		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10564103		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10564104		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10564105		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10564106		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565101	10565103	126.2	0.21	408632	0.19	382117	3.90	5232.801632330	4427.058866878
10565102		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565103		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565104		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565105		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565106		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565301	10565303	118.5	0.20	164789	0.20	164280	2.40	2139.690295359	2133.075443038
10565302		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565303		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565304		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565305		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565306		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565501	10565503	126.5	0.19	394870	0.19	447068	5.50	4562.940869565	5166.622086957
10565502		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565503		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565504		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565505		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565506		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565701	10565703	123.9	0.21	120820	0.21	119659	2.00	1575.237288136	1560.085254237
10565702		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565703		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565704		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565705		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565706		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565901	10565903	125.7	0.22	250003	0.20	276946	2.40	3367.232665076	3391.209864757
10565902		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565903		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565904		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10565905		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000

TREATABILITY SAMPLE #	SAMPLE #	WEIGHT(g)	LONG PATH AIR FLOW(lpm)	LONG PATH COUNTS/HR	SHORT PATH AIR FLOW(lpm)	SHORT PATH COUNTS/HR	BACKGROUND COUNTS/MIN	BACKGROUND LONG PATH EMISSION RATE(pCi/g/day)	BACKGROUND SHORT PATH EMISSION RATE(pCi/g/day)
10565906		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566101	10566103	106.6	0.19	229327	0.19	225365	2.40	3145.353930582	3090.978639775
10566102		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566103		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566104		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566105		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566106		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566301	10566303	106.6	0.21	142747	0.21	198167	1.80	2163.670384615	3004.328358349
10566302	10566303D	106.6	0.20	176201	0.20	236269	2.40	2543.412570356	3411.186679174
10566303		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566304		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566305		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566306		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566501	10566505	129.5	0.20	153031	0.20	172498	3.10	1817.616216216	2049.115675676
10566502	10566503D	129.5	0.18	147210	0.18	169294	4.00	1572.976216216	1809.334702703
10566503		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566504		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566505		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566506		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566701		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566702		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566703		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566704		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566705		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10566706		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10567901	10567903	129.8	0.20	7903	0.20	14180	0.90	93.123728814	167.596610169
10567902		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10567903		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10567904		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10567905		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10567906		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10568101	10568103	125.9	0.22	8844	0.22	9476	4.40	115.444956315	123.948594122
10568102		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10568103		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10568104		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10568105		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10568106		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10568301	10568303	125.2	0.20	10080	0.20	11047	2.40	122.215974441	134.110383387
10568302		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10568303		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10568304		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10568305		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000
10568306		0.0	0.00	0	0.00	0	0.00	0.00000	0.00000

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Chemical Extraction
Remedy Screening (Preliminary Phase) Stages I and II and Remedy Selection (Advanced Phase)

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CHEMICAL EXTRACTION DATA (PART 1 of 5)

TREATABILITY SAMPLE #	FERNALD SAMPLE #1	FERNALD SAMPLE #2	COMP. FERN. SAMPLE #	ETDC SAMPLE #1	ETDC SAMPLE #2	SILO NUMBER	PHASE	STAGE	BATCH	BENTONITE	SAMPLE NET WT(g)	pH	ACID NET WT(g)
10320301	100078			936	0	1	1	1	NA	0.00	1.49	-99.99	6.07
10320302	100078			936	0	1	1	1	NA	0.00	1.53	-99.99	6.00
10320303	100078			936	0	1	1	1	NA	0.00	1.54	-99.99	6.07
10320304	100043			887	0	2	1	1	NA	0.00	1.59	-99.99	5.98
10320305	100043			887	0	2	1	1	NA	0.00	1.52	-99.99	6.45
10320306	100043			887	0	2	1	1	NA	0.00	1.52	-99.99	6.05
10320901	100078			936	0	1	1	1	NA	0.00	1.50	-99.99	6.01
10320902	100078			936	0	1	1	1	NA	0.00	1.50	-99.99	6.00
10320903	100078			936	0	1	1	1	NA	0.00	1.51	-99.99	6.01
10320904	100078			936	0	1	1	1	NA	0.00	1.50	-99.99	6.00
10320905	100043			887	0	2	1	1	NA	0.00	1.51	-99.99	6.02
10320906	100043			887	0	2	1	1	NA	0.00	1.50	-99.99	6.01
10320907	100043			887	0	2	1	1	NA	0.00	1.51	-99.99	6.02
10320908	100043			887	0	2	1	1	NA	0.00	1.52	-99.99	6.00
10321101	100078			936	0	1	1	1	NA	0.00	1.50	-99.99	6.10
10321102	100078			936	0	1	1	1	NA	0.00	1.52	-99.99	6.10
10321103	100078			936	0	1	1	1	NA	0.00	1.50	-99.99	6.03
10321104	100043			887	0	2	1	1	NA	0.00	1.52	-99.99	6.02
10321105	100043			887	0	2	1	1	NA	0.00	1.52	-99.99	6.00
10321106	100043			887	0	2	1	1	NA	0.00	1.49	-99.99	6.05
10322001	100078			936	0	1	1	1	NA	0.00	3.04	-99.99	6.02
10322002	100078			936	0	1	1	1	NA	0.00	1.50	-99.99	6.01
10322003	100078			936	0	1	1	1	NA	0.00	3.00	-99.99	6.10
10322004	100078			936	0	1	1	1	NA	0.00	3.00	-99.99	5.99
10322005	100078			936	0	1	1	1	NA	0.00	3.00	-99.99	5.99
10322006	100078			936	0	1	1	1	NA	0.00	1.51	-99.99	6.00
10322007	100078			936	0	1	1	1	NA	0.00	3.00	-99.99	6.04
10322008	100078			936	0	1	1	1	NA	0.00	3.03	-99.99	6.00
10322009	100043			887	0	2	1	1	NA	0.00	-99.99	-99.99	-99.99
10322010	100078			936	0	1	1	1	NA	0.00	-99.99	-99.99	-99.99
10322201	100043			887	0	2	1	1	NA	0.00	3.02	-99.99	6.09
10322202	100043			887	0	2	1	1	NA	0.00	1.52	-99.99	6.05
10322203	100043			887	0	2	1	1	NA	0.00	3.00	-99.99	6.09
10322204	100043			887	0	2	1	1	NA	0.00	3.02	-99.99	6.02
10322205	100043			887	0	2	1	1	NA	0.00	3.00	-99.99	6.08
10322206	100043			887	0	2	1	1	NA	0.00	1.53	-99.99	6.00
10322207	100043			887	0	2	1	1	NA	0.00	3.00	-99.99	6.00
10322208	100043			887	0	2	1	1	NA	0.00	3.00	-99.99	6.07
10322209	100043			887	0	2	1	1	NA	0.00	3.01	-99.99	6.01
10322210	100043			887	0	2	1	1	NA	0.00	1.52	-99.99	6.03
10322211	100078			936	0	1	1	1	NA	0.00	1.50	-99.99	4.00
10322212	100078			936	0	1	1	1	NA	0.00	1.51	-99.99	6.05
10322213	100043			887	0	2	1	1	NA	0.00	3.04	-99.99	6.00
10322214	100078			936	0	1	1	1	NA	0.00	3.00	-99.99	6.01
10322215	100043			887	0	2	1	1	NA	0.00	3.01	-99.99	6.01
10322216	100078			936	0	1	1	1	NA	0.00	2.00	-99.99	4.00
10321401	100057			1057	0	1	1	2	NA	0.30	1.18	-99.99	6.01
10321402	100057			1057	0	1	1	2	NA	0.30	1.22	-99.99	6.04
10321403	100057			1057	0	1	1	2	NA	0.30	1.20	-99.99	6.04
10321404	100057			1057	0	1	1	2	NA	0.30	1.19	-99.99	6.04
10321405	100072			1161	0	2	1	2	NA	0.30	1.18	-99.99	6.15

TREATABILITY SAMPLE #	FERNALD SAMPLE #1	FERNALD SAMPLE #2	COMP. FERN. SAMPLE #	ETDC SAMPLE #1	ETDC SAMPLE #2	SILO NUMBER	PHASE	STAGE	BATCH	BENTONITE	SAMPLE NET WT(g)	pH	ACID NET WT(g)
10321406	100072			1161	0	2	1	2	NA	0.31	1.22	-99.99	6.05
10321407	100072			1161	0	2	1	2	NA	0.30	1.22	-99.99	6.06
10321408	100072			1161	0	2	1	2	NA	0.30	1.20	-99.99	6.04
10321601	100057			1057	0	1	1	2	NA	0.30	1.19	-99.99	6.00
10321602	100057			1057	0	1	1	2	NA	0.30	1.20	-99.99	6.14
10321603	100057			1057	0	1	1	2	NA	0.30	1.20	-99.99	6.06
10321604	100072			1161	0	2	1	2	NA	0.30	1.20	-99.99	6.04
10321605	100072			1161	0	2	1	2	NA	0.30	1.19	-99.99	6.12
10321606	100072			1161	0	2	1	2	NA	0.30	1.22	-99.99	6.07
10321801	100057			1057	0	1	1	2	NA	0.30	1.21	-99.99	6.01
10321802	100057			1057	0	1	1	2	NA	0.30	1.21	-99.99	6.01
10321803	100057			1057	0	1	1	2	NA	0.30	1.22	-99.99	6.02
10321804	100072			1161	0	2	1	2	NA	0.30	1.21	-99.99	6.03
10321805	100072			1161	0	2	1	2	NA	0.30	1.21	-99.99	6.07
10321806	100072			1161	0	2	1	2	NA	0.30	1.20	-99.99	6.02
10323001	100078	100043	75309	936	887	1&2	1	2	NA	0.00	1.51	-99.99	6.02
10323002	100078	100043	75309	936	887	1&2	1	2	NA	0.00	1.53	-99.99	6.01
10323003	100078	100043	75309	936	887	1&2	1	2	NA	0.00	1.50	-99.99	6.01
10323004	100078	100043	75309	936	887	1&2	1	2	NA	0.00	1.52	-99.99	6.01
10323005	100078	100043	75309	936	887	1&2	1	2	NA	0.00	1.56	-99.99	6.02
10323006	100078	100043	75309	936	887	1&2	1	2	NA	0.00	1.54	-99.99	6.01
10323007	100078	100043	75309	936	887	1&2	1	2	NA	0.00	1.49	-99.99	6.03
10323008	100078	100043	75309	936	887	1&2	1	2	NA	0.00	1.53	-99.99	5.99
10323009	100078	100043	75309	936	887	1&2	1	2	NA	0.00	1.47	-99.99	6.00
10323601	100078	100043	75309	936	887	1&2	1	2	NA	0.00	0.71	-99.99	7.01
10323602	100078	100043	75309	936	887	1&2	1	2	NA	0.00	0.70	-99.99	7.03
10323603	100078	100043	75309	936	887	1&2	1	2	NA	0.00	0.70	-99.99	7.01
10323604	100078	100043	75309	936	887	1&2	1	2	NA	0.00	0.71	-99.99	7.01
10323605	100078	100043	75309	936	887	1&2	1	2	NA	0.00	0.71	-99.99	7.02
10323606	100078	100043	75309	936	887	1&2	1	2	NA	0.00	0.70	-99.99	7.01
10323607	100078	100043	75309	936	887	1&2	1	2	NA	0.00	0.70	-99.99	7.00
10323608	100078	100043	75309	936	887	1&2	1	2	NA	0.00	0.70	-99.99	7.00
10323609	100078	100043	75309	936	887	1&2	1	2	NA	0.00	0.70	-99.99	7.00
10323610	100078	100043	75309	936	887	1&2	1	2	NA	0.00	0.63	-99.99	6.32
10323611	100078	100043	75309	936	887	1&2	1	2	NA	0.00	0.66	-99.99	6.63
10323612	100078	100043	75309	936	887	1&2	1	2	NA	0.00	0.63	-99.99	6.31
10324001	100078			936	0	1	1	2	NA	0.00	1.51	-99.99	6.00
10324002	100043			837	0	2	1	2	NA	0.00	1.51	0.00	0.00
105102001	100058			1435	0	1	ADV	1	1	10.00	90.06	-99.99	400.00
105102002	100058			1435	0	1	ADV	1	1	10.00	90.06	-99.99	400.00
105102003	100058			1436	0	1	ADV	1	2	10.05	90.06	-99.99	400.00
105102004	100058			1436	0	1	ADV	1	2	10.05	90.06	-99.99	400.00
105102005	100058			1437	0	1	ADV	1	3	10.07	90.07	-99.99	400.00
105102006	100058			1437	0	1	ADV	1	3	10.07	90.07	-99.99	400.00
105102007	100058			1438	0	1	ADV	1	4	10.03	90.07	-99.99	400.00
105102008	100058			1438	0	1	ADV	1	4	10.03	90.07	-99.99	400.00
105104001	100058			1439	0	1	ADV	1	1	10.03	90.04	-99.99	400.00
105104002	100058			1439	0	1	ADV	1	1	10.03	90.04	-99.99	400.00
105104003	100058			1441	0	1	ADV	1	2	10.07	90.14	-99.99	400.00
105104004	100058			1441	0	1	ADV	1	2	10.07	90.14	-99.99	400.00
105104005	100058			1445	0	1	ADV	1	3	10.09	90.20	-99.99	400.00
105104006	100058			1445	0	1	ADV	1	3	10.09	90.20	-99.99	400.00
105104007	100058			1442	1443	1	ADV	1	4	10.08	90.08	-99.99	400.00

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TREATABILITY SAMPLE #	FERNALD SAMPLE #1	FERNALD SAMPLE #2	COMP. FERN. SAMPLE #	ETDC SAMPLE #1	ETDC SAMPLE #2	SILO NUMBER	PHASE	STAGE	BATCH	BENTONITE	SAMPLE NET WT(g)	pH	ACID NET WT(g)
105104008	100058			1442	1443	1	ADV	1	4	10.08	90.08	-99.99	400.00
105106001	100073			1408	1409	2	ADV	1	1	10.09	90.01	-99.99	400.00
105106002	100073			1408	1409	2	ADV	1	1	10.09	90.01	-99.99	400.00
105106003	100073			1408	0	2	ADV	1	2	10.18	90.05	-99.99	400.00
105106004	100073			1408	0	2	ADV	1	2	10.18	90.05	-99.99	400.00
105106005	100073			1411	0	2	ADV	1	3	10.12	90.00	-99.99	400.00
105106006	100073			1411	0	2	ADV	1	3	10.12	90.00	-99.99	400.00
105106007	100073			1412	0	2	ADV	1	4	10.08	90.12	-99.99	400.00
105106008	100073			1412	0	2	ADV	1	4	10.08	90.12	-99.99	400.00
105108001	100073			1412	1413	2	ADV	1	1	10.10	90.02	-99.99	400.00
105108002	100073			1412	1413	2	ADV	1	1	10.10	90.02	-99.99	400.00
105108003	100073			1413	0	2	ADV	1	2	10.13	90.00	-99.99	400.00
105108004	100073			1413	0	2	ADV	1	2	10.13	90.00	-99.99	400.00
105108005	100073			1417	1415	2	ADV	1	3	10.10	90.24	-99.99	400.00
105108006	100073			1417	1415	2	ADV	1	3	10.10	90.24	-99.99	400.00
105108007	100073			1414	1416	2	ADV	1	4	10.04	90.08	-99.99	400.00
105108008	100073			1414	1416	2	ADV	1	4	10.04	90.08	-99.99	400.00

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EXTRACTION LUID DATA (PART 2 of 5)

TREATABILITY SAMPLE #	EXTRACTION FLUID 1 NAME	CONC.	LIQUID/SOLID RATIO	TIME	TEMP.	# OF EXT.	RINSES	H2O/SOLID RATIO	TEMP.	EXTRACTION FLUID 2 NAME	CONC.	LIQUID/SOLID RATIO	TIME	TEMP.	# OF EXT.	RINSES	H2O/SOLID RATIO	TEMP.
10320301	Nitric	13N	4:1	2 HRS	80 C	1												
10320302	HCl	11.6N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10320303	Acetic	8.8N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10320304	Nitric	13N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10320305	HCl	11.6N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10320306	Acetic	8.8N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10320901	Nitric	5.6N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10320902	HCl	5.4N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10320903	Acetic	4.3N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10320904	Acetic	8.8N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10320905	Nitric	5.6N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10320906	HCl	5.4N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10320907	Acetic	4.3N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10320908	Acetic	8.8N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321101	Nitric	2.6N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321102	HCl	2.6N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321103	Acetic	2 N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321104	Nitric	2.6N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321105	HCl	2.6N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321106	Acetic	2 N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10322001	Nitric	13N	2:1	2 HRS	AMB	1	3	2:1	AMB									
10322002	Nitric	13N	4:1	2 HRS	AMB	1	3	4:1	AMB									
10322003	Nitric	13N	2:1	2 HRS	80 C	1	3	2:1	AMB									
10322004	Nitric	2.6N	2:1	2 HRS	80 C	1	3	2:1	AMB									
10322005	HCl	11.6N	2:1	2 HRS	AMB	1	3	2:1	AMB									
10322006	HCl	11.6N	4:1	2 HRS	AMB	1	3	4:1	AMB									
10322007	HCl	11.6N	2:1	2 HRS	80 C	1	3	2:1	AMB									
10322008	HCl	2.6N	2:1	2 HRS	80 C	1	3	2:1	AMB									
10322009	NONE	N/A	N/A	N/A	N/A													
10322010	NONE	N/A	N/A	N/A	N/A													
10322201	Nitric	13N	2:1	2 HRS	AMB	1	3	2:1	AMB									
10322202	Nitric	13N	4:1	2 HRS	AMB	1	3	4:1	AMB									
10322203	Nitric	13N	2:1	2 HRS	80 C	1	3	2:1	AMB									
10322204	Nitric	2.6N	2:1	2 HRS	80 C	1	3	2:1	AMB									
10322205	HCl	11.6N	2:1	2 HRS	AMB	1	3	2:1	AMB									
10322206	HCl	11.6N	4:1	2 HRS	AMB	1	3	4:1	AMB									
10322207	HCl	11.6N	2:1	2 HRS	80 C	1	3	2:1	AMB									
10322208	HCl	2.6N	2:1	2 HRS	80 C	1	3	2:1	AMB									
10322209	Acetic	8.8N	2:1	2 HRS	AMB	1	3	2:1	AMB									
10322210	Acetic	8.8N	4:1	2 HRS	AMB	1	3	4:1	AMB									
10322211	Acetic	8.8N	2:1	2 HRS	AMB	1	3	2:1	AMB									
10322212	Acetic	8.8N	4:1	2 HRS	AMB	1	3	4:1	AMB									
10322213	Acetic	8.8N	2:1	2 HRS	80 C	1	3	2:1	AMB									
10322214	Acetic	8.8N	2:1	2 HRS	80 C	1	3	2:1	AMB									
10322215	Acetic	2N	2:1	2 HRS	80 C	1	3	2:1	AMB									
10322216	Acetic	2N	2:1	2 HRS	80 C	1	3	2:1	AMB									
10321401	HCl	5.4N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321402	Nitric	5.6N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321403	Acetic	8.8N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321404	Acetic	4.3N	4:1	2 HRS	80 C	1	3	4:1	AMB									

TREATABILITY SAMPLE #	EXTRACTION FLUID 1 NAME	CONC.	LIQUID/SOLID RATIO	TIME	TEMP.	# OF EXT.	RINSES	H2O/SOLID RATIO	TEMP.	EXTRACTION FLUID 2 NAME	CONC.	LIQUID/SOLID RATIO	TIME	TEMP.	# OF EXT.	RINSES	H2O/SOLID RATIO	TEMP.
10321405	HCl	5.4N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321406	Nitric	5.6N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321407	Acetic	8.8N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321408	Acetic	4.3N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321601	HCl	5.4N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321602	HCl	9N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321603	HCl + Cl	9N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321604	HCl	5.4N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321605	HCl	9N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321606	HCl + Cl	9N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321801	Nitric	5.6N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321802	Acetic	8.8N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321803	Acetic	4.3N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321804	Nitric	5.6N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321805	Acetic	8.8N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10321806	Acetic	4.3N	4:1	2 HRS	80 C	1	3	4:1	AMB									
10323001	HCl	9N	4:1	4 HRS	80 C	6	3	4:1	AMB									
10323002	HCl	9N	4:1	4 HRS	80 C	3	3	4:1	AMB									
10323003	Nitric	5.6N	4:1	4 HRS	80 C	6	3	4:1	AMB									
10323004	Nitric	5.6N	4:1	4 HRS	80 C	3	3	4:1	AMB									
10323005	EDTA	0.2M	4:1	4 HRS	80 C	6	3	4:1	AMB									
10323006	EDTA	0.2M	4:1	4 HRS	80 C	3	3	4:1	AMB									
10323007	EDTA	0.8M	4:1	4 HRS	80 C	6	3	4:1	AMB									
10323008	EDTA	0.8M	4:1	4 HRS	80 C	3	3	4:1	AMB									
10323009	HCl	9N	4:1	4 HRS	80 C	3	3	4:1	AMB									
10323601	EDTA	0.8M	10:1	4 HRS	80 C	1	3	10:1	AMB									
10323602	EDTA	0.8M	10:1	4 HRS	80 C	2	3	10:1	AMB									
10323603	EDTA	0.8M	10:1	4 HRS	80 C	3	3	10:1	AMB									
10323604	EDTA	0.8M	10:1	24 HRS	80 C	1	3	10:1	AMB									
10323605	EDTA	0.8M	10:1	24 HRS	80 C	2	3	10:1	AMB									
10323606	EDTA	0.8M	10:1	24 HRS	80 C	3	3	10:1	AMB									
10323607	KCl/EDTA	0.8M	10:1	24 HRS	80 C	1	3	10:1	AMB									
10323608	KCl/EDTA	0.8M	10:1	24 HRS	80 C	2	3	10:1	AMB									
10323609	KCl/EDTA	0.8M	10:1	24 HRS	80 C	3	3	10:1	AMB									
10323610	ETDA	0.8M	10:1	4 HRS	80 C	6	3	10:1	AMB	Nitric	5.6N	10:1	24 HRS	80 C	1	3	10:1	AMB
10323611	HCl	9N	10:1	4 HRS	80 C	6	3	10:1	AMB	EDTA	0.8M	10:1	24 HRS	80 C	1	3	10:1	AMB
10323612	Nitric	5.6N	10:1	4 HRS	80 C	6	3	10:1	AMB	EDTA	0.8M	10:1	24 HRS	80 C	1	3	10:1	AMB
10324001	Nitric	5.6N	4:1	4 HRS	80 C	1	2	4:1	AMB	EDTA	0.8M	4:1	4 HRS	80 C	6	3	4:1	AMB
10324002	Nitric	5.6N	4:1	4 HRS	80 C	1	2	4:1	AMB	EDTA	0.8M	4:1	4 HRS	80 C	6	3	4:1	AMB
105102001	KCl	15%	4:1	15 HRS	80 C	1	0											
105102002										EDTA	0.73M	4:1	4 HRS	80 C	6	3	4:1	AMB
105102003	KCl	15%		15 HRS	80 C	1												
105102004	EDTA	0.8M		4 HRS	80 C	6												
105102005	KCl	15%		15 HRS	80 C	1												
105102006	EDTA	0.8M		4 HRS	80 C	6												
105102007	KCl	15%		15 HRS	80 C	1												
105102008	EDTA	0.8M		4 HRS	80 C	6												
105104001	EDTA	0.8M		4 HRS	80 C	6												
105104002	HNO3	8N		4 HRS	80 C	1												
105104003	EDTA	0.8M		4 HRS	80 C	6												
105104004	HNO3	8N		4 HRS	80 C	1												
105104005	EDTA	0.8M		4 HRS	80 C	6												

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TREATABILITY SAMPLE #	EXTRACTION FLUID 1 NAME	CONC.	LIQUID/SOLID RATIO	TIME	TEMP.	# OF EXT.	RINSES	H2O/SOLID RATIO	TEMP.	EXTRACTION FLUID 2 NAME	CONC.	LIQUID/SOLID RATIO	TIME	TEMP.	# OF EXT.	RINSES	H2O/SOLID RATIO	TEMP.
105104006	HNO3	8N		4 HRS	80 C	1												
105104007	EDTA	0.8M		4 HRS	80 C	6												
105104008	HNO3	8N		4 HRS	80 C	1												
105106001	KCl	15%		15 HRS	80 C	1												
105106002	EDTA	0.8M		4 HRS	80 C	6												
105106003	KCl	15%		15 HRS	80 C	1												
105106004	EDTA	0.8M		4 HRS	80 C	6												
105106005	KCl	15%		15 HRS	80 C	1												
105106006	EDTA	0.8M		4 HRS	80 C	6												
105106007	KCl	15%		15 HRS	80 C	1												
105106008	EDTA	0.8M		4 HRS	80 C	6												
105108001	EDTA	0.8M		4 HRS	80 C	6												
105108002	HNO3	8N		4 HRS	80 C	1												
105108003	EDTA	0.8M		4 HRS	80 C	6												
105108004	HNO3	8N		4 HRS	80 C	1												
105108005	EDTA	0.8M		4 HRS	80 C	6												
105108006	HNO3	8N		4 HRS	80 C	1												
105108007	EDTA	0.8M		4 HRS	80 C	6												
105108008	HNO3	8N		4 HRS	80 C	1												

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CHEMICAL EXTRACTION DATA (PART 3 of 5)

TREATABILITY SAMPLE #	LEAD(ppm)	URANIUM	ALPHA SOLID (µCi/g)	BETA SOLID (µCi/g)	COMMENT
10320301	-9999.99	-99.99	-99.99	-99.99	Sample vial broken.
10320302	-9999.99	-99.99	3.70	1.32	
10320303	-9999.99	-99.99	4.44	1.50	
10320304	-9999.99	-99.99	2.53	0.84	
10320305	-9999.99	-99.99	2.52	0.89	
10320306	-9999.99	-99.99	2.66	0.91	
10320901	-9999.99	-99.99	7.49	2.89	
10320902	-9999.99	-99.99	5.68	2.07	
10320903	-9999.99	-99.99	4.00	1.16	
10320904	-9999.99	-99.99	3.91	1.22	
10320905	-9999.99	-99.99	2.38	0.78	
10320906	-9999.99	-99.99	2.48	0.88	
10320907	-9999.99	-99.99	2.25	0.76	
10320908	-9999.99	-99.99	2.65	0.90	
10321101	-9999.99	-99.99	4.23	1.57	
10321102	-9999.99	-99.99	4.08	1.53	
10321103	-9999.99	-99.99	4.43	1.55	
10321104	-9999.99	-99.99	2.01	0.71	
10321105	-9999.99	-99.99	2.26	0.74	
10321106	-9999.99	-99.99	1.46	0.49	
10322001	-9999.99	-99.99	3.13	0.97	
10322002	-9999.99	-99.99	3.33	1.08	
10322003	-9999.99	-99.99	3.17	1.11	
10322004	-9999.99	-99.99	3.94	1.34	
10322005	-9999.99	-99.99	3.67	1.31	
10322006	-9999.99	-99.99	3.44	1.25	
10322007	-9999.99	-99.99	3.64	1.29	
10322008	-9999.99	-99.99	3.06	1.09	
10322009	-9999.99	-99.99	2.51	1.02	
10322010	-9999.99	-99.99	3.31	1.35	
10322201	-9999.99	-99.99	1.59	0.59	Uranium result is Uranium by ICP
10322202	-9999.99	-99.99	1.55	0.58	
10322203	-9999.99	-99.99	1.83	0.67	
10322204	-9999.99	-99.99	1.68	0.59	
10322205	-9999.99	-99.99	1.81	0.68	
10322206	-9999.99	-99.99	1.63	0.60	
10322207	-9999.99	-99.99	1.61	0.58	
10322208	-9999.99	-99.99	1.75	0.63	
10322209	-9999.99	-99.99	1.72	0.64	
10322210	-9999.99	-99.99	1.45	0.49	
10322211	-9999.99	-99.99	1.71	0.63	
10322212	-9999.99	-99.99	1.49	0.55	
10322213	-9999.99	-99.99	1.60	0.59	
10322214	-9999.99	-99.99	1.85	0.64	
10322215	-9999.99	-99.99	1.71	0.61	
10322216	-9999.99	-99.99	1.28	0.43	
10321401	-9999.99	-99.99	2.83	1.08	
10321402	-9999.99	-99.99	2.27	0.76	
10321403	-9999.99	-99.99	2.59	0.90	
10321404	-9999.99	-99.99	2.70	0.89	

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TREATABILITY SAMPLE #	LEAD(ppm)	URANIUM	ALPHA SOLID (µCi/g)	BETA SOLID (µCi/g)	COMMENT
10321405	-9999.99	-99.99	1.72	0.61	
10321406	-9999.99	-99.99	1.50	0.48	
10321407	-9999.99	-99.99	1.43	0.45	
10321408	-9999.99	-99.99	1.39	0.47	
10321601	-9999.99	-99.99	2.67	0.99	
10321602	-9999.99	-99.99	2.95	1.02	
10321603	-9999.99	-99.99	2.89	1.04	
10321604	-9999.99	-99.99	1.57	0.58	
10321605	-9999.99	-99.99	1.45	0.51	
10321606	-9999.99	-99.99	1.55	0.53	
10321801	-9999.99	-99.99	2.49	0.92	
10321802	-9999.99	-99.99	3.14	1.02	
10321803	-9999.99	-99.99	2.71	0.90	
10321804	-9999.99	-99.99	1.51	0.51	
10321805	-9999.99	-99.99	1.73	0.57	
10321806	-9999.99	-99.99	1.53	0.53	
10323001	-9999.99	-99.99	2.71	1.01	
10323002	-9999.99	-99.99	2.45	0.92	
10323003	-9999.99	-99.99	1.72	0.67	
10323004	-9999.99	-99.99	2.17	0.78	
10323005	-9999.99	-99.99	0.41	0.10	
10323006	-9999.99	-99.99	1.33	0.42	
10323007	-9999.99	-99.99	0.26	0.08	
10323008	-9999.99	-99.99	0.34	0.08	
10323009	-9999.99	-99.99	3.04	1.13	
10323601	-9999.99	-99.99	0.61	0.18	
10323602	-9999.99	-99.99	0.27	0.07	
10323603	-9999.99	-99.99	0.22	0.06	
10323604	-9999.99	-99.99	0.31	0.06	
10323605	-9999.99	-99.99	0.34	0.12	
10323606	-9999.99	-99.99	0.24	0.09	
10323607	-9999.99	-99.99	0.48	0.10	
10323608	-9999.99	-99.99	0.23	0.08	
10323609	-9999.99	-99.99	0.18	0.05	
10323610	-9999.99	-99.99	0.14	0.03	Feed was 10323007 solid residue after 6 EDTA-residue had been 105 C before re-extraction.
10323611	-9999.99	-99.99	3.06	1.10	Feed was 10323001 solid residue after 6 HCl-residue had been 105 C before re-extraction.
10323612	-9999.99	-99.99	1.51	0.53	Feed was 10323003 solid residue after 6 HNO3-residue had been 105 C before re-extraction.
10324001	-9999.99	-99.99	8651.29	2496.08	
10324002	-9999.99	-99.99	0.18	0.02	
105102001	-9999.99	-99.99	0.61	0.15	1051020/01-08 extr. solids(Stream A) comp.& div. in 11 aliquots, 105102/01-11 for anlys. GA/B comp. anlys sent to ORNL.
105102002	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105102001 used for EDTA extractions.
105102003	-9999.99	-99.99	-9999.99	-9999.99	
105102004	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105102003 used for EDTA extractions.
105102005	-9999.99	-99.99	-9999.99	-9999.99	
105102006	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105102005 used for EDTA extractions.
105102007	-9999.99	-99.99	-9999.99	-9999.99	
105102008	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105102007 used for EDTA extractions.
105104001	-9999.99	-99.99	-9999.99	-9999.99	105104001-105104008 extracted solids (Stream B) composited, divided into 21 aliquots, 10510401-10510421 for analysis.
105104002	-9999.99	-99.99	0.24	0.08	Extr. solids from 105104001 used for HNO3 extractions. GA/B composite analysis sent to ORNL.
105104003	-9999.99	-99.99	-9999.99	-9999.99	
105104004	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105104003 used for HNO3 extractions.
105104005	-9999.99	-99.99	-9999.99	-9999.99	

TREATABILITY SAMPLE #	LEAD(ppm)	URANIUM	ALPHA SOLID (µCi/g)	BETA SOLID (µCi/g)	COMMENT
105104006	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105104005 used for HNO3 extractions.
105104007	-9999.99	-99.99	-9999.99	-9999.99	
105104008	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105104007 used for HNO3 extractions.
105106001	-9999.99	-99.99	1.11	0.42	105106001/2008 extr. solids(Stream C) comp, div. in 3 aliquots, 10510601/03 for analysis. GA/B comp. anlys sent to ORNL
105106002	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105106001 used for EDTA extractions.
105106003	-9999.99	-99.99	-9999.99	-9999.99	
105106004	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105106003 used for EDTA extractions.
105106005	-9999.99	-99.99	-9999.99	-9999.99	
105106006	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105106005 used for EDTA extractions.
105106007	-9999.99	-99.99	-9999.99	-9999.99	
105106008	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105106007 used for EDTA extractions.
105108001	-9999.99	-99.99	-9999.99	-9999.99	105108001-105102008 extracted solids (Stream D) composited, divided into 3 aliquots, 10510801-10510803 for analysis.
105108002	-9999.99	-99.99	0.12	0.04	Extr. solids from 105108001 used for HNO3 extraction. GA/B composite analysis sent to ORNL.
105108003	-9999.99	-99.99	-9999.99	-9999.99	
105108004	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105108003 used for HNO3 extractions.
105108005	-9999.99	-99.99	-9999.99	-9999.99	
105108006	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105108005 used for HNO3 extractions.
105108007	-9999.99	-99.99	-9999.99	-9999.99	
105108008	-9999.99	-99.99	-9999.99	-9999.99	Extracted solids from 105108007 used for HNO3 extractions.

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OU-4
EXTRACTION FLUID 1 DATA (PART 4 of 5)

TREATABILITY SAMPLE #	LEACHATE 1ST EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 2ND EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 3RD EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 6TH EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM
10320301	0.0350	0.0081	317.00	187.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10320302	0.0271	0.0384	16700.00	203.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10320303	0.0078	0.0301	15400.00	176.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10320304	0.0209	0.0055	370.00	287.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10320305	0.0314	0.0277	7450.00	432.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10320306	0.0043	0.0149	5650.00	292.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10320901	0.0223	0.0316	16800.00	118.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10320902	0.0080	0.0113	7950.00	167.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10320903	0.0019	0.0191	13600.00	144.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10320904	0.0022	0.0280	14400.00	139.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10320905	0.0192	0.0299	9580.00	311.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10320906	0.0279	0.0229	8100.00	296.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10320907	0.0017	0.0124	4740.00	224.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10320908	0.0040	0.0136	4990.00	283.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321101	0.0179	0.0211	16300.00	133.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321102	0.0051	0.0027	3400.00	141.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321103	0.0040	0.0257	14100.00	51.40	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321104	0.0123	0.0189	7380.00	104.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321105	0.0206	0.0122	3970.00	113.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321106	0.0015	0.0090	4780.00	88.30	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322001	0.0625	0.0134	737.00	327.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322002	0.0292	0.0061	232.00	154.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322003	0.0631	0.0156	693.00	348.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322004	0.0202	0.0411	28400.00	354.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322005	0.0140	0.0363	21800.00	330.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322006	0.0070	0.0168	17000.00	166.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322007	0.0108	0.0341	21600.00	372.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322008	0.0662	0.0124	903.00	383.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322009	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322010	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322201	0.0264	0.0162	667.00	739.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322202	-99.99	0.0002	281.00	257.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322203	0.0294	0.0191	657.00	701.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322204	0.0110	0.0261	5040.00	610.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322205	0.0003	0.0021	18400.00	548.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322206	0.0005	0.0001	10500.00	293.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322207	0.0596	0.0476	20700.00	759.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322208	0.0472	0.0224	1238.00	721.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322209	-99.99	0.0002	11700.00	440.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322210	-99.99	0.0001	5620.00	267.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322211	0.0002	-99.99	9650.00	431.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322212	0.0002	-99.99	5840.00	313.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322213	0.0030	0.0297	12800.00	542.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322214	0.0031	0.0311	11700.00	633.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322215	0.0007	0.0105	7100.00	515.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10322216	0.0006	0.0117	9880.00	597.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321401	0.0252	0.0100	12700.00	183.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321402	0.0134	0.0150	17700.00	198.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321403	0.0048	0.0189	11400.00	140.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99

TREATABILITY SAMPLE #	LEACHATE 1ST EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 2ND EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 3RD EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 6TH EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM
10321404	0.0053	0.0208	10800.00	111.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321405	0.0203	0.0095	8630.00	376.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321406	0.0104	0.0191	9200.00	390.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321407	0.0020	0.0117	5360.00	266.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321408	0.0016	0.0084	3830.00	278.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321601	0.0335	0.0120	5480.00	179.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321602	0.0428	0.0368	14500.00	165.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321603	0.0140	0.0129	13400.00	159.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321604	0.0238	0.0113	6470.00	328.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321605	0.0292	0.0223	7380.00	354.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321606	0.0027	0.0194	6540.00	302.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321801	0.0279	0.0334	15900.00	189.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321802	0.0054	0.0223	9380.00	131.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321803	0.0031	0.0204	9060.00	124.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321804	0.0119	0.0224	6750.00	422.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321805	0.0024	0.0126	4400.00	245.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10321806	0.0005	0.0075	3230.00	276.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10323001	0.0441	0.0354	10800.00	265.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	0.0011	0.0004	-99.99	-99.99
10323002	0.0436	0.0343	11100.00	326.00	-99.99	-99.99	-9999.99	-99.99	0.0024	0.0021	475.60	-99.99	-99.99	-99.99	-9999.99	-99.99
10323003	0.0278	0.0337	12900.00	260.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	0.0039	0.0010	-99.99	-99.99
10323004	0.0241	0.0346	12500.00	245.00	-99.99	-99.99	-9999.99	-99.99	0.0091	0.0045	634.50	-99.99	-99.99	-99.99	-9999.99	-99.99
10323005	0.0181	0.0359	14300.00	33.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	0.0046	0.0028	-99.99	-99.99
10323006	0.0149	0.0373	14000.00	38.30	-99.99	-99.99	-9999.99	-99.99	0.0120	0.0063	451.30	-99.99	-99.99	-99.99	-9999.99	-99.99
10323007	0.0412	0.0441	14400.00	25.90	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	0.0019	0.0006	-99.99	-99.99
10323008	0.0320	0.0348	12400.00	15.60	-99.99	-99.99	-9999.99	-99.99	0.0164	0.0096	855.50	-99.99	-99.99	-99.99	-9999.99	-99.99
10323009	0.0399	0.0414	10900.00	160.00	-99.99	-99.99	-9999.99	-99.99	0.0028	0.0018	482.10	-99.99	-99.99	-99.99	-9999.99	-99.99
10323601	0.0037	0.0036	7105.00	17.46	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10323602	0.0036	0.0032	6709.00	9.48	0.0007	0.0009	896.50	9.60	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10323603	0.0033	0.0035	6854.00	4.65	0.0007	0.0008	713.30	3.11	0.0002	0.0002	80.22	8.70	-99.99	-99.99	-9999.99	-99.99
10323604	0.0029	0.0025	5276.00	21.10	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10323605	0.0036	0.0036	6846.00	9.61	0.0007	0.0004	717.60	54.10	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10323606	0.0036	0.0031	7066.00	22.30	0.0008	0.0005	706.20	54.20	0.0002	0.0001	128.30	28.70	-99.99	-99.99	-9999.99	-99.99
10323607	0.0032	0.0033	6344.00	5.80	782.9000	802.5800	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10323608	0.0031	0.0029	6225.00	4.10	0.0006	0.0004	693.10	42.60	141.4900	94.8400	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10323609	0.0037	0.0031	6284.00	7.90	0.0006	0.0003	652.20	39.00	-99.99	-99.99	87.18	19.70	-99.99	-99.99	-9999.99	-99.99
10323610	0.0412	0.0441	14400.00	25.90	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	0.0019	0.0006	-9999.99	-99.99
10323611	0.0441	0.0354	10800.00	265.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	0.0011	0.0004	-9999.99	-99.99
10323612	0.0278	0.0337	12900.00	260.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	0.0039	0.0010	-9999.99	-99.99
10324001	0.0322	0.0386	31400.00	343.00	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99	-99.99	-99.99	-9999.99	-99.99
10324002	0.0119	0.0255	20560.00	981.00	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102001	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102002	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102003	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102004	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102005	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102006	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102007	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102008	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104001	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104002	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104003	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99

TREATABILITY SAMPLE #	LEACHATE 1ST EXTRACTION				LEACHATE 2ND EXTRACTION				LEACHATE 3RD EXTRACTION				LEACHATE 6TH EXTRACTION			
	GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM
105104004	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104005	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104006	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104007	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104008	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106001	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106002	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106003	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106004	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106005	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106006	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106007	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106008	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108001	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108002	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108003	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108004	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108005	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108006	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108007	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108008	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99

OU-4
EXTRACTION FLUID 2 DATA (PART 5 of 5)

TREATABILITY SAMPLE #	LEACHATE 1ST EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 2ND EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 3RD EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 6TH EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM
10320301	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10320302	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10320303	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10320304	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10320305	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10320306	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10320901	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10320902	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10320903	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10320904	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10320905	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10320906	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10320907	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10320908	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321101	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321102	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321103	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321104	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321105	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321106	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322001	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322002	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322003	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322004	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322005	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322006	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322007	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322008	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322009	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322010	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322201	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322202	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322203	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322204	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322205	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322206	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322207	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322208	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322209	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322210	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322211	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322212	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322213	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322214	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322215	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10322216	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321401	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321402	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321403	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99

TREATABILITY SAMPLE #	LEACHATE 1ST EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 2ND EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 3RD EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 6TH EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM
10321404	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321405	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321406	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321407	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321408	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321601	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321602	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321603	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321604	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321605	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321606	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321801	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321802	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321803	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321804	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321805	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10321806	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323001	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323002	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323003	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323004	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323005	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323006	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323007	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323008	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323009	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323601	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323602	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323603	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323604	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323605	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323606	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323607	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323608	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323609	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323610	-99.99	0.0002	61.20	117.90	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323611	0.0002	0.0002	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10323612	0.0002	0.0001	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10324001	0.0277	0.0101	825.00	0.28	0.0133	0.0086	184.00	0.03	0.0122	0.0078	104.00	0.16	0.0012	0.0005	8.30	-99.99
10324002	0.0254	0.0101	1490.00	0.25	0.0069	0.0043	258.00	0.00	0.0026	0.0020	75.70	0.12	0.0000	0.0000	5.27	0.45
105102001	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102002	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102003	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102004	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102005	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102006	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102007	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105102008	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104001	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104002	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104003	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99

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TREATABILITY SAMPLE #	LEACHATE 1ST EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 2ND EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 3RD EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM	LEACHATE 6TH EXTRACTION GROSS ALPHA (µCi/mL)	GROSS BETA (µCi/mL)	LEAD	URANIUM
105104004	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104005	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104006	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104007	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105104008	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106001	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106002	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106003	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106004	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106005	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106006	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106007	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105106008	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108001	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108002	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108003	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108004	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108005	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108006	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108007	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
105108008	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99

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Precipitation Stages I and II

INTERNATIONAL TECHNOLOGY CORPORATION

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REAGENT ADDITION DATA (PART 1 of 6)

FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #1	ETDC SAMPLE #2	STAGE	TEST #	FEED SAMPLE #	DESCRIPTION
75310	10401301	0	0	I			HNO3/H2O composite + 250 ppm Fe3+
75310	10402101	0	0	I	1		HNO3/H2O composite + 250 ppm Fe3+
75310	10402201	0	0	I	24		HNO3/H2O composite + 250 ppm Fe3+
75310	10402401	0	0	I			Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10403201	0	0	I	3	10402001	HNO3/H2O composite + 250 ppm Fe3+
75310	10403301	0	0	I	5	10402001	HNO3/H2O composite + 250 ppm Fe3+
75310	10403401	0	0	I	6	10402001	HNO3/H2O composite + 250 ppm Fe3+
75310	10403501	0	0	I	7	10402001	HNO3/H2O composite + 250 ppm Fe3+
75310	10404001	0	0	I	27	10402001	HNO3/H2O composite + 250 ppm Fe3+
75310	10404101	0	0	I	10	10402001	HNO3/H2O composite + 250 ppm Fe3+
75310	10404102	0	0	I	11	10402001	HNO3/H2O composite + 250 ppm Fe3+
75310	10404201	0	0	I	25	10402001	HNO3/H2O composite + 250 ppm Fe3+
75310	10404301	0	0	I	26	10402001	HNO3/H2O composite + 250 ppm Fe3+
75310	10404701	0	0	I	1	10402401	Treated ETDA/KCl composite + 300 ppm Fe3+
75310	10404801	0	0	I	2	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10404901	0	0	I	3	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10405001	0	0	I	5	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10405101	0	0	I	6	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10405201	0	0	I	7	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10405301	0	0	I	8	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10405401	0	0	I	10	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10406101	0	0	I	18	10401301	HNO3/H2O composite + 250 ppm Fe3+
75310	10406201	0	0	I	19	10401301	HNO3/H2O composite + 250 ppm Fe3+
75310	10406301	0	0	I	20	10401301	HNO3/H2O composite + 250 ppm Fe3+
75310	10406601	0	0	I	21	10406001	HNO3/H2O composite + 250 ppm Fe3+
75310	10406701	0	0	I	22	10406001	HNO3/H2O composite + 250 ppm Fe3+
75310	10406702	0	0	I	23	10406001	HNO3/H2O composite + 250 ppm Fe3+
75310	10407001	0	0	I	11	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10407101	0	0	I	24	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10407201	0	0	I	25	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10407202	0	0	I	26	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10407901	0	0	I	18	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10408001	0	0	I	19	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10408101	0	0	I	20	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10408401	0	0	I	21	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10408501	0	0	I	22	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10408502	0	0	I	23	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10408801	0	0	I	27	10402401	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10530101	0	0	I	2	10406001	HNO3/H2O composite + 250 ppm Fe3+
75310	10530201	0	0	I	8	10406001	HNO3/H2O composite + 250 ppm Fe3+
75310	10530701	0	0	I	12	10406001	HNO3/H2O composite + 250 ppm Fe3+
75310	10530801	0	0	I	13	10406001	HNO3/H2O composite + 250 ppm Fe3+
75310	10530901	0	0	I	13	10406001	HNO3/H2O composite + 250 ppm Fe3+
75310	10531301	0	0	I	14	10406001	HNO3/H2O composite + 250 ppm Fe3+
75310	10531401	0	0	I	16	10406001	HNO3/H2O composite + 250 ppm Fe3+
75310	10531601	0	0	I	17	10406001	HNO3/H2O composite + 250 ppm Fe3+
75310	10531901	0	0	I	15	10406001	HNO3/H2O composite + 250 ppm Fe3+
75310	10532001	0	0	I	15	10406001	HNO3/H2O composite + 250 ppm Fe3+
75310	10532201	0	0	I	12	10409502	Treated EDTA/KCl composite + 300 ppm Fe3+

• - Coresponding ETDC #'s: 1435-1439,1441-1445,1408,1409,1411-1416

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FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #1	ETDC SAMPLE #2	STAGE	TEST #	FEED SAMPLE #	DESCRIPTION
75310	10532301	0	0	I	13	10409502	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10532501	0	0	I	14	10409502	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10532801	0	0	I	15	10409502	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10533001	0	0	I	16	10409502	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10533201	0	0	I	17	10409502	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10534601	0	0	I	28		HNO3/H2O composite + 250 ppm Fe3+
75310	10534701	0	0	I	29		HNO3/H2O composite + 250 ppm Fe3+
75310	10536001	0	0	I	28		Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10536101	0	0	I	29		Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537401	0	0	I	23A	10536602	Treated EDTA/KCL composite + 300 ppm Fe3+
75310	10537402	0	0	I	23B	10536602	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537403	0	0	I	24A	10536602	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537404	0	0	I	24B	10536602	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537405	0	0	I	24C	10536602	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537406	0	0	I	24D	10536602	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537407	0	0	I	28A	10536602	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537408	0	0	I	28B	10536602	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537409	0	0	I	28C	10536602	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537410	0	0	I	6A	10536601	HNO3/H2O composite + 250 ppm Fe3+
75310	10537411	0	0	I	6B	10536601	HNO2/H2O composite + 250 ppm Fe3+
75310	10537412	0	0	I	7A	10536601	HNO3/H2O composite + 250 ppm Fe3+
75310	10537413	0	0	I	7B	10536601	HNO3/H2O composite + 250 ppm Fe3+
75310	10537414	0	0	I	17A	10536601	HNO3/H2O composite + 250 ppm Fe3+
75310	10537415	0	0	I	17B	10536601	HNO3/H2O composite + 250 ppm Fe3+
75310	10537416	0	0	I	24A	10536601	HNO3/H2O composite + 250 ppm Fe3+
75310	10537417	0	0	I	24B	10536601	HNO3/H2O composite + 250 ppm Fe3+
75310	10537418	0	0	I	24B	10536601	HNO3/H2O composite + 250 ppm Fe3+
75310	10537419	0	0	I	24C	10536601	HNO3/H2O composite + 250 ppm Fe3+
75310	10537420	0	0	I	26A	10536601	HNO2/H2O composite + 250 ppm Fe3+
75310	10537421	0	0	I	26B	10536601	HNO3/H2O composite + 250 ppm Fe3+
75310	10537501	0	0	I	24E	10536602	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537502	0	0	I	24F	10536602	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537503	0	0	I	23B	10536602	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537504	0	0	I	28A	10536602	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537505	0	0	I	28D	10536602	Treated EDTA/KCl composite + 300 ppm Fe3+
75310	10537506	0	0	II	23B	10536601&02	HNO3 & EDTA/KCl 30/70 wt/wt ratio (14.64 g EDTA & 6.29 g HNO3)
75310	10537507	0	0	II	28A	10536601&02	HNO3 & EDTA/KCl 30/70 wt/wt ratio (14.64 g EDTA & 6.29 g HNO3)
75310	10537508	0	0	I	28A	10401301/958	HNO3/H2O composite + treated EDTA composite 30/70 wt/wt ratio--NO Fe3+

1.5448

000439

* - Coresponding ETDC #'s: 1435-1439,1441-1445,1408,1409,1411-1416

OU-4
REAGENT ADDITION DATA (PART 2 OF 6)

TREATABILITY SAMPLE #	pH BEFORE REAG. 1	SAMPLE WGT(g)	SAMPLE DENSITY	REAGENT 1	CONC(%WGT) REAG. 1	AMT OF REAG. 1	DOSE REAG. 1	TIME OF REAG. 1	TURBIDITY OF REAG. 1	COMMENT
10401301	-99.99	5.37	0.000	Fe2(SO4)3		-99.99	0.00			
10402101	-99.99	5.37	0.000	NaOH		-99.99	0.00			
10402201	-99.99	5.37	0.000	Na3PO4		-99.99	0.00			
10402401	-99.99	5.24	0.000	Fe2(SO4)3		-99.99	0.00			
10403201	0.15	5.37	0.000	Na2CO3	9.1	8.17	0.14	37	NR	When CO3 soln touches samp. ornge cloud forms on bottom; disappears when agitat; wh. cryst. in soln
10403301	0.08	5.37	0.000	MgO	20.0	5.34	0.20	25	NR	White precip; devel. of pH & color: white pale-yellow - orange pH 1 - 7-8; ornge precip settles fast
10403401	0.08	5.37	0.000	Ca(OH)2	20.0	7.40	0.28	22	NR	Suspen.of Ca(OH)2 dissolv. by acid until slight turbid. beginning; lt. yellow color; precip. settles
10403501	0.13	5.37	0.000	Dolomitic lime	20.0	7.91	0.29	22	NR	Beige-white turbid; color & pH increase-yellow color; yellow-orange ; yellow-orange settles well
10404001	0.29	5.37	0.000	Na2SO4	10.0	2.25	0.04	7	45	Nothing changed
10404101	0.22	5.37	0.000	Fe2(SO4)3	2.5	2.01	0.01	8	70.0	Slight yellow turbid.; slight turbid. due to orange color of ferric sulfate soln.; stopped test
10404102	0.16	5.37	0.000	Al2(SO4)3	20.0	2.08	0.08	4	40.0	Nothing happened. Test stopped and vial put on shaker to ensure no precipitation
10404201	0.16	5.37	0.000	Na3PO4	10.0	1.57	0.03	3	40.0	No turbidity or color observed
10404301	0.15	5.37	0.000	Na3PO4	10.0	1.08	0.02	3	40.0	
10404701	1.00	5.24	0.000	NaOH	1N	5.23	0.01	18	NR	Begin. turbid.; dk orange turbid., looks like colloid; very fine & dense turbid; orange, put on shkr
10404801	0.99	5.24	0.000	Na3PO4	10.0	4.68	0.09	16	NR	Yellow-rose color; very abundant whte-pale yellow turbid.;ornge-pnk -purple; 5min settld 1/3 of tot
10404901	1.00	5.24	0.000	Na2CO3	9.09	3.09	0.05	15	NR	Orange turbid appears. In 2 min precip. settled to 1/2 of tot. hgt; put on shaker
10405001	1.01	5.24	0.000	MgO	20.0	1.60	0.06	11	NR	pH & turbid. increased; orange-white precip., settles fast; put sample on shaker
10405101	1.03	5.24	0.000	Ca(OH)2 tech lm	20.0	0.61	0.02	8	NR	Some colloid-like floculation into yellow soln.; orange turbid.; sample put on shaker
10405201	1.02	5.24	0.000	Dolomitic lime	20.0	0.73	0.03	15	NR	Yellow turbid.;pH increases slowly by itself; orange turbid.;sample settles fast; put on shaker
10405301	1.04	5.24	0.000	Na2SO4	10.0	1.68	0.03	3	40.0	Slight precip. in bottom of vial (white); sample put on shaker
10405401	1.00	5.24	0.000	Fe2(SO4)3	2.5	2.72	0.01	23	100.0	Soln. turned dark-yellow (maybe due to orange color of soln. (Fe3(SO4)3)); sample put on shakr
10406101	0.00	5.37	0.000	MgO	20.0	3.52	0.13	19	NR	Pale yellow turbid; orange turbid. which darkens while pH increases ; test stpped for Mg(OH)2 additi
10406201	-0.12	5.37	0.000	MgO	20.0	5.15	0.19	17	NR	Pale yellw turbid.; ornge turbid.; turbid. darker ornge; pH increas es fast; test stppd; solids settl
10406301	-0.04	5.37	0.000	MgO	20	3.67	0.14	14	0.0	Pale yellow turbidity; orange turbidity; stopped test
10406601	-0.04	5.37	0.000	NaOH	1N	0.55	0.00	21	NR	Yellow-pale orange soln.; pH increases slowly; pH at 1.9 an orange color appeared; stopped test
10406701	-0.12	5.37	0.000	NaOH	1N	0.89	0.00	11	NR	Orange turbidity; stopped test
10406702	-0.12	5.37	0.000	NaOH	1N	0.62	0.00	6	MAX	Orange turbidity; test was stopped
10407001	0.90	5.24	0.000	Al2(SO4)3	20	3.19	0.12	9	90	Pale yellow turbidity; vial put on shaker; pH on filtration = 1.3
10407101	0.85	5.24	0.000	Na3PO4	10	3.36	0.06	9	NR	White suspension, looks like a colloid; white turbidity
10407201	0.85	5.24	0.000	Na3PO4	10	2.00	0.04	4	MAX	White turbidity
10407202	0.83	5.24	0.000	Na3PO4	10	1.92	0.04	4	600	White turbidity
10407901	0.85	5.24	0.000	MgO	20	0.59	0.02	9	NR	Add. 2 drops pH increasd very fast; wht turbid. w/1st drop; evolved to ornge turbid.when passed 2nd
10408001	0.82	5.24	0.000	MgO	20	0.51	0.02	4	NR	2nd drop white turbidity; this turbidity evolves frm white to ornge
10408101	0.81	5.24	0.000	MgO	20	0.79	0.03	7	NR	Yellow-white then orange turbidity following the increase of pH

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TREATABILITY SAMPLE #	pH BEFORE REAG. 1	SAMPLE WGT(g)	SAMPLE DENSITY	REAGENT 1	CONC(%WGT) REAG. 1	AMT OF REAG. 1	DOSE REAG. 1	TIME OF REAG. 1	TURBIDITY OF REAG. 1	COMMENT
10408401	0.81	5.24	0.000	NaOH	1N	5.77	0.01	15	NR	Orange turbidity
10408501	0.81	5.24	0.000	NaOH	1N	1.78	0.00	6	MAX	Orange turbidity
10408502	0.80	5.24	0.000	NaOH	1N	1.78	0.00	4	MAX	Orange turbidity
10408801	0.81	5.24	0.000	Na2SO4	10	1.92	0.04	4	50	Very slight turbidity
10530101	0.04	5.37	0.000	Na3PO4	10	2.04	0.04	6	15	No chnge in color or turbidity; put on shaker; pH of filtrate = .27
10530201	-0.05	5.37	0.000	Na2SO4	10	2.14	0.04	4	15	No change in color or turbidity; vial put on shaker; pH of filtrate = .27
10530701	0.00	5.37	0.000	NaOH	1N	0.42	0.00	25	NR	Orange turbidity
10530801	-0.06	5.37	0.000	NaOH	1N	0.44	0.00	9	NR	Orange turbidity
10530901	-0.12	5.37	0.000	NaOH	1N	0.11	0.00	43		Orange turbidity
10531301	-0.03	5.37	0.000	Na2CO3	9.09	3.65	0.06	28	NR	Orange turbidity
10531401	0.00	5.37	0.000	Mg(OH)2	20	2.21	0.08	54	NR	Orange turbidity; put on shaker for 4 days; pH of filtrate = 8.49
10531601	-0.11	5.37	0.000	Ca(OH)2	20	2.09	0.08	9	NR	Yellow turbidity; orange turbidity; vial put on shaker for 4 days; pH of filtrate = 8.66
10531901	-0.11	5.37	0.000	NaOH	1N	0.38	0.00	11	NR	Orange turbidity
10532001	-0.12	5.37	0.000	NaOH	1N	0.50	0.00	13	NR	Wht turbid. in dk yellow soln.; soln. above precp.is clear; put on shaker overnght; pH of filt=8.3
10532201	1.13	5.24	0.000	NaOH	1N	0.48	0.00	1		Orange-white turbidity; pH is decreasing
10532301	1.18	5.24	0.000	Na3PO4	10	1.04	0.02	5	MAX	White pale orange turbidity
10532501	1.16	5.24	0.000	Na2CO3	9.09	2.07	0.04	25	NR	Orange turbidity
10532801	1.16	5.24	0.000	NaOH	1N	1.27	0.00	9	NR	Orange turbidity
10533001	1.17	5.24	0.000	Mg(OH)2	20	1.24	0.05	9	NR	White turbidity; turned orange as pH increased
10533201	1.16	5.24	0.000	Ca(OH)2	20	0.26	0.01	8.00	MAX	Orange turbidity
10534601	-99.99	5.37	0.000	NaOH		-99.99	0.00			
10534701	-99.99	5.37	0.000	Ca(OH)2		-99.99	0.00			
10536001	-99.99	5.24	0.000	NaOH		-99.99	0.00			
10536101	-99.99	5.24	0.000	Ca(OH)2		-99.99	0.00			
10537401	1.16	10.50	0.000	NaOH	25	0.63	0.02		NA	Samples were placed on shaker for 8 hours
10537402	1.16	10.51	0.000	NaOH	25	0.63	0.01			Samples were placed on shaker for 8 hours
10537403	1.16	10.48	0.000	Na3PO4 9H2O	10	3.18	0.03		NA	Samples were placed on shaker for 8 hours
10537404	1.16	10.49	0.000	Na3PO4 9H2O	10	10.49	0.10		NA	Noted some white precip. immed. after PO4 add.; samples placed on shaker for 8 hrs
10537405	1.16	10.50	0.000	Na3PO4 9H2O	10	3.18	0.03		NA	Placed on shaker for 8 hours
10537406	1.16	10.51	0.000	Na3PO4 9H2O	10	3.18	0.03		NA	Placed on shaker for 8 hours
10537407	1.16	10.49	0.000	NaOH	25	0.09	0.00		NA	Placed on shaker for 8 hours
10537408	1.16	10.49	0.000	NaOH	25	0.09	0.00		NA	Placed on shaker for 8 hours
10537409	1.16	10.48	0.000	NaOH	25	0.09	0.00		NA	Placed on shaker for 8 hours
10537410	-0.15	10.39	0.000	Ca(OH)2	20	2.25	0.04			Shaken overnight
10537411	-0.15	10.40	0.000	Ca(OH)2	20	2.31	0.04	15		Shaken overnight; settled 50% in 10 minutes
10537412	-0.15	10.37	0.000	Dolomitic lime	20	2.40	0.05	30		Shaken overnight
10537413	-0.15	10.41	0.000	Dolomitic lime	20	2.75	0.05	30		Shaken overnight
10537414	-0.15	10.36	0.000	Ca(OH)2	20	2.23	0.04	15		Shaken overnight
10537415	-0.15	10.39	0.000	Ca(OH)2	20	2.18	0.04	15		Shaken overnight
10537416	-0.15	10.40	0.000	Na3PO4 12H2O	10	1.05	0.01			Shaken overnight; 1 ml of Na3PO4 12H2O added p=1.050
10537417	-0.15	10.41	0.000	Na3PO4 12H2O	10	1.05	0.01			Shaken overnight
10537418	-0.15	10.40	0.000	Na3PO4 12H2O	10	1.05	0.01			Shaken overnight
10537419	-0.15	13.65	0.000	Na3PO4 12H2O	10	1.05	0.01			Shaken overnight
10537420	-0.15	10.39	0.000	Na3PO4 12H2O	10	1.05	0.01			Shaken overnight
10537421	-0.15	10.41	0.000	Na3PO4 12H2O	10	1.05	0.01			Shaken overnight
10537501	1.17	20.76	0.000	Na3PO4	10	7.56	0.04	60	NA	Placed treated samples on orbital shaker @ 350 rpm
10537502	1.17	20.73	0.000	Na3PO4	10	7.56	0.04	60	NA	Placed treated samples on orbital shaker @ 350 rpm
10537503	1.17	20.76	0.000	NaOH	25	1.49	0.02	60	NA	Placed treated sample on orbital shaker @ 350 rpm
10537504	1.17	20.73	0.000	NaOH	25	0.17	0.00	60	NA	Placed treated samples on orbital shaker @ 350 rpm *Test 28A Dup.

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TREATABILITY SAMPLE #	pH BEFORE REAG. 1	SAMPLE WGT(g)	SAMPLE DENSITY	REAGENT 1	CONC(%WGT) REAG. 1	AMT OF REAG. 1	DOSE REAG. 1	TIME OF REAG. 1	TURBIDITY OF REAG. 1	COMMENT
10537505	1.17	20.73	0.000	NaOH	25	0.17	0.00	60	NA	Placed on orbital shaker @ 350 rpm
10537506	0.33	20.94	0.000	NaOH	25	2.32	0.03	60	NA	Placed on orbital shaker
10537507	0.33	20.94	0.000	NaOH	25	1.20	0.01	60	NA	Placed on orbital shaker
10537508	-99.99	20.94	0.000	NaOH	25	1.19	0.01	60	NA	Placed on orbital shaker

OU-4
REAGENT ADDITION DATA (PART 3 OF 6)

TREATABILITY SAMPLE #	pH BEFORE REAG. 2	SAMPLE WGT(g)	REAGENT 2	CONC(%WGT) REAG. 2	AMT OF REAG. 2	DOSE REAG. 2	TIME OF REAG. 2	TURBIDITY OF REAG. 2	COMMENT
10401301	-99.99				-99.99	0.00			
10402101	-99.99				-99.99	0.00			
10402201	-99.99				-99.99	0.00			
10402401	-99.99				-99.99	0.00			
10403201	8.51			0.0	-99.99	0.00		0.0	
10403301	8.13			0.0	-99.99	0.00		0.0	
10403401	9.82			0.0	-99.99	0.00		0.0	
10403501	8.62			0.0	-99.99	0.00		0.0	
10404001	0.12	5.37	NaOH	1N	2.67	0.00	51	NR	No turbid; orange turbid. Sample placed on shaker for 24 hrs.
10404101	0.12			0.0	-99.99	0.00		0.00	
10404102	0.13			0.0	-99.99	0.00		0.0	
10404201	0.09	5.37	MgO	20.0	4.93	0.18	25	NR	White precip; pale green-yellow turbid., settles fast; vial put on shaker 24 hrs
10404301	0.11	5.37	Ca(OH)2	20.0	5.39	0.20	24	NR	Very fine white suspension appears; slightly yellow turbid. Vial put on shaker for 24 hrs.
10404701	8.31			0.0	-99.99	0.00		0.0	
10404801	8.25			0.0	-99.99	0.00		0.0	
10404901	8.21			0.0	-99.99	0.00		0.0	
10405001	8.31			0.0	-99.99	0.00		0.0	
10405101	8.28			0.0	-99.99	0.00		0.0	
10405201	8.37			0.0	-99.99	0.00		0.0	
10405301	1.31			0.0	-99.99	0.00		0.0	
10405401	1.19			0.0	-99.99	0.00		0.00	
10406101	7.94	5.37	Na3PO4	10.0	1.28	0.02	28	NR	Vial placed on shaker; pH of filtrate measured 8.63
10406201	8.16	5.37	Na2CO3	9.09	0.18	0.00	188	NR	No visible change in color or turbidity; put on shaker; pH of filtrate=9.05
10406301	8.17	5.37	Na2S	20	0.08	0.00	48	NR	Precipitate & soln. turned dk green; odor of H2S; put on shaker; pH of filtrate = 8.82
10406601	8.29	5.37	Na3PO4	10.0	0.11	0.00	126	NR	Now NaPO4 added, no visible chg in color or turbid.; sample put on shaker; pH of filtrate = 9.00
10406701	8.19	5.37	Na2CO3	9.09	0.06	0.00	92	NR	No visible chg in color or turbid.; put on shaker; pH of filtrate = 8.93
10406702	8.58	5.37	Na2S	20	0.02	0.00	80	NR	Suspension & precip. turned dark green; odor of H2S; put on shaker; pH of filtrate = 8.81
10407001	1.22				-99.99	0.00			
10407101	7.37	5.24	NaOH	1N	0.69	0.00	10	NR	White-pink turidity; put on shaker; pH on filtrate = 8.26
10407201	7.49	5.24	MgO	20	0.96	0.04	8	NR	Very white turbidity; put on shaker; pH on filtrate = 9.11
10407202	7.35	5.24	Ca(OH)2	20	0.23	0.01	6	MAX	White turbidity; put on shaker; pH on the filtrate = 8.56
10407901	8.03	5.24	Na3PO4	20	0.95	0.04	23	NR	No visible chg in color or turbidity; vial put on shaker; pH of filtrate = 8.63
10408001	7.64	5.24	Na2CO3	9.09	0.96	0.02	18	NR	No visible change; vial put on shaker; pH of filtrate = 8.7
10408101	8.19	5.24	Na2S	20	0.29	0.01	13	NR	Soln. & suspension turned black-green; vial put on shaker; pH on filtrate = 8.92
10408401	8.19	5.24	Na3PO4	10	1.04	0.02	184	NR	No visible change in color or turbidity; pH on filtrate = 8.45
10408501	8.11	5.24	Na2CO3	9.09	1.12	0.02	180	NR	No visible change in color or turbidity; pH on filtrate = 8.72
10408502	8.48	5.24	Na2S	20	0.76	0.03	165	NR	Solution turned black-green; pH on filtrate = 8.93
10408801	1.23	5.24	NaOH	1N	2.65	0.01	165	330	White colloid appearing; orange turbidity; pH of filtrate = 8.25
10530101	0.11				-99.99	0.00			
10530201	0.10				-99.99	0.00			
10530701	8.57	5.37	Na2OSiO2	10	85.00	1.58	9	NR	Vial put on shaker; pH of filtrate = 8.09
10530801	5.37	5.37	Na3PO4	10	100.00	1.86	13	NR	
10530901	8.32	5.37	Na3PO4	10	200.00	3.72	12	NR	
10531301	8.35	5.37	Na2SiO2	10	85.00	1.58	21	NR	Vial put on shaker

TREATABILITY SAMPLE #	pH BEFORE REAG. 2	SAMPLE WGT(g)	REAGENT 2	CONC(%WGT) REAG. 2	AMT OF REAG. 2	DOSE REAG. 2	TIME OF REAG. 2	TURBIDITY OF REAG. 2	COMMENT
10531401	8.51	5.37	Na2OSiO2	10	85.00	1.58	23	NR	White gel when sodium silicate touched solution; gel disappears when shaked
10531601	9.24	5.37	Na2OSiO2	10	0.09	0.00	5	NR	
10531901	4.97	5.37	Na2S	20	100.00	3.72	13	NR	Sample turned black
10532001	9.30	5.37	Na2S	20	100.00	3.72	6	NR	Sample turned black
10532201	488.00	5.24	Na2OSiO2	10	85.00	1.62	13	NR	Ornge-wht turbid & sodium silicate touches smp; form. of wht gel "colloid"-like; put on shkr overngh
10532301	5.89	5.24	Na2OSiO2	10	85.00	1.62	11	NR	
10532501	8.54	5.24	Na2OSiO2	10	85.00	1.62	4	600	Vial put on shaker overnight; pH of filtrate = 8.58
10532801	8.52	5.24	Na2S	20	100.00	3.82	3	NR	Sample turned black
10533001	8.57	5.24	Na2OSiO2	10	85.00	1.62	4	NR	Sample seems to be more white; put on shaker overnight; pH of filtrate = 9.09
10533201	8.53	5.24	Na2OSiO2	10	85.00	1.62	5	700	White gel-like precipitate; put on shaker overnight; pH of filtrate = 8.42
10534601	-99.99	5.37	Nalco 8154		-99.99	0.00			
10534701	-99.99	5.37	Nalco 8154		-99.99	0.00			
10536001	-99.99	5.24	Nalco 8154		-99.99	0.00			
10536101	-99.99	5.24	Nalco 8154		-99.99	0.00			
10537401	9.03	10.50	Na2S		0.21	0.00		NA	Sample placed on shaker overnight
10537402	9.03	10.51	Na2S		0.43	0.00			Noticed black precipitate immed. after Na2S added; sample placed on shaker overnight
10537403	7.95				-99.99	0.00			
10537404	7.95	10.49	NaOH	25	0.55	0.01		NA	Samples were placed on shaker overnight
10537405	7.95	10.50	NaOH	25	1.03	0.02		NA	Placed on shaker overnight
10537406	7.95	10.51	NaOH	25	1.63	0.04		NA	Placed on shaker overnight
10537407	3.00	10.49	Nalmet 8154		0.12	0.00	15	NA	6.03 (pH @ 15 min) brown precipitate; placed on shaker overnight
10537408	2.98	10.49	Nalmet 8154		0.24	0.00	15	NA	6.84 (pH @ 15 min) immed. after #8154; placed on shaker overnight
10537409	3.01	10.48	Nalmet 8154		0.35	0.00	15	NA	6.88 (pH @ 15 min) immed. after #8154; placed on shaker overnight
10537410	9.02				-99.99	0.00			
10537411	10.09				-99.99	0.00			
10537412	8.57				-99.99	0.00			
10537413	8.75				-99.99	0.00			
10537414	7.59	10.36	Na2O:SiO2	10	0.17	0.00	15		Shaken overnight
10537415	6.33	10.39	Na2O:SiO2	10	0.35	0.00	15		Shaken overnight
10537416	-99.99	10.40	NaOH	25	1.78	0.04	15		Shaken overnight
10537417	-99.99	10.41	NaOH	25	1.81	0.04	15		Shaken overnight
10537418	-99.99	10.40	NaOH	25	1.81	0.04	15		Shaken overnight
10537419	-99.99	13.65	NaOH	25	2.38	0.04	15		Shaken overnight
10537420	-99.99	10.39	Ca(OH)2	20	2.16	0.04	15		Shaken overnight
10537421	-99.99	10.41	Ca(OH)2	20	2.20	0.04	15		Shaken overnight
10537501	8.20	20.76	NaOH	25	0.69	0.01	82	NA	Samples treated with Na3PO4 changed from orange to faint purple.
10537502	8.20	20.73	Ca(OH)2	20	1.60	0.02	72	NA	
10537503	9.18	20.76	Na2S	20	0.85	0.01	67	NA	
10537504	3.06	20.73	Nalmet 8154	54	0.24	0.01	56	NA	
10537505	3.06	20.73	Nalmet 8154	54	0.05	0.00	5	NA	
10537506	9.21	20.94	Na2S	20	0.85	0.01	88	NA	
10537507	3.18	20.94	Nalmet 8154	54	0.24	0.01	104	NA	
10537508	3.01	20.94	Nalmet 8154	54	0.24	0.01	120	NA	

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REAGENT ADDITION DATA (PART 4 OF 6)

TREATABILITY SAMPLE #	pH BEFORE REAG. 3	SAMPLE WGT(g)	REAGENT 3	CONC(%WGT) REAG. 3	AMT OF REAG. 3	DOSE REAG. 3	TIME OF REAG. 3	TURBIDITY OF REAG. 3	COMMENT
10401301	-99.99				-99.99	0.00			
10402101	-99.99				-99.99	0.00			
10402201	-99.99				-99.99	0.00			
10402401	-99.99				-99.99	0.00			
10403201	-99.99			0.0	-99.99	0.00		0.0	
10403301	-99.99			0.0	-99.99	0.00		0.0	
10403401	-99.99			0.0	-99.99	0.00		0.0	
10403501	-99.99			0.0	-99.99	0.00		0.0	
10404001	8.57			0.0	-99.99	0.00		0.0	
10404101	-99.99			0.0	-99.99	0.00		0.0	
10404102	-99.99			0.0	-99.99	0.00		0.0	
10404201	8.39			0.0	-99.99	0.00		0.0	
10404301	10.46			0.0	-99.99	0.00		0.0	
10404701	-99.99			0.0	-99.99	0.00		0.0	
10404801	-99.99			0.0	-99.99	0.00		0.0	
10404901	-99.99			0.0	-99.99	0.00		0.0	
10405001	-99.99			0.0	-99.99	0.00		0.0	
10405101	-99.99			0.0	-99.99	0.00		0.0	
10405201	-99.99			0.0	-99.99	0.00		0.0	
10405301	-99.99			0.0	-99.99	0.00		0.0	
10405401	-99.99			0.0	-99.99	0.00		0.0	
10406101	8.68			0.0	-99.99	0.00		0.0	
10406201	9.14			0.0	-99.99	0.00		0.0	
10406301	9.39			0.0	-99.99	0.00		0.0	
10406601	9.70			0.0	-99.99	0.00		0.0	
10406701	9.49				-99.99	0.00			
10406702	9.54				-99.99	0.00			
10407001	-99.99				-99.99	0.00			
10407101	8.40				-99.99	0.00			
10407201	8.51				-99.99	0.00			
10407202	8.64				-99.99	0.00			
10407901	8.77				-99.99	0.00			
10408001	8.88				-99.99	0.00			
10408101	9.03				-99.99	0.00			
10408401	8.64				-99.99	0.00			
10408501	8.92				-99.99	0.00			
10408502	8.98				-99.99	0.00			
10408801	8.38				-99.99	0.00			
10530101	-99.99				-99.99	0.00			
10530201	-99.99				-99.99	0.00			
10530701	7.60				-99.99	0.00			
10530801	8.24	5.37	Na2OSiO2	10	85.00	1.58		NR	Test was rerun to get a better pH
10530901	6.34	5.37	Na2OSiO2	10	85.00	1.58	16	NR	Vial put on shaker; pH of filtrate = 8.25
10531301	6.68				-99.99	0.00			
10531401	-99.99				-99.99	0.00			
10531601	7.73				-99.99	0.00			
10531901	10.04	5.37	Na2OSiO2	10	85.00	1.58		NR	Rerun test because pH too high; vial put on shaker; pH of filtrate = 10.04
10532001	2.76	5.37	Na2OSiO2	10	85.00	1.58	9	NR	
10532201	8.50				-99.99	0.00			
10532301	8.28	5.24	NaOH	1N	0.38	0.00	15	NR	Used to raise pH to 8.5; vial on shaker overnight; pH filtrate = 8.51
10532501	6.95				-99.99	0.00			

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TREATABILITY SAMPLE #	pH BEFORE REAG. 3	SAMPLE WGT(g)	REAGENT 3	CONC(%WGT) REAG. 3	AMT OF REAG. 3	DOSE REAG. 3	TIME OF REAG. 3	TURBIDITY OF REAG. 3	COMMENT
10532801	7.64	5.24	Na2OSiO2	10	85.00	1.62	5	NR	Put on shaker overnight; pH of filtrate = 8.53; soln. above blk precip. is trouble (not clear)
10533001	7.61				-99.99	0.00			
10533201	7.77				-99.99	0.00			
10534601	-99.99				-99.99	0.00			
10534701	-99.99				-99.99	0.00			
10536001	-99.99				-99.99	0.00			
10536101	-99.99				-99.99	0.00			
10537401	9.00				-99.99	0.00			
10537402	9.07				-99.99	0.00			
10537403	-99.99				-99.99	0.00			
10537404	9.09				-99.99	0.00			
10537405	9.51				-99.99	0.00			
10537406	10.01				-99.99	0.00			
10537407	6.03				-99.99	0.00			
10537408	6.85				-99.99	0.00			
10537409	6.88				-99.99	0.00			
10537410	-99.99				-99.99	0.00			
10537411	-99.99				-99.99	0.00			
10537412	-99.99				-99.99	0.00			
10537413	-99.99				-99.99	0.00			
10537414	8.68				-99.99	0.00			
10537415	8.57				-99.99	0.00			
10537416	9.23				-99.99	0.00			
10537417	10.25				-99.99	0.00			
10537418	10.20				-99.99	0.00			
10537419	11.20				-99.99	0.00			
10537420	9.30				-99.99	0.00			
10537421	10.32				-99.99	0.00			
10537501	8.85				-99.99	0.00			
10537502	8.86				-99.99	0.00			
10537503	9.12				-99.99	0.00			
10537504	6.18				-99.99	0.00			
10537505	3.70	20.73	NaOH	25	0.03	0.00	48		
10537506	9.25				-99.99	0.00			
10537507	5.21				-99.99	0.00			
10537508	5.26				-99.99	0.00			

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REAGENT ADDITION DATA (PART 5 OF 6)

TREATABILITY SAMPLE #	pH BEFORE REAG. 4	SAMPLE WGT(g)	REAGENT 4	CONC(%WGT) REAG. 4	AMT OF REAG. 4	DOSE REAG. 4	TIME OF REAG. 4	TURBIDITY OF REAG. 4	COMMENT
10401301	-99.99				-99.99	0.00			
10402101	-99.99				-99.99	0.00			
10402201	-99.99				-99.99	0.00			
10402401	-99.99				-99.99	0.00			
10403201	-99.99			0.0	-99.99	0.00		0.0	
10403301	-99.99			0.0	-99.99	0.00		0.0	
10403401	-99.99			0.0	-99.99	0.00		0.0	
10403501	-99.99			0.0	-99.99	0.00		0.0	
10404001	-99.99			0.0	-99.99	0.00		0.0	
10404101	-99.99			0.0	-99.99	0.00		0.0	
10404102	-99.99			0.0	-99.99	0.00		0.0	
10404201	-99.99			0.0	-99.99	0.00		0.0	
10404301	-99.99			0.0	-99.99	0.00		0.0	
10404701	-99.99			0.0	-99.99	0.00		0.0	
10404801	-99.99			0.0	-99.99	0.00		0.0	
10404901	-99.99			0.0	-99.99	0.00		0.0	
10405001	-99.99			0.0	-99.99	0.00		0.0	
10405101	-99.99			0.0	-99.99	0.00		0.0	
10405201	-99.99			0.0	-99.99	0.00		0.0	
10405301	-99.99			0.0	-99.99	0.00		0.0	
10405401	-99.99			0.0	-99.99	0.00		0.0	
10406101	-99.99			0.0	-99.99	0.00		0.0	
10406201	-99.99			0.0	-99.99	0.00		0.0	
10406301	-99.99			0.0	-99.99	0.00		0.0	
10406601	-99.99			0.0	-99.99	0.00		0.0	
10406701	-99.99				-99.99	0.00			
10406702	-99.99				-99.99	0.00			
10407001	-99.99				-99.99	0.00			
10407101	-99.99				-99.99	0.00			
10407201	-99.99				-99.99	0.00			
10407202	-99.99				-99.99	0.00			
10407901	-99.99				-99.99	0.00			
10408001	-99.99				-99.99	0.00			
10408101	-99.99				-99.99	0.00			
10408401	-99.99				-99.99	0.00			
10408501	-99.99				-99.99	0.00			
10408502	-99.99				-99.99	0.00			
10408801	-99.99				-99.99	0.00			
10530101	-99.99				-99.99	0.00			
10530201	-99.99				-99.99	0.00			
10530701	-99.99				-99.99	0.00			
10530801	9.18				-99.99	0.00			
10530901	7.82				-99.99	0.00			
10531301	-99.99				-99.99	0.00			
10531401	-99.99				-99.99	0.00			
10531601	-99.99				-99.99	0.00			
10531901	10.99				-99.99	0.00			
10532001	7.14				-99.99	0.00			
10532201	-99.99				-99.99	0.00			
10532301	8.53				-99.99	0.00			
10532501	-99.99				-99.99	0.00			

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TREATABILITY SAMPLE #	pH BEFORE REAG. 4	SAMPLE WGT(g)	REAGENT 4	CONC(%WGT) REAG. 4	AMT OF REAG. 4	DOSE REAG. 4	TIME OF REAG. 4	TURBIDITY OF REAG. 4	COMMENT
10532801	7.82				-99.99	0.00			
10533001	-99.99				-99.99	0.00			
10533201	-99.99				-99.99	0.00			
10534601	-99.99				-99.99	0.00			
10534701	-99.99				-99.99	0.00			
10536001	-99.99				-99.99	0.00			
10536101	-99.99				-99.99	0.00			
10537401	-99.99				-99.99	0.00			
10537402	-99.99				-99.99	0.00			
10537403	-99.99				-99.99	0.00			
10537404	-99.99				-99.99	0.00			
10537405	-99.99				-99.99	0.00			
10537406	-99.99				-99.99	0.00			
10537407	-99.99				-99.99	0.00			
10537408	-99.99				-99.99	0.00			
10537409	-99.99				-99.99	0.00			
10537410	-99.99				-99.99	0.00			
10537411	-99.99				-99.99	0.00			
10537412	-99.99				-99.99	0.00			
10537413	-99.99				-99.99	0.00			
10537414	-99.99				-99.99	0.00			
10537415	-99.99				-99.99	0.00			
10537416	-99.99				-99.99	0.00			
10537417	-99.99				-99.99	0.00			
10537418	-99.99				-99.99	0.00			
10537419	-99.99				-99.99	0.00			
10537420	-99.99				-99.99	0.00			
10537421	-99.99				-99.99	0.00			
10537501	-99.99				-99.99	0.00			
10537502	-99.99				-99.99	0.00			
10537503	-99.99				-99.99	0.00			
10537504	-99.99				-99.99	0.00			
10537505	6.12				-99.99	0.00			
10537506	-99.99				-99.99	0.00			
10537507	-99.99				-99.99	0.00			
10537508	-99.99				-99.99	0.00			

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REAGENT ADDITION DATA (PART 6 OF 6)

TREATABILITY SAMPLE #	ALPHA SOLID	BETA SOLID	ALPHA LIQUID	BETA LIQUID	LEAD	URANIUM
10401301	-99.99	-99.99	-99.99	-99.99	21.90	-99.99
10402101	-99.99	-99.99	-99.99	-99.99	7.22	-99.99
10402201	-99.99	-99.99	-99.99	-99.99	8.32	-99.99
10402401	-99.99	-99.99	-99.99	-99.99	479.00	-99.99
10403201	-99.99	-99.99	-99.99	-99.99	7.86	5.90
10403301	-99.99	-99.99	-99.99	-99.99	12.70	-99.99
10403401	-99.99	-99.99	-99.99	-99.99	< 2.50	-99.99
10403501	-99.99	-99.99	-99.99	-99.99	< 2.50	0.15
10404001	-99.99	-99.99	-99.99	-99.99	8.82	-99.99
10404101	-99.99	-99.99	-99.99	-99.99	14.20	8.53
10404102	-99.99	-99.99	-99.99	-99.99	9.57	8.34
10404201	-99.99	-99.99	-99.99	-99.99	3.88	-99.99
10404301	-99.99	-99.99	-99.99	-99.99	< 2.50	-99.99
10404701	-99.99	-99.99	-99.99	-99.99	194.00	1.87
10404801	-99.99	-99.99	-99.99	-99.99	60.30	-99.99
10404901	-99.99	-99.99	-99.99	-99.99	276.00	14.58
10405001	-99.99	-99.99	-99.99	-99.99	328.00	0.57
10405101	-99.99	-99.99	-99.99	-99.99	199.00	0.78
10405201	-99.99	-99.99	-99.99	-99.99	184.00	3.67
10405301	-99.99	-99.99	-99.99	-99.99	203.00	14.77
10405401	-99.99	-99.99	-99.99	-99.99	302.00	11.70
10406101	-99.99	-99.99	-99.99	-99.99	6.83	-99.99
10406201	-99.99	-99.99	-99.99	-99.99	7.45	0.83
10406301	-99.99	-99.99	-99.99	-99.99	3.11	-99.99
10406601	-99.99	-99.99	-99.99	-99.99	10.30	-99.99
10406701	-99.99	-99.99	-99.99	-99.99	11.80	2.74
10406702	-99.99	-99.99	-99.99	-99.99	12.20	-99.99
10407001	-99.99	-99.99	-99.99	-99.99	76.70	8.63
10407101	-99.99	-99.99	-99.99	-99.99	25.90	-99.99
10407201	-99.99	-99.99	-99.99	-99.99	266.00	0.12
10407202	-99.99	-99.99	-99.99	-99.99	21.20	-99.99
10407901	-99.99	-99.99	-99.99	-99.99	209.00	0.94
10408001	-99.99	-99.99	-99.99	-99.99	216.00	6.90
10408101	-99.99	-99.99	-99.99	-99.99	321.00	0.45
10408401	-99.99	-99.99	-99.99	-99.99	116.00	-99.99
10408501	-99.99	-99.99	-99.99	-99.99	204.00	7.78
10408502	-99.99	-99.99	-99.99	-99.99	< 1.25	-99.99
10408801	-99.99	-99.99	-99.99	-99.99	110.00	0.17
10530101	-99.99	-99.99	-99.99	-99.99	16.50	8.20
10530201	-99.99	-99.99	-99.99	-99.99	8.21	8.46
10530701	-99.99	-99.99	-99.99	-99.99	8.89	0.16
10530801	-99.99	-99.99	-99.99	-99.99	10.30	-99.99
10530901	-99.99	-99.99	-99.99	-99.99	4.03	-99.99
10531301	-99.99	-99.99	-99.99	-99.99	7.48	6.48
10531401	-99.99	-99.99	-99.99	-99.99	13.30	-99.99
10531601	-99.99	-99.99	-99.99	-99.99	< 2.50	-99.99
10531901	-99.99	-99.99	-99.99	-99.99	12.60	-99.99
10532001	-99.99	-99.99	-99.99	-99.99	2.71	0.67
10532201	-99.99	-99.99	-99.99	-99.99	184.00	0.14
10532301	-99.99	-99.99	-99.99	-99.99	35.10	-99.99
10532501	-99.99	-99.99	-99.99	-99.99	274.00	10.65

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TREATABILITY SAMPLE #	ALPHA SOLID	BETA SOLID	ALPHA LIQUID	BETA LIQUID	LEAD	URANIUM
10532801	-99.99	-99.99	-99.99	-99.99	202.00	0.28
10533001	-99.99	-99.99	-99.99	-99.99	306.00	-99.99
10533201	-99.99	-99.99	-99.99	-99.99	177.00	0.11
10534601	-99.99	-99.99	-99.99	-99.99	9.42	-99.99
10534701	-99.99	-99.99	-99.99	-99.99	1.58	-99.99
10536001	-99.99	-99.99	-99.99	-99.99	67.06	0.19
10536101	-99.99	-99.99	-99.99	-99.99	104.10	0.36
10537401	-99.99	-99.99	-99.99	-99.99	420.00	1.46
10537402	-99.99	-99.99	-99.99	-99.99	< 0.72	1.11
10537403	-99.99	-99.99	-99.99	-99.99	222.00	ND
10537404	-99.99	-99.99	-99.99	-99.99	276.00	0.51
10537405	-99.99	-99.99	-99.99	-99.99	271.00	0.87
10537406	-99.99	-99.99	-99.99	-99.99	244.00	1.36
10537407	-99.99	-99.99	-99.99	-99.99	< 0.73	ND
10537408	-99.99	-99.99	-99.99	-99.99	< 0.73	ND
10537409	-99.99	-99.99	-99.99	-99.99	< 0.73	0.76
10537410	-99.99	-99.99	-99.99	-99.99	< 0.70	0.19
10537411	-99.99	-99.99	-99.99	-99.99	< 0.71	ND
10537412	-99.99	-99.99	-99.99	-99.99	2.76	ND
10537413	-99.99	-99.99	-99.99	-99.99	2.84	ND
10537414	-99.99	-99.99	-99.99	-99.99	< 0.71	0.78
10537415	-99.99	-99.99	-99.99	-99.99	< 0.71	0.24
10537416	-99.99	-99.99	-99.99	-99.99	12.90	0.13
10537417	-99.99	-99.99	-99.99	-99.99	11.90	1.36
10537418	-99.99	-99.99	-99.99	-99.99	12.20	1.28
10537419	-99.99	-99.99	-99.99	-99.99	14.40	1.27
10537420	-99.99	-99.99	-99.99	-99.99	< 0.71	ND
10537421	-99.99	-99.99	-99.99	-99.99	< 0.71	ND
10537501	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10537502	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10537503	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10537504	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10537505	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10537506	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10537507	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99
10537508	-99.99	-99.99	-99.99	-99.99	-99.99	-99.99

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Time and Temperature

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EXTRACTION STUDIES DATA (PART 1 OF 2)

BOOK #	PAGE #	SAMPLE #	FERNALD #	SILO #	STUDY	RUN #	TIME (hrs)	TEMP (deg C)	# OF EXT.	# OF RINS.	SAMPLE SIZE(g)	REACTION VESSEL (size/type)	EXTRACT LIQ/SOLID RATIO(wt)	RINSE LIQ/SOLID RATIO(wt)	PROCESS STEP	DESCRIPTION
1032	46	1	100058	1	Homogeneity											Feed
1032	46	1	100058	1	Homogeneity											Feed
1032	46	1	100058	1	Homogeneity											Feed
1032	46	2	100073	2	Homogeneity											Feed
1032	46	2	100073	2	Homogeneity											Feed
1032	46	2	100073	2	Homogeneity											Feed
1032	48	1	100058	1	Time/Temperature	1	7	80	1		4	25ml tube	4:1		2	EDTA(0.8M)
1032	48	2	100058	2	Time/Temperature	2	7	80	1		4	25ml tube	4:1		2	EDTA(0.8M)
1032	48	1	100073	1	Time/Temperature	3	24	80	1		4	25ml tube	4:1		2	EDTA(0.8M)
1032	48	2	100073	2	Time/Temperature	4	24	80	1		4	25ml tube	4:1		2	EDTA(0.8M)
1032	60	11	100058	1	Time/Temperature	5	1	80	2	3	4	25ml tube	4:1	4:1	2	EDTA(0.8M)
1032	60	21	100073	2	Time/Temperature	6	1	80	2	3	4	25ml tube	4:1	4:1	2	EDTA(0.8M)
1032	60	31	100058	1	Time/Temperature	7	7	80	2	3	4	25ml tube	4:1	4:1	2	EDTA(0.8M)
1032	60	41	100073	2	Time/Temperature	8	7	80	2	3	4	25ml tube	4:1	4:1	2	EDTA(0.8M)
1032	60	51	100058	1	Time/Temperature	9	1	20	2	3	4	25ml tube	4:1	4:1	2	EDTA(0.8M)
1032	60	61	100073	2	Time/Temperature	10	1	20	2	3	4	25ml tube	4:1	4:1	2	EDTA(0.8M)
1032	60	71	100058	1	Time/Temperature	11	7	20	2	3	4	25ml tube	4:1	4:1	2	EDTA(0.8M)
1032	60	81	100073	2	Time/Temperature	12	7	20	2	3	4	25ml tube	4:1	4:1	2	EDTA(0.8M)
1032	61	11	100058	1	Time/Temperature	13	4	50	2	3	4	25ml tube	4:1	4:1	2	EDTA(0.8M)
1032	61	21	100073	2	Time/Temperature	14	4	50	2	3	4	25ml tube	4:1	4:1	2	EDTA(0.8M)
1032	60	12	100058	1	Time/Temperature	5	1	80	2	3	4	25ml tube	4:1	4:1	3	EDTA(0.8M)
1032	60	22	100073	2	Time/Temperature	6	1	80	2	3	4	25ml tube	4:1	4:1	3	EDTA(0.8M)
1032	60	32	100058	1	Time/Temperature	7	7	80	2	3	4	25ml tube	4:1	4:1	3	EDTA(0.8M)
1032	60	42	100073	2	Time/Temperature	8	7	80	2	3	4	25ml tube	4:1	4:1	3	EDTA(0.8M)
1032	60	52	100058	1	Time/Temperature	9	1	20	2	3	4	25ml tube	4:1	4:1	3	EDTA(0.8M)
1032	60	62	100073	2	Time/Temperature	10	1	20	2	3	4	25ml tube	4:1	4:1	3	EDTA(0.8M)
1032	60	72	100058	1	Time/Temperature	11	7	20	2	3	4	25ml tube	4:1	4:1	3	EDTA(0.8M)
1032	60	82	100073	2	Time/Temperature	12	7	20	2	3	4	25ml tube	4:1	4:1	3	EDTA(0.8M)
1032	61	12	100058	1	Time/Temperature	13	4	50	2	3	4	25ml tube	4:1	4:1	3	EDTA(0.8M)
1032	61	22	100073	2	Time/Temperature	14	4	50	2	3	4	25ml tube	4:1	4:1	3	EDTA(0.8M)
1032	60	10	100058	1	Time/Temperature	5	16	80	2	3	4	25ml tube	4:1	4:1	1	KCL(15%)
1032	60	20	100073	2	Time/Temperature	6	16	80	2	3	4	25ml tube	4:1	4:1	1	KCL(15%)
1032	60	30	100058	1	Time/Temperature	7	16	80	2	3	4	25ml tube	4:1	4:1	1	KCL(15%)
1032	60	40	100073	2	Time/Temperature	8	16	80	2	3	4	25ml tube	4:1	4:1	1	KCL(15%)
1032	60	50	100058	1	Time/Temperature	9	16	20	2	3	4	25ml tube	4:1	4:1	1	KCL(15%)
1032	60	60	100073	2	Time/Temperature	10	16	20	2	3	4	25ml tube	4:1	4:1	1	KCL(15%)
1032	60	70	100058	1	Time/Temperature	11	16	20	2	3	4	25ml tube	4:1	4:1	1	KCL(15%)
1032	60	80	100073	2	Time/Temperature	12	16	20	2	3	4	25ml tube	4:1	4:1	1	KCL(15%)
1032	61	10	100058	1	Time/Temperature	13	16	50	2	3	4	25ml tube	4:1	4:1	1	KCL(15%)
1032	61	20	100073	2	Time/Temperature	14	16	50	2	3	4	25ml tube	4:1	4:1	1	KCL(15%)
1032	60	1	100058	1	Time/Temperature	5	1	80	2	3	4	25ml tube	4:1	4:1		Resid.Soli
1032	60	2	100073	2	Time/Temperature	6	1	80	2	3	4	25ml tube	4:1	4:1		Resid.Soli
1032	60	3	100058	1	Time/Temperature	7	7	80	2	3	4	25ml tube	4:1	4:1		Resid.Soli
1032	60	4	100073	2	Time/Temperature	8	7	80	2	3	4	25ml tube	4:1	4:1		Resid.Soli
1032	60	5	100058	1	Time/Temperature	9	1	20	2	3	4	25ml tube	4:1	4:1		Resid.Soli
1032	60	6	100073	2	Time/Temperature	10	1	20	2	3	4	25ml tube	4:1	4:1		Resid.Soli
1032	60	7	100058	1	Time/Temperature	11	7	20	2	3	4	25ml tube	4:1	4:1		Resid.Soli
1032	60	8	100073	2	Time/Temperature	12	7	20	2	3	4	25ml tube	4:1	4:1		Resid.Soli
1032	61	1	100058	1	Time/Temperature	13	4	50	2	3	4	25ml tube	4:1	4:1		Resid.Soli
1032	61	2	100073	2	Time/Temperature	14	4	50	2	3	4	25ml tube	4:1	4:1		Resid.Soli

BOOK #	PAGE #	SAMPLE #	FERNALD #	SILO #	STUDY	RUN #	TIME (hrs)	TEMP (deg C)	# OF EXT.	# OF RINS.	SAMPLE SIZE(g)	REACTION VESSEL (size/type)	EXTRACT LIQ/SOLID RATIO(wt)	RINSE LIQ/SOLID RATIO(wt)	PROCESS STEP	DESCRIPTION
1032	62	0	100058	1	Time/Temperature	15	16	80	6	10	50	1L kettle	4:1	2:1	1	KCL(15%)
1032	62	1	100058	1	Time/Temperature	15	4	80	6	10	50	1L kettle	4:1	2:1	2	EDTA(0.8M)
1032	62	2	100058	1	Time/Temperature	15	4	80	6	10	50	1L kettle	4:1	2:1	3	EDTA(0.8M)
1032	62	3	100058	1	Time/Temperature	15	4	80	6	10	50	1L kettle	4:1	2:1	4	EDTA(0.8M)
1032	62	4	100058	1	Time/Temperature	15	4	80	6	10	50	1L kettle	4:1	2:1	5	EDTA(0.8M)
1032	62	5	100058	1	Time/Temperature	15	4	80	6	10	50	1L kettle	4:1	2:1	6	EDTA(0.8M)
1032	62	6	100058	1	Time/Temperature	15	4	80	6	10	50	1L kettle	4:1	2:1	7	EDTA(0.8M)
1032	62	7	100058	1	Time/Temperature	15	4	80	6	10	50	1L kettle	4:1	2:1		Resid.Soli
1032	62	10	100073	2	Time/Temperature	16	16	80	6	10	50	1L kettle	4:1	2:1	1	KCL(15%)
1032	62	11	100073	2	Time/Temperature	16	4	80	6	10	50	1L kettle	4:1	2:1	2	EDTA(0.8M)
1032	62	12	100073	2	Time/Temperature	16	4	80	6	10	50	1L kettle	4:1	2:1	3	EDTA(0.8M)
1032	62	13	100073	2	Time/Temperature	16	4	80	6	10	50	1L kettle	4:1	2:1	4	EDTA(0.8M)
1032	62	14	100073	2	Time/Temperature	16	4	80	6	10	50	1L kettle	4:1	2:1	5	EDTA(0.8M)
1032	62	15	100073	2	Time/Temperature	16	4	80	6	10	50	1L kettle	4:1	2:1	6	EDTA(0.8M)
1032	62	16	100073	2	Time/Temperature	16	4	80	6	10	50	1L kettle	4:1	2:1	7	EDTA(0.8M)
1032	62	17	100073	2	Time/Temperature	16	4	80	6	10	50	1L kettle	4:1	2:1		Resid.Soli
1032	63	1	100058	1	Washing Study	15	0.3	20	6	10	50	1L kettle	4:1	2:1	1	H2O rinse
1032	63	2	100058	1	Washing Study	15	0.3	20	6	10	50	1L kettle	4:1	2:1	2	H2O rinse
1032	63	3	100058	1	Washing Study	15	0.3	20	6	10	50	1L kettle	4:1	2:1	3	H2O rinse
1032	63	4	100058	1	Washing Study	15	0.3	20	6	10	50	1L kettle	4:1	2:1	4	H2O rinse
1032	63	5	100058	1	Washing Study	15	0.3	20	6	10	50	1L kettle	4:1	2:1	5	H2O rinse
1032	63	6	100058	1	Washing Study	15	0.3	20	6	10	50	1L kettle	4:1	2:1	6	H2O rinse
1032	63	7	100058	1	Washing Study	15	0.3	20	6	10	50	1L kettle	4:1	2:1	7	H2O rinse
1032	63	8	100058	1	Washing Study	15	0.3	20	6	10	50	1L kettle	4:1	2:1	8	H2O rinse
1032	63	9	100058	1	Washing Study	15	0.3	20	6	10	50	1L kettle	4:1	2:1	9	H2O rinse
1032	63	10	100058	1	Washing Study	15	0.3	20	6	10	50	1L kettle	4:1	2:1	10	H2O rinse
1032	63	11	100073	2	Washing Study	16	0.3	20	6	10	50	1L kettle	4:1	2:1	1	H2O rinse
1032	63	12	100073	2	Washing Study	16	0.3	20	6	10	50	1L kettle	4:1	2:1	2	H2O rinse
1032	63	13	100073	2	Washing Study	16	0.3	20	6	10	50	1L kettle	4:1	2:1	3	H2O rinse
1032	63	14	100073	2	Washing Study	16	0.3	20	6	10	50	1L kettle	4:1	2:1	4	H2O rinse
1032	63	15	100073	2	Washing Study	16	0.3	20	6	10	50	1L kettle	4:1	2:1	5	H2O rinse
1032	63	16	100073	2	Washing Study	16	0.3	20	6	10	50	1L kettle	4:1	2:1	6	H2O rinse
1032	63	17	100073	2	Washing Study	16	0.3	20	6	10	50	1L kettle	4:1	2:1	7	H2O rinse
1032	63	18	100073	2	Washing Study	16	0.3	20	6	10	50	1L kettle	4:1	2:1	8	H2O rinse
1032	63	19	100073	2	Washing Study	16	0.3	20	6	10	50	1L kettle	4:1	2:1	9	H2O rinse
1032	63	20	100073	2	Washing Study	16	0.3	20	6	10	50	1L kettle	4:1	2:1	10	H2O rinse

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EXTRACTION STUDIES DATA (PART 2 OF 2)

BOOK #	PAGE #	SAMPLE #	FERNALD #	STUDY	PB-ICP (ppm)	TH-ICP (ppm)	U-ICP (ppm)	U-IC (ppm)	GROSS ALPHA (uCi/g)	GROSS BETA (uCi/g)
1032	46	1	100058	Homogeneity	57340	58.4	689.0	697	2.26E+00	8.44E-01
1032	46	1	100058	Homogeneity	47180	52.9	644.0	668	2.09E+00	7.60E-01
1032	46	1	100058	Homogeneity	49130	59.7	704.0	681	2.03E+00	7.63E-01
1032	46	2	100073	Homogeneity	30730	69.4	1643.0	1335	1.10E+00	4.13E-01
1032	46	2	100073	Homogeneity	31500	72.7	2051.0	1313	1.15E+00	4.38E-01
1032	46	2	100073	Homogeneity	30410	66.1	1400.0	1340	1.15E+00	4.06E-01
1032	48	1	100058	Time/Temperature	11200	1.3	30.1	39		
1032	48	2	100058	Time/Temperature	5908	6.5	88.9	117		
1032	48	1	100073	Time/Temperature	10940	2.1	57.1	72		
1032	48	2	100073	Time/Temperature	5764	7.6	48.9	64		
1032	60	11	100058	Time/Temperature	11310	1.6	39.4	42	2.90E-02	2.14E-02
1032	60	21	100073	Time/Temperature	6320	7.0	105.5	114	2.85E-02	2.14E-02
1032	60	31	100058	Time/Temperature	11550	1.7	50.2	52	3.93E-02	3.75E-02
1032	60	41	100073	Time/Temperature	6320	7.2	126.2	127	3.40E-02	2.42E-02
1032	60	51	100058	Time/Temperature	11925	1.9	53.3	48	2.47E-02	2.65E-02
1032	60	61	100073	Time/Temperature	5790	7.5	114.8	120	2.20E-02	1.93E-02
1032	60	71	100058	Time/Temperature	11830	1.9	57.8	60	3.11E-02	2.71E-02
1032	60	81	100073	Time/Temperature	6005	8.2	132.0	138	3.75E-02	2.32E-02
1032	61	11	100058	Time/Temperature	11545	2.5	67.2	76	4.80E-02	3.34E-02
1032	61	21	100073	Time/Temperature	5985	8.4	140.9	148	3.97E-02	2.41E-02
1032	60	12	100058	Time/Temperature	2423	0.2	5.8	14	1.88E-02	1.23E-02
1032	60	22	100073	Time/Temperature	1253	0.9	12.5	11	1.07E-02	7.00E-03
1032	60	32	100058	Time/Temperature	2692	0.3	5.7	5	1.41E-02	1.35E-02
1032	60	42	100073	Time/Temperature	1228	1.6	18.4	16	1.40E-02	7.71E-03
1032	60	52	100058	Time/Temperature	2524	0.3	10.3	9	1.12E-02	9.24E-03
1032	60	62	100073	Time/Temperature	1337	1.2	21.6	21	6.75E-03	5.59E-03
1032	60	72	100058	Time/Temperature	2739	0.4	14.6	15	2.34E-02	1.42E-02
1032	60	82	100073	Time/Temperature	1422	1.3	26.8	25	1.19E-02	8.06E-03
1032	61	12	100058	Time/Temperature	2821	0.5	19.7	19	2.27E-02	1.41E-02
1032	61	22	100073	Time/Temperature	1408	1.5	34.8	32	1.20E-02	7.43E-03
1032	60	10	100058	Time/Temperature	-999	-999.0	-999.0	4	2.97E-04	1.54E-04
1032	60	20	100073	Time/Temperature	-999	-999.0	-999.0	11	8.33E-07	8.50E-05
1032	60	30	100058	Time/Temperature	2	0.1	4.5	4	1.84E-04	1.30E-04
1032	60	40	100073	Time/Temperature	2	0.0	7.6	12	9.22E-07	9.02E-05
1032	60	50	100058	Time/Temperature	13	0.0	0.4	0	1.33E-04	1.43E-04
1032	60	60	100073	Time/Temperature	9	0.1	1.1	1	9.12E-05	1.03E-04
1032	60	70	100058	Time/Temperature	-999	-999.0	-999.0	0	9.94E-05	1.23E-04
1032	60	80	100073	Time/Temperature	-999	-999.0	-999.0	1	8.12E-05	9.46E-05
1032	61	10	100058	Time/Temperature	42	0.0	0.2	0	1.56E-04	1.97E-04
1032	61	20	100073	Time/Temperature	33	0.0	0.4	1	1.48E-04	2.14E-04
1032	60	1	100058	Time/Temperature	2662	102.2	676.2	575	6.65E-01	2.50E-01
1032	60	2	100073	Time/Temperature	1785	94.4	1452.0	1392	2.13E-01	6.71E-02
1032	60	3	100058	Time/Temperature	1412	99.4	419.9	414	8.07E-01	3.13E-01
1032	60	4	100073	Time/Temperature	1134	94.1	899.5	751	2.00E-01	6.00E-02
1032	60	5	100058	Time/Temperature	4630	95.1	610.4	599	1.10E+00	3.94E-01
1032	60	6	100073	Time/Temperature	4097	89.1	1323.0	1239	3.53E-01	1.10E-01
1032	60	7	100058	Time/Temperature	4091	102.8	582.3	428	5.18E-01	2.31E-01
1032	60	8	100073	Time/Temperature	3667	96.9	1384.0	931	2.37E-01	5.80E-02
1032	61	1	100058	Time/Temperature	3087	91.2	428.6	373	6.52E-01	1.98E-01
1032	61	2	100073	Time/Temperature	2131	71.4	857.2	790	3.02E-01	5.73E-02
1032	62	0	100058	Time/Temperature	19	0.0	0.3	3	4.39E-02	3.96E-02

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BOOK #	PAGE #	SAMPLE #	FERNALD #	STUDY	PB-ICP (ppm)	TH-ICP (ppm)	U-ICP (ppm)	U-IC (ppm)	GROSS ALPHA (uCi/g)	GROSS BETA (uCi/g)
1032	62	1	100058	Time/Temperature	13110	0.8	25.4	32	1.59E-02	1.33E-02
1032	62	2	100058	Time/Temperature	2790	0.3	9.5	11	2.82E-02	1.55E-02
1032	62	3	100058	Time/Temperature	589	0.1	1.6	6	2.23E-02	1.45E-02
1032	62	4	100058	Time/Temperature	223	0.3	3.2	3	1.70E-02	1.26E-02
1032	62	5	100058	Time/Temperature	98	0.1	1.0	3	8.55E-03	5.55E-03
1032	62	6	100058	Time/Temperature	38	0.1	1.0	1	1.48E-03	9.84E-04
1032	62	7	100058	Time/Temperature	348	124.0	470.3	456	1.12E-01	3.36E-02
1032	62	10	100073	Time/Temperature	31	0.0	0.5	0	1.10E-04	1.40E-04
1032	62	11	100073	Time/Temperature	7055	5.0	97.3	99	2.99E-02	2.74E-02
1032	62	12	100073	Time/Temperature	1532	1.4	32.1	31	1.65E-02	1.20E-02
1032	62	13	100073	Time/Temperature	346	0.4	5.8	11	1.78E-03	1.21E-03
1032	62	14	100073	Time/Temperature	115	0.4	4.2	6	1.84E-03	1.31E-03
1032	62	15	100073	Time/Temperature	60	0.4	3.3	4	1.28E-03	7.86E-04
1032	62	16	100073	Time/Temperature	29	0.2	2.8	2	6.22E-04	3.40E-04
1032	62	17	100073	Time/Temperature	422	90.2	1405.0	758	6.36E-02	1.87E-02
1032	63	1	100058	Washing Study	10	0.2	2.5	2	1.05E-03	3.96E-04
1032	63	2	100058	Washing Study	7	0.3	5.5	3	6.62E-04	2.00E-04
1032	63	3	100058	Washing Study	6	0.3	7.9	7	7.41E-04	1.88E-04
1032	63	4	100058	Washing Study	4	0.3	6.0	5	6.36E-04	1.64E-04
1032	63	5	100058	Washing Study	4	0.5	4.3	3	9.07E-04	2.24E-04
1032	63	6	100058	Washing Study	3	0.7	2.9	3	9.51E-04	2.68E-04
1032	63	7	100058	Washing Study	5	0.6	4.1	3	1.10E-03	3.12E-04
1032	63	8	100058	Washing Study	2	0.5	1.5	1	7.79E-04	2.10E-04
1032	63	9	100058	Washing Study	2	0.5	1.3	1	8.07E-04	2.29E-04
1032	63	10	100058	Washing Study	2	0.4	0.3	1	5.18E-04	1.85E-04
1032	63	11	100073	Washing Study	5	0.2	1.2	2	2.70E-04	1.29E-04
1032	63	12	100073	Washing Study	4	0.4	7.9	7	3.63E-04	7.78E-05
1032	63	13	100073	Washing Study	4	0.6	10.8	10	3.37E-04	8.22E-05
1032	63	14	100073	Washing Study	4	0.9	8.6	8	5.53E-04	1.31E-04
1032	63	15	100073	Washing Study	3	1.5	7.4	7	4.69E-04	1.65E-04
1032	63	16	100073	Washing Study	3	1.4	5.6	5	4.98E-04	1.53E-04
1032	63	17	100073	Washing Study	13	1.7	19.2	17	1.00E-03	2.28E-04
1032	63	18	100073	Washing Study	2	1.0	3.7	2	3.61E-04	1.28E-04
1032	63	19	100073	Washing Study	2	0.6	2.4	2	3.05E-04	1.01E-04
1032	63	20	100073	Washing Study	1	0.6	1.4	2	2.39E-04	8.58E-05

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Vitrification

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OU-4 VITRIFICATION

GENERAL SAMPLE INFORMATION (PART 1 OF 2)

COMP. SAMPLE	FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC SAMPLE #	COMMENT
Y	75391	10504101	0	SILO 1-NITRIC ACID METALS EXTRACTION EVAPORATED LEACHATE RESIDUE
Y	75392	10504102	0	SILO 2-NITRIC ACID METALS EXTRACTION EVAPORATED LEACHATE RESIDUE
Y	75393	10504401	0	SILO 1 & 2-PRECIPITATE FROM EDTA/KCL AND NITRIC ACID EXTRACTIONS LEACHATE
Y	75395	10679604	0	1.4 G NAOH INCLUDED IN COMPOSITE

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OU-4 VITRIFICATION

GENERAL SAMPLE INFORMATION (PART 2 OF 2)

COMP. SAMPLE	FERNALD SAMPLE #	TREATABILITY SAMPLE #	FERNALD #1 FLYASH	FERNALD #2 FLYASH	MTCLP SAMPLE #	PCT SAMPLE #
Y	75391	10504101			10504501	10504504
Y	75392	10504102			10504502	10504505
Y	75393	10504401			10504503	10504506
Y	75395	10679604				

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OU-4 VITRIFICATION
FORMULATION INFORMATION (PART 1 OF 4)

FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC #	COMMENT	AMT OF WASTE(g)	AMT OF SOIL(g)	AMT OF SITE FLYASH	AMT OF Na2CO3
75391	10504101	0	SILO 1-NITRIC ACID LEACHATE RESIDUE	3	0	2.8	0.0
75392	10504102	0	SILO 2-NITRIC ACID LEACHATE RESIDUE	7	0	7.2	0.0
75393	10504401	0	METALS EXTRACTION PRECIPITATE	5	5	0.0	0.0
75395	10679604	0	1.4 g NaOH INCLUDED IN COMPOSITE	95	0	95.4	16.8

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OU-4 VITRIFICATION
FORMULATION INFORMATION (PART 2 OF 4)

FERNALD SAMPLE #	TREATABILITY SAMPLE #	ETDC #	GENERAL DESCRIPTION	TIMES AT TEMPERATURE RANGES AMB.->750 C	750 C	750 C->1250 C	1250 C	1250 C->AMB.
75391	10504101	0		0.0	0.0	0.0	0.0	0.0
75392	10504102	0		0.0	0.0	0.0	0.0	0.0
75393	10504401	0		0.0	0.0	0.0	0.0	0.0
75395	10679604	0		0.0	0.0	0.0	0.0	0.0

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OU-4 VITRIFICATION
FORMULATION INFORMATION (PART 3 OF 4)

TREATABILITY SAMPLE #	NORMALIZED WASTE	NORMALIZED FLYASH	NORMALIZED SOIL	NORMALIZED NA. CARBONATE	NORMALIZED NA. CARBONATE AS NA2O
10504101	100	100	0	0	0
10504102	100	100	0	0	0
10504401	100	0	102	0	0
10679604	100	100	0	18	0

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OU-4 VITRIFICATION
FORMULATION INFORMATION (PART 4 OF 4)

TREATABILITY SAMPLE #	% OF WASTE	% OF FLYASH	% OF SOIL	% OF SODIUM
10504101	50.0	50.0	0.0	0.0
10504102	50.0	50.0	0.0	0.0
10504401	49.5	0.0	50.5	0.0
10679604	46.0	46.0	0.0	8.1

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OU-4 VITRIFICATION
ETDC ANALYTICAL INFORMATION (PART 1 OF 5)

TREATABILITY SAMPLE #	COMMENT	PCT GROSS ALPHA(dpm)	PCT GROSS ALPHA(pCi/l)	PCT GROSS BETA(dpm)	PCT GROSS BETA(pCi/l)	MTCLP GROSS ALPHA(dpm)	MTCLP GROSS ALPHA(pCi/l)	MTCLP GROSS BETA(dpm)	MTCLP GROSS BETA(pCi/l)
10504101		-99.9	-99.9	-99.9	-99.9	-99.90	-99.9	-99.9	-99.9
10504102		-99.9	-99.9	-99.9	-99.9	-99.90	-99.9	-99.9	-99.9
10504401		-99.9	-99.9	-99.9	-99.9	-99.90	-99.9	-99.9	-99.9
10679604		-99.9	-99.9	-99.9	-99.9	-99.90	-99.9	-99.9	-99.9

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OU-4 VITRIFICATION
ETDC ANALYTICAL INFORMATION (PART 2 OF 5)

TREATABILITY SAMPLE #	PCT URANIUM(ppm)	MTCLP URANIUM(ppm)	PCT CHLORIDE	PCT NITRATE	PCT SULFATE	MOISTURE CONTENT OF WASTE	BULK DENSITY RAW WASTE	BULK DENSITY TREATED WASTE	BULKING FACTOR
10504101	-100.0	-100.0				92.1	-99.9	-99.9	95.80
10504102	-100.0	-100.0				90.7	-99.9	-99.9	90.70
10504401	-100.0	-100.0				80.0	-99.9	-99.9	99.10
10679604	-100.0	-100.0				-99.9	-99.9	-99.9	-99.90

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OU-4 VITRIFICATION
ETDC ANALYTICAL INFORMATION (PART 3 OF 5)

TREATABILITY SAMPLE #	FINAL WEIGHT OF VITRIFIED MATERIAL	DENSITY OF VIT. WASTE	WT. OF GLASS FOR MTCLP	WT. OF GLASS FOR TCLP	SIZE FRACTION FOR MTCLP	WT. OF GLASS GROUND FOR PCT	WT. OF GLASS > 150 MICRONS	WT. OF GLASS 75-150 MICRONS	WT. OF GLASS < 75 MICRONS
10504101	4.8	2.6	-99.9	-99.9	-99.9999	0.0	-99.9	-99.9	-99.9
10504102	12.2	2.7	-99.9	-99.9	-999.99	0.0	-99.9	-99.9	-99.9
10504401	8.3	3.2	-99.9	-99.9	-99.9999	0.0	-99.9	-99.9	-99.9
10679604	153.9	3.2	-99.9	-99.9					

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OU-4 VITRIFICATION
ETDC ANALYTICAL INFORMATION (PART 4 OF 5)

TREATABILITY SAMPLE #	pH OF LEACHATE	FLOURIDE CONC. OF LEACHATE	WEIGHT OF GLASS AND VOLUME OF H20 IN EACH CONTAINER FOR PCT						GROSS WEIGHTS OF GLASS					
			WT. #1	VOL #1	WT. #2	VOL #2	WT. #3	VOL #3	INITIAL #1	FINAL #1	INITIAL #2	FINAL #2	INITIAL #3	FINAL #3
10504101	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9
10504102	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9
10504401	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9
10679604	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9	-99.9

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OU-4 VITRIFICATION
ETDC ANALYTICAL INFORMATION (PART 5 OF 5)

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TREATABILITY SAMPLE #	COMMENT	DESCRIPTION
10504101		
10504102		
10504401		
10679604		

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OU-4 VITRIFICATION
MTCLP METALS

TREATABILITY SAMPLE #	ARSENIC	SILVER	BARIUM	CADMIUM	CHROMIUM	LEAD	SELENIUM	URANIUM

APPENDIX C

LABORATORY QUALIFIERS

Organic Qualifiers

U = Indicates compound was analyzed for but not detected.

J = Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.

B = This flag is used when the analyte is found in the associated blank as well as the sample. It indicates possible/probable blank contamination.

E = This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis. If one or more compounds had a response greater than full scale, the sample or extract was diluted and reanalyzed. The diluted sample is identified by a "D" suffix appended to the sample number.

F = Estimated value due to a confirmed compound which is off-scale in both columns.

D = This flag is used for all compounds identified in the analysis at a secondary dilution factor.

X = A flag that FORMASTER III CLP software automatically inserts to indicate that the data was entered manually.

NA = Analysis not performed for this analyte.

LABORATORY QUALIFIERS (Continued)

Inorganic Qualifiers

Concentration Qualifiers

B = Reported value was obtained from a reading that was less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit.

U = Indicates compound was analyzed for but not detected.

Quality Qualifiers

E = The reported value is estimated because of the presence of interference.

N = Spiked sample recovery not within control limits.

W = Post-digestion spike for furnace AA analysis is not out of control limits (85 to 115%), while sample absorbance is less than 50% of spike absorbance.

* = Duplicate analysis not within control limits.

+ = Correlation coefficient for the MSA is less than 0.955.

S = The reported value was determined by the Method of Standard Additions.

VALIDATION QUALIFIER CODES

Codes related to Identification:

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

(No Code) = Confirmed identification.

[IDL is defined as the lowest measurable quantity above that of random noise multiplied times a factor of two (2)]

R = Results unusable. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. Resampling and reanalysis are necessary.

N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

Codes Related to Quantitation:

J = Analyte present. Reported value may not be accurate or precise.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

Codes Related to Radiochemical Samples:

J = Analyte present. Reported value may not be accurate or precise. Qualifier is applied where:

- Calculated total uranium value is outside the acceptance limits.
- Calculated percent enrichment value is outside the acceptance limits.
- Calculated U-234 to U-238 activity is outside the acceptance limits.

R = Result unusable. Analyte may or may not be present in the sample. Qualifier is applied where QC data not located or where QC data exceeds control limits. Supporting data necessary to confirm result. Resampling and reanalysis are necessary.

TABLE C-1, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 1

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Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100047	10563100	Silo 1 Zone A	Aluminum	0.8060		mg/L	-
100047	10563100	Silo 1 Zone A	Antimony	0.0300	U	mg/L	-
100047	10563100	Silo 1 Zone A	Arsenic	0.0020	U	mg/L	-
100047	10563100	Silo 1 Zone A	Barium	0.8040	E	mg/L	-
100047	10563100	Silo 1 Zone A	Beryllium	0.0020	U	mg/L	-
100047	10563100	Silo 1 Zone A	Boron	0.1740		mg/L	-
100047	10563100	Silo 1 Zone A	Cadmium	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Calcium	590.00		mg/L	-
100047	10563100	Silo 1 Zone A	Chromium	0.0619		mg/L	-
100047	10563100	Silo 1 Zone A	Cobalt	0.0100	U	mg/L	-
100047	10563100	Silo 1 Zone A	Copper	0.0100	U	mg/L	-
100047	10563100	Silo 1 Zone A	Iron	0.0266	B	mg/L	-
100047	10563100	Silo 1 Zone A	Lead	0.1830	*	mg/L	J
100047	10563100	Silo 1 Zone A	Lithium	0.1720		mg/L	-
100047	10563100	Silo 1 Zone A	Magnesium	0.4740	B	mg/L	-
100047	10563100	Silo 1 Zone A	Manganese	0.0100	U	mg/L	-
100047	10563100	Silo 1 Zone A	Mercury	0.0002	U	mg/L	-
100047	10563100	Silo 1 Zone A	Molybdenum	12.700	E	mg/L	-
100047	10563100	Silo 1 Zone A	Nickel	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Potassium	31.400		mg/L	-
100047	10563100	Silo 1 Zone A	Selenium	0.1010	S	mg/L	J
100047	10563100	Silo 1 Zone A	Silicon	6.5300		mg/L	-
100047	10563100	Silo 1 Zone A	Silver	0.0100	U	mg/L	-
100047	10563100	Silo 1 Zone A	Thallium	0.0020	U	mg/L	-
100047	10563100	Silo 1 Zone A	Vanadium	0.0114	B	mg/L	-
100047	10563100	Silo 1 Zone A	Zinc	0.0120	B	mg/L	-
100047	10563300	Silo 1 Zone A	Aluminum	0.8660		mg/L	-
100047	10563300	Silo 1 Zone A	Antimony	0.0464	B	mg/L	-
100047	10563300	Silo 1 Zone A	Arsenic	0.0020	U	mg/L	-
100047	10563300	Silo 1 Zone A	Barium	0.8830	E	mg/L	-
100047	10563300	Silo 1 Zone A	Beryllium	0.0020	U	mg/L	-
100047	10563300	Silo 1 Zone A	Boron	0.1960		mg/L	-
100047	10563300	Silo 1 Zone A	Cadmium	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Calcium	650.00		mg/L	-
100047	10563300	Silo 1 Zone A	Chromium	0.0637		mg/L	-
100047	10563300	Silo 1 Zone A	Cobalt	0.0100	U	mg/L	-
100047	10563300	Silo 1 Zone A	Copper	0.0100	U	mg/L	-
100047	10563300	Silo 1 Zone A	Iron	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Lead	0.0887	*	mg/L	J
100047	10563300	Silo 1 Zone A	Lithium	0.1860		mg/L	-
100047	10563300	Silo 1 Zone A	Magnesium	0.4690	B	mg/L	-
100047	10563300	Silo 1 Zone A	Manganese	0.0100	U	mg/L	-
100047	10563300	Silo 1 Zone A	Mercury	0.0002	U	mg/L	-
100047	10563300	Silo 1 Zone A	Molybdenum	13.700	E	mg/L	-
100047	10563300	Silo 1 Zone A	Nickel	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Potassium	35.100		mg/L	-
100047	10563300	Silo 1 Zone A	Selenium	0.0998	S	mg/L	J
100047	10563300	Silo 1 Zone A	Silicon	6.9900		mg/L	-
100047	10563300	Silo 1 Zone A	Silver	0.0100	U	mg/L	-
100047	10563300	Silo 1 Zone A	Thallium	0.0020	UW	mg/L	-
100047	10563300	Silo 1 Zone A	Vanadium	0.0134	B	mg/L	-
100047	10563300	Silo 1 Zone A	Zinc	0.0207		mg/L	-
100047	10563100	Silo 1 Zone A	Phenol	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	2-Chlorophenol	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	1,3-Dichlorobenzene	0.0200	U	mg/L	-

TABLE C-1, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 1

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100047	10563100	Silo 1 Zone A	1,4-Dichlorobenzene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Benzyl Alcohol	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	1,2-Dichlorobenzene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	2-Methylphenol	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	4-Methylphenol	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Hexachloroethane	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Nitrobenzene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Isophorone	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	2-Nitrophenol	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	2,4-Dimethylphenol	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Benzoic Acid	0.1000	U	mg/L	-
100047	10563100	Silo 1 Zone A	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	2,4-Dichlorophenol	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Naphthalene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	4-Chloroaniline	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Hexachlorobutadiene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	2-Methylnaphthalene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
100047	10563100	Silo 1 Zone A	2-Chloronaphthalene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	2-Nitroaniline	0.1000	U	mg/L	-
100047	10563100	Silo 1 Zone A	Dimethyl Phthalate	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Acenaphthylene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	2,6-Dinitrotoluene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	3-Nitroaniline	0.1000	U	mg/L	-
100047	10563100	Silo 1 Zone A	Acenaphthene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	2,4-Dinitrophenol	0.1000	U	mg/L	-
100047	10563100	Silo 1 Zone A	4-Nitrophenol	0.1000	U	mg/L	-
100047	10563100	Silo 1 Zone A	Dibenzofuran	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	2,4-Dinitrotoluene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Diethylphthalate	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Fluorene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	4-Nitroaniline	0.1000	U	mg/L	-
100047	10563100	Silo 1 Zone A	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
100047	10563100	Silo 1 Zone A	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Tributyl phosphate	0.2500		mg/L	-
100047	10563100	Silo 1 Zone A	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Hexachlorobenzene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Pentachlorophenol	0.1000	U	mg/L	-
100047	10563100	Silo 1 Zone A	Phenanthrene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Anthracene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Carbazole	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Di-n-Butylphthalate	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Fluoranthene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Pyrene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Butylbenzylphthalate	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
100047	10563100	Silo 1 Zone A	Benzo(a)Anthracene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Chrysene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-

TABLE C-1, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 1

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100047	10563100	Silo 1 Zone A	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Benzo(a)Pyrene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Phenol	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	2-Chlorophenol	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	1,3-Dichlorobenzene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	1,4-Dichlorobenzene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Benzyl Alcohol	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	1,2-Dichlorobenzene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	2-Methylphenol	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	4-Methylphenol	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Hexachloroethane	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Nitrobenzene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Isophorone	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	2-Nitrophenol	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	2,4-Dimethylphenol	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Benzoic Acid	0.0040	J	mg/L	-
100047	10563300	Silo 1 Zone A	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	2,4-Dichlorophenol	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Naphthalene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	4-Chloroaniline	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Hexachlorobutadiene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	2-Methylnaphthalene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
100047	10563300	Silo 1 Zone A	2-Chloronaphthalene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	2-Nitroaniline	0.1000	U	mg/L	-
100047	10563300	Silo 1 Zone A	Dimethyl Phthalate	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Acenaphthylene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	2,6-Dinitrotoluene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	3-Nitroaniline	0.1000	U	mg/L	-
100047	10563300	Silo 1 Zone A	Acenaphthene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	2,4-Dinitrophenol	0.1000	U	mg/L	-
100047	10563300	Silo 1 Zone A	4-Nitrophenol	0.1000	U	mg/L	-
100047	10563300	Silo 1 Zone A	Dibenzofuran	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	2,4-Dinitrotoluene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Diethylphthalate	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Fluorene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	4-Nitroaniline	0.1000	U	mg/L	-
100047	10563300	Silo 1 Zone A	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
100047	10563300	Silo 1 Zone A	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Tributyl phosphate	0.2600		mg/L	-
100047	10563300	Silo 1 Zone A	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Hexachlorobenzene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Pentachlorophenol	0.1000	U	mg/L	-

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100047	10563300	Silo 1 Zone A	Phenanthrene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Anthracene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Carbazole	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Di-n-Butylphthalate	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Fluoranthene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Pyrene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Butylbenzylphthalate	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
100047	10563300	Silo 1 Zone A	Benzo(a)Anthracene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Chrysene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Benzo(a)Pyrene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
100047	10563300	Silo 1 Zone A	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-
100047	10563100	Silo 1 Zone A	1,1-Dichloroethane	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	1,1-Dichloroethene	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	1,1,1-Trichloroethane	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	1,1,2-Trichloroethane	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	1,2-Dichloroethane	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	1,2-Dichloropropane	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	2-Butanone	0.0100	U	mg/L	-
100047	10563100	Silo 1 Zone A	2-Hexanone	0.0100	U	mg/L	-
100047	10563100	Silo 1 Zone A	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
100047	10563100	Silo 1 Zone A	Acetone	0.0110	B	mg/L	U
100047	10563100	Silo 1 Zone A	Benzene	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Bromodichloromethane	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Bromoform	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Bromomethane	0.0100	U	mg/L	-
100047	10563100	Silo 1 Zone A	Carbon Disulfide	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Carbon Tetrachloride	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Chlorobenzene	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Chloroethane	0.0100	U	mg/L	-
100047	10563100	Silo 1 Zone A	Chloroform	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Chloromethane	0.0100	U	mg/L	-
100047	10563100	Silo 1 Zone A	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Dibromochloromethane	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Ethylbenzene	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Methylene Chloride	0.0330	B	mg/L	U
100047	10563100	Silo 1 Zone A	Styrene	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Tetrachloroethene	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Toluene	0.0050	BJ	mg/L	U
100047	10563100	Silo 1 Zone A	Total Xylenes	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Trichloroethene	0.0050	U	mg/L	-
100047	10563100	Silo 1 Zone A	Vinyl Acetate	0.0100	U	mg/L	-
100047	10563100	Silo 1 Zone A	Vinyl Chloride	0.0100	U	mg/L	-
100047	10563300	Silo 1 Zone A	1,1-Dichloroethane	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	1,1-Dichloroethene	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	1,1,1-Trichloroethane	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	1,1,2-Trichloroethane	0.0050	U	mg/L	-

TABLE C-1, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 1

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100047	10563300	Silo 1 Zone A	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	1,2-Dichloroethane	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	1,2-Dichloropropane	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	2-Butanone	0.0030	J	mg/L	-
100047	10563300	Silo 1 Zone A	2-Hexanone	0.0100	U	mg/L	-
100047	10563300	Silo 1 Zone A	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
100047	10563300	Silo 1 Zone A	Acetone	0.0170		mg/L	-
100047	10563300	Silo 1 Zone A	Benzene	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Bromodichloromethane	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Bromoform	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Bromomethane	0.0100	U	mg/L	-
100047	10563300	Silo 1 Zone A	Carbon Disulfide	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Carbon Tetrachloride	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Chlorobenzene	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Chloroethane	0.0100	U	mg/L	-
100047	10563300	Silo 1 Zone A	Chloroform	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Dibromochloromethane	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Ethylbenzene	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Methylene Chloride	0.0300	B	mg/L	U
100047	10563300	Silo 1 Zone A	Styrene	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Tetrachloroethene	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Toluene	0.0050	BJ	mg/L	U
100047	10563300	Silo 1 Zone A	Total Xylenes	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Trichloroethene	0.0050	U	mg/L	-
100047	10563300	Silo 1 Zone A	Vinyl Acetate	0.0100	U	mg/L	-
100047	10563300	Silo 1 Zone A	Vinyl Chloride	0.0100	U	mg/L	-
100047	10563300	Silo 1 Zone A	Chloromethane	0.0100	U	mg/L	-
100048	10563500	Silo 1 Zone B	1,1-Dichloroethane	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	1,1-Dichloroethene	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	1,1,1-Trichloroethane	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	1,1,2-Trichloroethane	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	1,2-Dichloroethane	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	1,2-Dichloropropane	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	2-Butanone	0.0100	U	mg/L	-
100048	10563500	Silo 1 Zone B	2-Hexanone	0.0100	U	mg/L	-
100048	10563500	Silo 1 Zone B	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
100048	10563500	Silo 1 Zone B	Acetone	0.0120	B	mg/L	U
100048	10563500	Silo 1 Zone B	Benzene	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Bromodichloromethane	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Bromoform	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Bromomethane	0.0100	U	mg/L	-
100048	10563500	Silo 1 Zone B	Carbon Disulfide	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Carbon Tetrachloride	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Chlorobenzene	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Chloroethane	0.0100	U	mg/L	-
100048	10563500	Silo 1 Zone B	Chloroform	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Chloromethane	0.0100	U	mg/L	-
100048	10563500	Silo 1 Zone B	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Dibromochloromethane	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Ethylbenzene	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Methylene Chloride	0.0410	B	mg/L	U

TABLE C-1, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 1

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100048	10563500	Silo 1 Zone B	Styrene	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Tetrachloroethene	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Toluene	0.0050	BJ	mg/L	U
100048	10563500	Silo 1 Zone B	Total Xylenes	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Trichloroethene	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Vinyl Acetate	0.0100	U	mg/L	-
100048	10563500	Silo 1 Zone B	Vinyl Chloride	0.0100	U	mg/L	-
100048	10563500	Silo 1 Zone B	Aluminum	0.4400		mg/L	-
100048	10563500	Silo 1 Zone B	Antimony	0.0466	B	mg/L	-
100048	10563500	Silo 1 Zone B	Arsenic	0.0020	U	mg/L	-
100048	10563500	Silo 1 Zone B	Barium	0.7460	E	mg/L	-
100048	10563500	Silo 1 Zone B	Beryllium	0.0020	U	mg/L	-
100048	10563500	Silo 1 Zone B	Boron	0.2150		mg/L	-
100048	10563500	Silo 1 Zone B	Cadmium	0.0050	U	mg/L	-
100048	10563500	Silo 1 Zone B	Calcium	599.00		mg/L	-
100048	10563500	Silo 1 Zone B	Chromium	0.0613		mg/L	-
100048	10563500	Silo 1 Zone B	Cobalt	0.0100	U	mg/L	-
100048	10563500	Silo 1 Zone B	Copper	0.0100	U	mg/L	-
100048	10563500	Silo 1 Zone B	Iron	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Lead	0.0244	S*	mg/L	J
100048	10563500	Silo 1 Zone B	Lithium	0.2040		mg/L	-
100048	10563500	Silo 1 Zone B	Magnesium	0.4990	B	mg/L	-
100048	10563500	Silo 1 Zone B	Manganese	0.0100	U	mg/L	-
100048	10563500	Silo 1 Zone B	Mercury	0.0002	U	mg/L	-
100048	10563500	Silo 1 Zone B	Molybdenum	14.300	E	mg/L	-
100048	10563500	Silo 1 Zone B	Nickel	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Potassium	33.400		mg/L	-
100048	10563500	Silo 1 Zone B	Selenium	0.1770		mg/L	J
100048	10563500	Silo 1 Zone B	Silicon	10.900		mg/L	-
100048	10563500	Silo 1 Zone B	Silver	0.0100	U	mg/L	-
100048	10563500	Silo 1 Zone B	Thallium	0.0020	UW	mg/L	-
100048	10563500	Silo 1 Zone B	Vanadium	0.0228	B	mg/L	-
100048	10563500	Silo 1 Zone B	Zinc	0.0199	B	mg/L	-
100048	10563500	Silo 1 Zone B	Phenol	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	2-Chlorophenol	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	1,3-Dichlorobenzene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	1,4-Dichlorobenzene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Benzyl Alcohol	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	1,2-Dichlorobenzene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	2-Methylphenol	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	4-Methylphenol	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Hexachloroethane	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Nitrobenzene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Isophorone	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	2-Nitrophenol	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	2,4-Dimethylphenol	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Benzoic Acid	0.0040	J	mg/L	-
100048	10563500	Silo 1 Zone B	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	2,4-Dichlorophenol	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Naphthalene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	4-Chloroaniline	0.0200	U	mg/L	-

TABLE C-1, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 1

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100048	10563500	Silo 1 Zone B	Hexachlorobutadiene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	2-Methylnaphthalene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
100048	10563500	Silo 1 Zone B	2-Chloronaphthalene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	2-Nitroaniline	0.1000	U	mg/L	-
100048	10563500	Silo 1 Zone B	Dimethyl Phthalate	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Acenaphthylene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	2,6-Dinitrotoluene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	3-Nitroaniline	0.1000	U	mg/L	-
100048	10563500	Silo 1 Zone B	Acenaphthene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	2,4-Dinitrophenol	0.1000	U	mg/L	-
100048	10563500	Silo 1 Zone B	4-Nitrophenol	0.1000	U	mg/L	-
100048	10563500	Silo 1 Zone B	Dibenzofuran	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	2,4-Dinitrotoluene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Diethylphthalate	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Fluorene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	4-Nitroaniline	0.1000	U	mg/L	-
100048	10563500	Silo 1 Zone B	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
100048	10563500	Silo 1 Zone B	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Tributyl phosphate	0.0180	J	mg/L	-
100048	10563500	Silo 1 Zone B	4-Bromophenyl-phenylether	0.0200	U'	mg/L	-
100048	10563500	Silo 1 Zone B	Hexachlorobenzene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Pentachlorophenol	0.1000	U	mg/L	-
100048	10563500	Silo 1 Zone B	Phenanthrene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Anthracene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Carbazole	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Di-n-Butylphthalate	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Fluoranthene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Pyrene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Butylbenzylphthalate	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
100048	10563500	Silo 1 Zone B	Benzo(a)Anthracene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Chrysene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Benzo(a)Pyrene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
100048	10563500	Silo 1 Zone B	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	Aluminum	0.4800		mg/L	-
100049	10563700	Silo 1 Zone C	Antimony	0.0394	B	mg/L	-
100049	10563700	Silo 1 Zone C	Arsenic	0.0020	U	mg/L	-
100049	10563700	Silo 1 Zone C	Barium	0.4400	E	mg/L	-
100049	10563700	Silo 1 Zone C	Beryllium	0.0020	U	mg/L	-
100049	10563700	Silo 1 Zone C	Boron	0.1700		mg/L	-
100049	10563700	Silo 1 Zone C	Cadmium	0.0050	U	mg/L	-
100049	10563700	Silo 1 Zone C	Calcium	549.00		mg/L	-
100049	10563700	Silo 1 Zone C	Chromium	0.0633		mg/L	-
100049	10563700	Silo 1 Zone C	Cobalt	0.0100	U	mg/L	-
100049	10563700	Silo 1 Zone C	Copper	0.0100	U	mg/L	-

TABLE C-1, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 1

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100049	10563700	Silo 1 Zone C	Iron	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	Lead	0.0894	*	mg/L	J
100049	10563700	Silo 1 Zone C	Lithium	0.2500		mg/L	-
100049	10563700	Silo 1 Zone C	Magnesium	0.4450	B	mg/L	-
100049	10563700	Silo 1 Zone C	Manganese	0.0100	U	mg/L	-
100049	10563700	Silo 1 Zone C	Mercury	0.0002	U	mg/L	-
100049	10563700	Silo 1 Zone C	Molybdenum	10.300	E	mg/L	-
100049	10563700	Silo 1 Zone C	Nickel	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	Potassium	35.700		mg/L	-
100049	10563700	Silo 1 Zone C	Selenium	0.2260		mg/L	J
100049	10563700	Silo 1 Zone C	Silicon	9.4000		mg/L	-
100049	10563700	Silo 1 Zone C	Silver	0.0100	U	mg/L	-
100049	10563700	Silo 1 Zone C	Thallium	0.0020	UW	mg/L	-
100049	10563700	Silo 1 Zone C	Vanadium	0.0167	B	mg/L	-
100049	10563700	Silo 1 Zone C	Zinc	0.0142	B	mg/L	-
100049	10563700	Silo 1 Zone C	Phenol	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	2-Chlorophenol	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	1,3-Dichlorobenzene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	1,4-Dichlorobenzene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	Benzyl Alcohol	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	1,2-Dichlorobenzene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	2-Methylphenol	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	4-Methylphenol	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	Hexachloroethane	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	Nitrobenzene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	Isophorone	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	2-Nitrophenol	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	2,4-Dimethylphenol	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	Benzoic Acid	0.1000	U	mg/L	-
100049	10563700	Silo 1 Zone C	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	2,4-Dichlorophenol	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	Naphthalene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	4-Chloroaniline	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	Hexachlorobutadiene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	2-Methylnaphthalene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
100049	10563700	Silo 1 Zone C	2-Chloronaphthalene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	2-Nitroaniline	0.1000	U	mg/L	-
100049	10563700	Silo 1 Zone C	Dimethyl Phthalate	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	Acenaphthylene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	2,6-Dinitrotoluene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	3-Nitroaniline	0.1000	U	mg/L	-
100049	10563700	Silo 1 Zone C	Acenaphthene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	2,4-Dinitrophenol	0.1000	U	mg/L	-
100049	10563700	Silo 1 Zone C	4-Nitrophenol	0.1000	U	mg/L	-
100049	10563700	Silo 1 Zone C	Dibenzofuran	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	2,4-Dinitrotoluene	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	Diethylphthalate	0.0200	U	mg/L	-
100049	10563700	Silo 1 Zone C	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-

TABLE C-2, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
075304	10565100	Silo 1 Zone A	Phenol	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	2-Chlorophenol	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	1,3-Dichlorobenzene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	1,4-Dichlorobenzene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Benzyl Alcohol	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	1,2-Dichlorobenzene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	2-Methylphenol	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	4-Methylphenol	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Hexachloroethane	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Nitrobenzene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Isophorone	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	2-Nitrophenol	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	2,4-Dimethylphenol	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Benzoic Acid	0.1000	U	mg/L	-
075304	10565100	Silo 1 Zone A	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	2,4-Dichlorophenol	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Naphthalene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	4-Chloroaniline	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Hexachlorobutadiene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	2-Methylnaphthalene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
075304	10565100	Silo 1 Zone A	2-Chloronaphthalene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	2-Nitroaniline	0.1000	U	mg/L	-
075304	10565100	Silo 1 Zone A	Dimethyl Phthalate	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Acenaphthylene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	2,6-Dinitrotoluene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	3-Nitroaniline	0.1000	U	mg/L	-
075304	10565100	Silo 1 Zone A	Acenaphthene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	2,4-Dinitrophenol	0.1000	U	mg/L	-
075304	10565100	Silo 1 Zone A	4-Nitrophenol	0.1000	U	mg/L	-
075304	10565100	Silo 1 Zone A	Dibenzofuran	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	2,4-Dinitrotoluene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Diethylphthalate	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Fluorene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	4-Nitroaniline	0.1000	U	mg/L	-
075304	10565100	Silo 1 Zone A	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
075304	10565100	Silo 1 Zone A	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Tributyl phosphate	0.1900		mg/L	-
075304	10565100	Silo 1 Zone A	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Hexachlorobenzene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Pentachlorophenol	0.1000	U	mg/L	-
075304	10565100	Silo 1 Zone A	Phenanthrene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Anthracene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Carbazole	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Di-n-Butylphthalate	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Fluoranthene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Pyrene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Butylbenzylphthalate	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
075304	10565100	Silo 1 Zone A	Benzo(a)Anthracene	0.0200	U	mg/L	-

TABLE C-2, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
075304	10565100	Silo 1 Zone A	Chrysene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Benzo(a)Pyrene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	1,1-Dichloroethane	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	1,1-Dichloroethene	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	1,1,1-Trichloroethane	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	1,1,2-Trichloroethane	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	1,2-Dichloroethane	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	1,2-Dichloropropane	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	2-Butanone	0.0100	U	mg/L	-
075304	10565100	Silo 1 Zone A	2-Hexanone	0.0100	U	mg/L	-
075304	10565100	Silo 1 Zone A	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
075304	10565100	Silo 1 Zone A	Acetone	0.0240		mg/L	-
075304	10565100	Silo 1 Zone A	Benzene	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Bromodichloromethane	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Bromoform	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Bromomethane	0.0100	U	mg/L	-
075304	10565100	Silo 1 Zone A	Carbon Disulfide	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Carbon Tetrachloride	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Chlorobenzene	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Chloroethane	0.0100	U	mg/L	-
075304	10565100	Silo 1 Zone A	Chloroform	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Chloromethane	0.0100	U	mg/L	-
075304	10565100	Silo 1 Zone A	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Dibromochloromethane	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Ethylbenzene	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Methylene Chloride	0.0290	B	mg/L	U
075304	10565100	Silo 1 Zone A	Styrene	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Tetrachloroethene	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Toluene	0.0050	BJ	mg/L	U
075304	10565100	Silo 1 Zone A	Total Xylenes	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Trichloroethene	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Vinyl Acetate	0.0100	U	mg/L	-
075304	10565100	Silo 1 Zone A	Vinyl Chloride	0.0100	U	mg/L	-
075304	10565100	Silo 1 Zone A	Aluminum	0.7120		mg/L	-
075304	10565100	Silo 1 Zone A	Antimony	0.0525	B	mg/L	-
075304	10565100	Silo 1 Zone A	Arsenic	0.0020	U	mg/L	-
075304	10565100	Silo 1 Zone A	Barium	0.6820	E	mg/L	-
075304	10565100	Silo 1 Zone A	Beryllium	0.0020	U	mg/L	-
075304	10565100	Silo 1 Zone A	Boron	0.1430		mg/L	-
075304	10565100	Silo 1 Zone A	Cadmium	0.0050	U	mg/L	-
075304	10565100	Silo 1 Zone A	Calcium	635.00		mg/L	-
075304	10565100	Silo 1 Zone A	Chromium	0.0100	U	mg/L	-
075304	10565100	Silo 1 Zone A	Cobalt	0.0100	U	mg/L	-
075304	10565100	Silo 1 Zone A	Copper	0.0100	U	mg/L	-
075304	10565100	Silo 1 Zone A	Iron	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Lead	0.1060	*	mg/L	J
075304	10565100	Silo 1 Zone A	Lithium	0.2130		mg/L	-
075304	10565100	Silo 1 Zone A	Magnesium	0.4480	B	mg/L	-

TABLE C-2, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 2

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Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
075304	10565100	Silo 1 Zone A	Manganese	0.0100	U	mg/L	-
075304	10565100	Silo 1 Zone A	Mercury	0.0002	U	mg/L	-
075304	10565100	Silo 1 Zone A	Molybdenum	11.400	E	mg/L	-
075304	10565100	Silo 1 Zone A	Nickel	0.0200	U	mg/L	-
075304	10565100	Silo 1 Zone A	Potassium	29.000		mg/L	-
075304	10565100	Silo 1 Zone A	Selenium	0.0991	S	mg/L	J
075304	10565100	Silo 1 Zone A	Silicon	7.0400		mg/L	-
075304	10565100	Silo 1 Zone A	Silver	0.0100	U	mg/L	-
075304	10565100	Silo 1 Zone A	Thallium	0.0020	U	mg/L	-
075304	10565100	Silo 1 Zone A	Vanadium	0.0125	B	mg/L	-
075304	10565100	Silo 1 Zone A	Zinc	0.0155	B	mg/L	-
075305	10565300	Silo 1 Zone B	Aluminum	0.2910		mg/L	-
075305	10565300	Silo 1 Zone B	Antimony	0.0396	B	mg/L	-
075305	10565300	Silo 1 Zone B	Arsenic	0.0020	U	mg/L	-
075305	10565300	Silo 1 Zone B	Barium	0.7060	E	mg/L	-
075305	10565300	Silo 1 Zone B	Beryllium	0.0020	U	mg/L	-
075305	10565300	Silo 1 Zone B	Boron	0.1790		mg/L	-
075305	10565300	Silo 1 Zone B	Cadmium	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Calcium	586.00		mg/L	-
075305	10565300	Silo 1 Zone B	Chromium	0.0100	U	mg/L	-
075305	10565300	Silo 1 Zone B	Cobalt	0.0100	U	mg/L	-
075305	10565300	Silo 1 Zone B	Copper	0.0100	U	mg/L	-
075305	10565300	Silo 1 Zone B	Iron	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Lead	0.0072	W*	mg/L	J
075305	10565300	Silo 1 Zone B	Lithium	0.1970		mg/L	-
075305	10565300	Silo 1 Zone B	Magnesium	0.5210	B	mg/L	-
075305	10565300	Silo 1 Zone B	Manganese	0.0100	U	mg/L	-
075305	10565300	Silo 1 Zone B	Mercury	0.0002	U	mg/L	-
075305	10565300	Silo 1 Zone B	Molybdenum	11.500	E	mg/L	-
075305	10565300	Silo 1 Zone B	Nickel	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Potassium	27.600		mg/L	-
075305	10565300	Silo 1 Zone B	Selenium	0.1460		mg/L	J
075305	10565300	Silo 1 Zone B	Silicon	13.200		mg/L	-
075305	10565300	Silo 1 Zone B	Silver	0.0100	U	mg/L	-
075305	10565300	Silo 1 Zone B	Thallium	0.0020	U	mg/L	-
075305	10565300	Silo 1 Zone B	Vanadium	0.0287	B	mg/L	-
075305	10565300	Silo 1 Zone B	Zinc	0.0147	B	mg/L	-
075305	10565300	Silo 1 Zone B	Phenol	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	2-Chlorophenol	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	1,3-Dichlorobenzene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	1,4-Dichlorobenzene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Benzyl Alcohol	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	1,2-Dichlorobenzene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	2-Methylphenol	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	4-Methylphenol	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Hexachloroethane	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Nitrobenzene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Isophorone	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	2-Nitrophenol	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	2,4-Dimethylphenol	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Benzoic Acid	0.1000	U	mg/L	-
075305	10565300	Silo 1 Zone B	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	2,4-Dichlorophenol	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Naphthalene	0.0200	U	mg/L	-

TABLE C-2, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
075305	10565300	Silo 1 Zone B	4-Chloroaniline	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Hexachlorobutadiene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	2-Methylnaphthalene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
075305	10565300	Silo 1 Zone B	2-Chloronaphthalene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	2-Nitroaniline	0.1000	U	mg/L	-
075305	10565300	Silo 1 Zone B	Dimethyl Phthalate	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Acenaphthylene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	2,6-Dinitrotoluene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	3-Nitroaniline	0.1000	U	mg/L	-
075305	10565300	Silo 1 Zone B	Acenaphthene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	2,4-Dinitrophenol	0.1000	U	mg/L	-
075305	10565300	Silo 1 Zone B	4-Nitrophenol	0.1000	U	mg/L	-
075305	10565300	Silo 1 Zone B	Dibenzofuran	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	2,4-Dinitrotoluene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Diethylphthalate	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Fluorene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	4-Nitroaniline	0.1000	U	mg/L	-
075305	10565300	Silo 1 Zone B	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
075305	10565300	Silo 1 Zone B	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Tributyl phosphate	0.0210		mg/L	-
075305	10565300	Silo 1 Zone B	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Hexachlorobenzene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Pentachlorophenol	0.1000	U	mg/L	-
075305	10565300	Silo 1 Zone B	Phenanthrene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Anthracene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Carbazole	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Di-n-Butylphthalate	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Fluoranthene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Pyrene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Butylbenzylphthalate	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
075305	10565300	Silo 1 Zone B	Benzo(a)Anthracene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Chrysene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Benzo(a)Pyrene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-
075305	10565300	Silo 1 Zone B	1,1-Dichloroethane	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	1,1-Dichloroethene	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	1,1,1-Trichloroethane	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	1,1,2-Trichloroethane	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	1,2-Dichloroethane	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	1,2-Dichloropropane	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	2-Butanone	0.0100	U	mg/L	-
075305	10565300	Silo 1 Zone B	2-Hexanone	0.0100	U	mg/L	-
075305	10565300	Silo 1 Zone B	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
075305	10565300	Silo 1 Zone B	Acetone	0.0220		mg/L	-

TABLE C-2, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
075305	10565300	Silo 1 Zone B	Benzene	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Bromodichloromethane	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Bromoform	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Bromomethane	0.0100	U	mg/L	-
075305	10565300	Silo 1 Zone B	Carbon Disulfide	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Carbon Tetrachloride	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Chlorobenzene	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Chloroethane	0.0100	U	mg/L	-
075305	10565300	Silo 1 Zone B	Chloroform	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Chloromethane	0.0100	U	mg/L	-
075305	10565300	Silo 1 Zone B	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Dibromochloromethane	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Ethylbenzene	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Methylene Chloride	0.0370	B	mg/L	U
075305	10565300	Silo 1 Zone B	Styrene	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Tetrachloroethene	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Toluene	0.0050	BJ	mg/L	U
075305	10565300	Silo 1 Zone B	Total Xylenes	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Trichloroethene	0.0050	U	mg/L	-
075305	10565300	Silo 1 Zone B	Vinyl Acetate	0.0100	U	mg/L	-
075305	10565300	Silo 1 Zone B	Vinyl Chloride	0.0100	U	mg/L	-
075306	10565500	Silo 1 Zone C	Aluminum	0.2200		mg/L	-
075306	10565500	Silo 1 Zone C	Antimony	0.0347	B	mg/L	-
075306	10565500	Silo 1 Zone C	Arsenic	0.0020	U	mg/L	-
075306	10565500	Silo 1 Zone C	Barium	0.6250	E	mg/L	-
075306	10565500	Silo 1 Zone C	Beryllium	0.0020	U	mg/L	-
075306	10565500	Silo 1 Zone C	Boron	0.2170		mg/L	-
075306	10565500	Silo 1 Zone C	Cadmium	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Calcium	595.00		mg/L	-
075306	10565500	Silo 1 Zone C	Chromium	0.0100	U	mg/L	-
075306	10565500	Silo 1 Zone C	Cobalt	0.0100	U	mg/L	-
075306	10565500	Silo 1 Zone C	Copper	0.0100	U	mg/L	-
075306	10565500	Silo 1 Zone C	Iron	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Lead	0.0045	W*	mg/L	J
075306	10565500	Silo 1 Zone C	Lithium	0.1800		mg/L	-
075306	10565500	Silo 1 Zone C	Magnesium	0.6520	B	mg/L	-
075306	10565500	Silo 1 Zone C	Manganese	0.0100	U	mg/L	-
075306	10565500	Silo 1 Zone C	Mercury	0.0002	U	mg/L	-
075306	10565500	Silo 1 Zone C	Molybdenum	6.2300	E	mg/L	-
075306	10565500	Silo 1 Zone C	Nickel	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Potassium	23.700		mg/L	-
075306	10565500	Silo 1 Zone C	Selenium	0.2040		mg/L	J
075306	10565500	Silo 1 Zone C	Silicon	17.200		mg/L	-
075306	10565500	Silo 1 Zone C	Silver	0.0100	U	mg/L	-
075306	10565500	Silo 1 Zone C	Thallium	0.0020	U	mg/L	-
075306	10565500	Silo 1 Zone C	Vanadium	0.0354	B	mg/L	-
075306	10565500	Silo 1 Zone C	Zinc	0.0143	B	mg/L	-
075306	10565500	Silo 1 Zone C	Phenol	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	2-Chlorophenol	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	1,3-Dichlorobenzene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	1,4-Dichlorobenzene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Benzyl Alcohol	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	1,2-Dichlorobenzene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	2-Methylphenol	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	4-Methylphenol	0.0200	U	mg/L	-

TABLE C-2, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
075306	10565500	Silo 1 Zone C	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Hexachloroethane	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Nitrobenzene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Isophorone	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	2-Nitrophenol	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	2,4-Dimethylphenol	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Benzoic Acid	0.1000	U	mg/L	-
075306	10565500	Silo 1 Zone C	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	2,4-Dichlorophenol	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Naphthalene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	4-Chloroaniline	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Hexachlorobutadiene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	2-Methylnaphthalene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
075306	10565500	Silo 1 Zone C	2-Chloronaphthalene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	2-Nitroaniline	0.1000	U	mg/L	-
075306	10565500	Silo 1 Zone C	Dimethyl Phthalate	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Acenaphthylene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	2,6-Dinitrotoluene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	3-Nitroaniline	0.1000	U	mg/L	-
075306	10565500	Silo 1 Zone C	Acenaphthene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	2,4-Dinitrophenol	0.1000	U	mg/L	-
075306	10565500	Silo 1 Zone C	4-Nitrophenol	0.1000	U	mg/L	-
075306	10565500	Silo 1 Zone C	Dibenzofuran	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	2,4-Dinitrotoluene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Diethylphthalate	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Fluorene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	4-Nitroaniline	0.1000	U	mg/L	-
075306	10565500	Silo 1 Zone C	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
075306	10565500	Silo 1 Zone C	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Tributyl phosphate	0.0150	J	mg/L	-
075306	10565500	Silo 1 Zone C	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Hexachlorobenzene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Pentachlorophenol	0.1000	U	mg/L	-
075306	10565500	Silo 1 Zone C	Phenanthrene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Anthracene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Carbazole	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Di-n-Butylphthalate	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Fluoranthene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Pyrene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Butylbenzylphthalate	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
075306	10565500	Silo 1 Zone C	Benzo(a)Anthracene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Chrysene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Benzo(a)Pyrene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-
075306	10565500	Silo 1 Zone C	1,1-Dichloroethane	0.0050	U	mg/L	-

TABLE C-2, OU4 TREATABILITY CHEMICAL DATA FOR SILO 1, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
075306	10565500	Silo 1 Zone C	1,1-Dichloroethene	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	1,1,1-Trichloroethane	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	1,1,2-Trichloroethane	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	1,2-Dichloroethane	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	1,2-Dichloropropane	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	2-Butanone	0.0100	U	mg/L	-
075306	10565500	Silo 1 Zone C	2-Hexanone	0.0100	U	mg/L	-
075306	10565500	Silo 1 Zone C	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
075306	10565500	Silo 1 Zone C	Acetone	0.0120		mg/L	-
075306	10565500	Silo 1 Zone C	Benzene	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Bromodichloromethane	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Bromoform	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Bromomethane	0.0100	U	mg/L	-
075306	10565500	Silo 1 Zone C	Carbon Disulfide	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Carbon Tetrachloride	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Chlorobenzene	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Chloroethane	0.0100	U	mg/L	-
075306	10565500	Silo 1 Zone C	Chloroform	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Chloromethane	0.0100	U	mg/L	-
075306	10565500	Silo 1 Zone C	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Dibromochloromethane	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Ethylbenzene	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Methylene Chloride	0.0300	B	mg/L	U
075306	10565500	Silo 1 Zone C	Styrene	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Tetrachloroethene	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Toluene	0.0050	BJ	mg/L	U
075306	10565500	Silo 1 Zone C	Total Xylenes	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Trichloroethene	0.0050	U	mg/L	-
075306	10565500	Silo 1 Zone C	Vinyl Acetate	0.0100	U	mg/L	-
075306	10565500	Silo 1 Zone C	Vinyl Chloride	0.0100	U	mg/L	-

TABLE C-3. OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 1

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
075307	10565700	Silo 2 Zone A	Aluminum	0.7800		mg/L	-
075307	10565700	Silo 2 Zone A	Antimony	0.0327	B	mg/L	-
075307	10565700	Silo 2 Zone A	Arsenic	0.0067	B	mg/L	-
075307	10565700	Silo 2 Zone A	Barium	1.4400	E	mg/L	-
075307	10565700	Silo 2 Zone A	Beryllium	0.0020	U	mg/L	-
075307	10565700	Silo 2 Zone A	Boron	0.1300		mg/L	-
075307	10565700	Silo 2 Zone A	Cadmium	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Calcium	710.00		mg/L	-
075307	10565700	Silo 2 Zone A	Chromium	0.0858		mg/L	-
075307	10565700	Silo 2 Zone A	Cobalt	0.0100	U	mg/L	-
075307	10565700	Silo 2 Zone A	Copper	0.0100	U	mg/L	-
075307	10565700	Silo 2 Zone A	Iron	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Lead	0.0455	S*	mg/L	J
075307	10565700	Silo 2 Zone A	Lithium	0.2040		mg/L	-
075307	10565700	Silo 2 Zone A	Magnesium	0.4430	B	mg/L	-
075307	10565700	Silo 2 Zone A	Manganese	0.0100	U	mg/L	-
075307	10565700	Silo 2 Zone A	Mercury	0.0002	U	mg/L	-
075307	10565700	Silo 2 Zone A	Molybdenum	0.5400	E	mg/L	-
075307	10565700	Silo 2 Zone A	Nickel	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Potassium	34.800		mg/L	-
075307	10565700	Silo 2 Zone A	Selenium	0.0194	S	mg/L	J
075307	10565700	Silo 2 Zone A	Silicon	4.5100		mg/L	-
075307	10565700	Silo 2 Zone A	Silver	0.0100	U	mg/L	-
075307	10565700	Silo 2 Zone A	Thallium	0.0020	U	mg/L	-
075307	10565700	Silo 2 Zone A	Vanadium	0.0111	B	mg/L	-
075307	10565700	Silo 2 Zone A	Zinc	0.0247		mg/L	-
075307	10565900	Silo 2 Zone A	Aluminum	0.7330		mg/L	-
075307	10565900	Silo 2 Zone A	Antimony	0.0372	B	mg/L	-
075307	10565900	Silo 2 Zone A	Arsenic	0.0045	B	mg/L	-
075307	10565900	Silo 2 Zone A	Barium	1.3200	E	mg/L	-
075307	10565900	Silo 2 Zone A	Beryllium	0.0020	U	mg/L	-
075307	10565900	Silo 2 Zone A	Boron	0.1170		mg/L	-
075307	10565900	Silo 2 Zone A	Cadmium	0.0060		mg/L	-
075307	10565900	Silo 2 Zone A	Calcium	704.00		mg/L	-
075307	10565900	Silo 2 Zone A	Chromium	0.0590		mg/L	-
075307	10565900	Silo 2 Zone A	Cobalt	0.0100	U	mg/L	-
075307	10565900	Silo 2 Zone A	Copper	0.0100	U	mg/L	-
075307	10565900	Silo 2 Zone A	Iron	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Lead	0.0837	*	mg/L	J
075307	10565900	Silo 2 Zone A	Lithium	0.2210		mg/L	-
075307	10565900	Silo 2 Zone A	Magnesium	0.4400	B	mg/L	-
075307	10565900	Silo 2 Zone A	Manganese	0.0100	U	mg/L	-
075307	10565900	Silo 2 Zone A	Mercury	0.0002	U	mg/L	-
075307	10565900	Silo 2 Zone A	Molybdenum	0.4290	E	mg/L	-
075307	10565900	Silo 2 Zone A	Nickel	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Potassium	37.200		mg/L	-
075307	10565900	Silo 2 Zone A	Selenium	0.0151	S	mg/L	J
075307	10565900	Silo 2 Zone A	Silicon	3.4900		mg/L	-
075307	10565900	Silo 2 Zone A	Silver	0.0100	U	mg/L	-
075307	10565900	Silo 2 Zone A	Thallium	0.0020	U	mg/L	-
075307	10565900	Silo 2 Zone A	Vanadium	0.0100	U	mg/L	-
075307	10565900	Silo 2 Zone A	Zinc	0.0182	B	mg/L	-
075307	10565700	Silo 2 Zone A	Phenol	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	2-Chlorophenol	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	1,3-Dichlorobenzene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	1,4-Dichlorobenzene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Benzyl Alcohol	0.0200	U	mg/L	-

TABLE C-3, OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 1

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Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
075307	10565700	Silo 2 Zone A	1,2-Dichlorobenzene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	2-Methylphenol	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	4-Methylphenol	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Hexachloroethane	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Nitrobenzene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Isophorone	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	2-Nitrophenol	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	2,4-Dimethylphenol	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Benzoic Acid	0.1000	U	mg/L	-
075307	10565700	Silo 2 Zone A	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	2,4-Dichlorophenol	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Naphthalene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	4-Chloroaniline	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Hexachlorobutadiene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	2-Methylnaphthalene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
075307	10565700	Silo 2 Zone A	2-Chloronaphthalene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	2-Nitroaniline	0.1000	U	mg/L	-
075307	10565700	Silo 2 Zone A	Dimethyl Phthalate	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Acenaphthylene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	2,6-Dinitrotoluene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	3-Nitroaniline	0.1000	U	mg/L	-
075307	10565700	Silo 2 Zone A	Acenaphthene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	2,4-Dinitrophenol	0.1000	U	mg/L	-
075307	10565700	Silo 2 Zone A	4-Nitrophenol	0.1000	U	mg/L	-
075307	10565700	Silo 2 Zone A	Dibenzofuran	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	2,4-Dinitrotoluene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Diethylphthalate	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Fluorene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	4-Nitroaniline	0.1000	U	mg/L	-
075307	10565700	Silo 2 Zone A	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
075307	10565700	Silo 2 Zone A	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Tributyl phosphate	0.5400		mg/L	-
075307	10565700	Silo 2 Zone A	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Hexachlorobenzene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Pentachlorophenol	0.1000	U	mg/L	-
075307	10565700	Silo 2 Zone A	Phenanthrene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Anthracene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Carbazole	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Di-n-Butylphthalate	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Fluoranthene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Pyrene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Butylbenzylphthalate	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
075307	10565700	Silo 2 Zone A	Benzo(a)Anthracene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Chrysene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Benzo(a)Pyrene	0.0200	U	mg/L	-

TABLE C-3, OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 1

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
075307	10565700	Silo 2 Zone A	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Phenol	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	2-Chlorophenol	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	1,3-Dichlorobenzene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	1,4-Dichlorobenzene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Benzyl Alcohol	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	1,2-Dichlorobenzene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	2-Methylphenol	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	4-Methylphenol	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Hexachloroethane	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Nitrobenzene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Isophorone	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	2-Nitrophenol	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	2,4-Dimethylphenol	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Benzoic Acid	0.1000	U	mg/L	-
075307	10565900	Silo 2 Zone A	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	2,4-Dichlorophenol	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Naphthalene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	4-Chloroaniline	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Hexachlorobutadiene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	2-Methylnaphthalene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
075307	10565900	Silo 2 Zone A	2-Chloronaphthalene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	2-Nitroaniline	0.1000	U	mg/L	-
075307	10565900	Silo 2 Zone A	Dimethyl Phthalate	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Acenaphthylene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	2,6-Dinitrotoluene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	3-Nitroaniline	0.1000	U	mg/L	-
075307	10565900	Silo 2 Zone A	Acenaphthene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	2,4-Dinitrophenol	0.1000	U	mg/L	-
075307	10565900	Silo 2 Zone A	4-Nitrophenol	0.1000	U	mg/L	-
075307	10565900	Silo 2 Zone A	Dibenzofuran	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	2,4-Dinitrotoluene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Diethylphthalate	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Fluorene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	4-Nitroaniline	0.1000	U	mg/L	-
075307	10565900	Silo 2 Zone A	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
075307	10565900	Silo 2 Zone A	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Tributyl phosphate	0.6300		mg/L	-
075307	10565900	Silo 2 Zone A	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Hexachlorobenzene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Pentachlorophenol	0.1000	U	mg/L	-
075307	10565900	Silo 2 Zone A	Phenanthrene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Anthracene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Carbazole	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Di-n-Butylphthalate	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Fluoranthene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Pyrene	0.0200	U	mg/L	-

TABLE C-3, OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 1

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
075307	10565900	Silo 2 Zone A	Butylbenzylphthalate	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
075307	10565900	Silo 2 Zone A	Benzo(a)Anthracene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Chrysene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Benzo(a)Pyrene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
075307	10565900	Silo 2 Zone A	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-
075307	10565700	Silo 2 Zone A	Chloromethane	0.0100	U	mg/L	-
075307	10565900	Silo 2 Zone A	1,1-Dichloroethane	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	1,1-Dichloroethene	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	1,1,1-Trichloroethane	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	1,1,2-Trichloroethane	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	1,2-Dichloroethane	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	1,2-Dichloropropane	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	2-Butanone	0.0040	J	mg/L	-
075307	10565900	Silo 2 Zone A	2-Hexanone	0.0100	U	mg/L	-
075307	10565900	Silo 2 Zone A	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
075307	10565900	Silo 2 Zone A	Acetone	0.0260	B	mg/L	-
075307	10565900	Silo 2 Zone A	Benzene	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Bromodichloromethane	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Bromoform	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Bromomethane	0.0100	U	mg/L	-
075307	10565900	Silo 2 Zone A	Carbon Disulfide	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Carbon Tetrachloride	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Chlorobenzene	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Chloroethane	0.0100	U	mg/L	-
075307	10565900	Silo 2 Zone A	Chloroform	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Chloromethane	0.0100	U	mg/L	-
075307	10565900	Silo 2 Zone A	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Dibromochloromethane	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Ethylbenzene	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Methylene Chloride	0.0360	B	mg/L	U
075307	10565900	Silo 2 Zone A	Styrene	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Tetrachloroethene	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Toluene	0.0050	BJ	mg/L	U
075307	10565900	Silo 2 Zone A	Total Xylenes	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Trichloroethene	0.0050	U	mg/L	-
075307	10565900	Silo 2 Zone A	Vinyl Acetate	0.0100	U	mg/L	-
075307	10565900	Silo 2 Zone A	Vinyl Chloride	0.0100	U	mg/L	-
075307	10565700	Silo 2 Zone A	1,1-Dichloroethane	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	1,1-Dichloroethene	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	1,1,1-Trichloroethane	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	1,1,2-Trichloroethane	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	1,2-Dichloroethane	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	1,2-Dichloropropane	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	2-Butanone	0.0100	U	mg/L	-
075307	10565700	Silo 2 Zone A	2-Hexanone	0.0100	U	mg/L	-
075307	10565700	Silo 2 Zone A	4-Methyl-2-Pentanone	0.0100	U	mg/L	-

TABLE C-3, OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 1

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
075307	10565700	Silo 2 Zone A	Acetone	0.0340	B	mg/L	-
075307	10565700	Silo 2 Zone A	Benzene	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Bromodichloromethane	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Bromoform	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Bromomethane	0.0100	U	mg/L	-
075307	10565700	Silo 2 Zone A	Carbon Disulfide	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Carbon Tetrachloride	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Chlorobenzene	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Chloroethane	0.0100	U	mg/L	-
075307	10565700	Silo 2 Zone A	Chloroform	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Dibromochloromethane	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Ethylbenzene	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Methylene Chloride	0.0370	B	mg/L	U
075307	10565700	Silo 2 Zone A	Styrene	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Tetrachloroethene	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Toluene	0.0050	BJ	mg/L	U
075307	10565700	Silo 2 Zone A	Total Xylenes	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Trichloroethene	0.0050	U	mg/L	-
075307	10565700	Silo 2 Zone A	Vinyl Acetate	0.0100	U	mg/L	-
075307	10565700	Silo 2 Zone A	Vinyl Chloride	0.0100	U	mg/L	-
100063	10566100	Silo 2 Zone B	Phenol	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	2-Chlorophenol	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	1,3-Dichlorobenzene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	1,4-Dichlorobenzene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Benzyl Alcohol	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	1,2-Dichlorobenzene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	2-Methylphenol	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	4-Methylphenol	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Hexachloroethane	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Nitrobenzene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Isophorone	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	2-Nitrophenol	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	2,4-Dimethylphenol	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Benzoic Acid	0.1000	U	mg/L	-
100063	10566100	Silo 2 Zone B	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	2,4-Dichlorophenol	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Naphthalene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	4-Chloroaniline	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Hexachlorobutadiene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	2-Methylnaphthalene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
100063	10566100	Silo 2 Zone B	2-Chloronaphthalene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	2-Nitroaniline	0.1000	U	mg/L	-
100063	10566100	Silo 2 Zone B	Dimethyl Phthalate	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Acenaphthylene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	2,6-Dinitrotoluene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	3-Nitroaniline	0.1000	U	mg/L	-
100063	10566100	Silo 2 Zone B	Acenaphthene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	2,4-Dinitrophenol	0.1000	U	mg/L	-

TABLE C-3, OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 1

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100063	10566100	Silo 2 Zone B	4-Nitrophenol	0.1000	U	mg/L	-
100063	10566100	Silo 2 Zone B	Dibenzofuran	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	2,4-Dinitrotoluene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Diethylphthalate	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Fluorene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	4-Nitroaniline	0.1000	U	mg/L	-
100063	10566100	Silo 2 Zone B	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
100063	10566100	Silo 2 Zone B	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Tributyl phosphate	0.4500		mg/L	-
100063	10566100	Silo 2 Zone B	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Hexachlorobenzene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Pentachlorophenol	0.1000	U	mg/L	-
100063	10566100	Silo 2 Zone B	Phenanthrene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Anthracene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Carbazole	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Di-n-Butylphthalate	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Fluoranthene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Pyrene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Butylbenzylphthalate	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
100063	10566100	Silo 2 Zone B	Benzo(a)Anthracene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Chrysene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Benzo(a)Pyrene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Aluminum	0.5490		mg/L	-
100063	10566100	Silo 2 Zone B	Antimony	0.0300	U	mg/L	-
100063	10566100	Silo 2 Zone B	Arsenic	0.0098	B	mg/L	-
100063	10566100	Silo 2 Zone B	Barium	1.3200	E	mg/L	-
100063	10566100	Silo 2 Zone B	Beryllium	0.0020	U	mg/L	-
100063	10566100	Silo 2 Zone B	Boron	0.1340		mg/L	-
100063	10566100	Silo 2 Zone B	Cadmium	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Calcium	658.00		mg/L	-
100063	10566100	Silo 2 Zone B	Chromium	0.0795		mg/L	-
100063	10566100	Silo 2 Zone B	Cobalt	0.0100	U	mg/L	-
100063	10566100	Silo 2 Zone B	Copper	0.0100	U	mg/L	-
100063	10566100	Silo 2 Zone B	Iron	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Lead	0.0338	S*	mg/L	J
100063	10566100	Silo 2 Zone B	Lithium	0.2810		mg/L	-
100063	10566100	Silo 2 Zone B	Magnesium	0.4430	B	mg/L	-
100063	10566100	Silo 2 Zone B	Manganese	0.0100	U	mg/L	-
100063	10566100	Silo 2 Zone B	Mercury	0.0002	U	mg/L	-
100063	10566100	Silo 2 Zone B	Molybdenum	1.3100	E	mg/L	-
100063	10566100	Silo 2 Zone B	Nickel	0.0200	U	mg/L	-
100063	10566100	Silo 2 Zone B	Potassium	33.300		mg/L	-
100063	10566100	Silo 2 Zone B	Selenium	0.0458	S	mg/L	J
100063	10566100	Silo 2 Zone B	Silicon	6.5200		mg/L	-
100063	10566100	Silo 2 Zone B	Silver	0.0100	U	mg/L	-
100063	10566100	Silo 2 Zone B	Thallium	0.0020	U	mg/L	-
100063	10566100	Silo 2 Zone B	Vanadium	0.0261	B	mg/L	-
100063	10566100	Silo 2 Zone B	Zinc	0.0152	B	mg/L	-
100063	10566100	Silo 2 Zone B	1,1-Dichloroethane	0.0050	U	mg/L	-

TABLE C-3, OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 1

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100063	10566100	Silo 2 Zone B	1,1-Dichloroethene	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	1,1,1-Trichloroethane	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	1,1,2-Trichloroethane	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	1,2-Dichloroethane	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	1,2-Dichloropropane	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	2-Butanone	0.0100	U	mg/L	-
100063	10566100	Silo 2 Zone B	2-Hexanone	0.0100	U	mg/L	-
100063	10566100	Silo 2 Zone B	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
100063	10566100	Silo 2 Zone B	Acetone	0.0330		mg/L	-
100063	10566100	Silo 2 Zone B	Benzene	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Bromodichloromethane	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Bromoform	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Bromomethane	0.0100	U	mg/L	-
100063	10566100	Silo 2 Zone B	Carbon Disulfide	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Carbon Tetrachloride	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Chlorobenzene	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Chloroethane	0.0100	U	mg/L	-
100063	10566100	Silo 2 Zone B	Chloroform	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Chloromethane	0.0100	U	mg/L	-
100063	10566100	Silo 2 Zone B	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Dibromochloromethane	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Ethylbenzene	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Methylene Chloride	0.0400	B	mg/L	U
100063	10566100	Silo 2 Zone B	Styrene	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Tetrachloroethene	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Toluene	0.0050	BJ	mg/L	U
100063	10566100	Silo 2 Zone B	Total Xylenes	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Trichloroethene	0.0050	U	mg/L	-
100063	10566100	Silo 2 Zone B	Vinyl Acetate	0.0100	U	mg/L	-

TABLE C-4, OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100062	10566500	Silo 2 Zone A	Aluminum	0.6740		mg/L	-
100062	10566500	Silo 2 Zone A	Antimony	0.0317	B	mg/L	-
100062	10566500	Silo 2 Zone A	Arsenic	0.0052	B	mg/L	-
100062	10566500	Silo 2 Zone A	Barium	1.2600	E	mg/L	-
100062	10566500	Silo 2 Zone A	Beryllium	0.0020	U	mg/L	-
100062	10566500	Silo 2 Zone A	Boron	0.1360		mg/L	-
100062	10566500	Silo 2 Zone A	Cadmium	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	Calcium	696.00		mg/L	-
100062	10566500	Silo 2 Zone A	Chromium	0.0236		mg/L	-
100062	10566500	Silo 2 Zone A	Cobalt	0.0100	U	mg/L	-
100062	10566500	Silo 2 Zone A	Copper	0.0100	U	mg/L	-
100062	10566500	Silo 2 Zone A	Iron	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Lead	0.0329	*+	mg/L	J
100062	10566500	Silo 2 Zone A	Lithium	0.2180		mg/L	-
100062	10566500	Silo 2 Zone A	Magnesium	0.4430	B	mg/L	-
100062	10566500	Silo 2 Zone A	Manganese	0.0100	U	mg/L	-
100062	10566500	Silo 2 Zone A	Mercury	0.0002	U	mg/L	-
100062	10566500	Silo 2 Zone A	Molybdenum	0.3000	E	mg/L	-
100062	10566500	Silo 2 Zone A	Nickel	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Potassium	27.700		mg/L	-
100062	10566500	Silo 2 Zone A	Selenium	0.0103	S	mg/L	J
100062	10566500	Silo 2 Zone A	Silicon	4.6100		mg/L	-
100062	10566500	Silo 2 Zone A	Silver	0.0100	U	mg/L	-
100062	10566500	Silo 2 Zone A	Thallium	0.0033	B	mg/L	-
100062	10566500	Silo 2 Zone A	Vanadium	0.0100	U	mg/L	-
100062	10566500	Silo 2 Zone A	Zinc	0.0247		mg/L	-
100062	10566500	Silo 2 Zone A	Phenol	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	2-Chlorophenol	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	1,3-Dichlorobenzene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	1,4-Dichlorobenzene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Benzyl Alcohol	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	1,2-Dichlorobenzene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	2-Methylphenol	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	4-Methylphenol	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Hexachloroethane	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Nitrobenzene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Isophorone	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	2-Nitrophenol	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	2,4-Dimethylphenol	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Benzoic Acid	0.1000	U	mg/L	-
100062	10566500	Silo 2 Zone A	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	2,4-Dichlorophenol	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Naphthalene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	4-Chloroaniline	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Hexachlorobutadiene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	2-Methylnaphthalene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
100062	10566500	Silo 2 Zone A	2-Chloronaphthalene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	2-Nitroaniline	0.1000	U	mg/L	-
100062	10566500	Silo 2 Zone A	Dimethyl Phthalate	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Acenaphthylene	0.0200	U	mg/L	-

TABLE C-4, OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100062	10566500	Silo 2 Zone A	2,6-Dinitrotoluene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	3-Nitroaniline	0.1000	U	mg/L	-
100062	10566500	Silo 2 Zone A	Acenaphthene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	2,4-Dinitrophenol	0.1000	U	mg/L	-
100062	10566500	Silo 2 Zone A	4-Nitrophenol	0.1000	U	mg/L	-
100062	10566500	Silo 2 Zone A	Dibenzofuran	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	2,4-Dinitrotoluene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Diethylphthalate	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Fluorene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	4-Nitroaniline	0.1000	U	mg/L	-
100062	10566500	Silo 2 Zone A	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
100062	10566500	Silo 2 Zone A	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Tributyl phosphate	0.5100		mg/L	-
100062	10566500	Silo 2 Zone A	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Hexachlorobenzene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Pentachlorophenol	0.1000	U	mg/L	-
100062	10566500	Silo 2 Zone A	Phenanthrene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Anthracene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Carbazole	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Di-n-Butylphthalate	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Fluoranthene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Pyrene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Butylbenzylphthalate	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
100062	10566500	Silo 2 Zone A	Benzo(a)Anthracene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Chrysene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Benzo(a)Pyrene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-
100062	10566500	Silo 2 Zone A	1,1-Dichloroethane	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	1,1-Dichloroethene	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	1,1,1-Trichloroethane	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	1,1,2-Trichloroethane	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	1,2-Dichloroethane	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	1,2-Dichloropropane	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	2-Butanone	0.0100	U	mg/L	-
100062	10566500	Silo 2 Zone A	2-Hexanone	0.0100	U	mg/L	-
100062	10566500	Silo 2 Zone A	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
100062	10566500	Silo 2 Zone A	Acetone	0.0260		mg/L	-
100062	10566500	Silo 2 Zone A	Benzene	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	Bromodichloromethane	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	Bromoform	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	Bromomethane	0.0100	U	mg/L	-
100062	10566500	Silo 2 Zone A	Carbon Disulfide	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	Carbon Tetrachloride	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	Chlorobenzene	0.0010	J	mg/L	-
100062	10566500	Silo 2 Zone A	Chloroethane	0.0100	U	mg/L	-
100062	10566500	Silo 2 Zone A	Chloroform	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	Chloromethane	0.0100	U	mg/L	-
100062	10566500	Silo 2 Zone A	cis-1,3-Dichloropropene	0.0050	U	mg/L	-

TABLE C-4, OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100062	10566500	Silo 2 Zone A	Dibromochloromethane	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	Ethylbenzene	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	Methylene Chloride	0.0410	B	mg/L	U
100062	10566500	Silo 2 Zone A	Styrene	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	Tetrachloroethene	0.0010	J	mg/L	-
100062	10566500	Silo 2 Zone A	Toluene	0.0050	BJ	mg/L	U
100062	10566500	Silo 2 Zone A	Total Xylenes	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	Trichloroethene	0.0050	U	mg/L	-
100062	10566500	Silo 2 Zone A	Vinyl Acetate	0.0100	U	mg/L	-
100062	10566500	Silo 2 Zone A	Vinyl Chloride	0.0100	U	mg/L	-
100063	10563900	Silo 2 Zone B	Aluminum	0.4320		mg/L	-
100063	10563900	Silo 2 Zone B	Antimony	0.0436		mg/L	-
100063	10563900	Silo 2 Zone B	Arsenic	0.0096	B	mg/L	-
100063	10563900	Silo 2 Zone B	Barium	1.2500	E	mg/L	-
100063	10563900	Silo 2 Zone B	Beryllium	0.0020	U	mg/L	-
100063	10563900	Silo 2 Zone B	Boron	0.1770		mg/L	-
100063	10563900	Silo 2 Zone B	Cadmium	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Calcium	703.00		mg/L	-
100063	10563900	Silo 2 Zone B	Chromium	0.0136		mg/L	-
100063	10563900	Silo 2 Zone B	Cobalt	0.0100	U	mg/L	-
100063	10563900	Silo 2 Zone B	Copper	0.0100	U	mg/L	-
100063	10563900	Silo 2 Zone B	Iron	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Lead	0.0164	*	mg/L	J
100063	10563900	Silo 2 Zone B	Lithium	0.2920		mg/L	-
100063	10563900	Silo 2 Zone B	Magnesium	0.5080	B	mg/L	-
100063	10563900	Silo 2 Zone B	Manganese	0.0100	U	mg/L	-
100063	10563900	Silo 2 Zone B	Mercury	0.0002	U	mg/L	-
100063	10563900	Silo 2 Zone B	Molybdenum	1.0500	E	mg/L	-
100063	10563900	Silo 2 Zone B	Nickel	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Potassium	28.500		mg/L	-
100063	10563900	Silo 2 Zone B	Selenium	0.0674	S	mg/L	J
100063	10563900	Silo 2 Zone B	Silicon	9.9400		mg/L	-
100063	10563900	Silo 2 Zone B	Silver	0.0100	U	mg/L	-
100063	10563900	Silo 2 Zone B	Thallium	0.0020	U	mg/L	-
100063	10563900	Silo 2 Zone B	Vanadium	0.0349	B	mg/L	-
100063	10563900	Silo 2 Zone B	Zinc	0.0182	B	mg/L	-
100063	10563900	Silo 2 Zone B	Phenol	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	2-Chlorophenol	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	1,3-Dichlorobenzene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	1,4-Dichlorobenzene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Benzyl Alcohol	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	1,2-Dichlorobenzene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	2-Methylphenol	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	4-Methylphenol	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Hexachloroethane	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Nitrobenzene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Isophorone	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	2-Nitrophenol	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	2,4-Dimethylphenol	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Benzoic Acid	0.1000	U	mg/L	-
100063	10563900	Silo 2 Zone B	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	2,4-Dichlorophenol	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Naphthalene	0.0200	U	mg/L	-

TABLE C-4, OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100063	10563900	Silo 2 Zone B	4-Chloroaniline	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Hexachlorobutadiene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	2-Methylnaphthalene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
100063	10563900	Silo 2 Zone B	2-Chloronaphthalene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	2-Nitroaniline	0.1000	U	mg/L	-
100063	10563900	Silo 2 Zone B	Dimethyl Phthalate	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Acenaphthylene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	2,6-Dinitrotoluene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	3-Nitroaniline	0.1000	U	mg/L	-
100063	10563900	Silo 2 Zone B	Acenaphthene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	2,4-Dinitrophenol	0.1000	U	mg/L	-
100063	10563900	Silo 2 Zone B	4-Nitrophenol	0.1000	U	mg/L	-
100063	10563900	Silo 2 Zone B	Dibenzofuran	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	2,4-Dinitrotoluene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Diethylphthalate	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Fluorene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	4-Nitroaniline	0.1000	U	mg/L	-
100063	10563900	Silo 2 Zone B	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
100063	10563900	Silo 2 Zone B	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Tributyl phosphate	0.4200		mg/L	-
100063	10563900	Silo 2 Zone B	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Hexachlorobenzene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Pentachlorophenol	0.1000	U	mg/L	-
100063	10563900	Silo 2 Zone B	Phenanthrene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Anthracene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Carbazole	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Di-n-Butylphthalate	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Fluoranthene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Pyrene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Butylbenzylphthalate	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
100063	10563900	Silo 2 Zone B	Benzo(a)Anthracene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Chrysene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Benzo(a)Pyrene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-
100063	10563900	Silo 2 Zone B	1,1-Dichloroethene	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	1,1,1-Trichloroethane	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	1,1,2-Trichloroethane	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	1,2-Dichloroethane	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	1,2-Dichloropropane	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	2-Butanone	0.0100	U	mg/L	-
100063	10563900	Silo 2 Zone B	2-Hexanone	0.0100	U	mg/L	-
100063	10563900	Silo 2 Zone B	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
100063	10563900	Silo 2 Zone B	Acetone	0.0100		mg/L	-
100063	10563900	Silo 2 Zone B	Benzene	0.0050	U	mg/L	-

TABLE C-4, OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100063	10563900	Silo 2 Zone B	Bromodichloromethane	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Bromoform	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Bromomethane	0.0100	U	mg/L	-
100063	10563900	Silo 2 Zone B	Carbon Disulfide	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Carbon Tetrachloride	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Chlorobenzene	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Chloroethane	0.0100	U	mg/L	-
100063	10563900	Silo 2 Zone B	Chloroform	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Chloromethane	0.0100	U	mg/L	-
100063	10563900	Silo 2 Zone B	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Dibromochloromethane	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Ethylbenzene	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Methylene Chloride	0.0190	B	mg/L	U
100063	10563900	Silo 2 Zone B	Styrene	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Tetrachloroethene	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Toluene	0.0050	BJ	mg/L	U
100063	10563900	Silo 2 Zone B	Total Xylenes	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Trichloroethene	0.0050	U	mg/L	-
100063	10563900	Silo 2 Zone B	Vinyl Acetate	0.0100	U	mg/L	-
100063	10563900	Silo 2 Zone B	Vinyl Chloride	0.0100	U	mg/L	-
100064	10564100	Silo 2 Zone C	1,1-Dichloroethane	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	1,1-Dichloroethene	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	1,1,1-Trichloroethane	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	1,1,2-Trichloroethane	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	1,2-Dichloroethane	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	1,2-Dichloropropane	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	2-Butanone	0.0100	U	mg/L	-
100064	10564100	Silo 2 Zone C	2-Hexanone	0.0100	U	mg/L	-
100064	10564100	Silo 2 Zone C	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
100064	10564100	Silo 2 Zone C	Acetone	0.0410		mg/L	-
100064	10564100	Silo 2 Zone C	Benzene	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Bromodichloromethane	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Bromoform	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Bromomethane	0.0100	U	mg/L	-
100064	10564100	Silo 2 Zone C	Carbon Disulfide	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Carbon Tetrachloride	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Chlorobenzene	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Chloroethane	0.0100	U	mg/L	-
100064	10564100	Silo 2 Zone C	Chloroform	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Chloromethane	0.0100	U	mg/L	-
100064	10564100	Silo 2 Zone C	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Dibromochloromethane	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Ethylbenzene	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Methylene Chloride	0.0420	B	mg/L	U
100064	10564100	Silo 2 Zone C	Styrene	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Tetrachloroethene	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Toluene	0.0050	BJ	mg/L	U
100064	10564100	Silo 2 Zone C	Total Xylenes	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Trichloroethene	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Vinyl Acetate	0.0100	U	mg/L	-
100064	10564100	Silo 2 Zone C	Vinyl Chloride	0.0100	U	mg/L	-
100064	10564100	Silo 2 Zone C	Aluminum	0.4390		mg/L	-
100064	10564100	Silo 2 Zone C	Antimony	0.0364	B	mg/L	-
100064	10564100	Silo 2 Zone C	Arsenic	0.0105		mg/L	-

TABLE C-4, OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100064	10564100	Silo 2 Zone C	Barium	1.0100	E	mg/L	-
100064	10564100	Silo 2 Zone C	Beryllium	0.0020	U	mg/L	-
100064	10564100	Silo 2 Zone C	Boron	0.1730		mg/L	-
100064	10564100	Silo 2 Zone C	Cadmium	0.0050	U	mg/L	-
100064	10564100	Silo 2 Zone C	Calcium	702.00		mg/L	-
100064	10564100	Silo 2 Zone C	Chromium	0.0111		mg/L	-
100064	10564100	Silo 2 Zone C	Cobalt	0.0100	U	mg/L	-
100064	10564100	Silo 2 Zone C	Copper	0.0100	U	mg/L	-
100064	10564100	Silo 2 Zone C	Iron	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Lead	0.0394	S*	mg/L	J
100064	10564100	Silo 2 Zone C	Lithium	0.2560		mg/L	-
100064	10564100	Silo 2 Zone C	Magnesium	0.5240	B	mg/L	-
100064	10564100	Silo 2 Zone C	Manganese	0.0100	U	mg/L	-
100064	10564100	Silo 2 Zone C	Mercury	0.0002	U	mg/L	-
100064	10564100	Silo 2 Zone C	Molybdenum	1.3800	E	mg/L	-
100064	10564100	Silo 2 Zone C	Nickel	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Potassium	26.200		mg/L	-
100064	10564100	Silo 2 Zone C	Selenium	0.0687	S	mg/L	J
100064	10564100	Silo 2 Zone C	Silicon	9.8400		mg/L	-
100064	10564100	Silo 2 Zone C	Silver	0.0100	U	mg/L	-
100064	10564100	Silo 2 Zone C	Thallium	0.0020	U	mg/L	-
100064	10564100	Silo 2 Zone C	Vanadium	0.0419	B	mg/L	-
100064	10564100	Silo 2 Zone C	Zinc	0.0182	B	mg/L	-
100064	10564100	Silo 2 Zone C	Phenol	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	2-Chlorophenol	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	1,3-Dichlorobenzene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	1,4-Dichlorobenzene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Benzyl Alcohol	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	1,2-Dichlorobenzene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	2-Methylphenol	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	4-Methylphenol	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Hexachloroethane	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Nitrobenzene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Isophorone	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	2-Nitrophenol	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	2,4-Dimethylphenol	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Benzoic Acid	0.1000	U	mg/L	-
100064	10564100	Silo 2 Zone C	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	2,4-Dichlorophenol	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Naphthalene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	4-Chloroaniline	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Hexachlorobutadiene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	2-Methylnaphthalene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
100064	10564100	Silo 2 Zone C	2-Chloronaphthalene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	2-Nitroaniline	0.1000	U	mg/L	-
100064	10564100	Silo 2 Zone C	Dimethyl Phthalate	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Acenaphthylene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	2,6-Dinitrotoluene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	3-Nitroaniline	0.1000	U	mg/L	-
100064	10564100	Silo 2 Zone C	Acenaphthene	0.0200	U	mg/L	-

TABLE C-4, OU4 TREATABILITY CHEMICAL DATA FOR SILO 2, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100064	10564100	Silo 2 Zone C	2,4-Dinitrophenol	0.1000	U	mg/L	-
100064	10564100	Silo 2 Zone C	4-Nitrophenol	0.1000	U	mg/L	-
100064	10564100	Silo 2 Zone C	Dibenzofuran	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	2,4-Dinitrotoluene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Diethylphthalate	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Fluorene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	4-Nitroaniline	0.1000	U	mg/L	-
100064	10564100	Silo 2 Zone C	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
100064	10564100	Silo 2 Zone C	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Tributyl phosphate	0.1000		mg/L	-
100064	10564100	Silo 2 Zone C	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Hexachlorobenzene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Pentachlorophenol	0.1000	U	mg/L	-
100064	10564100	Silo 2 Zone C	Phenanthrene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Anthracene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Carbazole	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Di-n-Butylphthalate	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Fluoranthene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Pyrene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Butylbenzylphthalate	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
100064	10564100	Silo 2 Zone C	Benzo(a)Anthracene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Chrysene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Benzo(a)Pyrene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
100064	10564100	Silo 2 Zone C	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-

TABLE C-5, OU4 TREATABILITY CHEMICAL DATA FOR SILO 3, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100074	10567900	Silo 3	Aluminum	0.0801	B	mg/L	-
100074	10567900	Silo 3	Antimony	0.0300	U	mg/L	-
100074	10567900	Silo 3	Arsenic	0.0495	S	mg/L	-
100074	10567900	Silo 3	Barium	0.2440	E	mg/L	-
100074	10567900	Silo 3	Beryllium	0.0024	B	mg/L	-
100074	10567900	Silo 3	Boron	1.2900		mg/L	-
100074	10567900	Silo 3	Cadmium	0.0050	U	mg/L	-
100074	10567900	Silo 3	Calcium	825.00		mg/L	-
100074	10567900	Silo 3	Chromium	0.0285		mg/L	-
100074	10567900	Silo 3	Cobalt	0.0100	U	mg/L	-
100074	10567900	Silo 3	Copper	0.0100	U	mg/L	-
100074	10567900	Silo 3	Iron	0.0200	U	mg/L	-
100074	10567900	Silo 3	Lead	0.0020	U*	mg/L	J
100074	10567900	Silo 3	Lithium	16.900		mg/L	-
100074	10567900	Silo 3	Magnesium	33.700		mg/L	-
100074	10567900	Silo 3	Manganese	0.0100	U	mg/L	-
100074	10567900	Silo 3	Mercury	0.0002	U	mg/L	-
100074	10567900	Silo 3	Molybdenum	6.1600	E	mg/L	-
100074	10567900	Silo 3	Nickel	0.0200	U	mg/L	-
100074	10567900	Silo 3	Potassium	167.00		mg/L	-
100074	10567900	Silo 3	Selenium	0.1450		mg/L	J
100074	10567900	Silo 3	Silicon	9.8700		mg/L	-
100074	10567900	Silo 3	Silver	0.0100	U	mg/L	-
100074	10567900	Silo 3	Thallium	0.0178		mg/L	-
100074	10567900	Silo 3	Vanadium	0.3930		mg/L	-
100074	10567900	Silo 3	Zinc	0.0113	B	mg/L	-
100074	10568100	Silo 3	Aluminum	0.0813	B	mg/L	-
100074	10568100	Silo 3	Antimony	0.0410	B	mg/L	-
100074	10568100	Silo 3	Arsenic	0.0555	+	mg/L	J
100074	10568100	Silo 3	Barium	0.2380	E	mg/L	-
100074	10568100	Silo 3	Beryllium	0.0023	B	mg/L	-
100074	10568100	Silo 3	Boron	1.3000		mg/L	-
100074	10568100	Silo 3	Cadmium	0.0050	U	mg/L	-
100074	10568100	Silo 3	Calcium	836.00		mg/L	-
100074	10568100	Silo 3	Chromium	0.0328		mg/L	-
100074	10568100	Silo 3	Cobalt	0.0100	U	mg/L	-
100074	10568100	Silo 3	Copper	0.0100	U	mg/L	-
100074	10568100	Silo 3	Iron	0.0200	U	mg/L	-
100074	10568100	Silo 3	Lead	0.0020	U*	mg/L	J
100074	10568100	Silo 3	Lithium	16.800		mg/L	-
100074	10568100	Silo 3	Magnesium	26.800		mg/L	-
100074	10568100	Silo 3	Manganese	0.0100	U	mg/L	-
100074	10568100	Silo 3	Mercury	0.0002	U	mg/L	-
100074	10568100	Silo 3	Molybdenum	6.7400	E	mg/L	-
100074	10568100	Silo 3	Nickel	0.0200	U	mg/L	-
100074	10568100	Silo 3	Potassium	165.00		mg/L	-
100074	10568100	Silo 3	Selenium	0.1380		mg/L	J
100074	10568100	Silo 3	Silicon	10.300		mg/L	-
100074	10568100	Silo 3	Silver	0.0100	U	mg/L	-
100074	10568100	Silo 3	Thallium	0.0219		mg/L	-
100074	10568100	Silo 3	Vanadium	0.3980		mg/L	-
100074	10568100	Silo 3	Zinc	0.0139	B	mg/L	-
100074	10567900	Silo 3	Phenol	0.0200	U	mg/L	-
100074	10567900	Silo 3	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
100074	10567900	Silo 3	2-Chlorophenol	0.0200	U	mg/L	-
100074	10567900	Silo 3	1,3-Dichlorobenzene	0.0200	U	mg/L	-
100074	10567900	Silo 3	1,4-Dichlorobenzene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Benzyl Alcohol	0.0200	U	mg/L	-

TABLE C-5, OU4 TREATABILITY CHEMICAL DATA FOR SILO 3, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100074	10567900	Silo 3	1,2-Dichlorobenzene	0.0200	U	mg/L	-
100074	10567900	Silo 3	2-Methylphenol	0.0200	U	mg/L	-
100074	10567900	Silo 3	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
100074	10567900	Silo 3	4-Methylphenol	0.0200	U	mg/L	-
100074	10567900	Silo 3	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
100074	10567900	Silo 3	Hexachloroethane	0.0200	U	mg/L	-
100074	10567900	Silo 3	Nitrobenzene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Isophorone	0.0200	U	mg/L	-
100074	10567900	Silo 3	2-Nitrophenol	0.0200	U	mg/L	-
100074	10567900	Silo 3	2,4-Dimethylphenol	0.0200	U	mg/L	-
100074	10567900	Silo 3	Benzoic Acid	0.1000	U	mg/L	-
100074	10567900	Silo 3	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
100074	10567900	Silo 3	2,4-Dichlorophenol	0.0200	U	mg/L	-
100074	10567900	Silo 3	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Naphthalene	0.0200	U	mg/L	-
100074	10567900	Silo 3	4-Chloroaniline	0.0200	U	mg/L	-
100074	10567900	Silo 3	Hexachlorobutadiene	0.0200	U	mg/L	-
100074	10567900	Silo 3	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
100074	10567900	Silo 3	2-Methylnaphthalene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
100074	10567900	Silo 3	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
100074	10567900	Silo 3	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
100074	10567900	Silo 3	2-Chloronaphthalene	0.0200	U	mg/L	-
100074	10567900	Silo 3	2-Nitroaniline	0.1000	U	mg/L	-
100074	10567900	Silo 3	Dimethyl Phthalate	0.0200	U	mg/L	-
100074	10567900	Silo 3	Acenaphthylene	0.0200	U	mg/L	-
100074	10567900	Silo 3	2,6-Dinitrotoluene	0.0200	U	mg/L	-
100074	10567900	Silo 3	3-Nitroaniline	0.1000	U	mg/L	-
100074	10567900	Silo 3	Acenaphthene	0.0200	U	mg/L	-
100074	10567900	Silo 3	2,4-Dinitrophenol	0.1000	U	mg/L	-
100074	10567900	Silo 3	4-Nitrophenol	0.1000	U	mg/L	-
100074	10567900	Silo 3	Dibenzofuran	0.0200	U	mg/L	-
100074	10567900	Silo 3	2,4-Dinitrotoluene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Diethylphthalate	0.0200	U	mg/L	-
100074	10567900	Silo 3	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
100074	10567900	Silo 3	Fluorene	0.0200	U	mg/L	-
100074	10567900	Silo 3	4-Nitroaniline	0.1000	U	mg/L	-
100074	10567900	Silo 3	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
100074	10567900	Silo 3	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
100074	10567900	Silo 3	Tributyl phosphate	0.0200	U	mg/L	-
100074	10567900	Silo 3	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
100074	10567900	Silo 3	Hexachlorobenzene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Pentachlorophenol	0.1000	U	mg/L	-
100074	10567900	Silo 3	Phenanthrene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Anthracene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Carbazole	0.0200	U	mg/L	-
100074	10567900	Silo 3	Di-n-Butylphthalate	0.0200	U	mg/L	-
100074	10567900	Silo 3	Fluoranthene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Pyrene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Butylbenzylphthalate	0.0200	U	mg/L	-
100074	10567900	Silo 3	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
100074	10567900	Silo 3	Benzo(a)Anthracene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Chrysene	0.0200	U	mg/L	-
100074	10567900	Silo 3	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
100074	10567900	Silo 3	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
100074	10567900	Silo 3	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Benzo(a)Pyrene	0.0200	U	mg/L	-

TABLE C-5, OU4 TREATABILITY CHEMICAL DATA FOR SILO 3, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100074	10567900	Silo 3	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
100074	10567900	Silo 3	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Phenol	0.0200	U	mg/L	-
100074	10568100	Silo 3	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
100074	10568100	Silo 3	2-Chlorophenol	0.0200	U	mg/L	-
100074	10568100	Silo 3	1,3-Dichlorobenzene	0.0200	U	mg/L	-
100074	10568100	Silo 3	1,4-Dichlorobenzene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Benzyl Alcohol	0.0200	U	mg/L	-
100074	10568100	Silo 3	1,2-Dichlorobenzene	0.0200	U	mg/L	-
100074	10568100	Silo 3	2-Methylphenol	0.0200	U	mg/L	-
100074	10568100	Silo 3	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
100074	10568100	Silo 3	4-Methylphenol	0.0200	U	mg/L	-
100074	10568100	Silo 3	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
100074	10568100	Silo 3	Hexachloroethane	0.0200	U	mg/L	-
100074	10568100	Silo 3	Nitrobenzene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Isophorone	0.0200	U	mg/L	-
100074	10568100	Silo 3	2-Nitrophenol	0.0200	U	mg/L	-
100074	10568100	Silo 3	2,4-Dimethylphenol	0.0200	U	mg/L	-
100074	10568100	Silo 3	Benzoic Acid	0.1000	U	mg/L	-
100074	10568100	Silo 3	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
100074	10568100	Silo 3	2,4-Dichlorophenol	0.0200	U	mg/L	-
100074	10568100	Silo 3	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Naphthalene	0.0200	U	mg/L	-
100074	10568100	Silo 3	4-Chloroaniline	0.0200	U	mg/L	-
100074	10568100	Silo 3	Hexachlorobutadiene	0.0200	U	mg/L	-
100074	10568100	Silo 3	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
100074	10568100	Silo 3	2-Methylnaphthalene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
100074	10568100	Silo 3	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
100074	10568100	Silo 3	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
100074	10568100	Silo 3	2-Chloronaphthalene	0.0200	U	mg/L	-
100074	10568100	Silo 3	2-Nitroaniline	0.1000	U	mg/L	-
100074	10568100	Silo 3	Dimethyl Phthalate	0.0200	U	mg/L	-
100074	10568100	Silo 3	Acenaphthylene	0.0200	U	mg/L	-
100074	10568100	Silo 3	2,6-Dinitrotoluene	0.0200	U	mg/L	-
100074	10568100	Silo 3	3-Nitroaniline	0.1000	U	mg/L	-
100074	10568100	Silo 3	Acenaphthene	0.0200	U	mg/L	-
100074	10568100	Silo 3	2,4-Dinitrophenol	0.1000	U	mg/L	-
100074	10568100	Silo 3	4-Nitrophenol	0.1000	U	mg/L	-
100074	10568100	Silo 3	Dibenzofuran	0.0200	U	mg/L	-
100074	10568100	Silo 3	2,4-Dinitrotoluene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Diethylphthalate	0.0200	U	mg/L	-
100074	10568100	Silo 3	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
100074	10568100	Silo 3	Fluorene	0.0200	U	mg/L	-
100074	10568100	Silo 3	4-Nitroaniline	0.1000	U	mg/L	-
100074	10568100	Silo 3	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
100074	10568100	Silo 3	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
100074	10568100	Silo 3	Tributyl phosphate	0.0200	U	mg/L	-
100074	10568100	Silo 3	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
100074	10568100	Silo 3	Hexachlorobenzene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Pentachlorophenol	0.1000	U	mg/L	-
100074	10568100	Silo 3	Phenanthrene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Anthracene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Carbazole	0.0200	U	mg/L	-
100074	10568100	Silo 3	Di-n-Butylphthalate	0.0200	U	mg/L	-
100074	10568100	Silo 3	Fluoranthene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Pyrene	0.0200	U	mg/L	-

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100074	10568100	Silo 3	Butylbenzylphthalate	0.0200	U	mg/L	-
100074	10568100	Silo 3	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
100074	10568100	Silo 3	Benzo(a)Anthracene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Chrysene	0.0200	U	mg/L	-
100074	10568100	Silo 3	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
100074	10568100	Silo 3	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
100074	10568100	Silo 3	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Benzo(a)Pyrene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
100074	10568100	Silo 3	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-
100074	10567900	Silo 3	1,1-Dichloroethane	0.0050	U	mg/L	-
100074	10567900	Silo 3	1,1-Dichloroethene	0.0050	U	mg/L	-
100074	10567900	Silo 3	1,1,1-Trichloroethane	0.0050	U	mg/L	-
100074	10567900	Silo 3	1,1,2-Trichloroethane	0.0050	U	mg/L	-
100074	10567900	Silo 3	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
100074	10567900	Silo 3	1,2-Dichloroethane	0.0050	U	mg/L	-
100074	10567900	Silo 3	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
100074	10567900	Silo 3	1,2-Dichloropropane	0.0050	U	mg/L	-
100074	10567900	Silo 3	2-Butanone	0.0100	U	mg/L	-
100074	10567900	Silo 3	2-Hexanone	0.0100	U	mg/L	-
100074	10567900	Silo 3	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
100074	10567900	Silo 3	Acetone	0.0220		mg/L	-
100074	10567900	Silo 3	Benzene	0.0050	U	mg/L	-
100074	10567900	Silo 3	Bromodichloromethane	0.0050	U	mg/L	-
100074	10567900	Silo 3	Bromoform	0.0050	U	mg/L	-
100074	10567900	Silo 3	Bromomethane	0.0100	U	mg/L	-
100074	10567900	Silo 3	Carbon Disulfide	0.0050	U	mg/L	-
100074	10567900	Silo 3	Carbon Tetrachloride	0.0050	U	mg/L	-
100074	10567900	Silo 3	Chlorobenzene	0.0050	U	mg/L	-
100074	10567900	Silo 3	Chloroethane	0.0100	U	mg/L	-
100074	10567900	Silo 3	Chloroform	0.0050	U	mg/L	-
100074	10567900	Silo 3	Chloromethane	0.0100	U	mg/L	-
100074	10567900	Silo 3	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
100074	10567900	Silo 3	Dibromochloromethane	0.0050	U	mg/L	-
100074	10567900	Silo 3	Ethylbenzene	0.0050	U	mg/L	-
100074	10567900	Silo 3	Methylene Chloride	0.0250	B	mg/L	U
100074	10567900	Silo 3	Styrene	0.0050	U	mg/L	-
100074	10567900	Silo 3	Tetrachloroethene	0.0050	U	mg/L	-
100074	10567900	Silo 3	Toluene	0.0050	BJ	mg/L	U
100074	10567900	Silo 3	Total Xylenes	0.0050	U	mg/L	-
100074	10567900	Silo 3	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
100074	10567900	Silo 3	Trichloroethene	0.0050	U	mg/L	-
100074	10567900	Silo 3	Vinyl Acetate	0.0100	U	mg/L	-
100074	10567900	Silo 3	Vinyl Chloride	0.0100	U	mg/L	-
100074	10568100	Silo 3	1,1-Dichloroethane	0.0050	U	mg/L	-
100074	10568100	Silo 3	1,1-Dichloroethene	0.0050	U	mg/L	-
100074	10568100	Silo 3	1,1,1-Trichloroethane	0.0050	U	mg/L	-
100074	10568100	Silo 3	1,1,2-Trichloroethane	0.0050	U	mg/L	-
100074	10568100	Silo 3	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
100074	10568100	Silo 3	1,2-Dichloroethane	0.0050	U	mg/L	-
100074	10568100	Silo 3	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
100074	10568100	Silo 3	1,2-Dichloropropane	0.0050	U	mg/L	-
100074	10568100	Silo 3	2-Butanone	0.0100	U	mg/L	-
100074	10568100	Silo 3	2-Hexanone	0.0100	U	mg/L	-
100074	10568100	Silo 3	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
100074	10568100	Silo 3	Acetone	0.0070	J	mg/L	-

TABLE C-5, OU4 TREATABILITY CHEMICAL DATA FOR SILO 3, FORMULA 2

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100074	10568100	Silo 3	Benzene	0.0050	U	mg/L	-
100074	10568100	Silo 3	Bromodichloromethane	0.0050	U	mg/L	-
100074	10568100	Silo 3	Bromoform	0.0050	U	mg/L	-
100074	10568100	Silo 3	Bromomethane	0.0100	U	mg/L	-
100074	10568100	Silo 3	Carbon Disulfide	0.0050	U	mg/L	-
100074	10568100	Silo 3	Carbon Tetrachloride	0.0050	U	mg/L	-
100074	10568100	Silo 3	Chlorobenzene	0.0050	U	mg/L	-
100074	10568100	Silo 3	Chloroethane	0.0100	U	mg/L	-
100074	10568100	Silo 3	Chloroform	0.0050	U	mg/L	-
100074	10568100	Silo 3	Chloromethane	0.0100	U	mg/L	-
100074	10568100	Silo 3	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
100074	10568100	Silo 3	Dibromochloromethane	0.0050	U	mg/L	-
100074	10568100	Silo 3	Ethylbenzene	0.0050	U	mg/L	-
100074	10568100	Silo 3	Methylene Chloride	0.0230	B	mg/L	U
100074	10568100	Silo 3	Styrene	0.0050	U	mg/L	-
100074	10568100	Silo 3	Tetrachloroethene	0.0050	U	mg/L	-
100074	10568100	Silo 3	Toluene	0.0050	BJ	mg/L	U
100074	10568100	Silo 3	Total Xylenes	0.0050	U	mg/L	-
100074	10568100	Silo 3	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
100074	10568100	Silo 3	Trichloroethene	0.0050	U	mg/L	-
100074	10568100	Silo 3	Vinyl Acetate	0.0100	U	mg/L	-
100074	10568100	Silo 3	Vinyl Chloride	0.0100	U	mg/L	-

TABLE C-6, OU4 TREATABILITY CHEMICAL DATA FOR SILO 3, FORMULA 1

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Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100074	10568300	Silo 3	1,1-Dichloroethane	0.0050	U	mg/L	-
100074	10568300	Silo 3	1,1-Dichloroethene	0.0050	U	mg/L	-
100074	10568300	Silo 3	1,1,1-Trichloroethane	0.0050	U	mg/L	-
100074	10568300	Silo 3	1,1,2-Trichloroethane	0.0050	U	mg/L	-
100074	10568300	Silo 3	1,1,2,2-Tetrachloroethane	0.0050	U	mg/L	-
100074	10568300	Silo 3	1,2-Dichloroethane	0.0050	U	mg/L	-
100074	10568300	Silo 3	1,2-Dichloroethene (total)	0.0050	U	mg/L	-
100074	10568300	Silo 3	1,2-Dichloropropane	0.0050	U	mg/L	-
100074	10568300	Silo 3	2-Butanone	0.0100	U	mg/L	-
100074	10568300	Silo 3	2-Hexanone	0.0100	U	mg/L	-
100074	10568300	Silo 3	4-Methyl-2-Pentanone	0.0100	U	mg/L	-
100074	10568300	Silo 3	Acetone	0.0100		mg/L	-
100074	10568300	Silo 3	Benzene	0.0050	U	mg/L	-
100074	10568300	Silo 3	Bromodichloromethane	0.0050	U	mg/L	-
100074	10568300	Silo 3	Bromoform	0.0050	U	mg/L	-
100074	10568300	Silo 3	Bromomethane	0.0100	U	mg/L	-
100074	10568300	Silo 3	Carbon Disulfide	0.0050	U	mg/L	-
100074	10568300	Silo 3	Carbon Tetrachloride	0.0050	U	mg/L	-
100074	10568300	Silo 3	Chlorobenzene	0.0050	U	mg/L	-
100074	10568300	Silo 3	Chloroethane	0.0100	U	mg/L	-
100074	10568300	Silo 3	Chloroform	0.0050	U	mg/L	-
100074	10568300	Silo 3	Chloromethane	0.0100	U	mg/L	-
100074	10568300	Silo 3	cis-1,3-Dichloropropene	0.0050	U	mg/L	-
100074	10568300	Silo 3	Dibromochloromethane	0.0050	U	mg/L	-
100074	10568300	Silo 3	Ethylbenzene	0.0050	U	mg/L	-
100074	10568300	Silo 3	Methylene Chloride	0.0250	B	mg/L	U
100074	10568300	Silo 3	Styrene	0.0050	U	mg/L	-
100074	10568300	Silo 3	Tetrachloroethene	0.0050	U	mg/L	-
100074	10568300	Silo 3	Toluene	0.0050	BJ	mg/L	U
100074	10568300	Silo 3	Total Xylenes	0.0050	U	mg/L	-
100074	10568300	Silo 3	Trans-1,3-Dichloropropene	0.0050	U	mg/L	-
100074	10568300	Silo 3	Trichloroethene	0.0050	U	mg/L	-
100074	10568300	Silo 3	Vinyl Acetate	0.0100	U	mg/L	-
100074	10568300	Silo 3	Vinyl Chloride	0.0100	U	mg/L	-
100074	10568300	Silo 3	Aluminum	0.0723	B	mg/L	-
100074	10568300	Silo 3	Antimony	0.0300	U	mg/L	-
100074	10568300	Silo 3	Arsenic	0.0478	S	mg/L	-
100074	10568300	Silo 3	Barium	0.2070	E	mg/L	-
100074	10568300	Silo 3	Beryllium	0.0025	B	mg/L	-
100074	10568300	Silo 3	Boron	1.3600		mg/L	-
100074	10568300	Silo 3	Cadmium	0.0050	U	mg/L	-
100074	10568300	Silo 3	Calcium	792.00		mg/L	-
100074	10568300	Silo 3	Chromium	0.5310		mg/L	-
100074	10568300	Silo 3	Cobalt	0.0100	U	mg/L	-
100074	10568300	Silo 3	Copper	0.0100	U	mg/L	-
100074	10568300	Silo 3	Iron	0.0200	U	mg/L	-
100074	10568300	Silo 3	Lead	0.0020	UW*	mg/L	J
100074	10568300	Silo 3	Lithium	22.200		mg/L	-
100074	10568300	Silo 3	Magnesium	35.300		mg/L	-
100074	10568300	Silo 3	Manganese	0.0100	U	mg/L	-
100074	10568300	Silo 3	Mercury	0.0002	U	mg/L	-
100074	10568300	Silo 3	Molybdenum	5.9300	E	mg/L	-
100074	10568300	Silo 3	Nickel	0.0200	U	mg/L	-
100074	10568300	Silo 3	Potassium	183.00		mg/L	-
100074	10568300	Silo 3	Selenium	0.1790		mg/L	J
100074	10568300	Silo 3	Silicon	8.7700		mg/L	-
100074	10568300	Silo 3	Silver	0.0100	U	mg/L	-
100074	10568300	Silo 3	Thallium	0.0130	BW	mg/L	-

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100074	10568300	Silo 3	Vanadium	0.3670		mg/L	-
100074	10568300	Silo 3	Zinc	0.0105	B	mg/L	-
100074	10568300	Silo 3	Phenol	0.0200	U	mg/L	-
100074	10568300	Silo 3	bis(2-Chloroethyl)Ether	0.0200	U	mg/L	-
100074	10568300	Silo 3	2-Chlorophenol	0.0200	U	mg/L	-
100074	10568300	Silo 3	1,3-Dichlorobenzene	0.0200	U	mg/L	-
100074	10568300	Silo 3	1,4-Dichlorobenzene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Benzyl Alcohol	0.0200	U	mg/L	-
100074	10568300	Silo 3	1,2-Dichlorobenzene	0.0200	U	mg/L	-
100074	10568300	Silo 3	2-Methylphenol	0.0200	U	mg/L	-
100074	10568300	Silo 3	bis(2-Chloroisopropyl)Ether	0.0200	U	mg/L	-
100074	10568300	Silo 3	4-Methylphenol	0.0200	U	mg/L	-
100074	10568300	Silo 3	N-Nitroso-Di-n-Propylamine	0.0200	U	mg/L	-
100074	10568300	Silo 3	Hexachloroethane	0.0200	U	mg/L	-
100074	10568300	Silo 3	Nitrobenzene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Isophorone	0.0200	U	mg/L	-
100074	10568300	Silo 3	2-Nitrophenol	0.0200	U	mg/L	-
100074	10568300	Silo 3	2,4-Dimethylphenol	0.0200	U	mg/L	-
100074	10568300	Silo 3	Benzoic Acid	0.1000	U	mg/L	-
100074	10568300	Silo 3	bis(2-Chloroethoxy)Methane	0.0200	U	mg/L	-
100074	10568300	Silo 3	2,4-Dichlorophenol	0.0200	U	mg/L	-
100074	10568300	Silo 3	1,2,4-Trichlorobenzene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Naphthalene	0.0200	U	mg/L	-
100074	10568300	Silo 3	4-Chloroaniline	0.0200	U	mg/L	-
100074	10568300	Silo 3	Hexachlorobutadiene	0.0200	U	mg/L	-
100074	10568300	Silo 3	4-Chloro-3-Methylphenol	0.0200	U	mg/L	-
100074	10568300	Silo 3	2-Methylnaphthalene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Hexachlorocyclopentadiene	0.0200	U	mg/L	-
100074	10568300	Silo 3	2,4,6-Trichlorophenol	0.0200	U	mg/L	-
100074	10568300	Silo 3	2,4,5-Trichlorophenol	0.1000	U	mg/L	-
100074	10568300	Silo 3	2-Chloronaphthalene	0.0200	U	mg/L	-
100074	10568300	Silo 3	2-Nitroaniline	0.1000	U	mg/L	-
100074	10568300	Silo 3	Dimethyl Phthalate	0.0200	U	mg/L	-
100074	10568300	Silo 3	Acenaphthylene	0.0200	U	mg/L	-
100074	10568300	Silo 3	2,6-Dinitrotoluene	0.0200	U	mg/L	-
100074	10568300	Silo 3	3-Nitroaniline	0.1000	U	mg/L	-
100074	10568300	Silo 3	Acenaphthene	0.0200	U	mg/L	-
100074	10568300	Silo 3	2,4-Dinitrophenol	0.1000	U	mg/L	-
100074	10568300	Silo 3	4-Nitrophenol	0.0050	J	mg/L	-
100074	10568300	Silo 3	Dibenzofuran	0.0200	U	mg/L	-
100074	10568300	Silo 3	2,4-Dinitrotoluene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Diethylphthalate	0.0200	U	mg/L	-
100074	10568300	Silo 3	4-Chlorophenyl-phenylether	0.0200	U	mg/L	-
100074	10568300	Silo 3	Fluorene	0.0200	U	mg/L	-
100074	10568300	Silo 3	4-Nitroaniline	0.1000	U	mg/L	-
100074	10568300	Silo 3	4,6-Dinitro-2-Methylphenol	0.1000	U	mg/L	-
100074	10568300	Silo 3	N-Nitrosodiphenylamine	0.0200	U	mg/L	-
100074	10568300	Silo 3	Tributyl phosphate	0.0200	U	mg/L	-
100074	10568300	Silo 3	4-Bromophenyl-phenylether	0.0200	U	mg/L	-
100074	10568300	Silo 3	Hexachlorobenzene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Pentachlorophenol	0.1000	U	mg/L	-
100074	10568300	Silo 3	Phenanthrene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Anthracene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Carbazole	0.0200	U	mg/L	-
100074	10568300	Silo 3	Di-n-Butylphthalate	0.0200	U	mg/L	-
100074	10568300	Silo 3	Fluoranthene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Pyrene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Butylbenzylphthalate	0.0200	U	mg/L	-

TABLE C-6, OU4 TREATABILITY CHEMICAL DATA FOR SILO 3, FORMULA 1

Sample Number	Treatability Number	Location	Constituent	Result	Lab Qualifier	Units	Q5
100074	10568300	Silo 3	3,3'-Dichlorobenzidine	0.0400	U	mg/L	-
100074	10568300	Silo 3	Benzo(a)Anthracene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Chrysene	0.0200	U	mg/L	-
100074	10568300	Silo 3	bis(2-Ethylhexyl)Phthalate	0.0200	U	mg/L	-
100074	10568300	Silo 3	Di-n-Octyl Phthalate	0.0200	U	mg/L	-
100074	10568300	Silo 3	Benzo(b)Fluoranthene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Benzo(k)Fluoranthene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Benzo(a)Pyrene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Indeno(1,2,3-cd)Pyrene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Dibenz(a,h)Anthrancene	0.0200	U	mg/L	-
100074	10568300	Silo 3	Benzo(g,h,i)Perylene	0.0200	U	mg/L	-

TABLE C-7, RADIOLOGICAL TREATABILITY DATA FOR 3 SILOS FOR FORMULAS 1 AND 2

Sample Number	Treatability Number	Location		Radionuclide	Result	2-Sigma Error	Units	Q5
Formula 1:								
100047	10563100	Silo 1	Zone A	Ac-227	*		pCi/L	-
100047	10563100	Silo 1	Zone A	Pa-231	<1527		pCi/L	-
100047	10563100	Silo 1	Zone A	Pb-210	377	38	pCi/L	-
100047	10563100	Silo 1	Zone A	Po-210	55.8	18.7	pCi/L	-
100047	10563100	Silo 1	Zone A	Ra-226	12700	1800	pCi/L	-
100047	10563100	Silo 1	Zone A	Ra-228	3.32	1.33	pCi/L	-
100047	10563100	Silo 1	Zone A	Th-Total	*		mg/L	-
100047	10563100	Silo 1	Zone A	U-Total	0.00168	0.00018	mg/L	-
100047	10563300	Silo 1	Zone A	Ac-227	<1.0		pCi/L	-
100047	10563300	Silo 1	Zone A	Pa-231	<1168		pCi/L	-
100047	10563300	Silo 1	Zone A	Pb-210	280	29	pCi/L	-
100047	10563300	Silo 1	Zone A	Po-210	38.2	19.2	pCi/L	-
100047	10563300	Silo 1	Zone A	Ra-226	*A		pCi/L	-
100047	10563300	Silo 1	Zone A	Ra-228	*A		pCi/L	-
100047	10563300	Silo 1	Zone A	Th-Total	<0.0049		mg/L	-
100047	10563300	Silo 1	Zone A	U-Total	<0.001		mg/L	-
100048	10563500	Silo 1	Zone B	Ac-227	<1.0		pCi/L	-
100048	10563500	Silo 1	Zone B	Pa-231	<1428		pCi/L	-
100048	10563500	Silo 1	Zone B	Pb-210	80.4	8.6	pCi/L	-
100048	10563500	Silo 1	Zone B	Po-210	57.8	21.8	pCi/L	-
100048	10563500	Silo 1	Zone B	Ra-226	4850	710	pCi/L	-
100048	10563500	Silo 1	Zone B	Ra-228	<3.0		pCi/L	-
100048	10563500	Silo 1	Zone B	Th-Total	<0.0030		mg/L	-
100048	10563500	Silo 1	Zone B	U-Total	0.00172	0.00018	mg/L	-
100049	10563700	Silo 1	Zone C	Ac-227	<1.0		pCi/L	-
100049	10563700	Silo 1	Zone C	Pa-231	<1028		pCi/L	-
100049	10563700	Silo 1	Zone C	Pb-210	275	28	pCi/L	-
100049	10563700	Silo 1	Zone C	Po-210	77.3	25	pCi/L	-
100049	10563700	Silo 1	Zone C	Ra-226	5360	780	pCi/L	-
100049	10563700	Silo 1	Zone C	Ra-228	<3.0		pCi/L	-
100049	10563700	Silo 1	Zone C	Th-Total	<0.0032		mg/L	-
100049	10563700	Silo 1	Zone C	U-Total	<0.001		mg/L	-

TABLE C-7, RADIOLOGICAL TREATABILITY DATA FOR 3 SILOS FOR FORMULAS 1 AND 2

Sample Number	Treatability Number	Location		Radionuclide	Result	2-Sigma Error	Units	Q5
Formula 1:								
075307	10565700	Silo 2	Zone A	Ac-227	*		pCi/L	-
075307	10565700	Silo 2	Zone A	Pa-231	<2298		pCi/L	-
075307	10565700	Silo 2	Zone A	Pb-210	495	50	pCi/L	-
075307	10565700	Silo 2	Zone A	Po-210	11.1	8	pCi/L	-
075307	10565700	Silo 2	Zone A	Ra-226	48600	6900	pCi/L	-
075307	10565700	Silo 2	Zone A	Ra-228	8.34	1.86	pCi/L	-
075307	10565700	Silo 2	Zone A	Th-Total	*		mg/L	-
075307	10565700	Silo 2	Zone A	U-Total	<0.001		mg/L	-
075307	10565900	Silo 2	Zone A	Ac-227	*		pCi/L	-
075307	10565900	Silo 2	Zone A	Pa-231	<2479		pCi/L	-
075307	10565900	Silo 2	Zone A	Pb-210	346	35	pCi/L	-
075307	10565900	Silo 2	Zone A	Po-210	48.4	20.2	pCi/L	-
075307	10565900	Silo 2	Zone A	Ra-226	9100	1300	pCi/L	-
075307	10565900	Silo 2	Zone A	Ra-228	<3.0		pCi/L	-
075307	10565900	Silo 2	Zone A	Th-Total	*		mg/L	-
075307	10565900	Silo 2	Zone A	U-Total	<0.001		mg/L	-
100063	10566100	Silo 2	Zone B	Ac-227	**		pCi/L	-
100063	10566100	Silo 2	Zone B	Pa-231	<1483		pCi/L	-
100063	10566100	Silo 2	Zone B	Pb-210	185	19	pCi/L	-
100063	10566100	Silo 2	Zone B	Po-210	25.1	16.7	pCi/L	-
100063	10566100	Silo 2	Zone B	Ra-226	7310	1040	pCi/L	-
100063	10566100	Silo 2	Zone B	Ra-228	4.3	1.41	pCi/L	-
100063	10566100	Silo 2	Zone B	Th-Total	**		mg/L	-
100063	10566100	Silo 2	Zone B	U-Total	<0.001		mg/L	-
075308	10566300	Silo 2	Zone C	Ac-227	<1.0		pCi/L	-
075308	10566300	Silo 2	Zone C	Pa-231	<2088		pCi/L	-
075308	10566300	Silo 2	Zone C	Pb-210	333	34	pCi/L	-
075308	10566300	Silo 2	Zone C	Po-210	67.8	21.5	pCi/L	-
075308	10566300	Silo 2	Zone C	Ra-226	8910	1260	pCi/L	-
075308	10566300	Silo 2	Zone C	Ra-228	3.85	1.11	pCi/L	-
075308	10566300	Silo 2	Zone C	Th-Total	<0.0025		mg/L	-
075308	10566300	Silo 2	Zone C	U-Total	0.00199	0.00022	mg/L	-

TABLE C-7, RADIOLOGICAL TREATABILITY DATA FOR 3 SILOS FOR FORMULAS 1 AND 2

Sample Number	Treatability Number	Location	Radionuclide	Result	2-Sigma Error	Units	Q5
Formula 1:							
100074	10568300	Silo 3	Ac-227	*		pCi/L	-
100074	10568300	Silo 3	Pa-231	<463		pCi/L	-
100074	10568300	Silo 3	Pb-210	193	20	pCi/L	-
100074	10568300	Silo 3	Po-210	<18.9		pCi/L	-
100074	10568300	Silo 3	Ra-226	916	135	pCi/L	-
100074	10568300	Silo 3	Ra-228	59.5	8.8	pCi/L	-
100074	10568300	Silo 3	Th-Total	*		mg/L	-
100074	10568300	Silo 3	U-Total	0.00322	0.00035	mg/L	-

TABLE C-7, RADIOLOGICAL TREATABILITY DATA FOR 3 SILOS FOR FORMULAS 1 AND 2

Sample Number	Treatability Number	Location		Radionuclide	Result	2-Sigma Error	Units	Q5
Formula 2:								
075304	10565100	Silo 1	Zone A	Ac-227	**		pCi/L	-
075304	10565100	Silo 1	Zone A	Pa-231	<1270		pCi/L	-
075304	10565100	Silo 1	Zone A	Pb-210	141	15	pCi/L	-
075304	10565100	Silo 1	Zone A	Po-210	23.2	14.8	pCi/L	-
075304	10565100	Silo 1	Zone A	Ra-226	3680	540	pCi/L	-
075304	10565100	Silo 1	Zone A	Ra-228	4.11	1.37	pCi/L	-
075304	10565100	Silo 1	Zone A	Th-Total	** *		mg/L	-
075304	10565100	Silo 1	Zone A	U-Total	<0.001		mg/L	-
075305	10565300	Silo 1	Zone B	Ac-227	<1.0		pCi/L	-
075305	10565300	Silo 1	Zone B	Pa-231	<1070		pCi/L	-
075305	10565300	Silo 1	Zone B	Pb-210	42.3	4.9	pCi/L	-
075305	10565300	Silo 1	Zone B	Po-210	91.2	32.1	pCi/L	-
075305	10565300	Silo 1	Zone B	Ra-226	5210	740	pCi/L	-
075305	10565300	Silo 1	Zone B	Ra-228	<3.0		pCi/L	-
075305	10565300	Silo 1	Zone B	Th-Total	<0.00088		mg/L	-
075305	10565300	Silo 1	Zone B	U-Total	0.00159	0.00017	mg/L	-
075306	10565500	Silo 1	Zone C	Ac-227	<1.0		pCi/L	-
075306	10565500	Silo 1	Zone C	Pa-231	<1187		pCi/L	-
075306	10565500	Silo 1	Zone C	Pb-210	29.9	3.7	pCi/L	-
075306	10565500	Silo 1	Zone C	Po-210	71.4	24.7	pCi/L	-
075306	10565500	Silo 1	Zone C	Ra-226	6250	890	pCi/L	-
075306	10565500	Silo 1	Zone C	Ra-228	<3.0		pCi/L	-
075306	10565500	Silo 1	Zone C	Th-Total	<0.00074		mg/L	-
075306	10565500	Silo 1	Zone C	U-Total	0.00177	0.00019	mg/L	-

TABLE C-7, RADIOLOGICAL TREATABILITY DATA FOR 3 SILOS FOR FORMULAS 1 AND 2

Sample Number	Treatability Number	Location		Radionuclide	Result	2-Sigma Error	Units	Q5
Formula 2:								
100062	10566500	Silo 2	Zone A	Ac-227	<1.0		pCi/L	-
100062	10566500	Silo 2	Zone A	Pa-231	<1684		pCi/L	-
100062	10566500	Silo 2	Zone A	Pb-210	77.4	8.3	pCi/L	-
100062	10566500	Silo 2	Zone A	Po-210	8.29	6.25	pCi/L	-
100062	10566500	Silo 2	Zone A	Ra-226	11500	1600	pCi/L	-
100062	10566500	Silo 2	Zone A	Ra-228	4.03	1.38	pCi/L	-
100062	10566500	Silo 2	Zone A	Th-Total	<0.0025		mg/L	-
100062	10566500	Silo 2	Zone A	U-Total	<0.001		mg/L	-
100063	10563900	Silo 2	Zone B	Ac-227	**		pCi/L	-
100063	10563900	Silo 2	Zone B	Pa-231	<1470		pCi/L	-
100063	10563900	Silo 2	Zone B	Pb-210	50.7	5.6	pCi/L	-
100063	10563900	Silo 2	Zone B	Po-210	31.5	14.6	pCi/L	-
100063	10563900	Silo 2	Zone B	Ra-226	6130	890	pCi/L	-
100063	10563900	Silo 2	Zone B	Ra-228	5.12	1.61	pCi/L	-
100063	10563900	Silo 2	Zone B	Th-Total	** *		mg/L	-
100063	10563900	Silo 2	Zone B	U-Total	<0.001		mg/L	-
100064	10564100	Silo 2	Zone C	Ac-227	<1.0		pCi/L	-
100064	10564100	Silo 2	Zone C	Pa-231	<1489		pCi/L	-
100064	10564100	Silo 2	Zone C	Pb-210	83.3	8.9	pCi/L	-
100064	10564100	Silo 2	Zone C	Po-210	20.3	14.9	pCi/L	-
100064	10564100	Silo 2	Zone C	Ra-226	5500	800	pCi/L	-
100064	10564100	Silo 2	Zone C	Ra-228	3.09	1.11	pCi/L	-
100064	10564100	Silo 2	Zone C	Th-Total	<0.0065		mg/L	-
100064	10564100	Silo 2	Zone C	U-Total	0.00147	0.00016	mg/L	-

TABLE C-7, RADIOLOGICAL TREATABILITY DATA FOR 3 SILOS FOR FORMULAS 1 AND 2

Sample Number	Treatability Number	Location	Radionuclide	Result	2-Sigma Error	Units	Q5
Formula 2:							
100074	10567900	Silo 3	Ac-227	*		pCi/L	-
100074	10567900	Silo 3	Pa-231	<562		pCi/L	-
100074	10567900	Silo 3	Pb-210	3.80	1.14	pCi/L	-
100074	10567900	Silo 3	Po-210	6.27	4	pCi/L	-
100074	10567900	Silo 3	Ra-226	108	16	pCi/L	-
100074	10567900	Silo 3	Ra-228	51.7	7.6	pCi/L	-
100074	10567900	Silo 3	Th-Total	*		mg/L	-
100074	10567900	Silo 3	U-Total	<0.001		mg/L	-
100074	10568100	Silo 3	Ac-227	<1.0		pCi/L	-
100074	10568100	Silo 3	Pa-231	<507		pCi/L	-
100074	10568100	Silo 3	Pb-210	<3.0		pCi/L	-
100074	10568100	Silo 3	Po-210	<7.1		pCi/L	-
100074	10568100	Silo 3	Ra-226	734	107	pCi/L	-
100074	10568100	Silo 3	Ra-228	46.0	6.8	pCi/L	-
100074	10568100	Silo 3	Th-Total	<0.0013		mg/L	-
100074	10568100	Silo 3	U-Total	<0.001		mg/L	-

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Sample Number	Treatability Number	Location	Parameter	Result	Lab Q	Q5	Units
Formula 1:							
100047	10563100	Silo 1 Zone A	Ammonia	3.76	–	J	mg/L
100047	10563100	Silo 1 Zone A	Chloride	20.1		–	mg/L
100047	10563100	Silo 1 Zone A	Fluoride	0.05	U	–	mg/L
100047	10563100	Silo 1 Zone A	Nitrate	8.34		J	mg/L
100047	10563100	Silo 1 Zone A	pH	9.95		–	std unit
100047	10563100	Silo 1 Zone A	Phosphorus	0.07		–	mg/L
100047	10563100	Silo 1 Zone A	Sulfate	70.5		–	mg/L
100047	10563100	Silo 1 Zone A	Sulfide	0.05	U	–	mg/L
100047	10563300	Silo 1 Zone A	Ammonia	3.74	–	J	mg/L
100047	10563300	Silo 1 Zone A	Chloride	19.5		–	mg/L
100047	10563300	Silo 1 Zone A	Fluoride	0.05	U	–	mg/L
100047	10563300	Silo 1 Zone A	Nitrate	6.99		J	mg/L
100047	10563300	Silo 1 Zone A	pH	11.53		–	std unit
100047	10563300	Silo 1 Zone A	Phosphorus	0.06		–	mg/L
100047	10563300	Silo 1 Zone A	Sulfate	65.8		–	mg/L
100047	10563300	Silo 1 Zone A	Sulfide	0.05	U	–	mg/L
100048	10563500	Silo 1 Zone B	Ammonia	5.15	–	J	mg/L
100048	10563500	Silo 1 Zone B	Chloride	24.8		–	mg/L
100048	10563500	Silo 1 Zone B	Fluoride	0.08		J	mg/L
100048	10563500	Silo 1 Zone B	Nitrate	4.74		J	mg/L
100048	10563500	Silo 1 Zone B	pH	11.3		–	std unit
100048	10563500	Silo 1 Zone B	Phosphorus	0.02	U	–	mg/L
100048	10563500	Silo 1 Zone B	Sulfate	75.8		–	mg/L
100048	10563500	Silo 1 Zone B	Sulfide	0.05	U	–	mg/L
100049	10563700	Silo 1 Zone C	Ammonia	1.32	–	J	mg/L
100049	10563700	Silo 1 Zone C	Chloride	24.2		–	mg/L
100049	10563700	Silo 1 Zone C	Fluoride	0.062		J	mg/L
100049	10563700	Silo 1 Zone C	Nitrate	4.14		J	mg/L
100049	10563700	Silo 1 Zone C	pH	11.42		–	std unit
100049	10563700	Silo 1 Zone C	Phosphorus	0.03		–	mg/L
100049	10563700	Silo 1 Zone C	Sulfate	86.7		–	mg/L
100049	10563700	Silo 1 Zone C	Sulfide	0.05	U	–	mg/L

Sample Number	Treatability Number	Location	Parameter	Result	Lab Q	Q5	Units
Formula 1:							
075307	10565700	Silo 2 Zone A	Ammonia	0.6	–	J	mg/L
075307	10565700	Silo 2 Zone A	Chloride	9.67		–	mg/L
075307	10565700	Silo 2 Zone A	Fluoride	0.057		J	mg/L
075307	10565700	Silo 2 Zone A	Nitrate	5.48		J	mg/L
075307	10565700	Silo 2 Zone A	pH	11.76		–	std unit
075307	10565700	Silo 2 Zone A	Phosphorus	0.42		–	mg/L
075307	10565700	Silo 2 Zone A	Sulfate	53		–	mg/L
075307	10565700	Silo 2 Zone A	Sulfide	0.05	U	–	mg/L
075307	10565900	Silo 2 Zone A	Ammonia	0.61	–	J	mg/L
075307	10565900	Silo 2 Zone A	Chloride	9.68		–	mg/L
075307	10565900	Silo 2 Zone A	Fluoride	0.05	U	–	mg/L
075307	10565900	Silo 2 Zone A	Nitrate	5.66		J	mg/L
075307	10565900	Silo 2 Zone A	pH	11.78		–	std unit
075307	10565900	Silo 2 Zone A	Phosphorus	0.52		–	mg/L
075307	10565900	Silo 2 Zone A	Sulfate	42.1		–	mg/L
075307	10565900	Silo 2 Zone A	Sulfide	0.05	U	–	mg/L
100063	10566100	Silo 2 Zone B	Ammonia	0.79	–	J	mg/L
100063	10566100	Silo 2 Zone B	Chloride	8.81		–	mg/L
100063	10566100	Silo 2 Zone B	Fluoride	0.057		J	mg/L
100063	10566100	Silo 2 Zone B	Nitrate	13.8		J	mg/L
100063	10566100	Silo 2 Zone B	pH	11.5		–	std unit
100063	10566100	Silo 2 Zone B	Phosphorus	0.24		–	mg/L
100063	10566100	Silo 2 Zone B	Sulfate	71.1		–	mg/L
100063	10566100	Silo 2 Zone B	Sulfide	0.05	U	–	mg/L
075308	10566300	Silo 2 Zone C	Ammonia	0.68	–	J	mg/L
075308	10566300	Silo 2 Zone C	Chloride	8.74		–	mg/L
075308	10566300	Silo 2 Zone C	Fluoride	0.057		J	mg/L
075308	10566300	Silo 2 Zone C	Nitrate	8.81		J	mg/L
075308	10566300	Silo 2 Zone C	pH	11.58		–	std unit
075308	10566300	Silo 2 Zone C	Phosphorus	0.05		–	mg/L
075308	10566300	Silo 2 Zone C	Sulfate	60.9		–	mg/L
075308	10566300	Silo 2 Zone C	Sulfide	0.05	U	–	mg/L

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Sample Number	Treatability Number	Location	Parameter	Result	Lab Q	Q5	Units
Formula 1:							
100074	10568300	Silo 3	Ammonia	1.24	–	J	mg/L
100074	10568300	Silo 3	Chloride	47.7		–	mg/L
100074	10568300	Silo 3	Fluoride	0.086		J	mg/L
100074	10568300	Silo 3	Nitrate	141.2		J	mg/L
100074	10568300	Silo 3	pH	10.21		–	std unit
100074	10568300	Silo 3	Phosphorus	0.02		–	mg/L
100074	10568300	Silo 3	Sulfate	1232.6		–	mg/L
100074	10568300	Silo 3	Sulfide	0.05	U	–	mg/L

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Sample Number	Treatability Number	Location	Parameter	Result	Lab Q	Q5	Units
Formula 2:							
075304	10595100	Silo 1 Zone A	Ammonia	5.8	–	J	mg/L
075304	10595100	Silo 1 Zone A	Chloride	29.6		–	mg/L
075304	10595100	Silo 1 Zone A	Fluoride	0.064		J	mg/L
075304	10595100	Silo 1 Zone A	Nitrate	3.07		J	mg/L
075304	10595100	Silo 1 Zone A	pH	11.61		–	std unit
075304	10595100	Silo 1 Zone A	Phosphorus	0.06		–	mg/L
075304	10595100	Silo 1 Zone A	Sulfate	47.8		–	mg/L
075304	10595100	Silo 1 Zone A	Sulfide	0.05	U	–	mg/L
075305	10565300	Silo 1 Zone B	Ammonia	7.9	–	J	mg/L
075305	10565300	Silo 1 Zone B	Chloride	36.5		–	mg/L
075305	10565300	Silo 1 Zone B	Fluoride	0.066		J	mg/L
075305	10565300	Silo 1 Zone B	Nitrate	3.99		J	mg/L
075305	10565300	Silo 1 Zone B	pH	11.35		–	std unit
075305	10565300	Silo 1 Zone B	Phosphorus	0.03		–	mg/L
075305	10565300	Silo 1 Zone B	Sulfate	59.7		–	mg/L
075305	10565300	Silo 1 Zone B	Sulfide	0.05	U	–	mg/L
075306	10565500	Silo 1 Zone C	Ammonia	3.35	–	J	mg/L
075306	10565500	Silo 1 Zone C	Chloride	27.7		–	mg/L
075306	10565500	Silo 1 Zone C	Fluoride	0.066		J	mg/L
075306	10565500	Silo 1 Zone C	Nitrate	2.47		J	mg/L
075306	10565500	Silo 1 Zone C	pH	11.29		–	std unit
075306	10565500	Silo 1 Zone C	Phosphorus	0.02	U	–	mg/L
075306	10565500	Silo 1 Zone C	Sulfate	71.2		–	mg/L
075306	10565500	Silo 1 Zone C	Sulfide	0.05	U	–	mg/L

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Sample Number	Treatability Number	Location	Parameter	Result	Lab Q	Q5	Units
Formula 2:							
100062	10566500	Silo 2 Zone A	Ammonia	1.78	–	J	mg/L
100062	10566500	Silo 2 Zone A	Chloride	20.8		–	mg/L
100062	10566500	Silo 2 Zone A	Fluoride	0.057		J	mg/L
100062	10566500	Silo 2 Zone A	Nitrate	4.54		J	mg/L
100062	10566500	Silo 2 Zone A	pH	11.82		–	std unit
100062	10566500	Silo 2 Zone A	Phosphorus	0.44		–	mg/L
100062	10566500	Silo 2 Zone A	Sulfate	45.3		–	mg/L
100062	10566500	Silo 2 Zone A	Sulfide	0.05	U	–	mg/L
100063	10563900	Silo 2 Zone B	Ammonia	1.83	–	J	mg/L
100063	10563900	Silo 2 Zone B	Chloride	23.2		–	mg/L
100063	10563900	Silo 2 Zone B	Fluoride	0.072		J	mg/L
100063	10563900	Silo 2 Zone B	Nitrate	11.2		J	mg/L
100063	10563900	Silo 2 Zone B	pH	11.55		–	std unit
100063	10563900	Silo 2 Zone B	Phosphorus	0.17		–	mg/L
100063	10563900	Silo 2 Zone B	Sulfate	60.3		–	mg/L
100063	10563900	Silo 2 Zone B	Sulfide	0.05	U	–	mg/L
100064	10564100	Silo 2 Zone C	Ammonia	1.74	–	J	mg/L
100064	10564100	Silo 2 Zone C	Chloride	18.6		–	mg/L
100064	10564100	Silo 2 Zone C	Fluoride	0.072		J	mg/L
100064	10564100	Silo 2 Zone C	Nitrate	5.83		J	mg/L
100064	10564100	Silo 2 Zone C	pH	11.6		–	std unit
100064	10564100	Silo 2 Zone C	Phosphorus	0.04		–	mg/L
100064	10564100	Silo 2 Zone C	Sulfate	56.9		–	mg/L
100064	10564100	Silo 2 Zone C	Sulfide	2.79		U	mg/L

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Sample Number	Treatability Number	Location	Parameter	Result	Lab Q	Q5	Units
Formula 2:							
100074	10567900	Silo 3	Ammonia	3.05	–	J	mg/L
100074	10567900	Silo 3	Chloride	35.2		–	mg/L
100074	10567900	Silo 3	Fluoride	0.11		J	mg/L
100074	10567900	Silo 3	Nitrate	143		J	mg/L
100074	10567900	Silo 3	pH	10.16		–	std unit
100074	10567900	Silo 3	Phosphorus	0.03		–	mg/L
100074	10567900	Silo 3	Sulfate	1138.6		–	mg/L
100074	10567900	Silo 3	Sulfide	2.95		U	mg/L
100074	10568100	Silo 3	Ammonia	2.9	–	J	mg/L
100074	10568100	Silo 3	Chloride	36.6		–	mg/L
100074	10568100	Silo 3	Fluoride	0.115		J	mg/L
100074	10568100	Silo 3	Nitrate	134.8		J	mg/L
100074	10568100	Silo 3	pH	10.21		–	std unit
100074	10568100	Silo 3	Phosphorus	0.02		–	mg/L
100074	10568100	Silo 3	Sulfate	1122.6		–	mg/L
100074	10568100	Silo 3	Sulfide	2.35		U	mg/L

APPENDIX D

LABORATORY QUALIFIERS

Organic Qualifiers

U = Indicates compound was analyzed for but not detected.

J = Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.

B = This flag is used when the analyte is found in the associated blank as well as the sample. It indicates possible/probable blank contamination.

E = This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis. If one or more compounds had a response greater than full scale, the sample or extract was diluted and reanalyzed. The diluted sample is identified by a "D" suffix appended to the sample number.

F = Estimated value due to a confirmed compound which is off-scale in both columns.

D = This flag is used for all compounds identified in the analysis at a secondary dilution factor.

X = A flag that FORMASTER III CLP software automatically inserts to indicate that the data was entered manually.

NA = Analysis not performed for this analyte.

LABORATORY QUALIFIERS (Continued)

Inorganic Qualifiers

Concentration Qualifiers

B = Reported value was obtained from a reading that was less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit.

U = Indicates compound was analyzed for but not detected.

Quality Qualifiers

E = The reported value is estimated because of the presence of interference.

N = Spiked sample recovery not within control limits.

W = Post-digestion spike for furnace AA analysis is not out of control limits (85 to 115%), while sample absorbance is less than 50% of spike absorbance.

* = Duplicate analysis not within control limits.

+ = Correlation coefficient for the MSA is less than 0.955.

S = The reported value was determined by the Method of Standard Additions.

VALIDATION QUALIFIER CODES

Codes related to Identification:

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

(No Code) = Confirmed identification.

[IDL is defined as the lowest measurable quantity above that of random noise multiplied times a factor of two (2)]

R = Results unusable. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. Resampling and reanalysis are necessary.

N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

Codes Related to Quantitation:

J = Analyte present. Reported value may not be accurate or precise.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

Codes Related to Radiochemical Samples:

J = Analyte present. Reported value may not be accurate or precise. Qualifier is applied where:

- Calculated total uranium value is outside the acceptance limits.
- Calculated percent enrichment value is outside the acceptance limits.
- Calculated U-234 to U-238 activity is outside the acceptance limits.

R = Result unusable. Analyte may or may not be present in the sample. Qualifier is applied where QC data not located or where QC data exceeds control limits. Supporting data necessary to confirm result. Resampling and reanalysis are necessary.

TABLE D-1, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 1, FORMULA 1, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 1, Formula 1							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
100047	10563100 Silo 1 Zone A	Benzoic Acid	0.1	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	bis(2-Ethylhexyl)Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Diethyl phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Dimethyl phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Di-n-Octyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Fluoranthene	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	N-Nitroso-Di-n-Propylamine	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Phenol	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Pyrene	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Tributylphosphate	0.48544		mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	2-Butanone	0.01	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	2-Hexanone	0.01	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	4-Methyl-2-Pentanone	0.01	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Acetone	0.011	B	mg/L	U	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Carbon Tetrachloride	0.005	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Chloroform	0.005	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Methylene Chloride	0.033	B	mg/L	U	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Styrene	0.005	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Tetrachloroethene	0.005	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Toluene	0.005	BJ	mg/L	U	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Total Xylenes	0.005	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Antimony	0.03	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Arsenic	0.002	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Barium	1.56117	E	mg/L	-	3.90	NA	0.78	1.56
100047	10563100 Silo 1 Zone A	Beryllium	0.002	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Boron	0.33786		mg/L	-	0.48	NA	NA	NA
100047	10563100 Silo 1 Zone A	Cadmium	0.005	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Chromium	0.12019		mg/L	-	3.00	NA	1.20	2.40
100047	10563100 Silo 1 Zone A	Cobalt	0.01	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Copper	0.01	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Lead	0.35534	*	mg/L	J	71.07	NA	71.07	7.11
100047	10563100 Silo 1 Zone A	Mercury	0.0002	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Molybdenum	24.66019	E	mg/L	-	822.01	NA	NA	NA
100047	10563100 Silo 1 Zone A	Nickel	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Selenium	0.19612	S	mg/L	J	4.90	NA	3.92	19.61
100047	10563100 Silo 1 Zone A	Silver	0.01	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Thallium	0.002	U	mg/L	-	NA	NA	NA	NA
100047	10563100 Silo 1 Zone A	Vanadium	0.02214	B	mg/L	-	0.44	NA	NA	NA
100047	10563100 Silo 1 Zone A	Zinc	0.0233	B	mg/L	-	0.02	NA	NA	NA
100047	10563300 Silo 1 Zone A	Benzoic Acid	0.00777	J	mg/L	-	0.00	NA	NA	NA

Note: NA indicates no Leachate Action Level exists or comparison was not made to non-detected constituent.

TABLE D-1, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 1, FORMULA 1, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 1, Formula 1							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
100047	10563300 Silo 1 Zone A	bis(2-Ethylhexyl)Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Diethyl phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Dimethyl phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Di-n-Octyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Fluoranthene	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Phenol	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Pyrene	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	2-Butanone	0.00583	J	mg/L	-	0.01	NA	NA	NA
100047	10563300 Silo 1 Zone A	2-Hexanone	0.01	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	4-Methyl-2-Pentanone	0.01	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Acetone	0.03301		mg/L	-	0.05	NA	NA	NA
100047	10563300 Silo 1 Zone A	Carbon Tetrachloride	0.005	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Chloroform	0.005	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Methylene Chloride	0.03	B	mg/L	U	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Styrene	0.005	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Tetrachloroethene	0.005	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Toluene	0.005	BJ	mg/L	U	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Total Xylenes	0.005	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Antimony	0.0901	B	mg/L	-	30.03	NA	NA	NA
100047	10563300 Silo 1 Zone A	Arsenic	0.002	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Barium	1.71456	E	mg/L	-	4.29	NA	0.86	1.71
100047	10563300 Silo 1 Zone A	Beryllium	0.002	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Boron	0.38058		mg/L	-	0.54	NA	NA	NA
100047	10563300 Silo 1 Zone A	Cadmium	0.005	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Chromium	0.12369		mg/L	-	3.09	NA	1.24	2.47
100047	10563300 Silo 1 Zone A	Cobalt	0.01	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Copper	0.01	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Lead	0.17223	*	mg/L	J	34.45	NA	34.45	3.44
100047	10563300 Silo 1 Zone A	Mercury	0.0002	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Molybdenum	26.60194	E	mg/L	-	886.73	NA	NA	NA
100047	10563300 Silo 1 Zone A	Nickel	0.02	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Selenium	0.19379	S	mg/L	J	4.84	NA	3.88	19.38
100047	10563300 Silo 1 Zone A	Silver	0.01	U	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Thallium	0.002	UW	mg/L	-	NA	NA	NA	NA
100047	10563300 Silo 1 Zone A	Vanadium	0.02602	B	mg/L	-	0.52	NA	NA	NA
100047	10563300 Silo 1 Zone A	Zinc	0.04019		mg/L	-	0.04	NA	NA	NA
100048	10563500 Silo 1 Zone B	Benzoic Acid	0.00777	J	mg/L	-	0.00	NA	NA	NA
100048	10563500 Silo 1 Zone B	bis(2-Ethylhexyl)Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Diethyl phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Dimethyl phthalate	0.02	U	mg/L	-	NA	NA	NA	NA

Note: NA indicates no Leachate Action Level exists or comparison was not made to non-detected constituent.

TABLE D-1, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 1, FORMULA 1, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 1, Formula 1							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
100048	10563500 Silo 1 Zone B	Di-n-Octyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Fluoranthene	0.02	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	N-Nitroso-Di-n-Propylamine	0.02	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Phenol	0.02	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Pyrene	0.02	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Tributylphosphate	0.03495	J	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	2-Butanone	0.01	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	2-Hexanone	0.01	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	4-Methyl-2-Pentanone	0.01	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Acetone	0.012	B	mg/L	U	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Carbon Tetrachloride	0.005	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Chloroform	0.005	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Methylene Chloride	0.041	B	mg/L	U	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Styrene	0.005	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Tetrachloroethene	0.005	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Toluene	0.005	BJ	mg/L	U	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Total Xylenes	0.005	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Antimony	0.09049	B	mg/L	-	30.16	NA	NA	NA
100048	10563500 Silo 1 Zone B	Arsenic	0.002	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Barium	1.44854	E	mg/L	-	3.62	NA	0.72	1.45
100048	10563500 Silo 1 Zone B	Beryllium	0.002	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Boron	0.41748		mg/L	-	0.60	NA	NA	NA
100048	10563500 Silo 1 Zone B	Cadmium	0.005	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Chromium	0.11903		mg/L	-	2.98	NA	1.19	2.38
100048	10563500 Silo 1 Zone B	Cobalt	0.01	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Copper	0.01	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Lead	0.04738	S*	mg/L	J	9.48	NA	9.48	0.95
100048	10563500 Silo 1 Zone B	Mercury	0.0002	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Molybdenum	27.76699	E	mg/L	-	925.57	NA	NA	NA
100048	10563500 Silo 1 Zone B	Nickel	0.02	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Selenium	0.34369		mg/L	J	8.59	NA	6.87	34.37
100048	10563500 Silo 1 Zone B	Silver	0.01	U	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Thallium	0.002	UW	mg/L	-	NA	NA	NA	NA
100048	10563500 Silo 1 Zone B	Vanadium	0.04427	B	mg/L	-	0.89	NA	NA	NA
100048	10563500 Silo 1 Zone B	Zinc	0.03864	B	mg/L	-	0.04	NA	NA	NA
100049	10563700 Silo 1 Zone C	Benzoic Acid	0.1	U	mg/L	-	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	bis(2-Ethylhexyl)Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Diethyl phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Dimethyl phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Di-n-Octyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA

Note: NA indicates no Leachate Action Level exists or comparison was not made to non-detected constituent.

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TABLE D-1, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 1, FORMULA 1, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 1, Formula 1							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
100049	10563700 Silo 1 Zone C	Fluoranthene	0.02	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	N-Nitroso-Di-n-Propylamine	0.02	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Phenol	0.02	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Pyrene	0.02	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Tributylphosphate	0.05825		mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	2-Butanone	0.00388	J	mg/L	–	0.01	NA	NA	NA
100049	10563700 Silo 1 Zone C	2-Hexanone	0.01	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	4-Methyl-2-Pentanone	0.01	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Acetone	0.02718		mg/L	–	0.04	NA	NA	NA
100049	10563700 Silo 1 Zone C	Carbon Tetrachloride	0.005	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Chloroform	0.005	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Methylene Chloride	0.029	B	mg/L	U	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Styrene	0.005	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Tetrachloroethene	0.005	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Toluene	0.005	BJ	mg/L	U	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Total Xylenes	0.005	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Antimony	0.0765	B	mg/L	–	25.50	NA	NA	NA
100049	10563700 Silo 1 Zone C	Arsenic	0.002	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Barium	0.85437	E	mg/L	–	2.14	NA	0.43	0.85
100049	10563700 Silo 1 Zone C	Beryllium	0.002	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Boron	0.3301		mg/L	–	0.47	NA	NA	NA
100049	10563700 Silo 1 Zone C	Cadmium	0.005	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Chromium	0.12291		mg/L	–	3.07	NA	1.23	2.46
100049	10563700 Silo 1 Zone C	Cobalt	0.01	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Copper	0.01	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Lead	0.17359	*	mg/L	J	34.72	NA	34.72	3.47
100049	10563700 Silo 1 Zone C	Mercury	0.0002	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Molybdenum	20	E	mg/L	–	666.67	NA	NA	NA
100049	10563700 Silo 1 Zone C	Nickel	0.02	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Selenium	0.43883		mg/L	J	10.97	NA	8.78	43.88
100049	10563700 Silo 1 Zone C	Silver	0.01	U	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Thallium	0.002	UW	mg/L	–	NA	NA	NA	NA
100049	10563700 Silo 1 Zone C	Vanadium	0.03243	B	mg/L	–	0.65	NA	NA	NA
100049	10563700 Silo 1 Zone C	Zinc	0.02757	B	mg/L	–	0.03	NA	NA	NA

Note: NA indicates no Leachate Action Level exists or comparison was not made to non-detected constituent.

TABLE D-2, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 1, FORMULA 2, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 1, Formula 2							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
075304	10565100 Silo 1 Zone A	Benzoic Acid	0.1	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	bis(2-Ethylhexyl)Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Diethylphthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Dimethyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Di-n-Octyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Fluoranthene	0.02	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	N-Nitroso-Di-n-Propylamine	0.02	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Phenol	0.02	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Pyrene	0.02	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Tributyl phosphate	0.36122		mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	2-Butanone	0.01	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	2-Hexanone	0.01	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	4-Methyl-2-Pentanone	0.01	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Acetone	0.04563		mg/L	-	0.07	NA	NA	NA
075304	10565100 Silo 1 Zone A	Carbon Tetrachloride	0.005	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Chloroform	0.005	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Methylene Chloride	0.029	B	mg/L	U	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Styrene	0.005	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Tetrachloroethene	0.005	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Toluene	0.005	BJ	mg/L	U	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Total Xylenes	0.005	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Antimony	0.09981	B	mg/L	-	33.27	NA	NA	NA
075304	10565100 Silo 1 Zone A	Arsenic	0.002	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Barium	1.29658	E	mg/L	-	3.24	NA	0.65	1.30
075304	10565100 Silo 1 Zone A	Beryllium	0.002	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Boron	0.27186		mg/L	-	0.39	NA	NA	NA
075304	10565100 Silo 1 Zone A	Cadmium	0.005	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Chromium	0.01	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Cobalt	0.01	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Copper	0.01	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Lead	0.20152	*	mg/L	J	40.30	NA	40.30	4.03
075304	10565100 Silo 1 Zone A	Mercury	0.0002	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Molybdenum	21.673	E	mg/L	-	722.43	NA	NA	NA
075304	10565100 Silo 1 Zone A	Nickel	0.02	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Selenium	0.1884	S	mg/L	J	4.71	NA	3.77	18.84
075304	10565100 Silo 1 Zone A	Silver	0.01	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Thallium	0.002	U	mg/L	-	NA	NA	NA	NA
075304	10565100 Silo 1 Zone A	Vanadium	0.02376	B	mg/L	-	0.48	NA	NA	NA
075304	10565100 Silo 1 Zone A	Zinc	0.02947	B	mg/L	-	0.03	NA	NA	NA
075305	10565300 Silo 1 Zone B	Benzoic Acid	0.1	U	mg/L	-	NA	NA	NA	NA

Note: NA indicates no Leachate Action Levels exists or comparison was not made to non-detected constituent.

TABLE D-2, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 1, FORMULA 2, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 1, Formula 2							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
075305	10565300 Silo 1 Zone B	bis(2-Ethylhexyl)Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Diethylphthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Dimethyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Di-n-Octyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Fluoranthene	0.02	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	N-Nitroso-Di-n-Propylamine	0.02	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Phenol	0.02	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Pyrene	0.02	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Tributyl phosphate	0.03992		mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	2-Butanone	0.01	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	2-Hexanone	0.01	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	4-Methyl-2-Pentanone	0.01	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Acetone	0.04183		mg/L	-	0.06	NA	NA	NA
075305	10565300 Silo 1 Zone B	Carbon Tetrachloride	0.005	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Chloroform	0.005	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Methylene Chloride	0.037	B	mg/L	U	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Styrene	0.005	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Tetrachloroethene	0.005	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Toluene	0.005	BJ	mg/L	U	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Total Xylenes	0.005	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Antimony	0.07529	B	mg/L	-	25.10	NA	NA	NA
075305	10565300 Silo 1 Zone B	Arsenic	0.002	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Barium	1.34221	E	mg/L	-	3.36	NA	0.67	1.34
075305	10565300 Silo 1 Zone B	Beryllium	0.002	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Boron	0.3403		mg/L	-	0.49	NA	NA	NA
075305	10565300 Silo 1 Zone B	Cadmium	0.005	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Chromium	0.01	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Cobalt	0.01	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Copper	0.01	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Lead	0.01369	W*	mg/L	J	2.74	NA	2.74	0.27
075305	10565300 Silo 1 Zone B	Mercury	0.0002	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Molybdenum	21.86312	E	mg/L	-	728.77	NA	NA	NA
075305	10565300 Silo 1 Zone B	Nickel	0.02	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Selenium	0.27757		mg/L	J	6.94	NA	5.55	27.76
075305	10565300 Silo 1 Zone B	Silver	0.01	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Thallium	0.002	U	mg/L	-	NA	NA	NA	NA
075305	10565300 Silo 1 Zone B	Vanadium	0.05456	B	mg/L	-	1.09	NA	NA	NA
075305	10565300 Silo 1 Zone B	Zinc	0.02795	B	mg/L	-	0.03	NA	NA	NA
075306	10565500 Silo 1 Zone C	Benzoic Acid	0.1	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	bis(2-Ethylhexyl)Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA

Note: NA indicates no Leachate Action Levels exists or comparison was not made to non-detected constituent.

TABLE D-2, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 1, FORMULA 2, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 1, Formula 2							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
075306	10565500 Silo 1 Zone C	Diethylphthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Dimethyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Di-n-Octyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Fluoranthene	0.02	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	N-Nitroso-Di-n-Propylamine	0.02	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Phenol	0.02	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Pyrene	0.02	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Tributyl phosphate	0.02852	J	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	2-Butanone	0.01	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	2-Hexanone	0.01	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	4-Methyl-2-Pentanone	0.01	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Acetone	0.02281		mg/L	-	0.03	NA	NA	NA
075306	10565500 Silo 1 Zone C	Carbon Tetrachloride	0.005	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Chloroform	0.005	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Methylene Chloride	0.03	B	mg/L	U	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Styrene	0.005	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Tetrachloroethene	0.005	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Toluene	0.005	BJ	mg/L	U	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Total Xylenes	0.005	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Antimony	0.06597	B	mg/L	-	21.99	NA	NA	NA
075306	10565500 Silo 1 Zone C	Arsenic	0.002	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Barium	1.18821	E	mg/L	-	2.97	NA	0.59	1.19
075306	10565500 Silo 1 Zone C	Beryllium	0.002	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Boron	0.41255		mg/L	-	0.59	NA	NA	NA
075306	10565500 Silo 1 Zone C	Cadmium	0.005	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Chromium	0.01	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Cobalt	0.01	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Copper	0.01	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Lead	0.00856	W*	mg/L	J	1.71	NA	1.71	0.17
075306	10565500 Silo 1 Zone C	Mercury	0.0002	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Molybdenum	11.84411	E	mg/L	-	394.80	NA	NA	NA
075306	10565500 Silo 1 Zone C	Nickel	0.02	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Selenium	0.38783		mg/L	J	9.70	NA	7.76	38.78
075306	10565500 Silo 1 Zone C	Silver	0.01	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Thallium	0.002	U	mg/L	-	NA	NA	NA	NA
075306	10565500 Silo 1 Zone C	Vanadium	0.0673	B	mg/L	-	1.35	NA	NA	NA
075306	10565500 Silo 1 Zone C	Zinc	0.02719	B	mg/L	-	0.03	NA	NA	NA

Note: NA indicates no Leachate Action Levels exists or comparison was not made to non-detected constituent.

TABLE D-3, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 2, FORMULA 1, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 2, Formula 1							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
075307	10565700 Silo 2 Zone A	Benzoic Acid	0.1	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	bis(2-Ethylhexyl)Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Diethylphthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Dimethyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Di-n-Octyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Fluoranthene	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	N-Nitroso-Di-n-Propylamine	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Phenol	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Pyrene	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Tributyl phosphate	1.04854		mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Antimony	0.0635	B	mg/L	-	21.17	NA	NA	NA
075307	10565700 Silo 2 Zone A	Arsenic	0.01301	B	mg/L	-	1.86	NA	0.26	0.26
075307	10565700 Silo 2 Zone A	Barium	2.79612	E	mg/L	-	6.99	NA	1.40	2.80
075307	10565700 Silo 2 Zone A	Beryllium	0.002	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Boron	0.25243		mg/L	-	0.36	NA	NA	NA
075307	10565700 Silo 2 Zone A	Cadmium	0.005	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Chromium	0.1666		mg/L	-	4.17	NA	1.67	3.33
075307	10565700 Silo 2 Zone A	Cobalt	0.01	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Copper	0.01	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Lead	0.08835	S*	mg/L	J	17.67	NA	17.67	1.77
075307	10565700 Silo 2 Zone A	Mercury	0.0002	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Molybdenum	1.04854	E	mg/L	-	34.95	NA	NA	NA
075307	10565700 Silo 2 Zone A	Nickel	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Selenium	0.03767	S	mg/L	J	0.94	NA	0.75	3.77
075307	10565700 Silo 2 Zone A	Silver	0.01	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Thallium	0.002	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Vanadium	0.02155	B	mg/L	-	0.43	NA	NA	NA
075307	10565700 Silo 2 Zone A	Zinc	0.04796		mg/L	-	0.05	NA	NA	NA
075307	10565900 Silo 2 Zone A	Benzoic Acid	0.1	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	bis(2-Ethylhexyl)Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Diethylphthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Dimethyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Di-n-Octyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Fluoranthene	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	N-Nitroso-Di-n-Propylamine	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Phenol	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Pyrene	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Tributyl phosphate	1.2233		mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	2-Butanone	0.00777	J	mg/L	-	0.02	NA	NA	NA

Note: NA indicates no Leachate Action Level exits or comparison was not made to non-detected constituents.

TABLE D-3, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 2, FORMULA 1, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 2, Formula 1							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
075307	10565900 Silo 2 Zone A	2-Hexanone	0.01	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	4-Methyl-2-Pentanone	0.01	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Acetone	0.05049	B	mg/L	-	0.07	NA	NA	NA
075307	10565900 Silo 2 Zone A	Carbon Tetrachloride	0.005	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Chloroform	0.005	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Methylene Chloride	0.036	B	mg/L	U	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Styrene	0.005	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Tetrachloroethene	0.005	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Toluene	0.005	BJ	mg/L	U	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Total Xylenes	0.005	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Antimony	0.07223	B	mg/L	-	24.08	NA	NA	NA
075307	10565900 Silo 2 Zone A	Arsenic	0.00874	B	mg/L	-	1.25	NA	0.17	0.17
075307	10565900 Silo 2 Zone A	Barium	2.56311	E	mg/L	-	6.41	NA	1.28	2.56
075307	10565900 Silo 2 Zone A	Beryllium	0.002	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Boron	0.22718		mg/L	-	0.32	NA	NA	NA
075307	10565900 Silo 2 Zone A	Cadmium	0.01165		mg/L	-	2.91	NA	2.33	1.17
075307	10565900 Silo 2 Zone A	Chromium	0.11456		mg/L	-	2.86	NA	1.15	2.29
075307	10565900 Silo 2 Zone A	Cobalt	0.01	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Copper	0.01	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Lead	0.16252	*	mg/L	J	32.50	NA	32.50	3.25
075307	10565900 Silo 2 Zone A	Mercury	0.0002	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Molybdenum	0.83301	E	mg/L	-	27.77	NA	NA	NA
075307	10565900 Silo 2 Zone A	Nickel	0.02	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Selenium	0.02932	S	mg/L	J	0.73	NA	0.59	2.93
075307	10565900 Silo 2 Zone A	Silver	0.01	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Thallium	0.002	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Vanadium	0.01	U	mg/L	-	NA	NA	NA	NA
075307	10565900 Silo 2 Zone A	Zinc	0.03534	B	mg/L	-	0.04	NA	NA	NA
075307	10565700 Silo 2 Zone A	2-Butanone	0.01	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	2-Hexanone	0.01	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	4-Methyl-2-Pentanone	0.01	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Acetone	0.06602	B	mg/L	-	0.09	NA	NA	NA
075307	10565700 Silo 2 Zone A	Carbon Tetrachloride	0.005	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Chloroform	0.005	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Methylene Chloride	0.037	B	mg/L	U	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Styrene	0.005	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Tetrachloroethene	0.005	U	mg/L	-	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Toluene	0.005	BJ	mg/L	U	NA	NA	NA	NA
075307	10565700 Silo 2 Zone A	Total Xylenes	0.005	U	mg/L	-	NA	NA	NA	NA

Note: NA indicates no Leachate Action Level exits or comparison was not made to non-detected constituents.

TABLE D-3, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 2, FORMULA 1, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 2, Formula 1							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
075308	10566300 Silo 2 Zone C	Benzoic Acid	0.005	J	mg/L	-	0.00	NA	NA	NA
075308	10566300 Silo 2 Zone C	bis(2-Ethylhexyl)Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Diethylphthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Dimethyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Di-n-Octyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Fluoranthene	0.02	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	N-Nitroso-Di-n-Propylamine	0.02	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Phenol	0.02	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Pyrene	0.02	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Tributyl phosphate	0.38835		mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	2-Butanone	0.01	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	2-Hexanone	0.01	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	4-Methyl-2-Pentanone	0.01	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Acetone	0.09709		mg/L	-	0.14	NA	NA	NA
075308	10566300 Silo 2 Zone C	Carbon Tetrachloride	0.005	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Chloroform	0.005	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Methylene Chloride	0.034	B	mg/L	U	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Styrene	0.005	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Tetrachloroethene	0.005	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Toluene	0.005	BJ	mg/L	U	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Total Xylenes	0.005	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Antimony	0.09146	B	mg/L	-	30.49	NA	NA	NA
075308	10566300 Silo 2 Zone C	Arsenic	0.01631	B	mg/L	-	2.33	NA	0.33	0.33
075308	10566300 Silo 2 Zone C	Barium	2.23301	E	mg/L	-	5.58	NA	1.12	2.23
075308	10566300 Silo 2 Zone C	Beryllium	0.002	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Boron	0.22524		mg/L	-	0.32	NA	NA	NA
075308	10566300 Silo 2 Zone C	Cadmium	0.005	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Chromium	0.12971		mg/L	-	3.24	NA	1.30	2.59
075308	10566300 Silo 2 Zone C	Cobalt	0.01	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Copper	0.05806		mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Lead	0.78447	S*	mg/L	J	156.89	NA	156.89	15.69
075308	10566300 Silo 2 Zone C	Mercury	0.0002	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Molybdenum	3.41748	E	mg/L	-	113.92	NA	NA	NA
075308	10566300 Silo 2 Zone C	Nickel	0.02	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Selenium	0.11728	S	mg/L	J	2.93	NA	2.35	11.73
075308	10566300 Silo 2 Zone C	Silver	0.01	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Thallium	0.002	U	mg/L	-	NA	NA	NA	NA
075308	10566300 Silo 2 Zone C	Vanadium	0.05126	B	mg/L	-	1.03	NA	NA	NA
075308	10566300 Silo 2 Zone C	Zinc	0.02718	B	mg/L	-	0.03	NA	NA	NA

Note: NA indicates no Leachate Action Level exits or comparison was not made to non-detected constituents.

TABLE D-3, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 2, FORMULA 1, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 2, Formula 1							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
100063	10566100 Silo 2 Zone B	Benzoic Acid	0.1	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	bis(2-Ethylhexyl)Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Diethylphthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Dimethyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Di-n-Octyl Phthalate	0.02	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Fluoranthene	0.02	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	N-Nitroso-Di-n-Propylamine	0.02	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Phenol	0.02	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Pyrene	0.02	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Tributyl phosphate	0.87379		mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	2-Butanone	0.01	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	2-Hexanone	0.01	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	4-Methyl-2-Pentanone	0.01	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Acetone	0.06408		mg/L	-	0.09	NA	NA	NA
100063	10566100 Silo 2 Zone B	Carbon Tetrachloride	0.005	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Chloroform	0.005	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Methylene Chloride	0.04	B	mg/L	U	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Styrene	0.005	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Tetrachloroethene	0.005	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Toluene	0.005	BJ	mg/L	U	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Total Xylenes	0.005	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Antimony	0.03	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Arsenic	0.01903	B	mg/L	-	2.72	NA	0.38	0.38
100063	10566100 Silo 2 Zone B	Barium	2.56311	E	mg/L	-	6.41	NA	1.28	2.56
100063	10566100 Silo 2 Zone B	Beryllium	0.002	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Boron	0.26019		mg/L	-	0.37	NA	NA	NA
100063	10566100 Silo 2 Zone B	Cadmium	0.005	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Chromium	0.15437		mg/L	-	3.86	NA	1.54	3.09
100063	10566100 Silo 2 Zone B	Cobalt	0.01	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Copper	0.01	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Lead	0.06563	S*	mg/L	J	13.13	NA	13.13	1.31
100063	10566100 Silo 2 Zone B	Mercury	0.0002	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Molybdenum	2.54369	E	mg/L	-	84.79	NA	NA	NA
100063	10566100 Silo 2 Zone B	Nickel	0.03883	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Selenium	9E-05	S	mg/L	J	0.00	NA	0.00	0.01
100063	10566100 Silo 2 Zone B	Silver	0.01942	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Thallium	0.002	U	mg/L	-	NA	NA	NA	NA
100063	10566100 Silo 2 Zone B	Vanadium	0.05068	B	mg/L	-	1.01	NA	NA	NA
100063	10566100 Silo 2 Zone B	Zinc	0.02951	B	mg/L	-	0.03	NA	NA	NA

Note: NA indicates no Leachate Action Level exits or comparison was not made to non-detected constituents.

TABLE D-4, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 2, FORMULA 2, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 2, Formula 2							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
100062	10566500 Silo 2 Zone A	Antimony	0.06027	B	mg/L	-	20.09	NA	NA	NA
100062	10566500 Silo 2 Zone A	Arsenic	0.00989	B	mg/L	-	1.41	NA	0.20	0.20
100062	10566500 Silo 2 Zone A	Barium	2.39544	E	mg/L	-	5.99	NA	1.20	2.40
100062	10566500 Silo 2 Zone A	Beryllium	0.00200	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Boron	0.25856		mg/L	-	0.37	NA	NA	NA
100062	10566500 Silo 2 Zone A	Cadmium	0.00500	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Chromium	0.04487		mg/L	-	1.12	NA	0.45	0.90
100062	10566500 Silo 2 Zone A	Cobalt	0.01000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Copper	0.01000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Lead	0.06255	*+	mg/L	J	12.51	NA	12.51	1.25
100062	10566500 Silo 2 Zone A	Mercury	0.00020	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Molybdenum	0.57034	E	mg/L	-	19.01	NA	NA	NA
100062	10566500 Silo 2 Zone A	Nickel	0.02000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Selenium	0.01958	S	mg/L	J	0.49	NA	0.39	1.96
100062	10566500 Silo 2 Zone A	Silver	0.01000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Thallium	0.00627	B	mg/L	-	12.54	NA	3.14	NA
100062	10566500 Silo 2 Zone A	Vanadium	0.01000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Zinc	0.04696		mg/L	-	0.05	NA	NA	NA
100062	10566500 Silo 2 Zone A	Phenol	0.02000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	N-Nitroso-Di-n-Propylamine	0.02000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Benzoic Acid	0.10000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Dimethyl Phthalate	0.02000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Diethylphthalate	0.02000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Tributyl phosphate	0.96958		mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Fluoranthene	0.02000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Pyrene	0.02000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	bis(2-Ethylhexyl)Phthalate	0.02000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Di-n-Octyl Phthalate	0.02000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	2-Butanone	0.01000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	2-Hexanone	0.01000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	4-Methyl-2-Pentanone	0.01000	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Acetone	0.04943		mg/L	-	0.07	NA	NA	NA
100062	10566500 Silo 2 Zone A	Carbon Tetrachloride	0.00500	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Chloroform	0.00500	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Methylene Chloride	0.07795	B	mg/L	U	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Styrene	0.00500	U	mg/L	-	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Tetrachloroethene	0.00190	J	mg/L	-	0.03	2.71	0.38	NA
100062	10566500 Silo 2 Zone A	Toluene	0.00951	BJ	mg/L	U	NA	NA	NA	NA
100062	10566500 Silo 2 Zone A	Total Xylenes	0.00500	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Antimony	0.08289		mg/L	-	27.63	NA	NA	NA

Note: NA indicates no Leachate Action Level exists or comparison was not made to non-detected constituent.

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TABLE D-4, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 2, FORMULA 2, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 2, Formula 2							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
100063	10563900 Silo 2 Zone B	Arsenic	0.01825	B	mg/L	-	2.61	NA	0.37	0.37
100063	10563900 Silo 2 Zone B	Barium	2.37643	E	mg/L	-	5.94	NA	1.19	2.38
100063	10563900 Silo 2 Zone B	Beryllium	0.00200	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Boron	0.33651		mg/L	-	0.48	NA	NA	NA
100063	10563900 Silo 2 Zone B	Cadmium	0.00500	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Chromium	0.02586		mg/L	-	0.65	NA	0.26	0.52
100063	10563900 Silo 2 Zone B	Cobalt	0.01000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Copper	0.01000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Lead	0.03118	*	mg/L	J	6.24	NA	6.24	0.62
100063	10563900 Silo 2 Zone B	Mercury	0.00020	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Molybdenum	1.99620	E	mg/L	-	66.54	NA	NA	NA
100063	10563900 Silo 2 Zone B	Nickel	0.02000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Selenium	0.12814	S	mg/L	J	3.20	NA	2.56	12.81
100063	10563900 Silo 2 Zone B	Silver	0.01000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Thallium	0.00200	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Vanadium	0.06635	B	mg/L	-	1.33	NA	NA	NA
100063	10563900 Silo 2 Zone B	Zinc	0.03460	B	mg/L	-	0.03	NA	NA	NA
100063	10563900 Silo 2 Zone B	Phenol	0.02000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	N-Nitroso-Di-n-Propylamine	0.02000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Benzoic Acid	0.10000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Dimethyl Phthalate	0.02000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Diethylphthalate	0.02000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Tributyl phosphate	0.79848		mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Fluoranthene	0.02000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Pyrene	0.02000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	bis(2-Ethylhexyl)Phthalate	0.02000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Di-n-Octyl Phthalate	0.02000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	2-Butanone	0.01000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	2-Hexanone	0.01000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	4-Methyl-2-Pentanone	0.01000	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Acetone	0.01901		mg/L	-	0.03	NA	NA	NA
100063	10563900 Silo 2 Zone B	Carbon Tetrachloride	0.00500	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Chloroform	0.00500	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Methylene Chloride	0.03612	B	mg/L	U	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Styrene	0.00500	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Tetrachloroethene	0.00500	U	mg/L	-	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Toluene	0.00951	BJ	mg/L	U	NA	NA	NA	NA
100063	10563900 Silo 2 Zone B	Total Xylenes	0.00500	U	mg/L	-	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Antimony	0.06920	B	mg/L	-	23.07	NA	NA	NA
100064	10564100 Silo 2 Zone C	Arsenic	0.01996		mg/L	-	2.85	NA	0.40	0.40

Note: NA indicates no Leachate Action Level exists or comparison was not made to non-detected constituent.

TABLE D-4, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 2, FORMULA 2, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for All Zones of Silo 2, Formula 2							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
100064	10564100 Silo 2 Zone C	Barium	1.92015	E	mg/L	–	4.80	NA	0.96	1.92
100064	10564100 Silo 2 Zone C	Beryllium	0.00200	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Boron	0.32890		mg/L	–	0.47	NA	NA	NA
100064	10564100 Silo 2 Zone C	Cadmium	0.00500	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Chromium	0.02110		mg/L	–	0.53	NA	0.21	0.42
100064	10564100 Silo 2 Zone C	Cobalt	0.01000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Copper	0.01000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Lead	0.07490	S*	mg/L	J	14.98	NA	14.98	1.50
100064	10564100 Silo 2 Zone C	Mercury	0.00020	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Molybdenum	2.62357	E	mg/L	–	87.45	NA	NA	NA
100064	10564100 Silo 2 Zone C	Nickel	0.02000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Selenium	0.13061	S	mg/L	J	3.27	NA	2.61	13.06
100064	10564100 Silo 2 Zone C	Silver	0.01000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Thallium	0.00200	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Vanadium	0.07966	B	mg/L	–	1.59	NA	NA	NA
100064	10564100 Silo 2 Zone C	Zinc	0.03460	B	mg/L	–	0.03	NA	NA	NA
100064	10564100 Silo 2 Zone C	Phenol	0.02000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	N-Nitroso-Di-n-Propylamine	0.02000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Benzoic Acid	0.10000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Dimethyl Phthalate	0.02000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Diethylphthalate	0.02000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Tributyl phosphate	0.19011		mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Fluoranthene	0.02000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Pyrene	0.02000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	bis(2-Ethylhexyl)Phthalate	0.02000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Di-n-Octyl Phthalate	0.02000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	2-Butanone	0.01000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	2-Hexanone	0.01000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	4-Methyl-2-Pentanone	0.01000	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Acetone	0.07795		mg/L	–	0.11	NA	NA	NA
100064	10564100 Silo 2 Zone C	Carbon Tetrachloride	0.00500	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Chloroform	0.00500	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Methylene Chloride	0.07985	B	mg/L	U	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Styrene	0.00500	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Tetrachloroethene	0.00500	U	mg/L	–	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Toluene	0.00951	BJ	mg/L	U	NA	NA	NA	NA
100064	10564100 Silo 2 Zone C	Total Xylenes	0.00500	U	mg/L	–	NA	NA	NA	NA

Note: NA indicates no Leachate Action Level exists or comparison was not made to non-detected constituent.

TABLE D-5, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 3, FORMULA 1, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilezed Treatability TCLP Data for Silo 3, Formula 1							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	QS	HI=0.2	10-6	ARAR	Grnd Wtr
100074	10568300 Silo 3	Antimony	0.03	U	mg/L	–	NA	NA	NA	NA
100074	10568300 Silo 3	Arsenic	0.0893457	S	mg/L	–	12.76	NA	1.79	1.79
100074	10568300 Silo 3	Barium	0.3869158	E	mg/L	–	0.97	NA	0.19	0.39
100074	10568300 Silo 3	Beryllium	0.0046728	B	mg/L	–	0.12	584.10	4.67	NA
100074	10568300 Silo 3	Boron	2.542056		mg/L	–	3.63	NA	NA	NA
100074	10568300 Silo 3	Cadmium	0.005	U	mg/L	–	NA	NA	NA	NA
100074	10568300 Silo 3	Chromium	0.9925233		mg/L	–	24.81	NA	9.93	19.85
100074	10568300 Silo 3	Cobalt	0.01	U	mg/L	–	NA	NA	NA	NA
100074	10568300 Silo 3	Copper	0.01	U	mg/L	–	NA	NA	NA	NA
100074	10568300 Silo 3	Lead	0.002	UW*	mg/L	J	NA	NA	NA	NA
100074	10568300 Silo 3	Manganese	0.01	U	mg/L	–	NA	NA	NA	NA
100074	10568300 Silo 3	Mercury	0.0002	U	mg/L	–	NA	NA	NA	NA
100074	10568300 Silo 3	Molybdenum	11.084112	E	mg/L	–	369.47	NA	NA	NA
100074	10568300 Silo 3	Nickel	0.02	U	mg/L	–	NA	NA	NA	NA
100074	10568300 Silo 3	Selenium	0.3345794		mg/L	J	8.36	NA	6.69	33.46
100074	10568300 Silo 3	Silver	0.01	U	mg/L	–	NA	NA	NA	NA
100074	10568300 Silo 3	Thallium	0.0242990	BW	mg/L	–	48.60	NA	12.15	NA
100074	10568300 Silo 3	Vanadium	0.6859813		mg/L	–	13.72	NA	NA	NA
100074	10568300 Silo 3	Zinc	0.0196261	B	mg/L	–	0.02	NA	NA	NA

Note: NA Indicates no Leachate Action Level exists or comparison was not made to non-detected constituent.

TABLE D-6, DILUTION ADJUSTED TREATABILITY DATA FOR SILO 3, FORMULA 2, COMPARED TO LEACHATE ACTION LEVELS

OU4 Cement Stabilized Treatability TCLP Data for Silo 3, Formula 2							Percent of Leachate Action Level			
Sample	Location	Constituent	Result	Lab	Units	Q5	HI=0.2	10-6	ARAR	Grnd Wtr
100074	10567900 Silo 3	Antimony	0.03	U	mg/L	-	NA	NA	NA	NA
100074	10567900 Silo 3	Arsenic	0.0890287	S	mg/L	-	12.72	NA	1.78	1.78
100074	10567900 Silo 3	Barium	0.4388489	E	mg/L	-	1.10	NA	0.22	0.44
100074	10567900 Silo 3	Beryllium	0.0043165	B	mg/L	-	0.11	539.56	4.32	NA
100074	10567900 Silo 3	Boron	2.3201438		mg/L	-	3.31	NA	NA	NA
100074	10567900 Silo 3	Cadmium	0.005	U	mg/L	-	NA	NA	NA	NA
100074	10567900 Silo 3	Chromium	0.0512589		mg/L	-	1.28	NA	0.51	1.03
100074	10567900 Silo 3	Cobalt	0.01	U	mg/L	-	NA	NA	NA	NA
100074	10567900 Silo 3	Copper	0.01	U	mg/L	-	NA	NA	NA	NA
100074	10567900 Silo 3	Lead	0.002	U*	mg/L	J	NA	NA	NA	NA
100074	10567900 Silo 3	Manganese	0.01	U	mg/L	-	NA	NA	NA	NA
100074	10567900 Silo 3	Mercury	0.0002	U	mg/L	-	NA	NA	NA	NA
100074	10567900 Silo 3	Molybdenum	11.079136	E	mg/L	-	369.30	NA	NA	NA
100074	10567900 Silo 3	Nickel	0.02	U	mg/L	-	NA	NA	NA	NA
100074	10567900 Silo 3	Selenium	0.2607913		mg/L	J	6.52	NA	5.22	26.08
100074	10567900 Silo 3	Silver	0.01	U	mg/L	-	NA	NA	NA	NA
100074	10567900 Silo 3	Thallium	0.0320143		mg/L	-	64.03	NA	16.01	NA
100074	10567900 Silo 3	Vanadium	0.7068345		mg/L	-	14.14	NA	NA	NA
100074	10567900 Silo 3	Zinc	0.0203237	B	mg/L	-	0.02	NA	NA	NA
100074	10568100 Silo 3	Antimony	0.0737410	B	mg/L	-	24.58	NA	NA	NA
100074	10568100 Silo 3	Arsenic	0.0998201	+	mg/L	J	14.26	NA	2.00	2.00
100074	10568100 Silo 3	Barium	0.4280575	E	mg/L	-	1.07	NA	0.21	0.43
100074	10568100 Silo 3	Beryllium	0.0041366	B	mg/L	-	0.10	517.08	4.14	NA
100074	10568100 Silo 3	Boron	2.3381294		mg/L	-	3.34	NA	NA	NA
100074	10568100 Silo 3	Cadmium	0.005	U	mg/L	-	NA	NA	NA	NA
100074	10568100 Silo 3	Chromium	0.0589928		mg/L	-	1.47	NA	0.59	1.18
100074	10568100 Silo 3	Cobalt	0.01	U	mg/L	-	NA	NA	NA	NA
100074	10568100 Silo 3	Copper	0.01	U	mg/L	-	NA	NA	NA	NA
100074	10568100 Silo 3	Lead	0.002	U*	mg/L	J	NA	NA	NA	NA
100074	10568100 Silo 3	Manganese	0.01	U	mg/L	-	NA	NA	NA	NA
100074	10568100 Silo 3	Mercury	0.0002	U	mg/L	-	NA	NA	NA	NA
100074	10568100 Silo 3	Molybdenum	12.122302	E	mg/L	-	404.08	NA	NA	NA
100074	10568100 Silo 3	Nickel	0.02	U	mg/L	-	NA	NA	NA	NA
100074	10568100 Silo 3	Selenium	0.2482014		mg/L	J	6.21	NA	4.96	24.82
100074	10568100 Silo 3	Silver	0.01	U	mg/L	-	NA	NA	NA	NA
100074	10568100 Silo 3	Thallium	0.0393884		mg/L	-	78.78	NA	19.69	NA
100074	10568100 Silo 3	Vanadium	0.7158273		mg/L	-	14.32	NA	NA	NA
100074	10568100 Silo 3	Zinc	0.025	B	mg/L	-	0.03	NA	NA	NA

Note: NA indicates no Leachate Action Level exists or comparison was not made to non-detected constituent.

TABLE D-7, DILUTION ADJUSTED TCLP SILO RADIOLOGICAL TREATABILITY DATA COMPARED TO LEACHATE ACTION LEVELS

Sample Number	Treatability Number	Location	Constituent	Result	2-Sigma Error	Units	Q5	Percent of Leachate Action Level			
								HI=0.2	10-6	ARARs	Gmd Wtr
Formulation 1:											
100047	10563100	Silo 1 Zone A	Ac-227	*		pCi/L	-	NA	NA	NA	NA
100047	10563100	Silo 1 Zone A	Pa-231	<1527		pCi/L	-	NA	NA	NA	NA
100047	10563100	Silo 1 Zone A	Pb-210	732.03883	38	pCi/L	-	NA	24401	732.04	NA
100047	10563100	Silo 1 Zone A	Po-210	108.34951	18.7	pCi/L	-	NA	NA	NA	NA
100047	10563100	Silo 1 Zone A	Ra-226	24660.194	1800	pCi/L	-	NA	123301	1233	4932
100047	10563100	Silo 1 Zone A	Ra-228	6.4466019	1.33	pCi/L	-	NA	32.233	0.3223	1.2893
100047	10563100	Silo 1 Zone A	Th-Total	*		mg/L	-	NA	NA	NA	NA
100047	10563100	Silo 1 Zone A	U-Total	0.0032621	0.00018	mg/L	-	NA	0.9422	0.1545	NA
100047	10563300	Silo 1 Zone A	Ac-227	<1		pCi/L	-	NA	NA	NA	NA
100047	10563300	Silo 1 Zone A	Pa-231	<1168		pCi/L	-	NA	NA	NA	NA
100047	10563300	Silo 1 Zone A	Pb-210	543.68932	29	pCi/L	-	NA	18123	543.69	NA
100047	10563300	Silo 1 Zone A	Po-210	74.174757	19.2	pCi/L	-	NA	NA	NA	NA
100047	10563300	Silo 1 Zone A	Ra-226	*A		pCi/L	-	NA	NA	NA	NA
100047	10563300	Silo 1 Zone A	Ra-228	*A		pCi/L	-	NA	NA	NA	NA
100047	10563300	Silo 1 Zone A	Th-Total	<0.0049		mg/L	-	NA	NA	NA	NA
100047	10563300	Silo 1 Zone A	U-Total	<0.001		mg/L	-	NA	NA	NA	NA
100048	10563500	Silo 1 Zone B	Ac-227	<1		pCi/L	-	NA	NA	NA	NA
100048	10563500	Silo 1 Zone B	Pa-231	<1428		pCi/L	-	NA	NA	NA	NA
100048	10563500	Silo 1 Zone B	Pb-210	156.11650	8.6	pCi/L	-	NA	5203.9	156.12	NA
100048	10563500	Silo 1 Zone B	Po-210	112.23300	21.8	pCi/L	-	NA	NA	NA	NA
100048	10563500	Silo 1 Zone B	Ra-226	9417.4757	710	pCi/L	-	NA	47087	470.87	1883.5
100048	10563500	Silo 1 Zone B	Ra-228	<3		pCi/L	-	NA	NA	NA	NA
100048	10563500	Silo 1 Zone B	Th-Total	<0.0030		mg/L	-	NA	NA	NA	NA
100048	10563500	Silo 1 Zone B	U-Total	0.0033398	0.00018	mg/L	-	NA	0.9646	0.1582	NA
100049	10563700	Silo 1 Zone C	Ac-227	<1		pCi/L	-	NA	NA	NA	NA
100049	10563700	Silo 1 Zone C	Pa-231	<1028		pCi/L	-	NA	NA	NA	NA
100049	10563700	Silo 1 Zone C	Pb-210	533.98058	28	pCi/L	-	NA	17799	533.98	NA
100049	10563700	Silo 1 Zone C	Po-210	150.09708	25	pCi/L	-	NA	NA	NA	NA
100049	10563700	Silo 1 Zone C	Ra-226	10407.766	780	pCi/L	-	NA	52039	520.39	2081.6
100049	10563700	Silo 1 Zone C	Ra-228	<3		pCi/L	-	NA	NA	NA	NA
100049	10563700	Silo 1 Zone C	Th-Total	<0.0032		mg/L	-	NA	NA	NA	NA
100049	10563700	Silo 1 Zone C	U-Total	<0.001		mg/L	-	NA	NA	NA	NA

Note: NA indicates no Leachate Action Level exists or comparison not made to non-detected constituent. * and ** indicate no result.

TABLE D-7, DILUTION ADJUSTED TCLP SILO RADIOLOGICAL TREATABILITY DATA COMPARED TO LEACHATE ACTION LEVELS

Sample Number	Treatability Number	Location	Constituent	Result	2-Sigma Error	Units	Q5	Percent of Leachate Action Level			
								HI=0.2	10-6	ARARs	Grnd Wtr
Formulation 1:											
075307	10565700	Silo 2 Zone A	Ac-227	*		pCi/L	-	NA	NA	NA	NA
075307	10565700	Silo 2 Zone A	Pa-231	<2298		pCi/L	-	NA	NA	NA	NA
075307	10565700	Silo 2 Zone A	Pb-210	961.16504	50	pCi/L	-	NA	32039	961.17	NA
075307	10565700	Silo 2 Zone A	Po-210	21.553398	8	pCi/L	-	NA	NA	NA	NA
075307	10565700	Silo 2 Zone A	Ra-226	94368.932	6900	pCi/L	-	NA	471845	4718.4	18874
075307	10565700	Silo 2 Zone A	Ra-228	16.194174	1.86	pCi/L	-	NA	80.971	0.8097	3.2388
075307	10565700	Silo 2 Zone A	Th-Total	*		mg/L	-	NA	NA	NA	NA
075307	10565700	Silo 2 Zone A	U-Total	<0.001		mg/L	-	NA	NA	NA	NA
075307	10565900	Silo 2 Zone A	Ac-227	*		pCi/L	-	NA	NA	NA	NA
075307	10565900	Silo 2 Zone A	Pa-231	<2479		pCi/L	-	NA	NA	NA	NA
075307	10565900	Silo 2 Zone A	Pb-210	671.84466	35	pCi/L	-	NA	22395	671.84	NA
075307	10565900	Silo 2 Zone A	Po-210	93.980582	20.2	pCi/L	-	NA	NA	NA	NA
075307	10565900	Silo 2 Zone A	Ra-226	17669.902	1300	pCi/L	-	NA	88350	883.5	3534
075307	10565900	Silo 2 Zone A	Ra-228	<3		pCi/L	-	NA	NA	NA	NA
075307	10565900	Silo 2 Zone A	Th-Total	*		mg/L	-	NA	NA	NA	NA
075307	10565900	Silo 2 Zone A	U-Total	<0.001		mg/L	-	NA	NA	NA	NA
100063	10566100	Silo 2 Zone B	Ac-227	**		pCi/L	-	NA	NA	NA	NA
100063	10566100	Silo 2 Zone B	Pa-231	<1483		pCi/L	-	NA	NA	NA	NA
100063	10566100	Silo 2 Zone B	Pb-210	359.22330	19	pCi/L	-	NA	11974	359.22	NA
100063	10566100	Silo 2 Zone B	Po-210	48.737864	16.7	pCi/L	-	NA	NA	NA	NA
100063	10566100	Silo 2 Zone B	Ra-226	14194.174	1040	pCi/L	-	NA	70971	709.71	2838.8
100063	10566100	Silo 2 Zone B	Ra-228	8.3495145	1.41	pCi/L	-	NA	41.748	0.4175	1.6699
100063	10566100	Silo 2 Zone B	Th-Total	**		mg/L	-	NA	NA	NA	NA
100063	10566100	Silo 2 Zone B	U-Total	<0.001		mg/L	-	NA	NA	NA	NA
075308	10566300	Silo 2 Zone C	Ac-227	<1		pCi/L	-	NA	NA	NA	NA
075308	10566300	Silo 2 Zone C	Pa-231	<2088		pCi/L	-	NA	NA	NA	NA
075308	10566300	Silo 2 Zone C	Pb-210	646.60194	34	pCi/L	-	NA	21553	646.6	NA
075308	10566300	Silo 2 Zone C	Po-210	131.65048	21.5	pCi/L	-	NA	NA	NA	NA
075308	10566300	Silo 2 Zone C	Ra-226	17300.970	1260	pCi/L	-	NA	86505	865.05	3460.2
075308	10566300	Silo 2 Zone C	Ra-228	7.4757281	1.11	pCi/L	-	NA	37.379	0.3738	1.4951
075308	10566300	Silo 2 Zone C	Th-Total	<0.0025		mg/L	-	NA	NA	NA	NA
075308	10566300	Silo 2 Zone C	U-Total	0.0038641	0.00022	mg/L	-	NA	1.1161	0.1831	NA

Note: NA indicates no Leachate Action Level exists or comparison not made to non-detected constituent. * and ** indicate no result.

TABLE D-7, DILUTION ADJUSTED TCLP SILO RADIOLOGICAL TREATABILITY DATA COMPARED TO LEACHATE ACTION LEVELS

Sample Number	Treatability Number	Location	Constituent	Result	2-Sigma Error	Units	Q5	Percent of Leachate Action Level			
								HI=0.2	10-6	ARARs	Grnd Wtr
Formulation 1:											
100074	10568300	Silo 3	Ac-227	*		pCi/L	–	NA	NA	NA	NA
100074	10568300	Silo 3	Pa-231	< 463		pCi/L	–	NA	NA	NA	NA
100074	10568300	Silo 3	Pb-210	360.74766	20	pCi/L	–	NA	12025	360.75	NA
100074	10568300	Silo 3	Po-210	< 18.9		pCi/L	–	NA	NA	NA	NA
100074	10568300	Silo 3	Ra-226	1712.1495	135	pCi/L	–	NA	8560.7	85.607	342.43
100074	10568300	Silo 3	Ra-228	111.21495	8.8	pCi/L	–	NA	556.07	5.5607	22.243
100074	10568300	Silo 3	Th-Total	*		mg/L	–	NA	NA	NA	NA
100074	10568300	Silo 3	U-Total	0.0060187	0.00035	mg/L	–	NA	1.7384	0.2851	NA

Note: NA indicates no Leachate Action Level exists or comparison not made to non-detected constituent. * and ** indicate no result.

APPENDIX E

LABORATORY QUALIFIERS

Organic Qualifiers

U = Indicates compound was analyzed for but not detected.

J = Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.

B = This flag is used when the analyte is found in the associated blank as well as the sample. It indicates possible/probable blank contamination.

E = This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis. If one or more compounds had a response greater than full scale, the sample or extract was diluted and reanalyzed. The diluted sample is identified by a "D" suffix appended to the sample number.

F = Estimated value due to a confirmed compound which is off-scale in both columns.

D = This flag is used for all compounds identified in the analysis at a secondary dilution factor.

X = A flag that FORMASTER III CLP software automatically inserts to indicate that the data was entered manually.

NA = Analysis not performed for this analyte.

LABORATORY QUALIFIERS (Continued)

Inorganic Qualifiers

Concentration Qualifiers

B = Reported value was obtained from a reading that was less than the contract required detection limit (CRDL) but greater than or equal to the instrument detection limit.

U = Indicates compound was analyzed for but not detected.

Quality Qualifiers

E = The reported value is estimated because of the presence of interference.

N = Spiked sample recovery not within control limits.

W = Post-digestion spike for furnace AA analysis is not out of control limits (85 to 115%), while sample absorbance is less than 50% of spike absorbance.

* = Duplicate analysis not within control limits.

+ = Correlation coefficient for the MSA is less than 0.955.

S = The reported value was determined by the Method of Standard Additions.

VALIDATION QUALIFIER CODES

Codes related to Identification:

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

(No Code) = Confirmed identification.

[IDL is defined as the lowest measurable quantity above that of random noise multiplied times a factor of two (2)]

R = Results unusable. Analyte may or may not be present in the sample. Supporting data necessary to confirm result. Resampling and reanalysis are necessary.

N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

Codes Related to Quantitation:

J = Analyte present. Reported value may not be accurate or precise.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

Codes Related to Radiochemical Samples:

J = Analyte present. Reported value may not be accurate or precise. Qualifier is applied where:

- Calculated total uranium value is outside the acceptance limits.
- Calculated percent enrichment value is outside the acceptance limits.
- Calculated U-234 to U-238 activity is outside the acceptance limits.

R = Result unusable. Analyte may or may not be present in the sample. Qualifier is applied where QC data not located or where QC data exceeds control limits. Supporting data necessary to confirm result. Resampling and reanalysis are necessary.

FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 1:							
100047-10563101	1	A	Aluminum	(mg/L)	1.79		
100047-10563101	1	A	Antimony	(mg/L)	0.03	U	
100047-10563101	1	A	Arsenic	(mg/L)	0.002	U	
100047-10563101	1	A	Barium	(mg/L)	0.426		
100047-10563101	1	A	Beryllium	(mg/L)	0.002	U	
100047-10563101	1	A	Boron	(mg/L)	0.05	U	
100047-10563101	1	A	Cadmium	(mg/L)	0.005	U	
100047-10563101	1	A	Calcium	(mg/L)	86.5		
100047-10563101	1	A	Chromium	(mg/L)	0.022		
100047-10563101	1	A	Cobalt	(mg/L)	0.01	U	
100047-10563101	1	A	Copper	(mg/L)	0.01	U	
100047-10563101	1	A	Cyanide	(mg/L)	0.005	U	
100047-10563101	1	A	Iron	(mg/L)	0.02	U	
100047-10563101	1	A	Lead	(mg/L)	1.29		
100047-10563101	1	A	Lithium	(mg/L)	0.14		
100047-10563101	1	A	Magnesium	(mg/L)	0.14	B	
100047-10563101	1	A	Manganese	(mg/L)	0.01	U	
100047-10563101	1	A	Mercury	(mg/L)	0.0002	U	
100047-10563101	1	A	Molybdenu	(mg/L)	7.17		
100047-10563101	1	A	Nickel	(mg/L)	0.02	U	
100047-10563101	1	A	Potassium	(mg/L)	20.4	B	
100047-10563101	1	A	Selenium	(mg/L)	0.0448	S	
100047-10563101	1	A	Silicon	(mg/L)	1.9		
100047-10563101	1	A	Silver	(mg/L)	0.01	U	
100047-10563101	1	A	Sodium	(mg/L)	157		
100047-10563101	1	A	Thallium	(mg/L)	0.002	U	
100047-10563101	1	A	Vanadium	(mg/L)	0.01	U	
100047-10563101	1	A	Zinc	(mg/L)	0.0519		
100047-10563301	1	A	Aluminum	(mg/L)	1.76		
100047-10563301	1	A	Antimony	(mg/L)	0.03	U	
100047-10563301	1	A	Arsenic	(mg/L)	0.002	U	
100047-10563301	1	A	Barium	(mg/L)	0.471		
100047-10563301	1	A	Beryllium	(mg/L)	0.002	U	
100047-10563301	1	A	Boron	(mg/L)	0.05	U	
100047-10563301	1	A	Cadmium	(mg/L)	0.005	U	
100047-10563301	1	A	Calcium	(mg/L)	90.2		
100047-10563301	1	A	Chromium	(mg/L)	0.0212		
100047-10563301	1	A	Cobalt	(mg/L)	0.01	U	
100047-10563301	1	A	Copper	(mg/L)	0.01	U	
100047-10563301	1	A	Cyanide	(mg/L)	0.005	U	
100047-10563301	1	A	Iron	(mg/L)	0.02	U	
100047-10563301	1	A	Lead	(mg/L)	1.18		
100047-10563301	1	A	Lithium	(mg/L)	0.138		
100047-10563301	1	A	Magnesium	(mg/L)	0.14	B	
100047-10563301	1	A	Manganese	(mg/L)	0.01	U	
100047-10563301	1	A	Mercury	(mg/L)	0.0002	U	
100047-10563301	1	A	Molybdenu	(mg/L)	6.53		
100047-10563301	1	A	Nickel	(mg/L)	0.02	U	
100047-10563301	1	A	Potassium	(mg/L)	21.5	B	
100047-10563301	1	A	Selenium	(mg/L)	0.0397	S	
100047-10563301	1	A	Silicon	(mg/L)	1.87		
100047-10563301	1	A	Silver	(mg/L)	0.01	U	
100047-10563301	1	A	Sodium	(mg/L)	153		
100047-10563301	1	A	Thallium	(mg/L)	0.002	U	
100047-10563301	1	A	Vanadium	(mg/L)	0.01	U	
100047-10563301	1	A	Zinc	(mg/L)	0.0261		

FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 1:							
100048-10563501	1	B	Aluminum	(mg/L)	1.77		
100048-10563501	1	B	Antimony	(mg/L)	0.03	U	
100048-10563501	1	B	Arsenic	(mg/L)	0.002	U	
100048-10563501	1	B	Barium	(mg/L)	0.204		
100048-10563501	1	B	Beryllium	(mg/L)	0.002	U	
100048-10563501	1	B	Boron	(mg/L)	0.05	U	
100048-10563501	1	B	Cadmium	(mg/L)	0.005	U	
100048-10563501	1	B	Calcium	(mg/L)	50.8		
100048-10563501	1	B	Chromium	(mg/L)	0.0277		
100048-10563501	1	B	Cobalt	(mg/L)	0.01	U	
100048-10563501	1	B	Copper	(mg/L)	0.01	U	
100048-10563501	1	B	Cyanide	(mg/L)	0.005	U	
100048-10563501	1	B	Iron	(mg/L)	0.02	U	
100048-10563501	1	B	Lead	(mg/L)	0.0422	+	
100048-10563501	1	B	Lithium	(mg/L)	0.144		
100048-10563501	1	B	Magnesium	(mg/L)	0.101	B	
100048-10563501	1	B	Manganese	(mg/L)	0.01	U	
100048-10563501	1	B	Mercury	(mg/L)	0.0002	U	
100048-10563501	1	B	Molybdenu	(mg/L)	13.4		
100048-10563501	1	B	Nickel	(mg/L)	0.02	U	
100048-10563501	1	B	Potassium	(mg/L)	19	B	
100048-10563501	1	B	Selenium	(mg/L)	0.094	S	
100048-10563501	1	B	Silicon	(mg/L)	3.2		
100048-10563501	1	B	Silver	(mg/L)	0.01	U	
100048-10563501	1	B	Sodium	(mg/L)	172		
100048-10563501	1	B	Thallium	(mg/L)	0.01	U	
100048-10563501	1	B	Vanadium	(mg/L)	0.0108	B	
100048-10563501	1	B	Zinc	(mg/L)	0.0118	B	

FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 1:							
100049-10563701	1	C	Aluminum	(mg/L)	1.81		
100049-10563701	1	C	Antimony	(mg/L)	0.03	U	
100049-10563701	1	C	Arsenic	(mg/L)	0.002	U	
100049-10563701	1	C	Barium	(mg/L)	0.17	B	
100049-10563701	1	C	Beryllium	(mg/L)	0.002	U	
100049-10563701	1	C	Boron	(mg/L)	0.05	U	
100049-10563701	1	C	Cadmium	(mg/L)	0.005	U	
100049-10563701	1	C	Calcium	(mg/L)	39.2		
100049-10563701	1	C	Chromium	(mg/L)	0.0333		
100049-10563701	1	C	Cobalt	(mg/L)	0.01	U	
100049-10563701	1	C	Copper	(mg/L)	0.01	U	
100049-10563701	1	C	Cyanide	(mg/L)	0.005	U	
100049-10563701	1	C	Iron	(mg/L)	0.02	U	
100049-10563701	1	C	Lead	(mg/L)	1.37		
100049-10563701	1	C	Lithium	(mg/L)	0.143		
100049-10563701	1	C	Magnesium	(mg/L)	0.0818	B	
100049-10563701	1	C	Manganese	(mg/L)	0.01	U	
100049-10563701	1	C	Mercury	(mg/L)	0.0002	U	
100049-10563701	1	C	Molybdenu	(mg/L)	7.29		
100049-10563701	1	C	Nickel	(mg/L)	0.02	U	
100049-10563701	1	C	Potassium	(mg/L)	18.7	B	
100049-10563701	1	C	Selenium	(mg/L)	0.136		
100049-10563701	1	C	Silicon	(mg/L)	3.66		
100049-10563701	1	C	Silver	(mg/L)	0.01	U	
100049-10563701	1	C	Sodium	(mg/L)	184		
100049-10563701	1	C	Thallium	(mg/L)	0.002	U	
100049-10563701	1	C	Vanadium	(mg/L)	0.01	U	
100049-10563701	1	C	Zinc	(mg/L)	0.0318		

FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 1:							
075307-10565701	2	A	Aluminum	(mg/L)	0.801		
075307-10565701	2	A	Antimony	(mg/L)	0.03	U	
075307-10565701	2	A	Arsenic	(mg/L)	0.002	UW	
075307-10565701	2	A	Barium	(mg/L)	0.843		
075307-10565701	2	A	Beryllium	(mg/L)	0.002	U	
075307-10565701	2	A	Boron	(mg/L)	0.05	U	
075307-10565701	2	A	Cadmium	(mg/L)	0.005	U	
075307-10565701	2	A	Calcium	(mg/L)	127		
075307-10565701	2	A	Chromium	(mg/L)	0.0103		
075307-10565701	2	A	Cobalt	(mg/L)	0.01	U	
075307-10565701	2	A	Copper	(mg/L)	0.01	U	
075307-10565701	2	A	Cyanide	(mg/L)	0.005	U	
075307-10565701	2	A	Iron	(mg/L)	0.02	U	
075307-10565701	2	A	Lead	(mg/L)	0.388		
075307-10565701	2	A	Lithium	(mg/L)	0.153		
075307-10565701	2	A	Magnesium	(mg/L)	0.15	B	
075307-10565701	2	A	Manganese	(mg/L)	0.01	U	
075307-10565701	2	A	Mercury	(mg/L)	0.0002	U	
075307-10565701	2	A	Molybdenu	(mg/L)	0.068		
075307-10565701	2	A	Nickel	(mg/L)	0.02	U	
075307-10565701	2	A	Potassium	(mg/L)	25.7		
075307-10565701	2	A	Selenium	(mg/L)	0.01	UW	
075307-10565701	2	A	Silicon	(mg/L)	1.15		
075307-10565701	2	A	Silver	(mg/L)	0.01	U	
075307-10565701	2	A	Sodium	(mg/L)	143		
075307-10565701	2	A	Thallium	(mg/L)	0.01	U	
075307-10565701	2	A	Vanadium	(mg/L)	0.01	U	
075307-10565701	2	A	Zinc	(mg/L)	0.005	U	
075307-10565901	2	A	Aluminum	(mg/L)	0.788		
075307-10565901	2	A	Antimony	(mg/L)	0.03	U	
075307-10565901	2	A	Arsenic	(mg/L)	0.0038	B	
075307-10565901	2	A	Barium	(mg/L)	0.852		
075307-10565901	2	A	Beryllium	(mg/L)	0.002	U	
075307-10565901	2	A	Boron	(mg/L)	0.05	U	
075307-10565901	2	A	Cadmium	(mg/L)	0.005	U	
075307-10565901	2	A	Calcium	(mg/L)	130		
075307-10565901	2	A	Chromium	(mg/L)	0.0119		
075307-10565901	2	A	Cobalt	(mg/L)	0.01	U	
075307-10565901	2	A	Copper	(mg/L)	0.01	U	
075307-10565901	2	A	Cyanide	(mg/L)	0.005	U	
075307-10565901	2	A	Iron	(mg/L)	0.02	U	
075307-10565901	2	A	Lead	(mg/L)	0.381		
075307-10565901	2	A	Lithium	(mg/L)	0.151		
075307-10565901	2	A	Magnesium	(mg/L)	0.149	B	
075307-10565901	2	A	Manganese	(mg/L)	0.01	U	
075307-10565901	2	A	Mercury	(mg/L)	0.0002	U	
075307-10565901	2	A	Molybdenu	(mg/L)	0.063		
075307-10565901	2	A	Nickel	(mg/L)	0.02	U	
075307-10565901	2	A	Potassium	(mg/L)	25		
075307-10565901	2	A	Selenium	(mg/L)	0.0124	B	
075307-10565901	2	A	Silicon	(mg/L)	1.12		
075307-10565901	2	A	Silver	(mg/L)	0.01	U	
075307-10565901	2	A	Sodium	(mg/L)	141		
075307-10565901	2	A	Thallium	(mg/L)	0.01	UW	
075307-10565901	2	A	Vanadium	(mg/L)	0.01	U	
075307-10565901	2	A	Zinc	(mg/L)	0.005	U	

FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 1:							
100063-10566101	2	B	Aluminum	(mg/L)	1.19		
100063-10566101	2	B	Antimony	(mg/L)	0.03	U	
100063-10566101	2	B	Arsenic	(mg/L)	0.0047	B	
100063-10566101	2	B	Barium	(mg/L)	0.666		
100063-10566101	2	B	Beryllium	(mg/L)	0.002	U	
100063-10566101	2	B	Boron	(mg/L)	0.0672		
100063-10566101	2	B	Cadmium	(mg/L)	0.005	U	
100063-10566101	2	B	Calcium	(mg/L)	82.3		
100063-10566101	2	B	Chromium	(mg/L)	0.0158		
100063-10566101	2	B	Cobalt	(mg/L)	0.01	U	
100063-10566101	2	B	Copper	(mg/L)	0.01	U	
100063-10566101	2	B	Cyanide	(mg/L)	0.0061	B	
100063-10566101	2	B	Iron	(mg/L)	0.02	U	
100063-10566101	2	B	Lead	(mg/L)	0.472		
100063-10566101	2	B	Lithium	(mg/L)	0.222		
100063-10566101	2	B	Magnesium	(mg/L)	0.0999	B	
100063-10566101	2	B	Manganese	(mg/L)	0.01	U	
100063-10566101	2	B	Mercury	(mg/L)	0.0002	U	
100063-10566101	2	B	Molybdenu	(mg/L)	0.287		
100063-10566101	2	B	Nickel	(mg/L)	0.02	U	
100063-10566101	2	B	Potassium	(mg/L)	18.7		
100063-10566101	2	B	Selenium	(mg/L)	0.0244	B	
100063-10566101	2	B	Silicon	(mg/L)	2.18		
100063-10566101	2	B	Silver	(mg/L)	0.01	U	
100063-10566101	2	B	Sodium	(mg/L)	128		
100063-10566101	2	B	Thallium	(mg/L)	0.01	UW	
100063-10566101	2	B	Vanadium	(mg/L)	0.01	U	
100063-10566101	2	B	Zinc	(mg/L)	0.005	U	

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FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 1:							
075308-10566301	2	C	Aluminum	(mg/L)	0.959		
075308-10566301	2	C	Antimony	(mg/L)	0.0315	B	
075308-10566301	2	C	Arsenic	(mg/L)	0.0036	B	
075308-10566301	2	C	Barium	(mg/L)	0.712		
075308-10566301	2	C	Beryllium	(mg/L)	0.002	U	
075308-10566301	2	C	Boron	(mg/L)	0.0514		
075308-10566301	2	C	Cadmium	(mg/L)	0.005	U	
075308-10566301	2	C	Calcium	(mg/L)	82.5		
075308-10566301	2	C	Chromium	(mg/L)	0.01	U	
075308-10566301	2	C	Cobalt	(mg/L)	0.01	U	
075308-10566301	2	C	Copper	(mg/L)	0.01	U	
075308-10566301	2	C	Cyanide	(mg/L)	0.005	U	
075308-10566301	2	C	Iron	(mg/L)	0.02	U	
075308-10566301	2	C	Lead	(mg/L)	0.646		
075308-10566301	2	C	Lithium	(mg/L)	0.192		
075308-10566301	2	C	Magnesium	(mg/L)	0.103	B	
075308-10566301	2	C	Manganese	(mg/L)	0.01	U	
075308-10566301	2	C	Mercury	(mg/L)	0.0002	U	
075308-10566301	2	C	Molybdenu	(mg/L)	0.241		
075308-10566301	2	C	Nickel	(mg/L)	0.02	U	
075308-10566301	2	C	Potassium	(mg/L)	17		
075308-10566301	2	C	Selenium	(mg/L)	0.0274		
075308-10566301	2	C	Silicon	(mg/L)	2.22		
075308-10566301	2	C	Silver	(mg/L)	0.01	U	
075308-10566301	2	C	Sodium	(mg/L)	104		
075308-10566301	2	C	Thallium	(mg/L)	0.01	U	
075308-10566301	2	C	Vanadium	(mg/L)	0.01	U	
075308-10566301	2	C	Zinc	(mg/L)	0.005	U	

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FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 1:							
100074-10568301	3		Aluminum	(mg/L)	0.372		
100074-10568301	3		Antimony	(mg/L)	0.03	U	
100074-10568301	3		Arsenic	(mg/L)	0.011		
100074-10568301	3		Barium	(mg/L)	0.0417	B	
100074-10568301	3		Beryllium	(mg/L)	0.002	U	
100074-10568301	3		Boron	(mg/L)	0.671		
100074-10568301	3		Cadmium	(mg/L)	0.005	U	
100074-10568301	3		Calcium	(mg/L)	61.9		
100074-10568301	3		Chromium	(mg/L)	0.497		
100074-10568301	3		Cobalt	(mg/L)	0.01	U	
100074-10568301	3		Copper	(mg/L)	0.01	U	
100074-10568301	3		Cyanide	(mg/L)	0.005	U	
100074-10568301	3		Iron	(mg/L)	0.02	U	
100074-10568301	3		Lead	(mg/L)	0.002	U	
100074-10568301	3		Lithium	(mg/L)	18.5		
100074-10568301	3		Magnesium	(mg/L)	0.171	B	
100074-10568301	3		Manganese	(mg/L)	0.01	U	
100074-10568301	3		Mercury	(mg/L)	0.0002	U	
100074-10568301	3		Molybdenu	(mg/L)	5.2		
100074-10568301	3		Nickel	(mg/L)	0.02	U	
100074-10568301	3		Potassium	(mg/L)	204		
100074-10568301	3		Selenium	(mg/L)	0.144		
100074-10568301	3		Silicon	(mg/L)	6.64		
100074-10568301	3		Silver	(mg/L)	0.01	U	
100074-10568301	3		Sodium	(mg/L)	612		
100074-10568301	3		Thallium	(mg/L)	0.0132	BM	
100074-10568301	3		Vanadium	(mg/L)	0.161		
100074-10568301	3		Zinc	(mg/L)	0.005	U	

FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 2:							
075304-10565101	1	A	Aluminum	(mg/L)	1.21		
075304-10565101	1	A	Antimony	(mg/L)	0.03	U	
075304-10565101	1	A	Arsenic	(mg/L)	0.002	U	
075304-10565101	1	A	Barium	(mg/L)	0.306		
075304-10565101	1	A	Beryllium	(mg/L)	0.002	U	
075304-10565101	1	A	Boron	(mg/L)	0.05	U	
075304-10565101	1	A	Cadmium	(mg/L)	0.005	U	
075304-10565101	1	A	Calcium	(mg/L)	73.4		
075304-10565101	1	A	Chromium	(mg/L)	0.01	U	
075304-10565101	1	A	Cobalt	(mg/L)	0.01	U	
075304-10565101	1	A	Copper	(mg/L)	0.01	U	
075304-10565101	1	A	Cyanide	(mg/L)	0.005	U	
075304-10565101	1	A	Iron	(mg/L)	0.02	U	
075304-10565101	1	A	Lead	(mg/L)	0.635		
075304-10565101	1	A	Lithium	(mg/L)	0.0959		
075304-10565101	1	A	Magnesium	(mg/L)	0.101	B	
075304-10565101	1	A	Manganese	(mg/L)	0.01	U	
075304-10565101	1	A	Mercury	(mg/L)	0.0002	U	
075304-10565101	1	A	Molybdenu	(mg/L)	2.3		
075304-10565101	1	A	Nickel	(mg/L)	0.02	U	
075304-10565101	1	A	Potassium	(mg/L)	14.8		
075304-10565101	1	A	Selenium	(mg/L)	0.0212		
075304-10565101	1	A	Silicon	(mg/L)	2.44		
075304-10565101	1	A	Silver	(mg/L)	0.01	U	
075304-10565101	1	A	Sodium	(mg/L)	84.3		
075304-10565101	1	A	Thallium	(mg/L)	0.01	U	
075304-10565101	1	A	Vanadium	(mg/L)	0.01	U	
075304-10565101	1	A	Zinc	(mg/L)	0.0056	B	

FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 2:							
075305-10565301	1	B	Aluminum	(mg/L)	1.1		
075305-10565301	1	B	Antimony	(mg/L)	0.0316	B	
075305-10565301	1	B	Arsenic	(mg/L)	0.002	U	
075305-10565301	1	B	Barium	(mg/L)	0.199	B	
075305-10565301	1	B	Beryllium	(mg/L)	0.002	U	
075305-10565301	1	B	Boron	(mg/L)	0.05	U	
075305-10565301	1	B	Cadmium	(mg/L)	0.005	U	
075305-10565301	1	B	Calcium	(mg/L)	47.8		
075305-10565301	1	B	Chromium	(mg/L)	0.01	U	
075305-10565301	1	B	Cobalt	(mg/L)	0.01	U	
075305-10565301	1	B	Copper	(mg/L)	0.01	U	
075305-10565301	1	B	Cyanide	(mg/L)	0.0091	B	
075305-10565301	1	B	Iron	(mg/L)	0.02	U	
075305-10565301	1	B	Lead	(mg/L)	0.707		
075305-10565301	1	B	Lithium	(mg/L)	0.0826		
075305-10565301	1	B	Magnesium	(mg/L)	0.0766	B	
075305-10565301	1	B	Manganese	(mg/L)	0.01	U	
075305-10565301	1	B	Mercury	(mg/L)	0.0002	U	
075305-10565301	1	B	Molybdenu	(mg/L)	4.81		
075305-10565301	1	B	Nickel	(mg/L)	0.02	U	
075305-10565301	1	B	Potassium	(mg/L)	13.1		
075305-10565301	1	B	Selenium	(mg/L)	0.0347	S	
075305-10565301	1	B	Silicon	(mg/L)	3.51		
075305-10565301	1	B	Silver	(mg/L)	0.01	U	
075305-10565301	1	B	Sodium	(mg/L)	83.6		
075305-10565301	1	B	Thallium	(mg/L)	0.01	U	
075305-10565301	1	B	Vanadium	(mg/L)	0.01	U	
075305-10565301	1	B	Zinc	(mg/L)	0.005	U	

FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 2:							
075306-10565501	1	C	Aluminum	(mg/L)	1		
075306-10565501	1	C	Antimony	(mg/L)	0.03	U	
075306-10565501	1	C	Arsenic	(mg/L)	0.002	U	
075306-10565501	1	C	Barium	(mg/L)	0.208		
075306-10565501	1	C	Beryllium	(mg/L)	0.002	U	
075306-10565501	1	C	Boron	(mg/L)	0.05	U	
075306-10565501	1	C	Cadmium	(mg/L)	0.005	U	
075306-10565501	1	C	Calcium	(mg/L)	37		
075306-10565501	1	C	Chromium	(mg/L)	0.01	U	
075306-10565501	1	C	Cobalt	(mg/L)	0.01	U	
075306-10565501	1	C	Copper	(mg/L)	0.01	U	
075306-10565501	1	C	Cyanide	(mg/L)	0.005	U	
075306-10565501	1	C	Iron	(mg/L)	0.02	U	
075306-10565501	1	C	Lead	(mg/L)	0.636		
075306-10565501	1	C	Lithium	(mg/L)	0.063		
075306-10565501	1	C	Magnesium	(mg/L)	0.0622	B	
075306-10565501	1	C	Manganese	(mg/L)	0.01	U	
075306-10565501	1	C	Mercury	(mg/L)	0.0002	U	
075306-10565501	1	C	Molybdenu	(mg/L)	1.83		
075306-10565501	1	C	Nickel	(mg/L)	0.02	U	
075306-10565501	1	C	Potassium	(mg/L)	10.7		
075306-10565501	1	C	Selenium	(mg/L)	0.0463		
075306-10565501	1	C	Silicon	(mg/L)	4.05		
075306-10565501	1	C	Silver	(mg/L)	0.01	U	
075306-10565501	1	C	Sodium	(mg/L)	75.8		
075306-10565501	1	C	Thallium	(mg/L)	0.01	U	
075306-10565501	1	C	Vanadium	(mg/L)	0.01	U	
075306-10565501	1	C	Zinc	(mg/L)	0.005	U	

FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 2:							
100062-10566501	2	A	Aluminum	(mg/L)	0.913		
100062-10566501	2	A	Antimony	(mg/L)	0.03	U	
100062-10566501	2	A	Arsenic	(mg/L)	0.0035	B	
100062-10566501	2	A	Barium	(mg/L)	0.494		
100062-10566501	2	A	Beryllium	(mg/L)	0.002	U	
100062-10566501	2	A	Boron	(mg/L)	0.05	U	
100062-10566501	2	A	Cadmium	(mg/L)	0.005	U	
100062-10566501	2	A	Calcium	(mg/L)	101		
100062-10566501	2	A	Chromium	(mg/L)	0.01	U	
100062-10566501	2	A	Cobalt	(mg/L)	0.01	U	
100062-10566501	2	A	Copper	(mg/L)	0.01	U	
100062-10566501	2	A	Cyanide	(mg/L)	0.005	U	
100062-10566501	2	A	Iron	(mg/L)	0.02	U	
100062-10566501	2	A	Lead	(mg/L)	0.132		
100062-10566501	2	A	Lithium	(mg/L)	0.0776		
100062-10566501	2	A	Magnesium	(mg/L)	0.138	B	
100062-10566501	2	A	Manganese	(mg/L)	0.01	U	
100062-10566501	2	A	Mercury	(mg/L)	0.00022		
100062-10566501	2	A	Molybdenu	(mg/L)	0.0278		
100062-10566501	2	A	Nickel	(mg/L)	0.02	U	
100062-10566501	2	A	Potassium	(mg/L)	14.5		
100062-10566501	2	A	Selenium	(mg/L)	0.0052		
100062-10566501	2	A	Silicon	(mg/L)	2.13		
100062-10566501	2	A	Silver	(mg/L)	0.01	U	
100062-10566501	2	A	Sodium	(mg/L)	50.7		
100062-10566501	2	A	Thallium	(mg/L)	0.002	U	
100062-10566501	2	A	Vanadium	(mg/L)	0.01	U	
100062-10566501	2	A	Zinc	(mg/L)	0.005	U	

FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 2:							
100063-10563901	2	B	Aluminum	(mg/L)	0.993		
100063-10563901	2	B	Antimony	(mg/L)	0.03	U	
100063-10563901	2	B	Arsenic	(mg/L)	0.002	U	
100063-10563901	2	B	Barium	(mg/L)	0.379		
100063-10563901	2	B	Beryllium	(mg/L)	0.002	U	
100063-10563901	2	B	Boron	(mg/L)	0.05	U	
100063-10563901	2	B	Cadmium	(mg/L)	0.005	U	
100063-10563901	2	B	Calcium	(mg/L)	73		
100063-10563901	2	B	Chromium	(mg/L)	0.01	U	
100063-10563901	2	B	Cobalt	(mg/L)	0.01	U	
100063-10563901	2	B	Copper	(mg/L)	0.01	U	
100063-10563901	2	B	Cyanide	(mg/L)	0.005	U	
100063-10563901	2	B	Iron	(mg/L)	0.02	U	
100063-10563901	2	B	Lead	(mg/L)	0.237		
100063-10563901	2	B	Lithium	(mg/L)	0.112		
100063-10563901	2	B	Magnesium	(mg/L)	0.114	B	
100063-10563901	2	B	Manganese	(mg/L)	0.01	U	
100063-10563901	2	B	Mercury	(mg/L)	0.0002	U	
100063-10563901	2	B	Molybdenu	(mg/L)	0.133		
100063-10563901	2	B	Nickel	(mg/L)	0.02	U	
100063-10563901	2	B	Potassium	(mg/L)	12	B	
100063-10563901	2	B	Selenium	(mg/L)	0.0118	S	
100063-10563901	2	B	Silicon	(mg/L)	3.32		
100063-10563901	2	B	Silver	(mg/L)	0.01	U	
100063-10563901	2	B	Sodium	(mg/L)	49.4		
100063-10563901	2	B	Thallium	(mg/L)	0.002	UW	
100063-10563901	2	B	Vanadium	(mg/L)	0.01	U	
100063-10563901	2	B	Zinc	(mg/L)	0.0087	B	

FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 2:							
100064-10564101	2	C	Aluminum	(mg/L)	0.91		
100064-10564101	2	C	Antimony	(mg/L)	0.03	U	
100064-10564101	2	C	Arsenic	(mg/L)	0.003	B	
100064-10564101	2	C	Barium	(mg/L)	0.386		
100064-10564101	2	C	Beryllium	(mg/L)	0.002	U	
100064-10564101	2	C	Boron	(mg/L)	0.05	U	
100064-10564101	2	C	Cadmium	(mg/L)	0.005	U	
100064-10564101	2	C	Calcium	(mg/L)	71.5		
100064-10564101	2	C	Chromium	(mg/L)	0.01	U	
100064-10564101	2	C	Cobalt	(mg/L)	0.01	U	
100064-10564101	2	C	Copper	(mg/L)	0.01	U	
100064-10564101	2	C	Cyanide	(mg/L)	0.005	U	
100064-10564101	2	C	Iron	(mg/L)	0.02	U	
100064-10564101	2	C	Lead	(mg/L)	0.207		
100064-10564101	2	C	Lithium	(mg/L)	0.0768		
100064-10564101	2	C	Magnesium	(mg/L)	0.123	B	
100064-10564101	2	C	Manganese	(mg/L)	0.01	U	
100064-10564101	2	C	Mercury	(mg/L)	0.0002	U	
100064-10564101	2	C	Molybdenu	(mg/L)	0.112		
100064-10564101	2	C	Nickel	(mg/L)	0.02	U	
100064-10564101	2	C	Potassium	(mg/L)	9.75	B	
100064-10564101	2	C	Selenium	(mg/L)	0.0138	S	
100064-10564101	2	C	Silicon	(mg/L)	3.89		
100064-10564101	2	C	Silver	(mg/L)	0.01	U	
100064-10564101	2	C	Sodium	(mg/L)	31.9		
100064-10564101	2	C	Thallium	(mg/L)	0.002	U	
100064-10564101	2	C	Vanadium	(mg/L)	0.01	U	
100064-10564101	2	C	Zinc	(mg/L)	0.0157	B	

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FEMP Sample No.	Silo No.	Zone	Element	Units	Results	Lab Qual	Q5
Formula 2:							
100074-10567901	3		Aluminum	(mg/L)	0.498		
100074-10567901	3		Antimony	(mg/L)	0.03	U	
100074-10567901	3		Arsenic	(mg/L)	0.0112		
100074-10567901	3		Barium	(mg/L)	0.0502	B	
100074-10567901	3		Beryllium	(mg/L)	0.002	B	
100074-10567901	3		Boron	(mg/L)	0.379		
100074-10567901	3		Cadmium	(mg/L)	0.005	U	
100074-10567901	3		Calcium	(mg/L)	66.3		
100074-10567901	3		Chromium	(mg/L)	0.0462		
100074-10567901	3		Cobalt	(mg/L)	0.01	U	
100074-10567901	3		Copper	(mg/L)	0.01	U	
100074-10567901	3		Cyanide	(mg/L)	0.007	U	
100074-10567901	3		Iron	(mg/L)	0.02	U	
100074-10567901	3		Lead	(mg/L)	0.002	U	
100074-10567901	3		Lithium	(mg/L)	7.19		
100074-10567901	3		Magnesium	(mg/L)	0.217	B	
100074-10567901	3		Manganese	(mg/L)	0.01	U	
100074-10567901	3		Mercury	(mg/L)	0.0002	U	
100074-10567901	3		Molybdenu	(mg/L)	2.82		
100074-10567901	3		Nickel	(mg/L)	0.02	U	
100074-10567901	3		Potassium	(mg/L)	94.7		
100074-10567901	3		Selenium	(mg/L)	0.0492		
100074-10567901	3		Silicon	(mg/L)	7.1		
100074-10567901	3		Silver	(mg/L)	0.01	U	
100074-10567901	3		Sodium	(mg/L)	287		
100074-10567901	3		Thallium	(mg/L)	0.002	UW	
100074-10567901	3		Vanadium	(mg/L)	0.14		
100074-10567901	3		Zinc	(mg/L)	0.005	U	
100074-10568101	3		Aluminum	(mg/L)	0.456		
100074-10568101	3		Antimony	(mg/L)	0.03	U	
100074-10568101	3		Arsenic	(mg/L)	0.0122		
100074-10568101	3		Barium	(mg/L)	0.0509	B	
100074-10568101	3		Beryllium	(mg/L)	0.002	U	
100074-10568101	3		Boron	(mg/L)	0.42		
100074-10568101	3		Cadmium	(mg/L)	0.005	U	
100074-10568101	3		Calcium	(mg/L)	69		
100074-10568101	3		Chromium	(mg/L)	0.0415		
100074-10568101	3		Cobalt	(mg/L)	0.01	U	
100074-10568101	3		Copper	(mg/L)	0.01	U	
100074-10568101	3		Cyanide	(mg/L)	0.005	U	
100074-10568101	3		Iron	(mg/L)	0.0303	B	
100074-10568101	3		Lead	(mg/L)	0.002	U	
100074-10568101	3		Lithium	(mg/L)	7.89		
100074-10568101	3		Magnesium	(mg/L)	0.212	B	
100074-10568101	3		Manganese	(mg/L)	0.01	U	
100074-10568101	3		Mercury	(mg/L)	0.0002	U	
100074-10568101	3		Molybdenu	(mg/L)	3.31		
100074-10568101	3		Nickel	(mg/L)	0.02	U	
100074-10568101	3		Potassium	(mg/L)	100		
100074-10568101	3		Selenium	(mg/L)	0.0506		
100074-10568101	3		Silicon	(mg/L)	7.32		
100074-10568101	3		Silver	(mg/L)	0.01	U	
100074-10568101	3		Sodium	(mg/L)	303		
100074-10568101	3		Thallium	(mg/L)	0.01	UW	
100074-10568101	3		Vanadium	(mg/L)	0.151		
100074-10568101	3		Zinc	(mg/L)	0.005	U	

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Table E-2. Radiological 5 Day Static Leach Data Page #

Sample		Location	Radionuclide		Result	2 Sigma	Units	Q5
Formula 1:								
100047	10563108	Silo 1 Zone A	Ac-227	<	1.0		pCi/L	-
100047	10563108	Silo 1 Zone A	Pa-231	<	1200		pCi/L	-
100047	10563108	Silo 1 Zone A	Pb-210		92.6	9.9	pCi/L	-
100047	10563108	Silo 1 Zone A	Po-210		169	45	pCi/L	-
100047	10563108	Silo 1 Zone A	Ra-226		9580	1420	pCi/L	-
100047	10563108	Silo 1 Zone A	Ra-228		*		pCi/L	-
100047	10563108	Silo 1 Zone A	Th-Total		0.00338	0.00257	mg/L	-
100047	10563108	Silo 1 Zone A	U-Total		0.00124	0.00013	mg/L	-
100047	10563308	Silo 1 Zone A	Ac-227	<	1.0		pCi/L	-
100047	10563308	Silo 1 Zone A	Pa-231	<	971		pCi/L	-
100047	10563308	Silo 1 Zone A	Pb-210		584	59	pCi/L	-
100047	10563308	Silo 1 Zone A	Po-210		202	45	pCi/L	-
100047	10563308	Silo 1 Zone A	Ra-226		10800	1600	pCi/L	-
100047	10563308	Silo 1 Zone A	Ra-228	<	3.0		pCi/L	-
100047	10563308	Silo 1 Zone A	Th-Total	<	0.00160		mg/L	-
100047	10563308	Silo 1 Zone A	U-Total		0.00116	0.00012	mg/L	-
100048	10563508	Silo 1 Zone B	Ac-227	<	1.0		pCi/L	-
100048	10563508	Silo 1 Zone B	Pa-231	<	995		pCi/L	-
100048	10563508	Silo 1 Zone B	Pb-210		662	67	pCi/L	-
100048	10563508	Silo 1 Zone B	Po-210		216	42	pCi/L	-
100048	10563508	Silo 1 Zone B	Ra-226		3480	540	pCi/L	-
100048	10563508	Silo 1 Zone B	Ra-228		*		pCi/L	-
100048	10563508	Silo 1 Zone B	Th-Total	<	0.00100		mg/L	-
100048	10563508	Silo 1 Zone B	U-Total		0.00161	0.00017	mg/L	-
100049	10563708	Silo 1 Zone C	Ac-227	<	1.0		pCi/L	-
100049	10563708	Silo 1 Zone C	Pa-231	<	1043		pCi/L	-
100049	10563708	Silo 1 Zone C	Pb-210		286	29	pCi/L	-
100049	10563708	Silo 1 Zone C	Po-210		201	48	pCi/L	-
100049	10563708	Silo 1 Zone C	Ra-226		3360	510	pCi/L	-
100049	10563708	Silo 1 Zone C	Ra-228		*		pCi/L	-
100049	10563708	Silo 1 Zone C	Th-Total	<	0.00160		mg/L	-
100049	10563708	Silo 1 Zone C	U-Total		0.00201	0.00021	mg/L	-

Table E-2. Radiological 5 Day Static Leach Data Page #

Sample	Location		Radionuclide		Result	2 Sigma	Units	Q5
Formula 1:								
075307	10565708	Silo 2 Zone A	Ac-227	<	1.0		pCi/L	-
075307	10565708	Silo 2 Zone A	Pa-231	<	1881		pCi/L	-
075307	10565708	Silo 2 Zone A	Pb-210		2080	210	pCi/L	-
075307	10565708	Silo 2 Zone A	Po-210		353	55	pCi/L	-
075307	10565708	Silo 2 Zone A	Ra-226		25800	3740	pCi/L	-
075307	10565708	Silo 2 Zone A	Ra-228		7.83	1.55	pCi/L	-
075307	10565708	Silo 2 Zone A	Th-Total	<	0.00300		mg/L	-
075307	10565708	Silo 2 Zone A	U-Total		0.00180	0.00019	mg/L	-
075307	10565908	Silo 2 Zone A	Ac-227		1.38	0.78	pCi/L	-
075307	10565908	Silo 2 Zone A	Pa-231	<	2422		pCi/L	-
075307	10565908	Silo 2 Zone A	Pb-210		2000	200	pCi/L	-
075307	10565908	Silo 2 Zone A	Po-210		322	55	pCi/L	-
075307	10565908	Silo 2 Zone A	Ra-226		37000	5330	pCi/L	-
075307	10565908	Silo 2 Zone A	Ra-228		7.88	1.58	pCi/L	-
075307	10565908	Silo 2 Zone A	Th-Total	<	0.00560		mg/L	-
075307	10565908	Silo 2 Zone A	U-Total		0.00242	0.00026	mg/L	-
100063	10566108	Silo 2 Zone B	Ac-227	<	1.0		pCi/L	-
100063	10566108	Silo 2 Zone B	Pa-231	<	1213		pCi/L	-
100063	10566108	Silo 2 Zone B	Pb-210		1900	190	pCi/L	-
100063	10566108	Silo 2 Zone B	Po-210		417	76	pCi/L	-
100063	10566108	Silo 2 Zone B	Ra-226		19400	2850	pCi/L	-
100063	10566108	Silo 2 Zone B	Ra-228		5.09	1.21	pCi/L	-
100063	10566108	Silo 2 Zone B	Th-Total	<	0.00660		mg/L	-
100063	10566108	Silo 2 Zone B	U-Total		0.00319	0.00034	mg/L	-
075308	10566308	Silo 2 Zone C	Ac-227	<	1.0		pCi/L	-
075308	10566308	Silo 2 Zone C	Pa-231	<	1762		pCi/L	-
075308	10566308	Silo 2 Zone C	Pb-210		3350	340	pCi/L	-
075308	10566308	Silo 2 Zone C	Po-210		396	73	pCi/L	-
075308	10566308	Silo 2 Zone C	Ra-226		21600	3120	pCi/L	-
075308	10566308	Silo 2 Zone C	Ra-228		8.93	1.72	pCi/L	-
075308	10566308	Silo 2 Zone C	Th-Total	<	0.00240		mg/L	-
075308	10566308	Silo 2 Zone C	U-Total		0.00264	0.00028	mg/L	-

Table E-2. Radiological 5 Day Static Leach Data Page #

Sample		Location	Radionuclide		Result	2 Sigma	Units	Q5
Formula 1:								
100074	10568308	Silo 3	Ac-227	<	1.0		pCi/L	-
100074	10568308	Silo 3	Pa-231	<	443		pCi/L	-
100074	10568308	Silo 3	Pb-210	<	3.0		pCi/L	-
100074	10568308	Silo 3	Po-210		11.0	7.5	pCi/L	-
100074	10568308	Silo 3	Ra-226		247	40	pCi/L	-
100074	10568308	Silo 3	Ra-228		*		pCi/L	-
100074	10568308	Silo 3	Th-Total	<	0.00180		mg/L	-
100074	10568308	Silo 3	U-Total		0.00171	0.00018	mg/L	-

Table E-2. Radiological 5 Day Static Leach Data Page #

Sample		Location	Radionuclide		Result	2 Sigma	Units	Q5
Formula 2:								
075304	10565108	Silo 1 Zone A	Ac-227	<	1.0		pCi/L	-
075304	10565108	Silo 1 Zone A	Pa-231	<	843		pCi/L	-
075304	10565108	Silo 1 Zone A	Pb-210		1870	190	pCi/L	-
075304	10565108	Silo 1 Zone A	Po-210		448	87	pCi/L	-
075304	10565108	Silo 1 Zone A	Ra-226		630	99	pCi/L	-
075304	10565108	Silo 1 Zone A	Ra-228	<	3.0		pCi/L	-
075304	10565108	Silo 1 Zone A	Th-Total	<	0.00100		mg/L	-
075304	10565108	Silo 1 Zone A	U-Total		0.03310	0.00470	mg/L	-
075305	10565308	Silo 1 Zone B	Ac-227		1.10	0.49	pCi/L	-
075305	10565308	Silo 1 Zone B	Pa-231	<	724		pCi/L	-
075305	10565308	Silo 1 Zone B	Pb-210		2350	240	pCi/L	-
075305	10565308	Silo 1 Zone B	Po-210		533	91	pCi/L	-
075305	10565308	Silo 1 Zone B	Ra-226		416	64	pCi/L	-
075305	10565308	Silo 1 Zone B	Ra-228	<	3.0		pCi/L	-
075305	10565308	Silo 1 Zone B	Th-Total	<	0.00120		mg/L	-
075305	10565308	Silo 1 Zone B	U-Total		0.00876	0.00132	mg/L	-
075306	10565508	Silo 1 Zone C	Ac-227		1.82	0.74	pCi/L	-
075306	10565508	Silo 1 Zone C	Pa-231	<	1006		pCi/L	-
075306	10565508	Silo 1 Zone C	Pb-210		2260	230	pCi/L	-
075306	10565508	Silo 1 Zone C	Po-210		362	62	pCi/L	-
075306	10565508	Silo 1 Zone C	Ra-226		4060	634	pCi/L	-
075306	10565508	Silo 1 Zone C	Ra-228	<	3.0		pCi/L	-
075306	10565508	Silo 1 Zone C	Th-Total	<	0.00420		mg/L	-
075306	10565508	Silo 1 Zone C	U-Total	<	0.00100		mg/L	-

Table E-2. Radiological 5 Day Static Leach Data **Page #**

Sample		Location	Radionuclide		Result	2 Sigma	Units	Q5
Formula 2:								
100062	10566508	Silo 2 Zone A	Ac-227	<	1.0		pCi/L	–
100062	10566508	Silo 2 Zone A	Pa-231	<	1784		pCi/L	–
100062	10566508	Silo 2 Zone A	Pb-210		644	65	pCi/L	–
100062	10566508	Silo 2 Zone A	Po-210		168	32	pCi/L	–
100062	10566508	Silo 2 Zone A	Ra-226		18600	2700	pCi/L	–
100062	10566508	Silo 2 Zone A	Ra-228		*		pCi/L	–
100062	10566508	Silo 2 Zone A	Th-Total	<	0.00180		mg/L	–
100062	10566508	Silo 2 Zone A	U-Total		0.00128	0.00013	mg/L	–
100063	10563908	Silo 2 Zone B	Ac-227	<	1.0		pCi/L	–
100063	10563908	Silo 2 Zone B	Pa-231	<	1077		pCi/L	–
100063	10563908	Silo 2 Zone B	Pb-210		751	76	pCi/L	–
100063	10563908	Silo 2 Zone B	Po-210		220	44	pCi/L	–
100063	10563908	Silo 2 Zone B	Ra-226		6870	1030	pCi/L	–
100063	10563908	Silo 2 Zone B	Ra-228		*		pCi/L	–
100063	10563908	Silo 2 Zone B	Th-Total	<	0.00100		mg/L	–
100063	10563908	Silo 2 Zone B	U-Total		0.00129	0.00014	mg/L	–
100064	10564108	Silo 2 Zone C	Ac-227	<	1.0		pCi/L	–
100064	10564108	Silo 2 Zone C	Pa-231	<	1419		pCi/L	–
100064	10564108	Silo 2 Zone C	Pb-210		1160	120	pCi/L	–
100064	10564108	Silo 2 Zone C	Po-210		103	25	pCi/L	–
100064	10564108	Silo 2 Zone C	Ra-226		12000	1800	pCi/L	–
100064	10564108	Silo 2 Zone C	Ra-228	<	3.0		pCi/L	–
100064	10564108	Silo 2 Zone C	Th-Total	<	0.00220		mg/L	–
100064	10564108	Silo 2 Zone C	U-Total		0.00125	0.00013	mg/L	–

Table E-2. Radiological 5 Day Static Leach Data Page #

Sample		Location	Radionuclide		Result	2 Sigma	Units	Q5
Formula 2:								
100074	10567908	Silo 3	Ac-227	<	1.0		pCi/L	-
100074	10567908	Silo 3	Pa-231	<	442		pCi/L	-
100074	10567908	Silo 3	Pb-210	<	3.0		pCi/L	-
100074	10567908	Silo 3	Po-210	<	8.6		pCi/L	-
100074	10567908	Silo 3	Ra-226		249	40	pCi/L	-
100074	10567908	Silo 3	Ra-228		*		pCi/L	-
100074	10567908	Silo 3	Th-Total	<	0.00220		mg/L	-
100074	10567908	Silo 3	U-Total	<	0.00100		mg/L	-
100074	10568108	Silo 3	Ac-227	<	1.0		pCi/L	-
100074	10568108	Silo 3	Pa-231	<	464		pCi/L	-
100074	10568108	Silo 3	Pb-210	<	3.0		pCi/L	-
100074	10568108	Silo 3	Po-210	<	7.9		pCi/L	-
100074	10568108	Silo 3	Ra-226		308	51	pCi/L	-
100074	10568108	Silo 3	Ra-228		*		pCi/L	-
100074	10568108	Silo 3	Th-Total	<	0.00210		mg/L	-
100074	10568108	Silo 3	U-Total	<	0.00100		mg/L	-

TABLE E-3A

5-DAY STATIC LEACH DATA, SILO 1, FORMULA 1

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Aluminum	4/4	1.760-1.810	L[l]	1.782	1.78	1.757[i]	1.809	1.244
Barium	4/4	0.170-0.471	L[l]	0.289	0.315	0.158[i]	0.471[i]	48.064
Calcium	4/4	39.200-90.200	L[l]	62.783	68.65	38.822[i]	90.200[i]	38.271
Chromium	4/4	0.021-0.033	L[l]	0.026	0.025	0.020[i]	0.033	21.626
Lead	4/4	0.042-1.370	L[l]	0.545	1.235	0.073	1.370[i]	64.271
Lithium	4/4	0.138-0.144	L[l]	0.141	0.142	0.138	0.144[i]	1.95
Magnesium	4/4	0.082-0.140	L[l]	0.113	0.121	0.083	0.140[i]	25.18
Molybdenum	4/4	6.530-13.400	L[l]	8.224	7.23	5.583[i]	12.113	37.441
Potassium	4/4	18.700-21.500	L[l]	19.869	19.7	18.410[i]	21.443	6.526
Selenium	4/4	0.040-0.136	L[l]	0.069	0.069	0.034[i]	0.136[i]	57.762
Silicon	4/4	1.870-3.660	L[l]	2.54	2.55	1.685[i]	3.660[i]	34.305
Sodium	4/4	153.00-184.00	L[l]	166.05	164.5	150.26[i]	183.49	8.557
Vanadium	1/4	0.011-0.011	L[l]	0.006	0.005	0.004[i]	0.01	44.961
Zinc	4/4	0.012-0.052	L[l]	0.027	0.029	0.013	0.052[i]	54.671

c Distribution: N = Normal; L = Lognormal

d If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size is < 2

i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

j Frequency of detection is less than 5%

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

m Statistics for constituent with outliers rejected

000569

5448

TABLE E-3B

FIVE-DAY STATIC LEACH DATA, SILO 1, FORMULA 2

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Aluminum	3/3	1.000-1.210	L[l]	1.1	1.1	0.937i	1.210[i]	9.52
Antimony	1/3	0.032-0.032	L[l]	0.019	0.015	0.009i	0.032[i]	46.675
Barium	3/3	0.199-0.306	L[l]	0.233	0.208	0.156i	0.306[i]	24.972
Calcium	3/3	37.000-73.400	L[l]	50.634	47.8	28.251i	73.400[i]	35.451
Cyanide	1/3	0.009-0.009	L[l]	0.004	0.003	0.001i	0.009[i]	81.075
Lead	3/3	0.635-0.707	L[l]	0.658	0.636	0.594i	0.707[i]	6.261
Lithium	3/3	0.063-0.096	L[l]	0.079	0.083	0.055i	0.096[i]	20.559
Magnesium	3/3	0.062-0.101	L[l]	0.078	0.077	0.052i	0.101[i]	24.537
Molybdenum	3/3	1.830-4.810	L[l]	2.725	2.3	1.163i	4.810[i]	53.764
Potassium	3/3	10.700-14.800	L[l]	12.754	13.1	9.676i	14.800[i]	16.01
Selenium	3/3	0.021-0.046	L[l]	0.032	0.035	0.017i	0.046[i]	36.875
Silicon	3/3	2.440-4.050	L[l]	3.261	3.51	2.100i	4.050[i]	24.582
Sodium	3/3	75.800-84.300	L[l]	81.14	83.6	73.445i	84.300[i]	5.808
Zinc	1/3	0.006-0.006	L[l]	0.003	0.003	0.001i	0.006[i]	50.654

c Distribution: N = Normal; L = Lognormal

d If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size is < 2

i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

j Frequency of detection is less than 5%

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

m Statistics for constituent with outliers rejected

000570

5448

TABLE E-4A

5-DAY STATIC LEACH DATA, SILO 2, FORMULA 1

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Aluminum	4/4	0.788-1.190	L[l]	0.921	0.88	0.735[i]	1.155	20.035
Antimony	1/4	0.032-0.032	L[l]	0.018	0.015	0.012[i]	0.028	43.137
Arsenic	3/4	0.004-0.005	L[l]	0.003	0.004	0.001[i]	0.005[i]	48.56
Barium	4/4	0.666-0.852	L[l]	0.764	0.777	0.661[i]	0.852[i]	12.169
Boron	2/4	0.051-0.067	L[l]	0.038	0.038	0.021[i]	0.067[i]	49.412
Calcium	4/4	82.300-130.00	L[l]	102.9	104.75	76.073[i]	130.00[i]	25.267
Chromium	3/4	0.010-0.016	L[l]	0.01	0.011	0.006[i]	0.016[i]	41.632
Cyanide	1/4	0.006-0.006	L[l]	0.003	0.003	0.002[i]	0.005	52.941
Lead	4/4	0.381-0.646	L[l]	0.461	0.43	0.345[i]	0.615	26.138
Lithium	4/4	0.151-0.222	L[l]	0.177	0.172	0.142[i]	0.221	18.966
Magnesium	4/4	0.100-0.150	L[l]	0.123	0.126	0.095[i]	0.150[i]	22.135
Molybdenum	4/4	0.063-0.287	L[l]	0.131	0.154	0.051[i]	0.287[i]	70.501
Potassium	4/4	17.000-25.700	L[l]	21.259	21.85	16.661[i]	25.700[i]	20.346
Selenium	3/4	0.012-0.027	L[l]	0.014	0.018	0.006[i]	0.027[i]	60.415
Silicon	4/4	1.120-2.220	L[l]	1.58	1.665	1.008[i]	2.220[i]	36.895
Sodium	4/4	104.00-143.00	L[l]	128	134.5	107.68	143.00[i]	13.91

c Distribution: N = Normal; L = Lognormal.

d If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size is < 2.

i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

j Frequency of detection is less than 5%.

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

m Statistics for constituent with outliers rejected.

000571

9448

TABLE E-4B

5-DAY STATIC LEACH DATA, SILO 2, FORMULA 2

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Aluminum	3/3	0.910-0.993	L[l]	0.938	0.913	0.863[i]	0.993	5.015
Arsenic	2/3	0.003-0.004	L[l]	0.002	0.003	0.001[i]	0.004[i]	52.915
Barium	3/3	0.379-0.494	L[l]	0.417	0.386	0.325[i]	0.494[i]	15.362
Calcium	3/3	71.500-101.00	L[l]	80.782	73	58.276[i]	101[i]	20.304
Lead	3/3	0.132-0.237	L[l]	0.186	0.207	0.111[i]	0.237[i]	28.168
Lithium	3/3	0.077-0.112	L[l]	0.087	0.078	0.061[i]	0.112[i]	22.63
Magnesium	3/3	0.114-0.138	L[l]	0.125	0.123	0.106[i]	0.138[i]	9.699
Mercury	1/3	0.000-0.000	L[l]	0	0	0	0[i]	43.301
Molybdenum	3/3	0.028-0.133	L[l]	0.075	0.112	0.018[i]	0.133[i]	61.225
Potassium	3/3	9.750-14.500	L[l]	11.927	12	8.534[i]	14.5[i]	19.664
Selenium	3/3	0.005-0.014	L[l]	0.009	0.012	0.004[i]	0.014[i]	43.835
Silicon	3/3	2.130-3.890	L[l]	3.019	3.325	1.783[i]	3.89[i]	28.844
Sodium	3/3	31.900-50.700	L[l]	43.07	49.4	27.77[i]	50.7[i]	23.861
Zinc	2/3	0.009-0.016	L[l]	0.007	0.009	0.001[i]	0.016[i]	73.651

c Distribution: N = Normal; L = Lognormal.

d If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size is < 2.

i If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size < 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.

j Frequency of detection is less than 5%.

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

m Statistics for constituent with outliers rejected.

000572

5448

TABLE E-5A

FIVE-DAY STATIC LEACH DATA, SILO 3, FORMULA 1

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Aluminum	1/1	0.372-0.372	h	0.372	h	h	h	h
Arsenic	1/1	0.011-0.011	h	0.011	h	h	h	h
Barium	1/1	0.042-0.042	h	0.042	h	h	h	h
Boron	1/1	0.671-0.671	h	0.671	h	h	h	h
Calcium	1/1	61.900-61.900	h	61.9	h	h	h	h
Chromium	1/1	0.497-0.497	h	0.497	h	h	h	h
Lithium	1/1	18.500-18.500	h	18.5	h	h	h	h
Magnesium	1/1	0.171-0.171	h	0.171	h	h	h	h
Molybdenum	1/1	5.200-5.200	h	5.2	h	h	h	h
Potassium	1/1	204.00-204.00	h	204	h	h	h	h
Selenium	1/1	0.144-0.144	h	0.144	h	h	h	h
Silicon	1/1	6.640-6.640	h	6.64	h	h	h	h
Sodium	1/1	612.00-612.00	h	612	h	h	h	h
Thallium	1/1	0.013-0.013	h	0.013	h	h	h	h
Vanadium	1/1	0.161-0.161	h	0.161	h	h	h	h

c Distribution: N = Normal; L = Lognormal.
d If the distribution is normal or if the distribution is log-normal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.
e If the distribution is normal or if the distribution is log-normal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.
h Not applicable if sample size is < 2.
j Frequency of detection is less than 5%.
k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.
l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as log-normal.
m Statistics for constituent with outliers rejected.

000573

5448

TABLE E-5B

FIVE-DAY STATIC LEACH DATA, SILO 3, FORMULA 2

Chemical	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variations (%)
Aluminum	2/2	0.456-0.498	h	h	0.477	0.456[h]	0.498[h]	6.226
Arsenic	2/2	0.011-0.012	h	h	0.012	0.011[h]	0.012[h]	6.044
Barium	2/2	0.050-0.051	h	h	0.051	0.050[h]	0.051[h]	0.979
Beryllium	1/2	0.002-0.002	h	h	0.002	0.002[h]	0.002[h]	47.14
Boron	2/2	0.379-0.420	h	h	0.399	0.379[h]	0.420[h]	7.257
Calcium	2/2	66.300-69.000	h	h	67.65	66.300[h]	69.000[h]	2.822
Chromium	2/2	0.042-0.046	h	h	0.044	0.042[h]	0.046[h]	7.579
Iron	1/2	0.030-0.030	h	h	0.02	0.030[h]	0.030[h]	71.237
Lithium	2/2	7.190-7.890	h	h	7.54	7.190[h]	7.890[h]	6.565
Magnesium	2/2	0.212-0.217	h	h	0.214	0.212[h]	0.217[h]	1.648
Molybdenum	2/2	2.820-3.310	h	h	3.065	2.820[h]	3.310[h]	11.304
Potassium	2/2	94.700-100.00	h	h	97.35	94.700[h]	100.00[h]	3.85
Selenium	2/2	0.049-0.051	h	h	0.05	0.049[h]	0.051[h]	1.984
Silicon	2/2	7.100-7.320	h	h	7.21	7.100[h]	7.320[h]	2.158
Sodium	2/2	287.00-303.00	h	h	295	287.00[h]	303.00[h]	3.835
Vanadium	2/2	0.140-0.151	h	h	0.146	0.140[h]	0.151[h]	5.346

c Distribution: N = Normal; L = Lognormal.

d If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and frequency of detection > 50%, an arithmetic mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric mean is given.

e If the distribution is normal or if the distribution is lognormal, the number of detects > 7, and the frequency of detection > 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is lognormal and either the number of detects is < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.

h Not applicable if sample size < 2.

j Frequency of detection is less than 5%.

k Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as lognormal.

l Data set contains fewer than seven observations or more than 50% nondetects, therefore the distribution could not be definitively determined. It is treated as lognormal.

m Statistics for constituent with outliers rejected.

000574

5448

TABLE E-6A

FIVE-DAY STATIC LEACH RADIOLOGICAL DATA FOR SILO 1, FORMULA 1

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coeffficient of Variables (%)
Pb-210	4 /4	92.600 -662.00	L[l]	318.1	435	110.06	662[i]	65.117
Po-210	4 /4	169.00 -216.00	L[l]	196.21	201.5	173.45	216[i]	10.093
Ra-226	4 /4	3360.0 - 10800	L[l]	5897.6	6530	2805.4[i]	10800[i]	57.907
Th-Total	1 /4	0.003 - 0.003	L[l]	0.001	0.001	0[i]	0.003	98.353
U-Total	4 /4	0.001 - 0.002	L[l]	0.001	0.001	0.001[i]	0.002	25.885

TABLE E-6B

FIVE-DAY STATIC LEACH RADIOLOGICAL DATA FOR SILO 1, FORMULA 2

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variables (%)
Ac-227	2 /3	1.100 - 1.820	L[l]	1	1.1	0.334 [i]	1.82 [i]	57.974
Pb-210	3 /3	1870.0 -2350.0	L[l]	2149.5	2260	1749.3 [i]	2350 [i]	11.812
Po-210	3 /3	362.00 -533.00	L[l]	442.15	448	318.93 [i]	533 [i]	19.099
Ra-226	3 /3	416.00 -4060.0	L[l]	1020.9	630	132 [i]	4060 [i]	120.15
U-Total	2 /3	0.009 - 0.033	L[l]	0.005	0.009	0 [i]	0.033 [i]	120.03

[c] Distribution: N = Normal; L = Lognormal.
[d] If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.
[d] If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.
[h] Not applicable if sample size ≤ 2.
[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size ≤ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.
[j] Freqency of detection is less than 5%.
[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.
[l] Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.
[m] Statistics for constituent with outliers rejected.

000575

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TABLE E-7A

Five-Day Static Leach Radiological Data for Silo 2, Formula 1

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variables (%)
Ac-227	1 /4	1.380 - 1.380	L[l]	0.644	0.5	0.355 [i]	1.171	61.111
Pb-210	4 /4	1900.0 -3350.0	L[l]	2268.4	2040	1665.5 [i]	3089.5	29.253
Po-210	4 /4	322.00 -417.00	L[l]	370.14	374.5	322.88	417 [i]	11.47
Ra-226	4 /4	19400 - 37000	L[l]	25149	23700	18026 [i]	35086	30.175
Ra-228	4 /4	5.090 - 8.930	L[l]	7.277	7.855	5.449	8.93 [i]	22.092
U-Total	4 /4	0.002 - 0.003	L[l]	0.002	0.003	0.002	0.003 [i]	22.881

TABLE E-7B

FIVE-DAY STATIC LEACH RADIOLOGICAL DATA FOR SILO 2, FORMULA 2

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean^d (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variables (%)
Pb-210	3 /3	644.00 -1160.0	L^l	824.76	751	493.01 [i]	1160 [i]	31.976
Po-210	3 /3	103.00 -220.00	L^l	156.14	168	81.631 [i]	220 [i]	35.817
Ra-226	3 /3	6870.0 - 18600	L^l	11531	12000	4970.5 [i]	18600 [i]	47.08
U-Total	3 /3	0.001 - 0.001	L^l	0.001	0.001	0.001 [i]	0.001 [i]	1.635

[c] Distribution: N = Normal; L = Lognormal.
[d] If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.
[e] If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.
[h] Not applicable if sample size ≤ 2.
[i] If the upper 95% CI on the mean exceeds the maximum detected concentration or if the sample size ≤ 2, the maximum detected concentration is substituted for the upper 95% CI and the minimum is substituted for the lower 95% CI.
[j] Freqency of detection is less than 5%.
[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.
[l] Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.
[m] Statistics for constituent with outliers rejected.

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TABLE E-8A

FIVE-DAY STATIC LEACH RADIOLOGICAL DATA FOR SILO 3, FORMULA 1

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variables (%)
Po-210	1 /1	11.000 -11.000	h	11.0	h	h	h	h
Ra-226	1 /1	247.00 -247.00	h	247	h	h	h	h
U-Total	1 /1	0.002 - 0.002	h	0.002	h	h	h	h

TABLE E-8B

FIVE-DAY STATIC LEACH RADIOLOGICAL DATA FOR SILO 3, FORMULA 2

Radionuclide	Frequency of Detection	Range of Detection (mg/L)	Dist[c]	Mean[d] (mg/L)	Median (mg/L)	Lower 95% CI on Mean (mg/L)	Upper 95% CI on Mean (mg/L)	Coefficient of Variables (%)
Ra-226	2 /2	249.00 -308.00	h	278.5	h	h	h	h

[c] Distribution: N = Normal; L = Lognormal.
[d] If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and frequency of detection ≥ 50%, an arithmetic mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric mean is given.
[e] If the distribution is normal or if the distribution is log-normal, the number of detects ≥ 7, and the frequency of detection ≥ 50%, an arithmetic upper 95% confidence interval (CI) on the mean is given. If the distribution is log-normal and either the number of detects < 7 or the frequency of detection is < 50%, a geometric upper 95% CI on the mean is given.
[h] Not applicable if sample size ≤ 2.
[j] Freqency of detection is less than 5%.
[k] Distribution failed the Correlation Coefficient Test and therefore could not be definitively determined. It is treated as log-normal.
[l] Data set contains fewer than seven observations or more than 50% non-detects, therefore the distribution could not be definitively determined. It is treated as log-normal.
[m] Statistics for constituent with outliers rejected.

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APPENDIX F

PROCEDURE FOR FLOCCULATION MINI JAR TEST

APPLICATION

This method is used to determine the optimum condition, i.e., coagulant dosage and operation condition, for maximum removal or coagulation of the desired wastewater constituents. Generally, the selected coagulant is added to the wastewater under specified conditions, such as dosage, pH, temperature, etc., and then the mixture is rapidly mixed, followed by the addition of a coagulant aid and gentle flocculation. After determining the best coagulant and the optimum conditions of applications, other design parameters, such as settling properties and sludge production, should be determined. This procedure has been modified to use small samples of 5 to 20 ml in cases of limited sample quantity. It uses 20 ml sample vials as reaction vessels and hand mixing or an orbital shaker as a mixing device.

PROCEDURE

1. Select coagulants and/or flocculants based on knowledge of the sample matrix. Then make reagent solutions at concentrations of 100 to 1000 ppm for polymers, 1000 to 10,000 ppm for inorganic coagulants, and 1 to 30 percent for acid or base neutralization reagents.

2. Determine the approximate minimum dosage of each coagulant for which a floc will be formed. This may be accomplished by adding the coagulant in 0.05 ml increments to 5 to 20 ml of the raw wastewater and slowing mixing (by capping and inverting the vial several times) until the first evidence of a floc is observed.

3. After repeating Step 2 for each reagent of interest, set up multiple vials with the same amounts of liquid sample for comparison testing. Then set up multiple 1-ml syringes with the respective amounts of reagents for floc formations. Add the reagents to their respective vials in as narrow a time frame as possible.

4. Rapid-mix the samples on a orbital shaker at approximately 200 to 400 rpm for 1 to 2 minutes, then flocculate slowly at 5 to 50 rpm for 15 minutes. The rate of flocculation should be slow enough that floc shear does not occur. Record the time for a visible floc to form in each sample, and after flocculation, shut off the shaker and allow the samples to settle. Note the relative depths of clear liquids in each of the vials with time.

5. Determine the residual parameters of interest, e.g., TOC, color, metals, turbidity, etc., in the supernatant. Also measure the pH after the material has settled and use this as the pH level for subsequent correlation. A slow settling rate will be considered as less than 0.5 to 1 inch per minute.

6. If necessary, repeat Step 3 through 5 using organic polymers. Again, record the time of formation of the visual floc. If polyelectrolytes are to be added, a cationic polymer should be added toward the end of the rapid mix. Anionic polymers should be added about the middle of the flocculation step.

REFERENCE

ASTM Method 2035-80, Standard Procedure for Coagulation-Flocculation Jar Test, 1976, Development of Criteria for Wastewater Treatment Processes, Chapter XI, "Coagulation and Precipitation", Proceedings of a Seminar Sponsored by Vandervilt University, Nashville, TN.

APPENDIX G

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

5448

CERTIFICATE OF ANALYSIS

Thomas Tank
IT Corporation
312 Directors Drive
Knoxville, TN 37923

March 22, 1990

PROJECT NUMBER: 482331 **JOB NUMBER:** 303317.24.05.20

This is the Certificate of Analysis for the following samples:

Client Project ID:	303317.24.05.20 (Fernald)
Date Received by Lab:	10/20/89
Number of Samples:	13
Sample Type:	Silo Material

I. Introduction

ITAS Geotechnical Services located within the Technology Development Laboratory (TDL) was contracted to provide geotechnical/physical analytical services to support the K-65 Silo Residues and Sub-soils Feasibility Study Testing Plan. Physical testing and sample handling was conducted in a on-site laboratory at the Feed Materials Production Center (FMPC) located in Hamilton County, Ohio.

II. Analytical Results/Methodology

REFERENCE: Annual Book of ASTM Standards. 1989. Soil and Rock; Building Stones; Geotextiles. Vol. 4.08.

Specific Gravity (not used in water content analysis)	ASTM D854-83
Water Content	ASTM D2216-80
Atterberg Limits (liquid limit, plasticity index, classification)	ASTM D4318-84
Grain Size (hydrometer <0.075 mm and sieve analysis ≥0.075 mm)	ASTM D422-63

Reviewed and Approved:

Michael A. Krstich
Geotechnical Services

mak:MAK040

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

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II. Analytical Results/Methodology (Continued)

Sample Cross Reference List and Silo Sampling Results are contained in Appendix A.
Results are contained in Appendix B.
Analyses Summation List and Summary is contained in Appendix C.

III. Quality Control

QC measures to insure accuracy and precision of test results included the following:

100% verification on all numerical results - all raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified by the geotechnical laboratory manager.

Data validation through test reasonableness - summaries of all test results for individual reports are reviewed by the geotechnical laboratory manager to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.

Routine instrument calibration - all instruments, gauges and equipment used in testing is calibrated on a timely routine basis. All instrument calibration follows ASTM or manufactures guidelines.

Maintenance of all past calibration records - records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the geotechnical laboratory managers office.

Use of trained personnel for conducting tests - all technicians are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented for internal quality control checks.

Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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Job Number: 303317.24.05.20

CROSS-REFERENCE LIST

SILO NO.	SAMPLE NO.	MANWAY ID/ VERTICAL SECTION	MATRIX
1	1	NE-1 A	K-65
1	2	NE-1 C	K-65
1	3	SE-2 BT	K-65
1	4	SW-1/SE-1/NW-1 COMPOSITE	K-65
2	1	NW-1 A	K-65
2	2	NE-2 BT	K-65
2	3	SW-1 A	K-65
2	4	SW-2/NW-2/NE-1 COMPOSITE	K-65
3	1	NW-1 A	METAL OXIDE
3	2	NW-1 C	METAL OXIDE
3	3	SE-1 A	METAL OXIDE
3	4	SE-1 C	METAL OXIDE
3	5	NE-1 ABC COMPOSITE	METAL OXIDE

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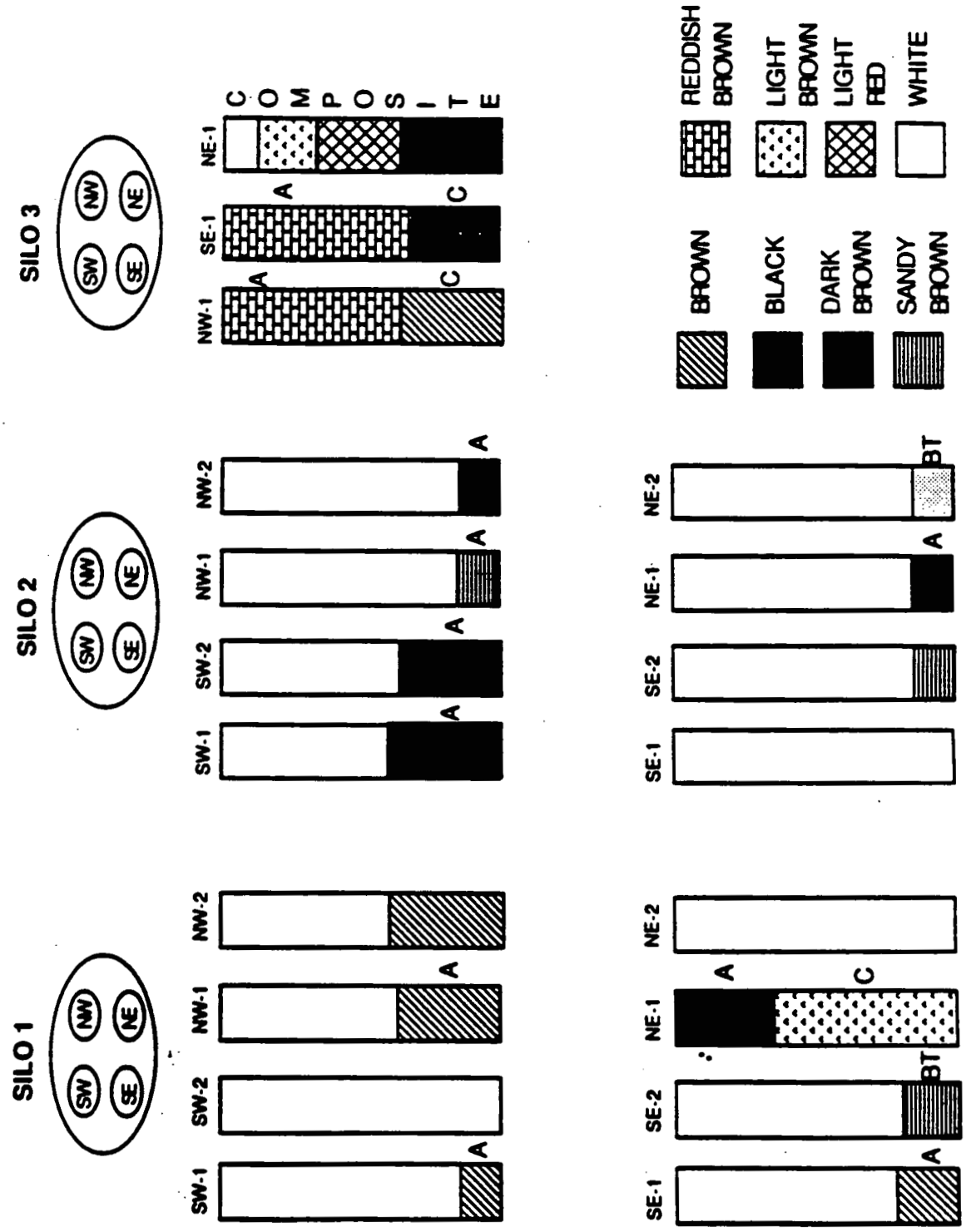
K-65 AND METAL OXIDES SILOS SAMPLPLIMT/RESULTS



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Job Number: 303317.24.05.20

SILO NO: 1 MANWAY NO: NE-1 VERTICAL SECTION: A

WATER CONTENT

50.7%

SPECIFIC GRAVITY

3.19 g/cc

ATTERBERG LIMITS

LIQUID LIMIT: 55.2 PLASTICITY INDEX: 5.2

PLASTIC LIMIT: 50.0 USCS: MH

GRAIN SIZE

SIEVE SIZE/TIME	DIAMETER (mm)	PERCENT FINER
SIEVE ANALYSIS:		
3.000 in	75.000	100.0
1.500 in	37.500	100.0
0.750 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	95.1
NO. 20	0.850	93.2
NO. 40	0.425	92.6
NO. 60	0.250	91.6
NO. 140	0.106	80.1
NO. 200	0.075	72.7
HYDROMETER ANALYSIS		
1 min	0.047	49.3
2 min	0.034	46.3
5 min	0.022	40.1
15 min	0.013	33.9
30 min	0.008	27.8
60 min	0.007	24.7
240 min	0.003	21.6
1440 min	0.001	15.4

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Date: 3/22/90
Client Project ID: 303317.24.05.20

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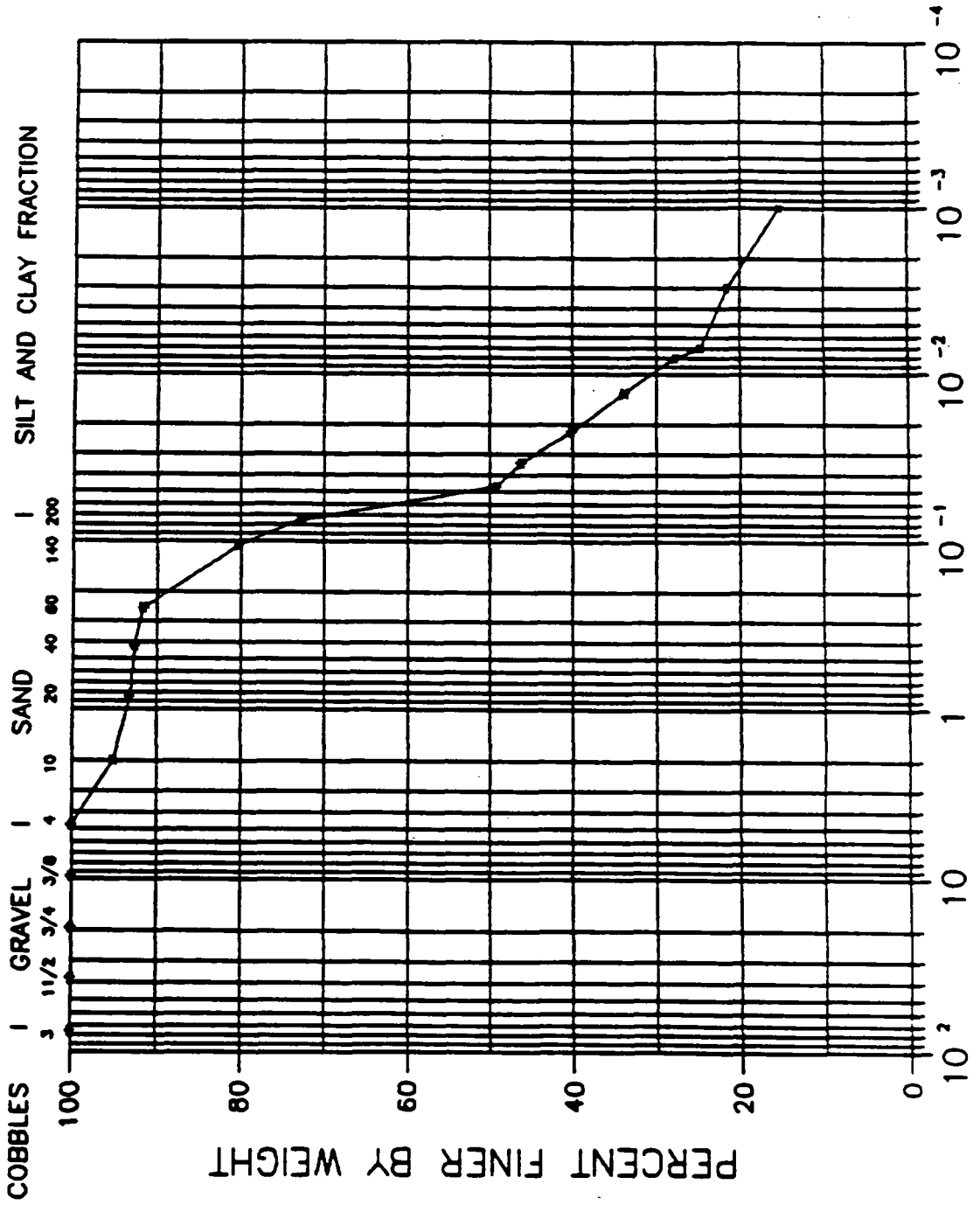
(615) 690-3211

Job Number: 303317.24.05.20

CLIENT: IT CORPORATION
PROJECT NO: 90106
MANWAY NO: NE-1
DESCRIPTION: K-65 MATERIAL
USCS CLASSIFICATION: NA

CLIENT PROJECT: FERNALD
BORING NO: SILO NO. 1
VERTICAL SECTION: A



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Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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Job Number: 303317.24.05.20

SILO NO: 1 MANWAY NO: NE-1 VERTICAL SECTION: C

WATER CONTENT

71.5%

SPECIFIC GRAVITY

2.74 g/cc

ATTERBERG LIMITS

LIQUID LIMIT: 70.3 PLASTICITY INDEX: 3.7

PLASTIC LIMIT: 66.6 USCS: MH

GRAIN SIZE

SIEVE SIZE/TIME	DIAMETER (mm)	PERCENT FINER
SIEVE ANALYSIS:		
3.000 in	75.000	100.0
1.500 in	37.500	100.0
0.750 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	97.3
NO. 20	0.850	91.6
NO. 40	0.425	86.7
NO. 60	0.250	81.2
NO. 140	0.106	72.2
NO. 200	0.075	71.5
HYDROMETER ANALYSIS		
1 min	0.042	62.1
2 min	0.031	58.5
5 min	0.019	56.0
15 min	0.011	53.6
30 min	0.008	48.7
60 min	0.006	46.3
240 min	0.003	41.4
1440 min	0.001	26.8

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Date: 3/22/90
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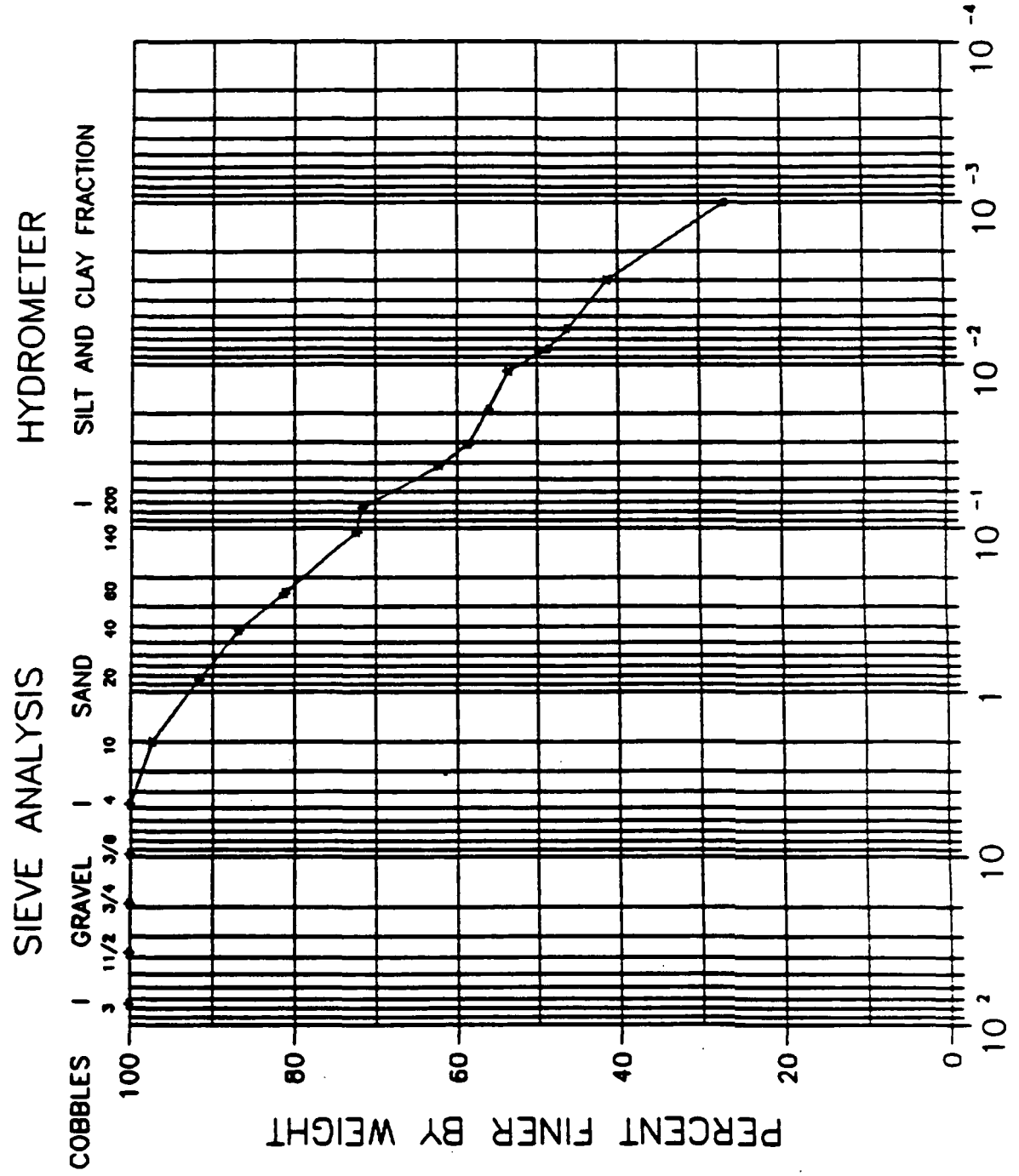
(615) 690-3211

Job Number: 303317.24.05.20

CLIENT: IT CORPORATION
PROJECT NO: 90106
MANWAY NO: NE-1
DESCRIPTION: K-65 MATERIAL
USCS CLASSIFICATION: NA

CLIENT PROJECT: FERNALD
BORING NO: SILO NO. 1
VERTICAL SECTION: C



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Date: 3/22/90
Client Project ID: 303317.24.05.20

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Job Number: 303317.24.05.20

SILO NO: 1 MANWAY NO: SE-2 VERTICAL SECTION: BT

WATER CONTENT

31.9%

SPECIFIC GRAVITY

3.37 g/cc

ATTERBERG LIMITS

LIQUID LIMIT: NP PLASTICITY INDEX: NP

PLASTIC LIMIT: NP USCS: NA

CONSISTENCY BREAK POINT (WATER CONTENT): 38.0%

GRAIN SIZE

SIEVE SIZE/TIME	DIAMETER (mm)	PERCENT FINER
SIEVE ANALYSIS:		
3.000 in	75.000	100.0
1.500 in	37.500	100.0
0.750 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	96.7
NO. 20	0.850	95.1
NO. 40	0.425	92.4
NO. 60	0.250	83.6
NO. 140	0.106	49.3
NO. 200	0.075	43.9
HYDROMETER ANALYSIS		
1 min	0.051	28.5
2 min	0.036	23.7
5 min	0.023	19.0
15 min	0.014	17.4
30 min	0.010	15.8
60 min	0.007	15.8
240 min	0.003	14.2
1440 min	0.001	12.7

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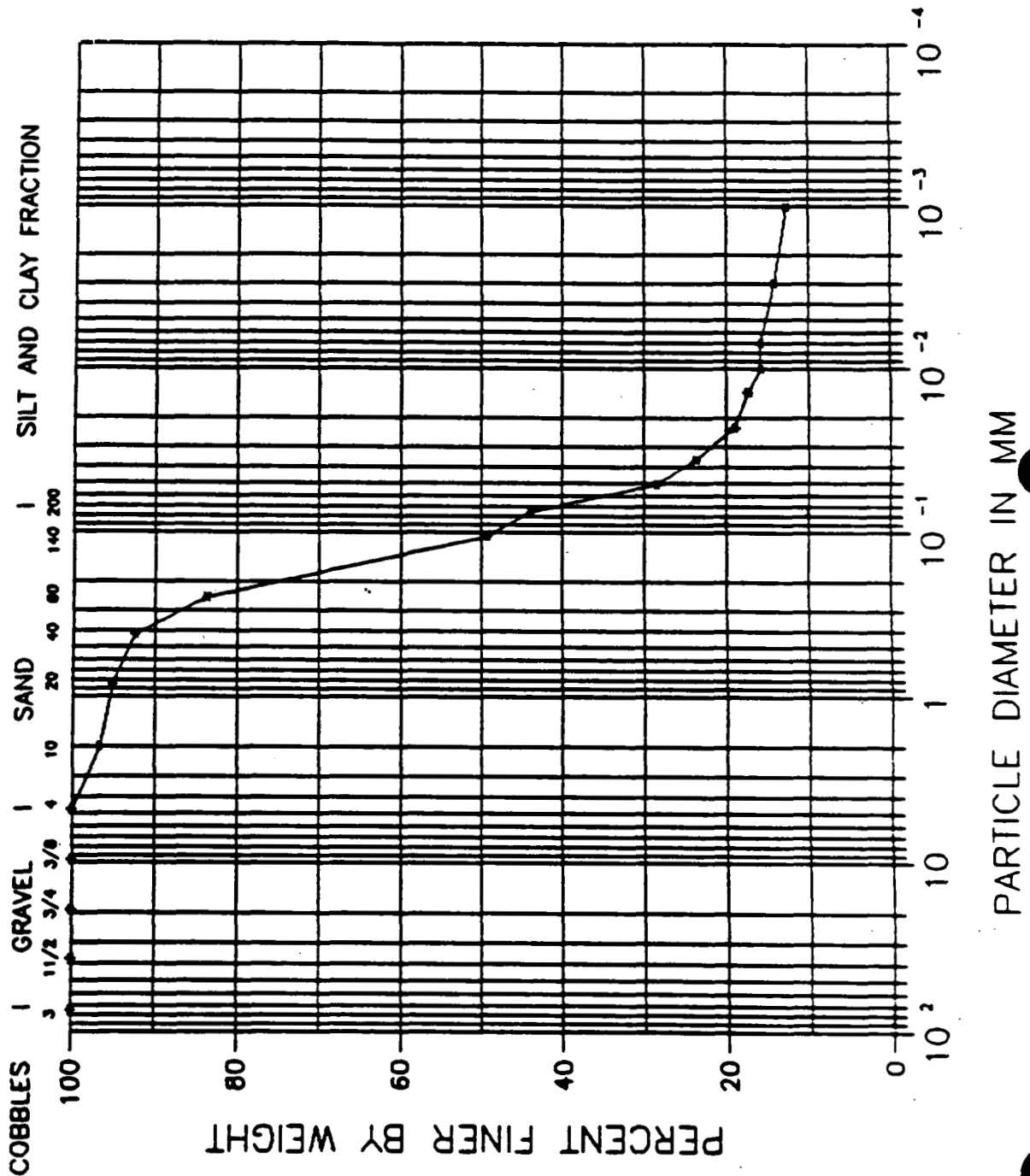
Job Number: 303317.24.05.20

CLIENT: IT CORPORATION
PROJECT NO: 90106
MANWAY NO: SE-2
DESCRIPTION: K-65 MATERIAL
USCS CLASSIFICATION: NA

CLIENT PROJECT: FERNALD
BORING NO: SILO NO. 1
VERTICAL SECTION: BT



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Client Project ID: 303317.24.05.20

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Job Number: 303317.24.05.20

SILO NO: 1 MANWAY NO: SW-1/SE-1/NW-1 VERTICAL SECTION: COMPOSITE

WATER CONTENT

22.8%

SPECIFIC GRAVITY

2.58 g/cc

ATTERBERG LIMITS

LIQUID LIMIT: NP PLASTICITY INDEX: NP

PLASTIC LIMIT: NP USCS: NA

CONSISTENCY BREAK POINT (WATER CONTENT): 35.7%

GRAIN SIZE

SIEVE SIZE/TIME	DIAMETER (mm)	PERCENT FINER
SIEVE ANALYSIS:		
3.000 in	75.000	100.0
1.500 in	37.500	100.0
0.750 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	97.2
NO. 20	0.850	95.5
NO. 40	0.425	92.0
NO. 60	0.250	81.1
NO. 140	0.106	58.7
NO. 200	0.075	54.5
HYDROMETER ANALYSIS		
1 min	0.049	40.7
2 min	0.035	37.6
5 min	0.022	34.5
15 min	0.013	31.3
30 min	0.009	28.2
60 min	0.007	26.6
240 min	0.003	25.1
1440 min	0.001	21.9

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Date: 3/22/90
Client Project ID: 303317.24.05.20

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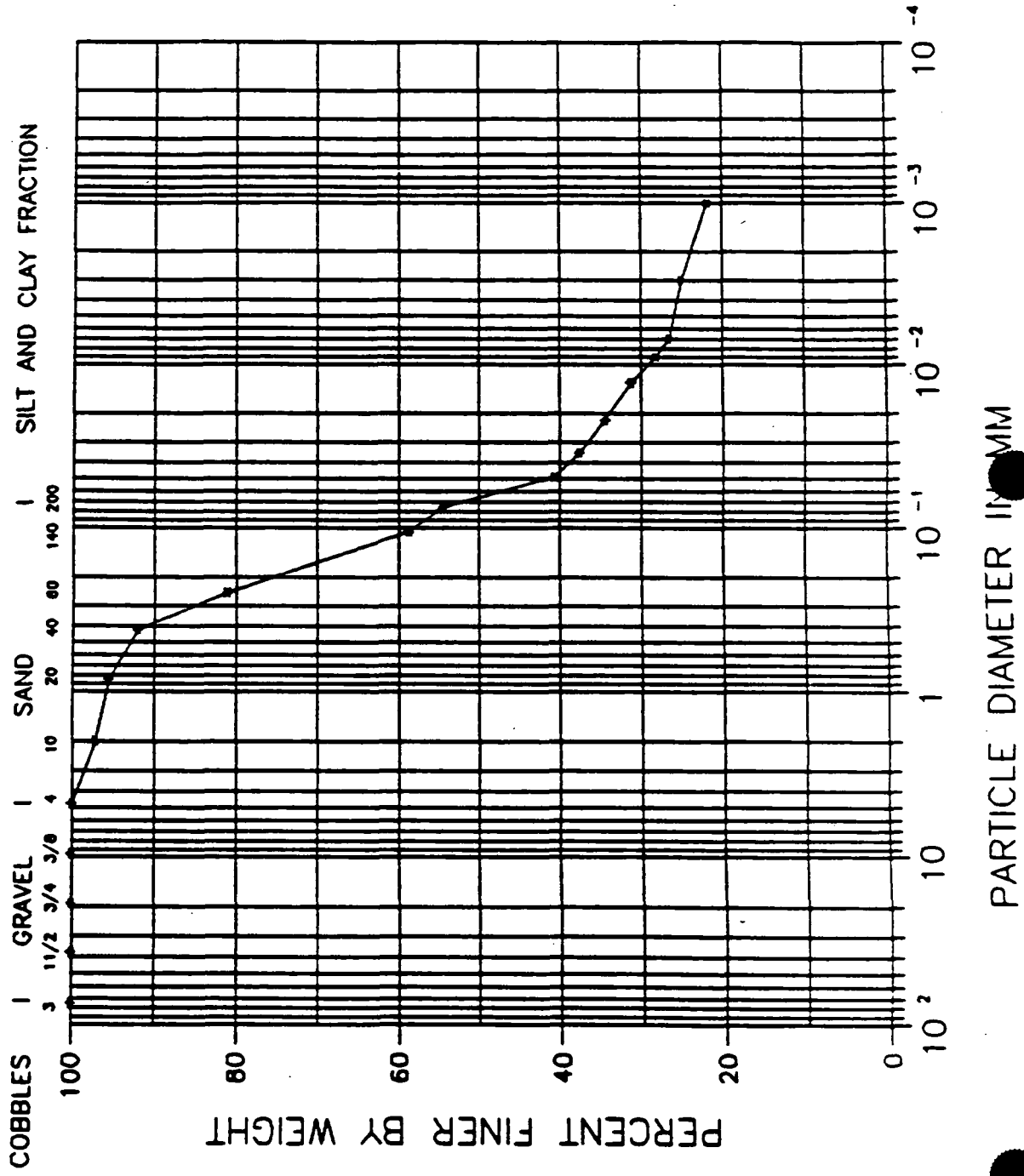
Job Number: 303317.24.05.20

CLIENT: IT CORPORATION
PROJECT NO: 90106
MANWAY NO: SW-1/SE-1/NW-1 COMPOSITE
DESCRIPTION: K-65 MATERIAL
USCS CLASSIFICATION: NA

CLIENT PROJECT: FERNALD
BORING NO: SILO NO. 1
VERTICAL SECTION: A



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Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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304 DIRECTORS DRIVE
KNOXVILLE, TN
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Job Number: 303317.24.05.20

SILO NO: 2 MANWAY NO: NW-1 VERTICAL SECTION: A

WATER CONTENT

25.9%

SPECIFIC GRAVITY

2.87 g/cc

ATTERBERG LIMITS

LIQUID LIMIT: NP PLASTICITY INDEX: NP

PLASTIC LIMIT: NP USCS: NA

CONSISTENCY BREAK POINT (WATER CONTENT): 47.6%

GRAIN SIZE

SIEVE SIZE/TIME	DIAMETER (mm)	PERCENT FINER
SIEVE ANALYSIS:		
3.000 in	75.000	100.0
1.500 in	37.500	100.0
0.750 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	93.2
NO. 20	0.850	88.1
NO. 40	0.425	83.0
NO. 60	0.250	74.9
NO. 140	0.106	45.7
NO. 200	0.075	39.8
HYDROMETER ANALYSIS		
1 min	0.050	31.0
2 min	0.036	28.0
5 min	0.023	25.1
15 min	0.013	19.2
30 min	0.010	16.2
60 min	0.007	14.8
240 min	0.003	11.8
1440 min	0.001	8.9

mak/MAK040

642 1-89

Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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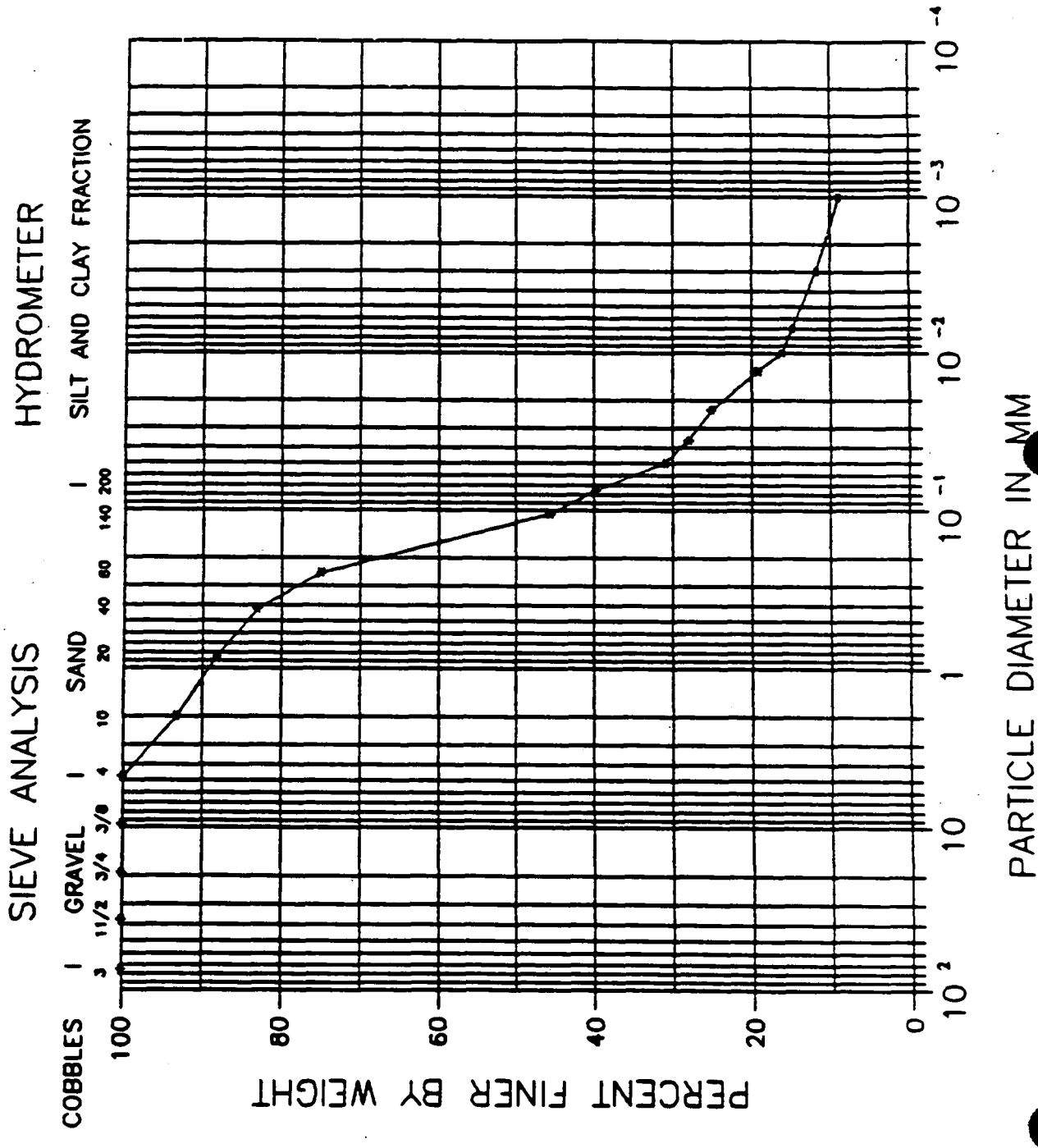
IT ANALYTICAL SERVICES
304 DIRECTORS DRIVE
KNOXVILLE, TN
(615) 690-3211

Job Number: 303317.24.05.20

CLIENT: IT CORPORATION
PROJECT NO: 90106
MANWAY NO: NW-1
DESCRIPTION: K-65 MATERIAL
USCS CLASSIFICATION: NA

CLIENT PROJECT: FERNALD
BORING NO: SILO NO. 2
VERTICAL SECTION: A



682-1-89

Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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IT ANALYTICAL SERVICES
304 DIRECTORS DRIVE
KNOXVILLE, TN
(615) 690-3211

Job Number: 303317.24.05.20

SILO NO: 2 MANWAY NO: NE-2 VERTICAL SECTION: BT

WATER CONTENT

21.8%

SPECIFIC GRAVITY

2.59 g/cc

ATTERBERG LIMITS

LIQUID LIMIT: NP PLASTICITY INDEX: NP

PLASTIC LIMIT: NP USCS: NA

CONSISTENCY BREAK POINT (WATER CONTENT): 40.9%

GRAIN SIZE

SIEVE SIZE/TIME	DIAMETER (mm)	PERCENT FINER
SIEVE ANALYSIS:		
3.000 in	75.000	100.0
1.500 in	37.500	100.0
0.750 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	86.3
NO. 20	0.850	80.5
NO. 40	0.425	69.6
NO. 60	0.250	62.2
NO. 140	0.106	53.1
NO. 200	0.075	51.9
HYDROMETER ANALYSIS		
1 min	0.050	36.1
2 min	0.036	32.8
5 min	0.023	26.3
15 min	0.014	18.1
30 min	0.010	11.5
60 min	0.007	9.8
240 min	0.003	8.2
1440 min	0.001	4.9

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Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

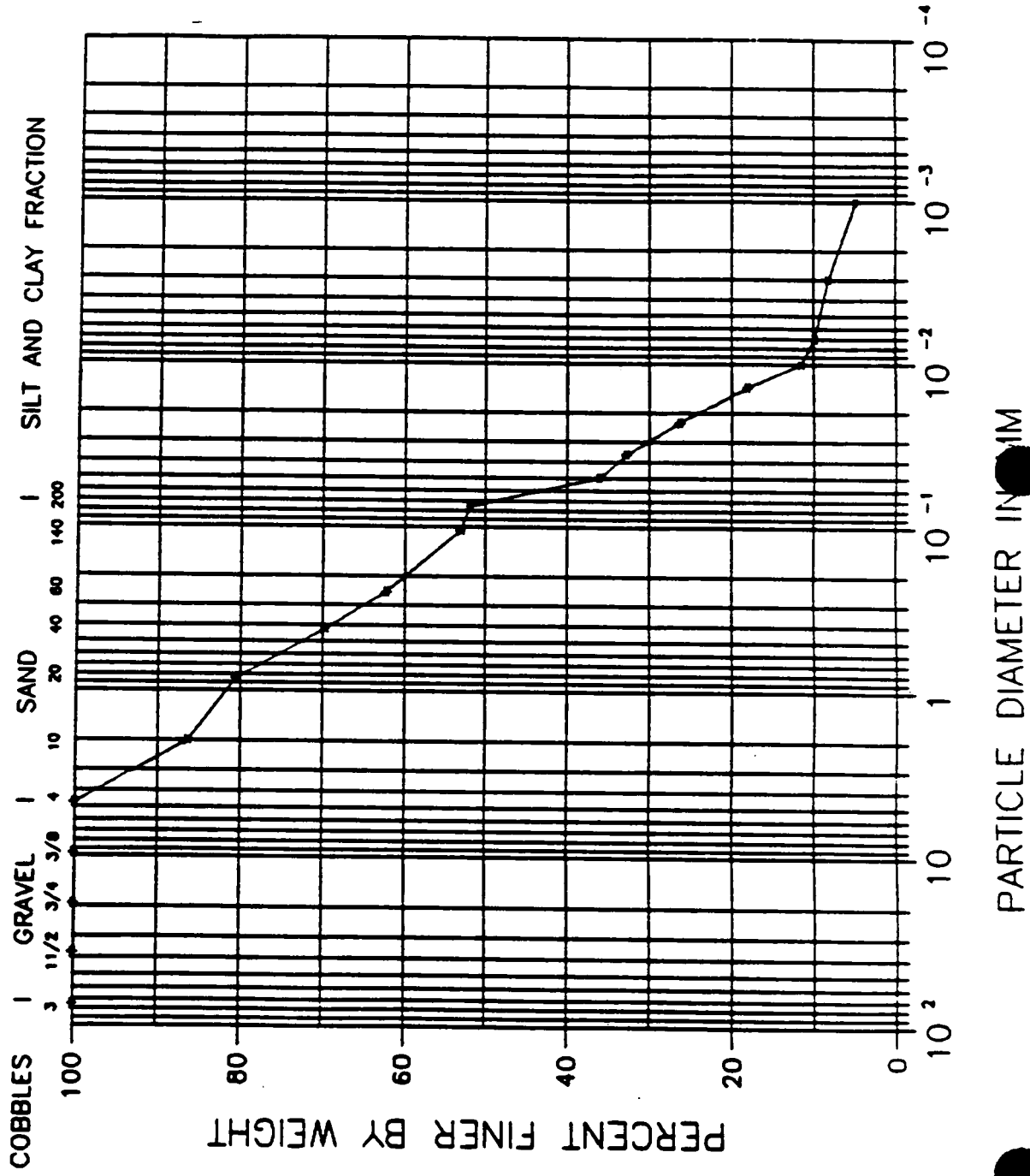
5448

IT ANALYTICAL SERVICES
304 DIRECTORS DRIVE
KNOXVILLE, TN
(615) 690-3211

Job Number: 303317.24.05.20

CLIENT: IT CORPORATION
PROJECT NO: 90106
MANWAY NO: NE-2
DESCRIPTION: K-65 MATERIAL
USCS CLASSIFICATION: NA

CLIENT PROJECT: FERNALD
BORING NO: SILO NO. 2
VERTICAL SECTION: BT



662-1-89

Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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Job Number: 303317.24.05.20

SILO NO: 2 MANWAY NO: SW-1 VERTICAL SECTION: A

WATER CONTENT

73.5%

SPECIFIC GRAVITY

3.11 g/cc

ATTERBERG LIMITS

LIQUID LIMIT: NP PLASTICITY INDEX: NP

PLASTIC LIMIT: NP USCS: NA

CONSISTENCY BREAK POINT (WATER CONTENT): 79.4%

GRAIN SIZE

SIEVE SIZE/TIME	DIAMETER (mm)	PERCENT FINER
SIEVE ANALYSIS:		
3.000 in	75.000	100.0
1.500 in	37.500	100.0
0.750 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	96.5
NO. 20	0.850	89.4
NO. 40	0.425	80.4
NO. 60	0.250	73.1
NO. 140	0.106	63.7
NO. 200	0.075	63.3
HYDROMETER ANALYSIS		
1 min	0.042	48.2
2 min	0.030	47.2
5 min	0.019	45.3
15 min	0.011	42.5
30 min	0.008	39.7
60 min	0.006	36.8
240 min	0.003	34.0
1440 min	0.001	20.8

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Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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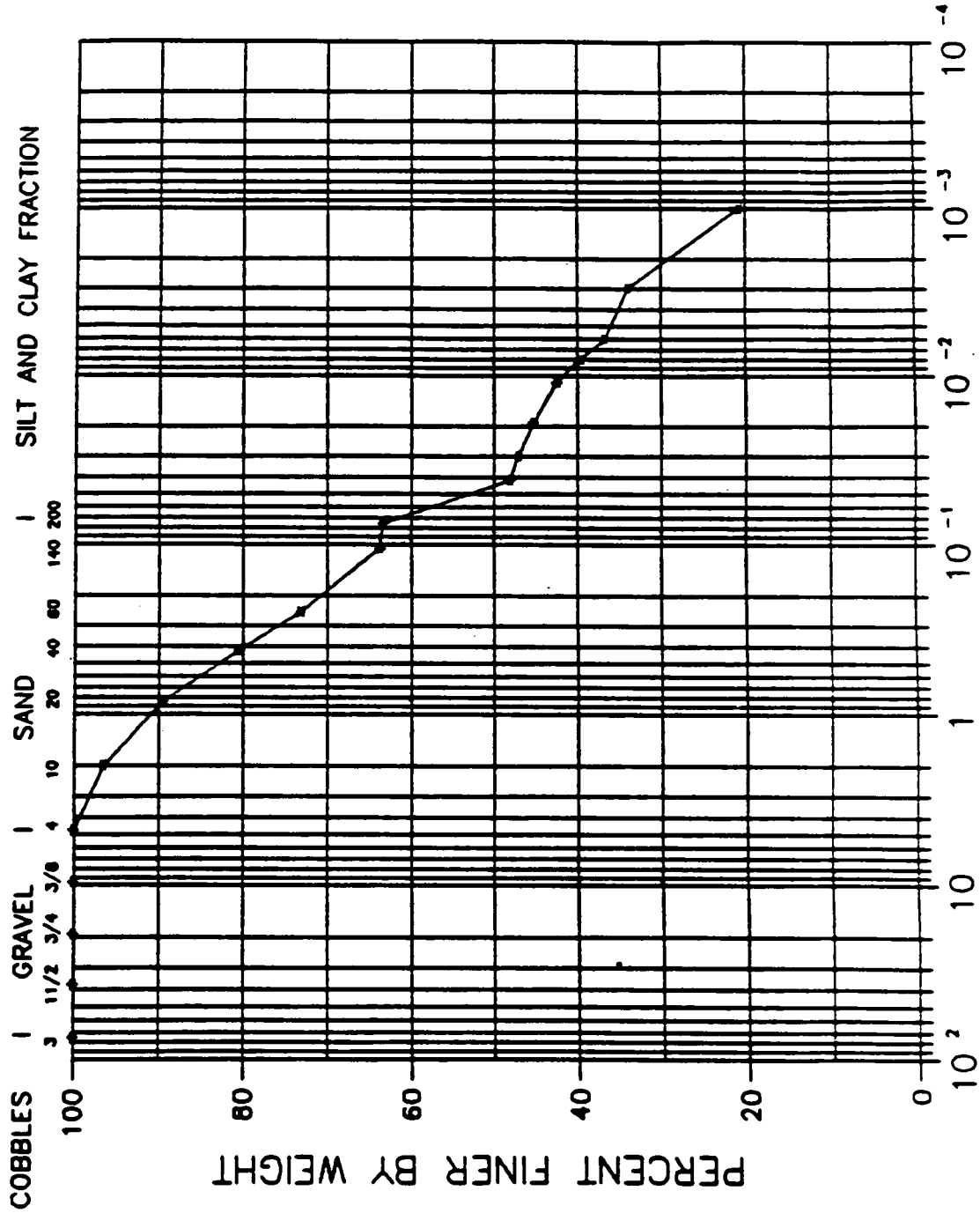
IT ANALYTICAL SERVICES
304 DIRECTORS DRIVE
KNOXVILLE, TN
(615) 690-3211

Job Number: 303317.24.05.20

CLIENT: IT CORPORATION
PROJECT NO: 90106
MANWAY NO: SW-1
DESCRIPTION: K-65 MATERIAL
USCS CLASSIFICATION: NA

CLIENT PROJECT: FERNALD
BORING NO: SILO NO. 2
VERTICAL SECTION: A



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Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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KNOXVILLE, TN
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Job Number: 303317.24.05.20

SILO NO: 2 MANWAY NO: SW-2/NW-2/NE-1 VERTICAL SECTION: COMPOSITE

WATER CONTENT

34.2%

SPECIFIC GRAVITY

2.78 g/cc

ATTERBERG LIMITS

LIQUID LIMIT: NP PLASTICITY INDEX: NP

PLASTIC LIMIT: NP USCS: NA

CONSISTENCY BREAK POINT (WATER CONTENT): 46.4%

GRAIN SIZE

SIEVE SIZE/TIME	DIAMETER (mm)	PERCENT FINER
SIEVE ANALYSIS:		
3.000 in	75.000	100.0
1.500 in	37.500	100.0
0.750 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	96.4
NO. 20	0.850	88.9
NO. 40	0.425	67.2
NO. 60	0.250	57.1
NO. 140	0.106	39.7
NO. 200	0.075	38.1
HYDROMETER ANALYSIS		
1 min	0.050	32.0
2 min	0.036	30.5
5 min	0.023	28.9
15 min	0.013	25.9
30 min	0.009	22.9
60 min	0.007	19.8
240 min	0.003	18.3
1440 min	0.001	10.7

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Date: 3/22/90
Client Project ID: 303317.24.05.20

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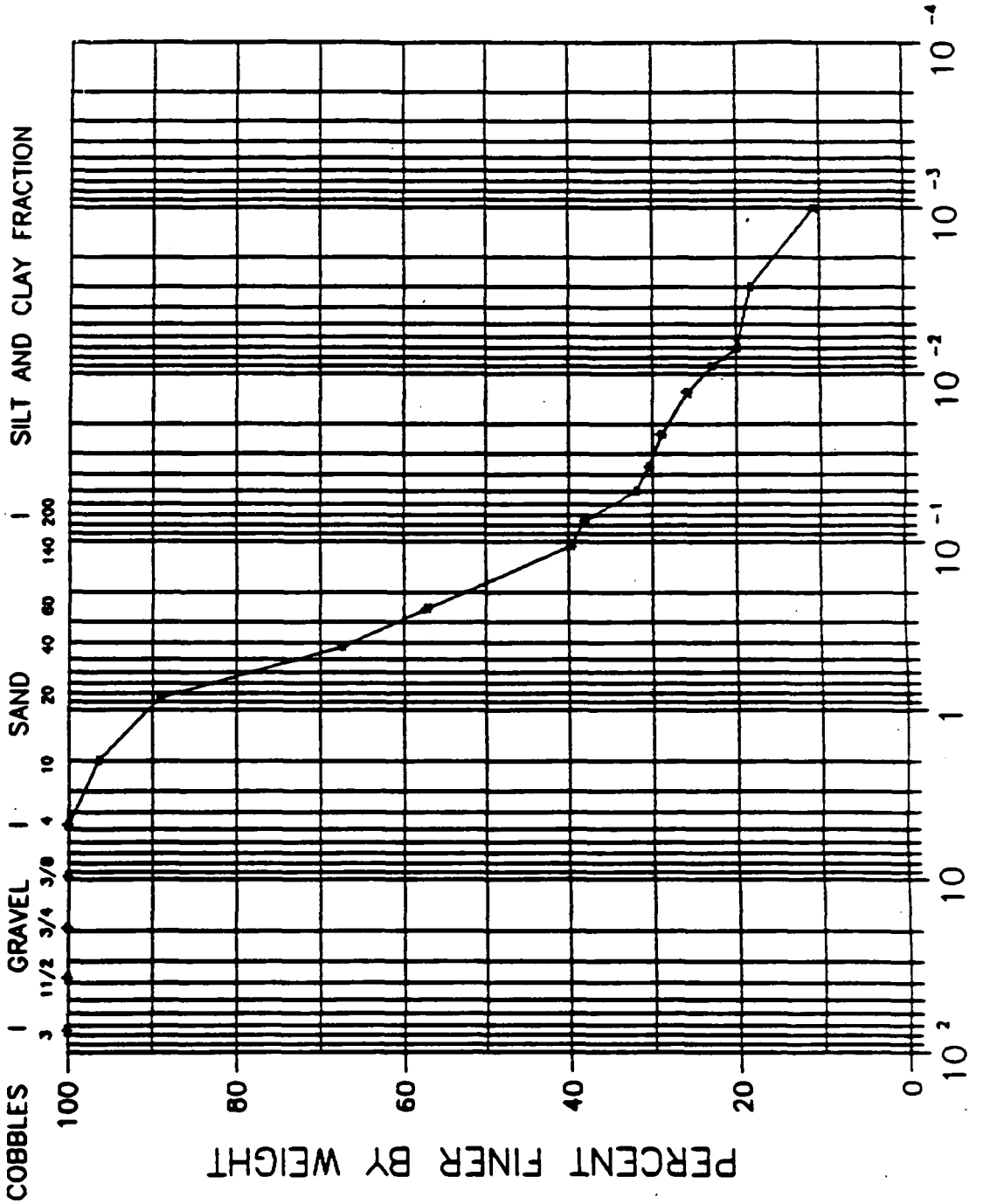
KNOXVILLE, TN
(615) 690-3211

Job Number: 303317.24.05.20

CLIENT: IT CORPORATION
PROJECT NO: 90106
MANWAY NO: SW-2/NW-2/NE-1 COMPOSITE
DESCRIPTION: K-65 MATERIAL
USCS CLASSIFICATION: NA

CLIENT PROJECT: FERNALD
BORING NO: SILO NO. 2
VERTICAL SECTION: A



Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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304 DIRECTORS DRIVE
KNOXVILLE, TN
(615) 690-3211

Job Number: 303317.24.05.20

SILO NO: S3 MANWAY NO: NW-1 VERTICAL SECTION: A

WATER CONTENT

7.4%

SPECIFIC GRAVITY

2.35 g/cc

ATTERBERG LIMITS

LIQUID LIMIT: NP PLASTICITY INDEX: NP

PLASTIC LIMIT: NP USCS: NA

CONSISTENCY BREAK POINT (WATER CONTENT): 66.0%

GRAIN SIZE

SIEVE SIZE/TIME	DIAMETER (mm)	PERCENT FINER
SIEVE ANALYSIS:		
3.000 in	75.000	100.0
1.500 in	37.500	100.0
0.750 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	100.0
NO. 20	0.850	99.7
NO. 40	0.425	97.7
NO. 60	0.250	96.0
NO. 140	0.106	93.5
NO. 200	0.075	93.2
HYDROMETER ANALYSIS		
1 min	0.045	92.4
2 min	0.033	85.3
5 min	0.022	67.5
15 min	0.014	35.5
30 min	0.010	35.5
60 min	0.007	35.5
240 min	0.004	35.5
1440 min	0.001	35.5

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Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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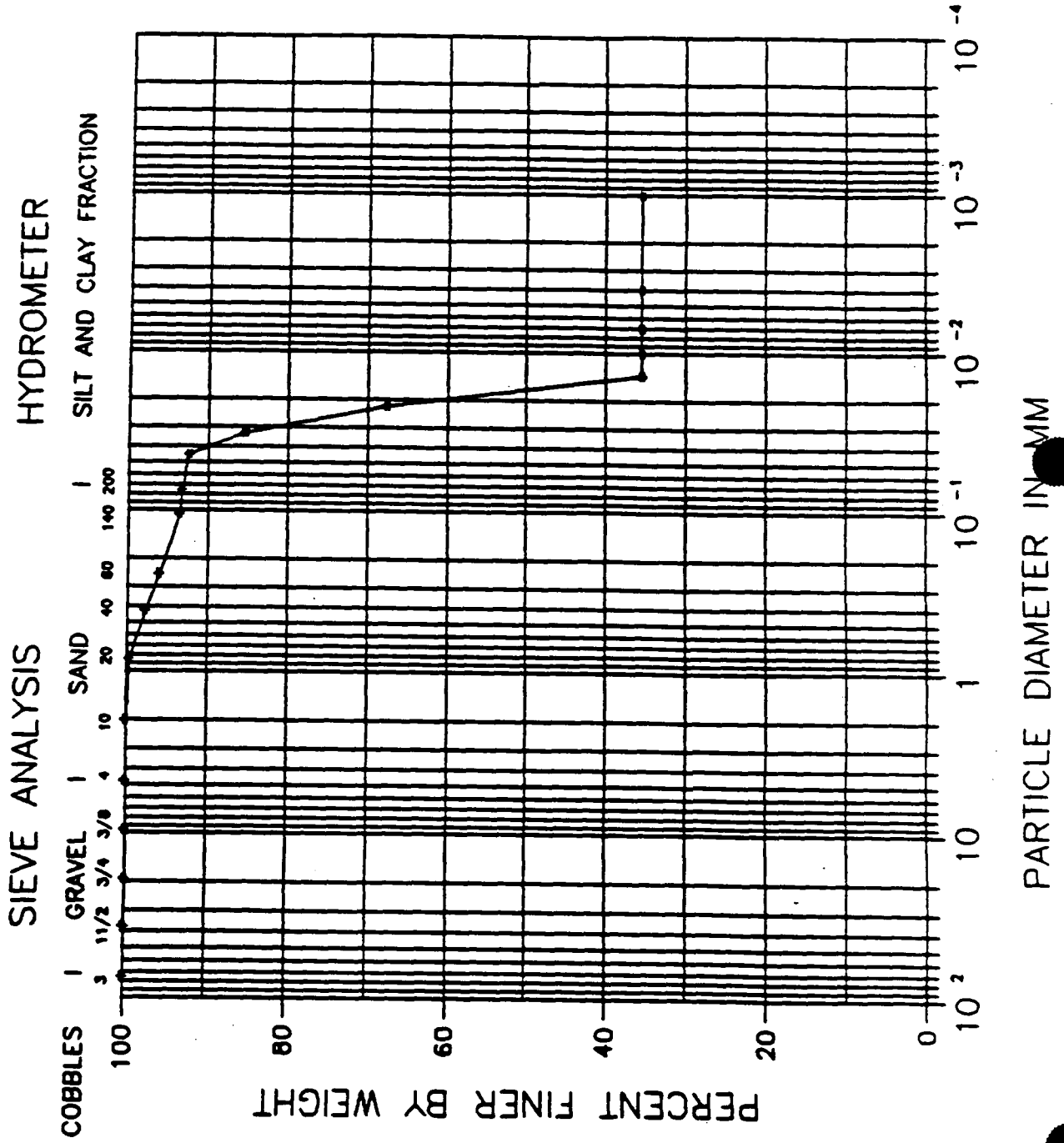
IT ANALYTICAL SERVICES
304 DIRECTORS DRIVE
KNOXVILLE, TN
(615) 690-3211

Job Number: 303317.24.05.20

CLIENT: IT CORPORATION
PROJECT NO: 90106
MANWAY NO: NW-1
DESCRIPTION: METAL OXIDE
USCS CLASSIFICATION: NA

CLIENT PROJECT: FERNALD
BORING NO: SILO NO. S3
VERTICAL SECTION: A



682-1-90

Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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304 DIRECTORS DRIVE
KNOXVILLE, TN
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Job Number: 303317.24.05.20

SILO NO: S3 MANWAY NO: NW-1 VERTICAL SECTION: C

WATER CONTENT

3.7%

SPECIFIC GRAVITY

2.08 g/cc

ATTERBERG LIMITS

LIQUID LIMIT: NP PLASTICITY INDEX: NP

PLASTIC LIMIT: NP USCS: NA

CONSISTENCY BREAK POINT (WATER CONTENT): 68.3%

GRAIN SIZE

SIEVE SIZE/TIME	DIAMETER (mm)	PERCENT FINER
SIEVE ANALYSIS:		
3.000 in	75.000	100.0
1.500 in	37.500	100.0
0.750 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	100.0
NO. 20	0.850	98.7
NO. 40	0.425	98.2
NO. 60	0.250	97.5
NO. 140	0.106	94.6
NO. 200	0.075	93.9
HYDROMETER ANALYSIS		
1 min	0.049	93.3
2 min	0.036	86.4
5 min	0.025	64.5
15 min	0.015	50.2
30 min	0.011	50.2
60 min	0.008	50.2
240 min	0.004	50.2
1440 min	0.001	50.2

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Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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304 DIRECTORS DRIVE
KNOXVILLE, TN
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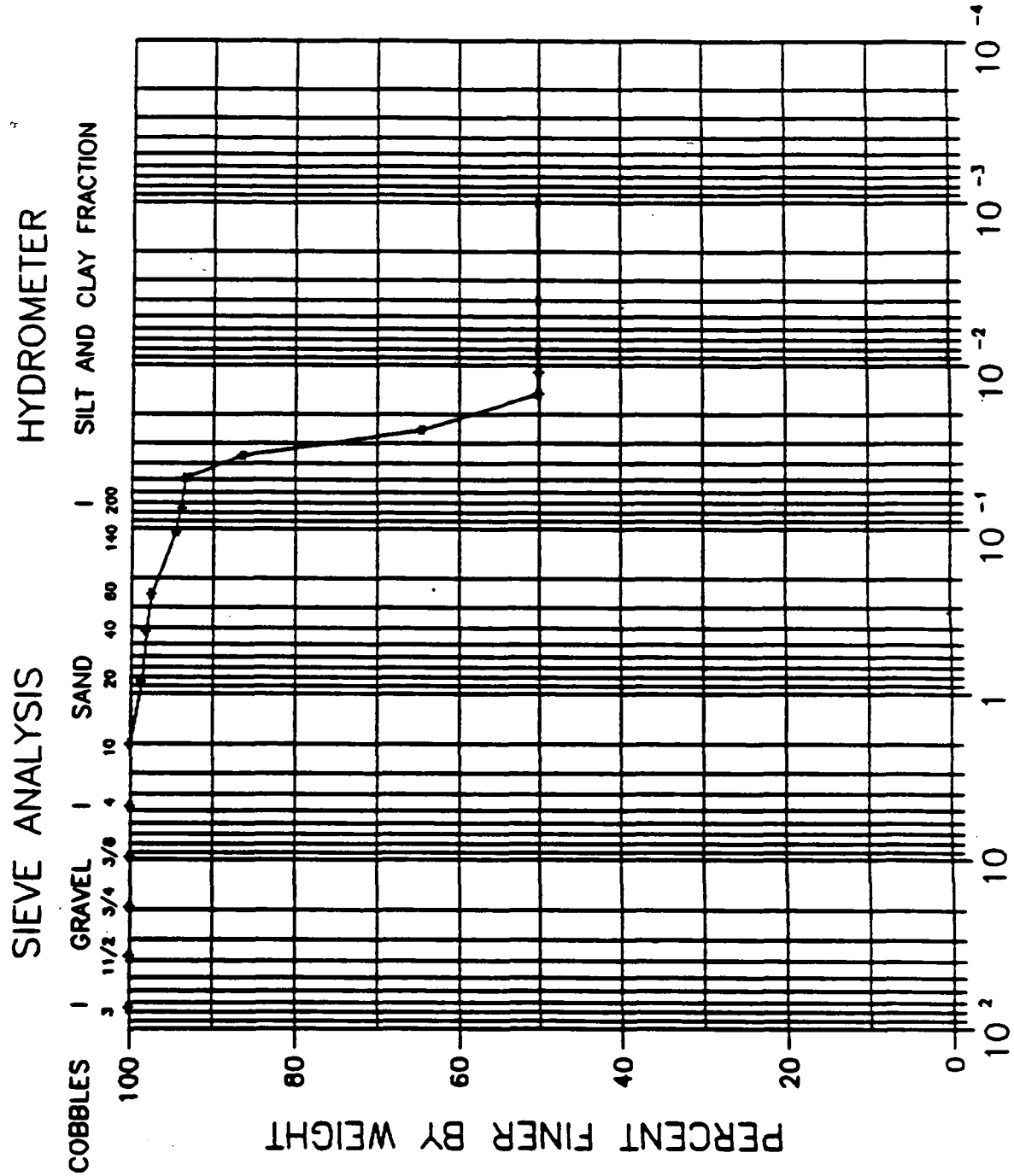
Job Number: 303317.24.05.20

CLIENT: IT CORPORATION
PROJECT NO: 90106
MANWAY NO: NW-1
DESCRIPTION: METAL OXIDE
USCS CLASSIFICATION: NA

CLIENT PROJECT: FERNALD
BORING NO: SILO NO. S3
VERTICAL SECTION: C



Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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304 DIRECTORS DRIVE
KNOXVILLE, TN
(615) 690-3211

Job Number: 303317.24.05.20

SILO NO: S3 MANWAY NO: SE-1 VERTICAL SECTION: A

WATER CONTENT

10.2%

SPECIFIC GRAVITY

2.58 g/cc

ATTERBERG LIMITS

LIQUID LIMIT: NP PLASTICITY INDEX: NP

PLASTIC LIMIT: NP USCS: NA

CONSISTENCY BREAK POINT (WATER CONTENT): 77.7%

GRAIN SIZE

SIEVE SIZE/TIME	DIAMETER (mm)	PERCENT FINER
SIEVE ANALYSIS:		
3.000 in	75.000	100.0
1.500 in	37.500	100.0
0.750 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	100.0
NO. 20	0.850	97.4
NO. 40	0.425	92.6
NO. 60	0.250	90.8
NO. 140	0.106	90.0
NO. 200	0.075	90.0
HYDROMETER ANALYSIS		
1 min	0.043	87.2
2 min	0.031	80.0
5 min	0.020	72.7
15 min	0.013	29.1
30 min	0.010	25.4
60 min	0.007	21.8
240 min	0.003	21.8
1440 min	0.001	21.8

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Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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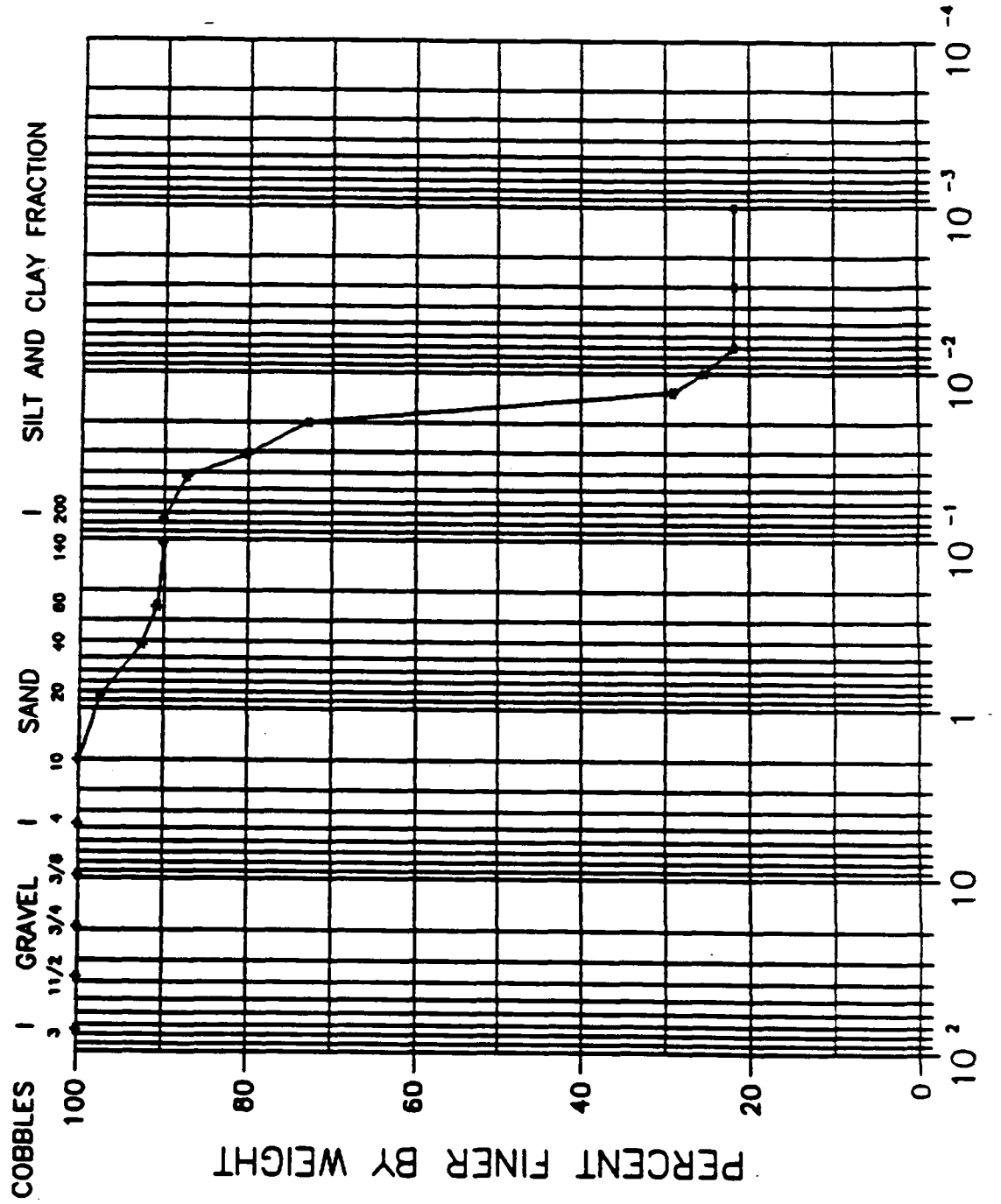
IT ANALYTICAL SERVICES
304 DIRECTORS DRIVE
KNOXVILLE, TN
(615) 690-3211

Job Number: 303317.24.05.20

CLIENT: IT CORPORATION
PROJECT NO: 90106
MANWAY NO: SE
DESCRIPTION: METAL OXIDE
USCS CLASSIFICATION: NA

CLIENT PROJECT: FERNALD
BORING NO: SILO NO. S3
VERTICAL SECTION: A



Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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304 DIRECTORS DRIVE
KNOXVILLE, TN
(615) 690-3211

Job Number: 303317.24.05.20

SILO NO: S3 MANWAY NO: SE-1 VERTICAL SECTION: C

WATER CONTENT

6.3%

SPECIFIC GRAVITY

2.29 g/cc

ATTERBERG LIMITS

LIQUID LIMIT: NP PLASTICITY INDEX: NP

PLASTIC LIMIT: NP USCS: NA

CONSISTENCY BREAK POINT (WATER CONTENT): 62.6

GRAIN SIZE

SIEVE SIZE/TIME	DIAMETER (mm)	PERCENT FINER
SIEVE ANALYSIS:		
3.000 in	75.000	100.0
1.500 in	37.500	100.0
0.750 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	100.0
NO. 20	0.850	97.3
NO. 40	0.425	94.7
NO. 60	0.250	93.6
NO. 140	0.106	93.0
NO. 200	0.075	92.9
HYDROMETER ANALYSIS		
1 min	0.046	91.1
2 min	0.033	86.0
5 min	0.023	61.9
15 min	0.014	37.8
30 min	0.010	34.4
60 min	0.007	34.4
240 min	0.004	34.4
1440 min	0.001	34.4

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Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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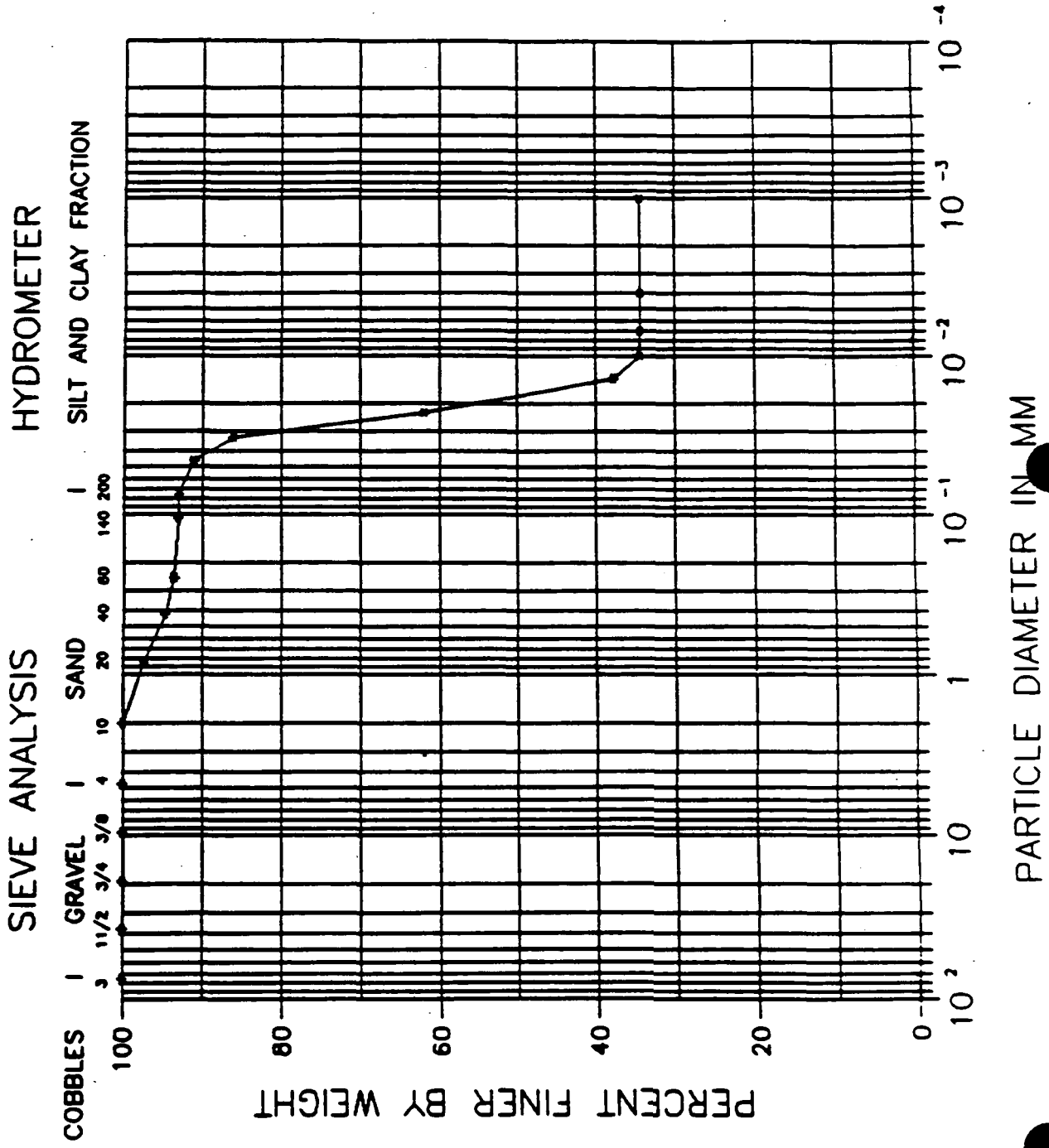
304 DIRECTORS DRIVE
KNOXVILLE, TN
(615) 690-3211

Job Number: 303317.24.05.20

CLIENT: IT CORPORATION
PROJECT NO: 90106
MANWAY NO: SE
DESCRIPTION: METAL OXIDE
USCS CLASSIFICATION: NA

CLIENT PROJECT: FERNALD
BORING NO: SILO NO. S3
VERTICAL SECTION: C



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Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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Job Number: 303317.24.05.20

SILO NO: S3 MANWAY NO: NE-1 VERTICAL SECTION: COMPOSITE

WATER CONTENT

3.8%

SPECIFIC GRAVITY

2.75 g/cc

ATTERBERG LIMITS

LIQUID LIMIT: NP PLASTICITY INDEX: NP

PLASTIC LIMIT: NP USCS: NA

CONSISTENCY BREAK POINT (WATER CONTENT): 57.5%

GRAIN SIZE

SIEVE SIZE/TIME	DIAMETER (mm)	PERCENT FINER
SIEVE ANALYSIS:		
3.000 in	75.000	100.0
1.500 in	37.500	100.0
0.750 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	100.0
NO. 20	0.850	95.1
NO. 40	0.425	91.1
NO. 60	0.250	89.0
NO. 140	0.106	88.0
NO. 200	0.075	87.8
HYDROMETER ANALYSIS		
1 min	0.038	85.2
2 min	0.028	79.1
5 min	0.019	63.9
15 min	0.012	39.5
30 min	0.009	36.5
60 min	0.006	36.5
240 min	0.003	36.5
1440 min	0.001	36.5

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Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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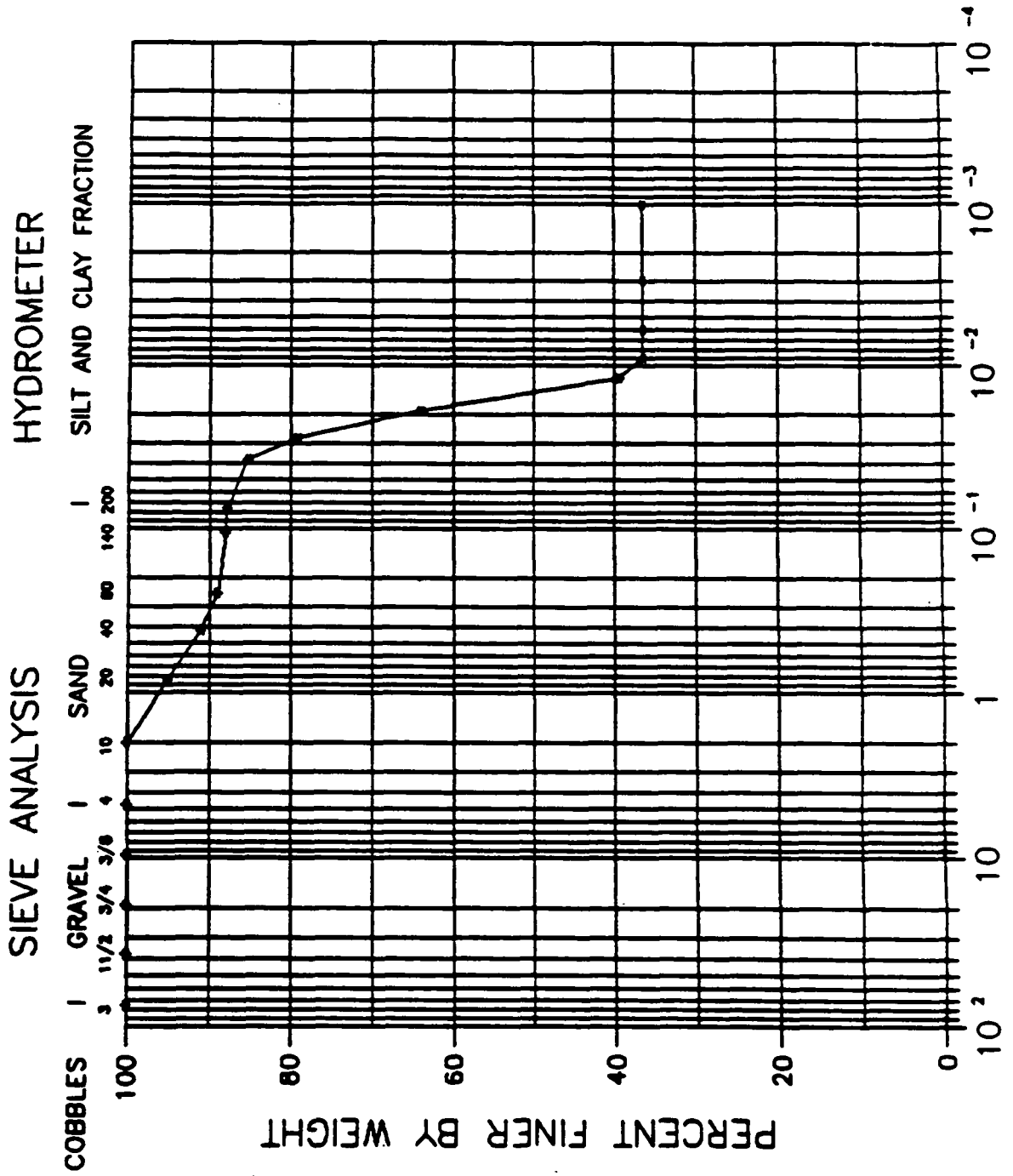
Job Number: 303317.24.05.20

CLIENT: IT CORPORATION
PROJECT NO: 90106
MANWAY NO: NE-1
DESCRIPTION: METAL OXIDE
USCS CLASSIFICATION: NA

CLIENT PROJECT: FERNALD
BORING NO: SILO NO. S3
VERTICAL SECTION: ABC COMPOSITE



Thomas Tank
Fernald
Date: 3/22/90
Client Project ID: 303317.24.05.20

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Job Number: 303317.24.05.20

CROSS-REFERENCE LIST

SILO NO./ MANWAY ID/ VERT. SEC.	WATER CONTENT %	SPECIFIC GRAVITY g/cc	PLASTICITY INDEX/ BREAK POINT (%)*	PERCENT FINER NO.200
1/NE-1 A	50.7	3.19	5.2	72.7
1/NE-1 C	71.5	2.74	3.7	71.5
1/SE-2 BT	31.9	3.37	NP/38.0	43.9
1/COMPOSITE	22.8	2.58	NP/35.7	54.5
2/NW-1 A	25.9	2.87	NP/47.6	39.8
2/NE-2 BT	21.8	2.59	NP/40.9	51.9
2/SW-1 A	73.5	3.11	NP/79.4	63.3
2/COMPOSITE A	34.2	2.78	NP/46.4	39.1
3/NW-1 A	7.4	2.35	NP/66.0	93.2
3/NW-1 C	3.7	2.08	NP/68.3	93.9
3/SE-1 A	10.2	2.58	NP/77.7	90.0
3/SE-1 C	6.3	2.29	NP/62.6	92.9
3/COMPOSITE	3.8	2.75	NP/57.5	87.8

*When the plasticity index was NP (non plastic) a break point in consistency was observed and the moisture content determined.

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KNOXVILLE, TN

SUMMARY

The results in this report for the geotechnical analyses of K-65 and metal oxides silos samples contain data that must be interpreted with certain understandings. First and foremost, the material that was analyzed from each of the three silos was not soil or even soil-like material. The geotechnical protocols used (standard ASTM methods) are primarily for either soil or soil-like material.

The silo material was primarily nonplastic (NP). However, it was observed during the analysis that a definable break in consistency was evident. This break in consistency was observed to be a difference between a solid-like consistency and a fluid-like consistency with the addition of a small amount of water. This was considered by us to represent a physical characteristic of the material that was not definable by current ASTM standards. We therefore decided to measure the water content of the material at this noted break in consistency and present it in the data for those samples with nonplastic consistencies.

Another physical phenomena occurred in the particle size distribution analyses for silo 3 material, the metal oxides. All metal oxide samples exhibited a quasi-equilibrium in particle suspension. The data illustrate that the particles stopped settling out of suspension after 60 minutes. The explanation of this phenomena is strictly hypothetical. First, there may have been a phase separation in the cylinder as a result of the type of material that was being analyzed. Second, there may have been an incomplete dispersion of particles reaction that normally takes place with the addition of sodium hexametaphosphate. This may be a result of the metal oxide material differing in its charge characteristics as compared to soil or soil like material. Once again these explanations are only hypothetical.

mak/MAKD40

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

5448

CERTIFICATE OF ANALYSIS

Susan Rhyne
IT Corporation
312 Directors Drive
Knoxville, TN 37923

June 29, 1992

IT Project Number: 313327.40.03.03

This is the Certificate of Analysis for the following samples:

Client Project ID:	Fernald RI/FS, OU4
Number of Samples:	Fourteen
Sample Type:	Soil
Date Testing Began:	November 26, 1992

I. Introduction/Case Narrative

Fourteen soil samples from the K-65 Fernald project were analyzed by IT/ETDC for analysis of grainsize distribution, moisture content, specific gravity, atterberg limits, one dimensional consolidation and standard proctor test. Physical testing was performed at the Westinghouse Laboratory. Geotechnical site work began in November, 1991, and all testing of geotechnical parameters was completed in June of 1992. Actual testing dates are included in Summary Table of Analysis Dates on pages 39 and 40 of this report.

Please see Appendix A, the Sample Number Cross Reference List; Appendix B, the Analysis Results and Summary Table of Test Dates; and Appendix C, the Chain of Custody and Request for Analysis records.

Reviewed and Approved:

Ralph Cole
Laboratory Manager, Geotechnical Services

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KNOXVILLE, TN
(615) 690-3211

II. Analytical Results/Methodology

REFERENCES: Test Methods for Evaluating Solid Waste. Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, Soil and Rock; Dimension Stone; Geosynthetics. Soiltest Technical Bulletin.

Moisture Content	ASTM D 2216
Atterberg Limits	ASTM D 4318
Grainsize Distribution	ASTM D 422
Specific Gravity	ASTM D 854
One Dimensional Consolidation	ASTM D 2435
Standard Proctor	ASTM D 698/ STB CN-435

III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and Quality Control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification on all numerical results - all raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.

- Data validation through test reasonableness - summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.

- Quality control procedures are built into most standardized geotechnical procedures. For example, many analyses routinely call for a re-analysis, specifying an acceptance criteria.

- Routine instrument calibration - all instruments, gauges and equipment used in testing is calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.

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- Maintenance of all past calibration records - records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.

- Use of trained personnel for conducting tests - all technicians are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by IT.

IV. Data Qualification

Sample numbers 100053, 100054, 100055, 100068, 100069, 100070 and 100097 were received as jar samples and represent section composites. Geotechnical parameters that could be performed using disturbed material were applied to the samples.

Sample numbers 100090 through 100096 were received as undisturbed samples in lexan tubes and represent discrete vertical sections of the in-place silo material. One-dimensional consolidation tests, which require undisturbed material, were performed on these samples. Moisture content and specific gravity tests were also performed to aid in the consolidation calculations.

Moisture content as defined in ASTM D 2216 is calculated by dividing weight of water by the weight of dry solids, and multiplying the result by 100.

Standard proctor values were obtained by use of the harvard miniature compaction apparatus due to the inability to obtain or work with the quantities of sample material that would be required for a standard 236 cubic centimeter volume proctor mold.

Unit weight (density) values were obtained from prepared consolidation specimens.

A small closure error is evident in the particle size distribution graphs due to salts contained in the samples dissolving in the soil suspension during the hydrometer analysis. This phenomenon is most noticeable in the two or three data points below the 0.075 mm diameter sieve.

APPENDIX A

June 29, 1992
Susan Rhyne
IT Corporation
Client Project ID: Fernald RI/FS, OU4
IT Project No.: 313327.40.03.03

5448

IT ANALYTICAL SERVICES
304 DIRECTORS DRIVE
KNOXVILLE, TN
(615) 690-3211

SAMPLE NUMBER REFERENCE LIST

CLIENT SAMPLE NUMBERS
100053
100054
100055
100068
100069
100070
100090
100091
100092
100093
100094
100095
100096
100097

APPENDIX B

June 29, 1992
Susan Rhyne
IT Corporation
Client Project ID: Fernald RI/FS, OU4
IT Project No.: 313327.40.03.03

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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	Fernald K-65	USCS SYMBOL:	ML
PROJECT NO.:	313327.40.03.03	WATER CONTENT, %:	37.1
CUST. SAMPLE NO.:	100053	LIQUID LIMIT:	37.0
SPECIFIC GRAVITY:	3.0300 (MEASURED)	PLASTICITY INDEX:	6.0
MAXIMUM DRY DENSITY:	96.8 pcf	OPTIMUM MOISTURE:	28.7 %

SIEVE ANALYSIS

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	100.0
0.375 in	9.500	99.8
NO. 4	4.750	99.4
NO. 10	2.000	97.5
NO. 20	0.850	94.2
NO. 40	0.425	87.9
NO. 60	0.250	78.3
NO. 140	0.106	62.7
NO. 200	0.075	56.9

HYDROMETER ANALYSIS

DIAMETER (mm)	PERCENT FINER (%)
0.0327	50.4
0.0241	45.9
0.0157	41.9
0.0094	36.8
0.0068	33.4
0.0050	26.6
0.0036	24.9
0.0025	20.4
0.0011	11.9

682-1-89

June 29, 1992
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IT Project No.: 313327.40.03.03

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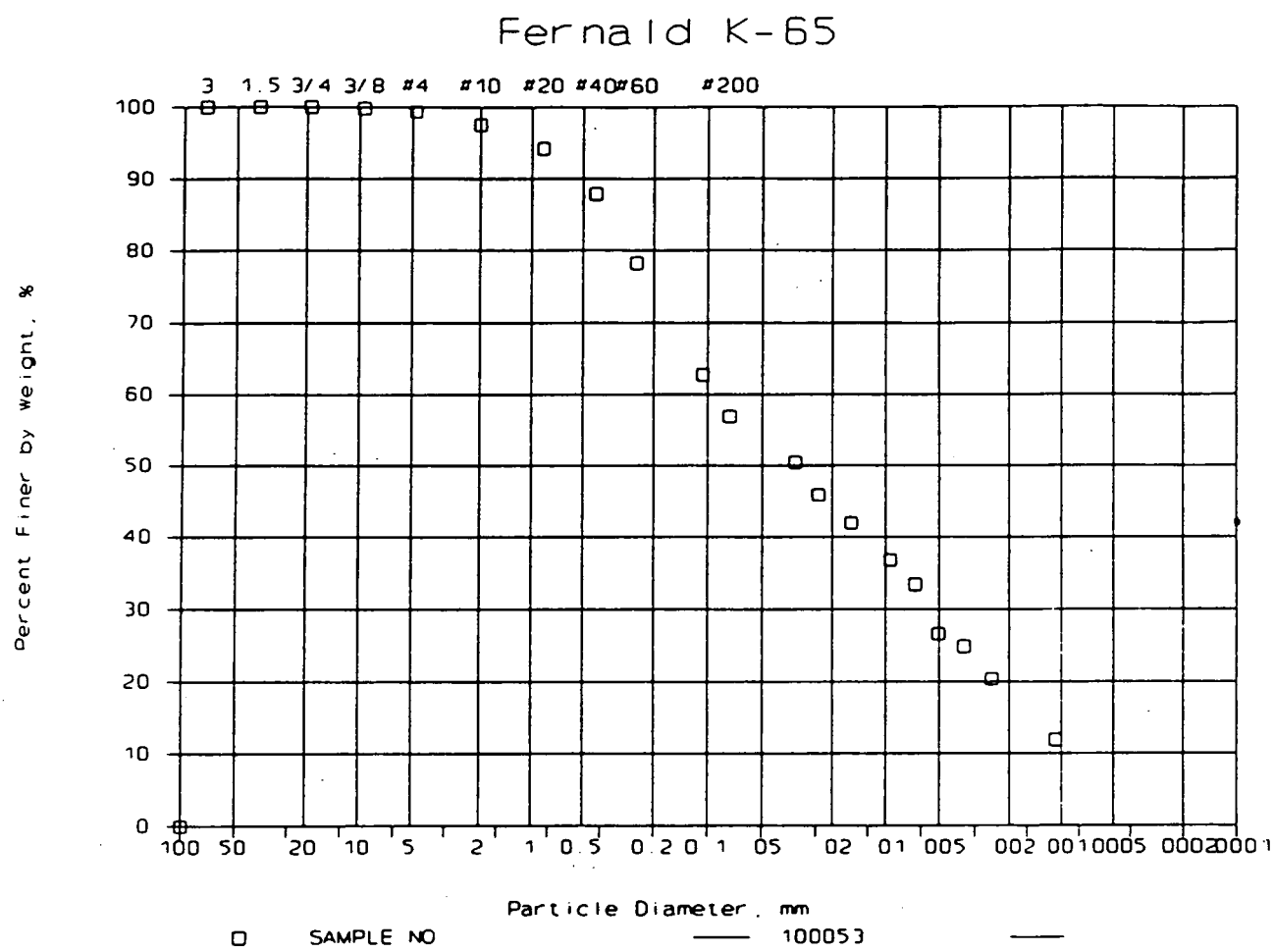

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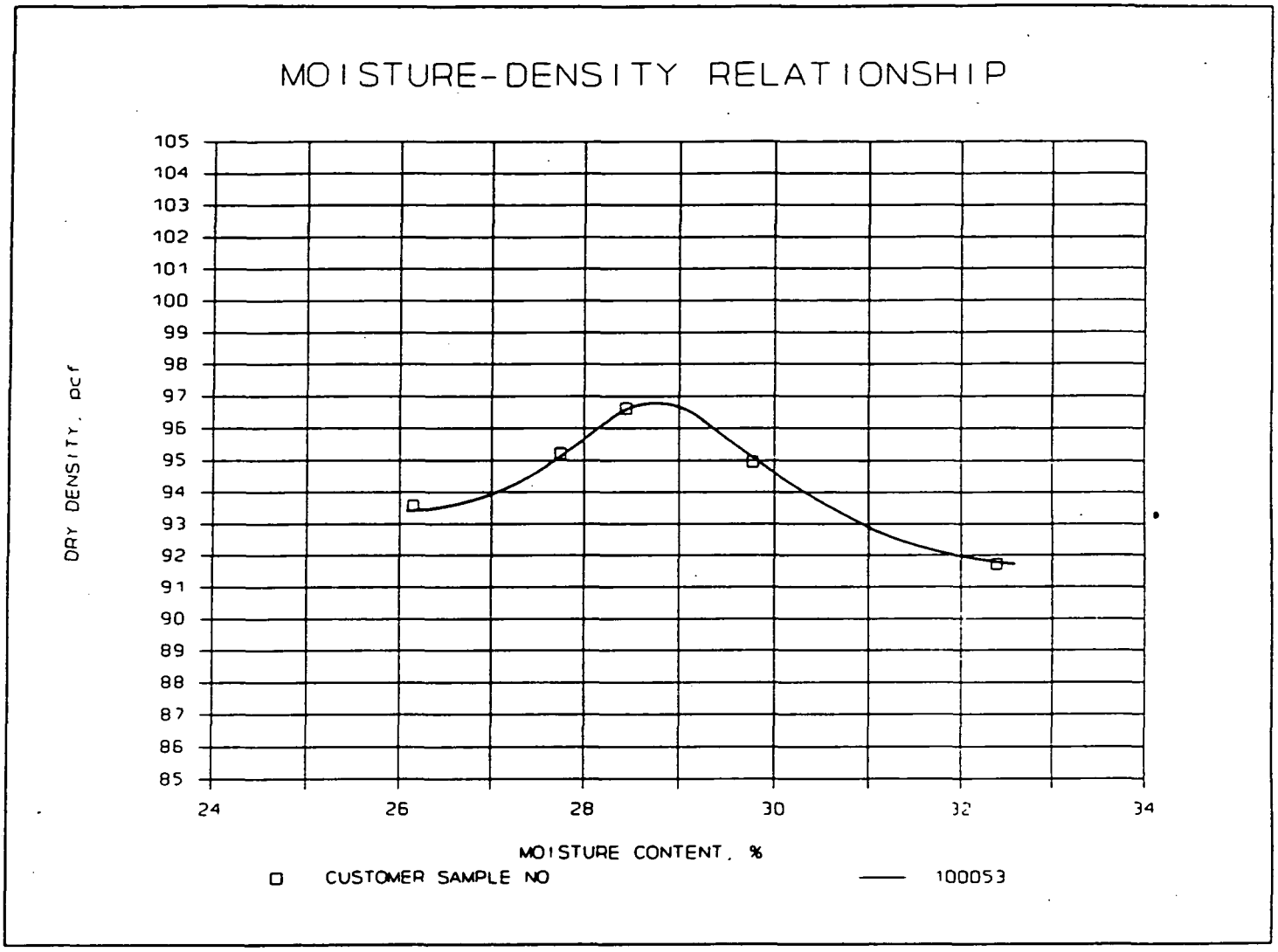

MAXIMUM DRY DENSITY: 96.8 pcf

OPTIMUM MOISTURE: 28.7 %

INDIVIDUAL PROCTOR POINTS:

MOISTURE CONTENT	26.2 %	27.8 %	28.5 %	29.8 %	32.4 %
DRY DENSITY	93.6 pcf	95.2 pcf	96.6 pcf	95.0 pcf	91.7 pcf

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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	Fernald K-65	USCS SYMBOL:	ML
PROJECT NO.:	313327.40.03.03	WATER CONTENT, %:	52.4
CUST. SAMPLE NO.:	100054	LIQUID LIMIT:	49.0
SPECIFIC GRAVITY:	3.0752 (MEASURED)	PLASTICITY INDEX:	5.0
MAXIMUM DRY DENSITY:	80.8 pcf	OPTIMUM MOISTURE:	41.2 %

SIEVE ANALYSIS

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	99.9
NO. 10	2.000	99.0
NO. 20	0.850	95.7
NO. 40	0.425	87.8
NO. 60	0.250	79.0
NO. 140	0.106	70.9
NO. 200	0.075	68.3

HYDROMETER ANALYSIS

DIAMETER (mm)	PERCENT FINER (%)
0.0283	67.0
0.0206	60.8
0.0136	56.3
0.0083	50.1
0.0059	44.5
0.0045	41.6
0.0033	34.3
0.0025	28.1
0.0010	16.3

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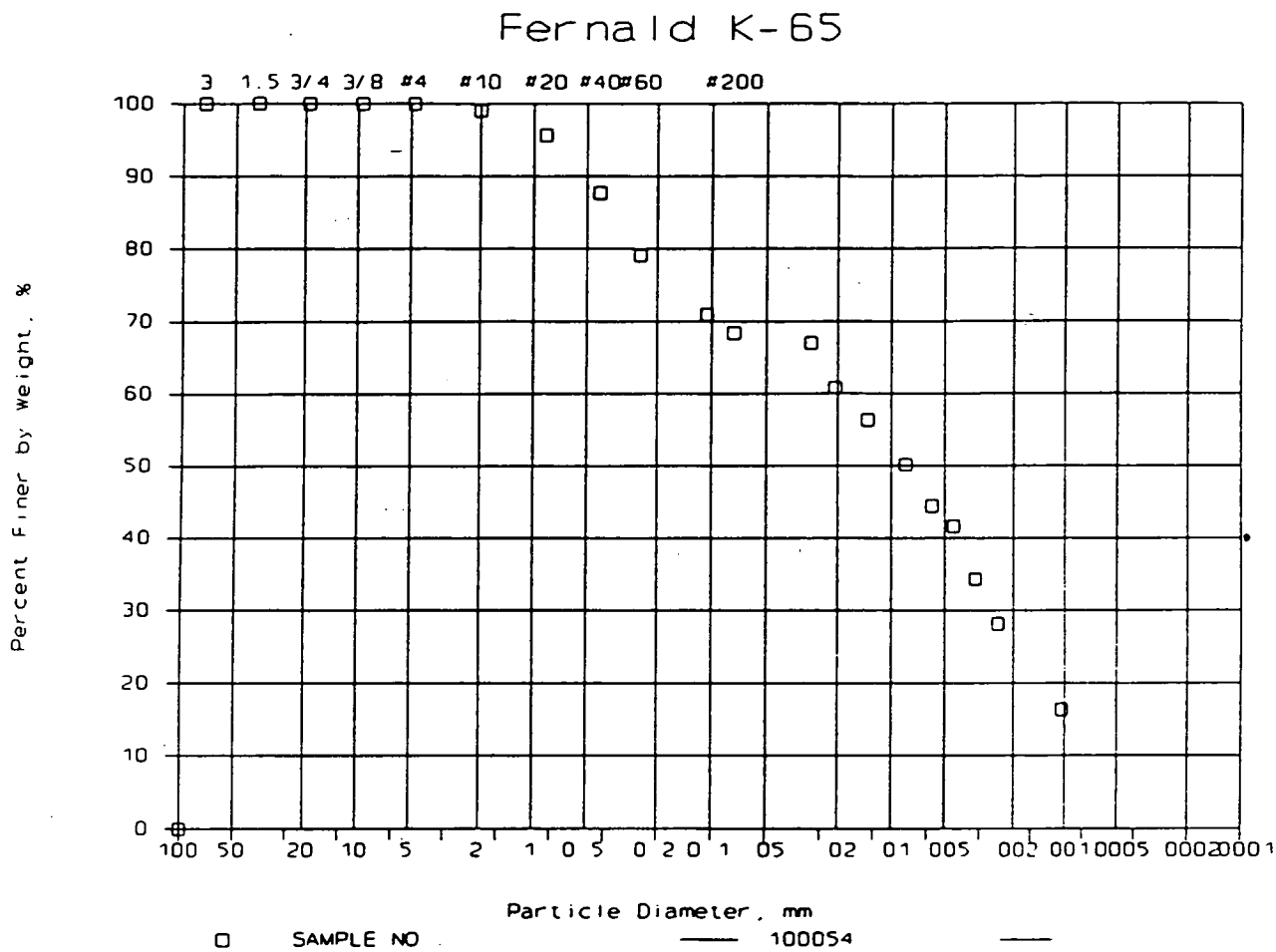

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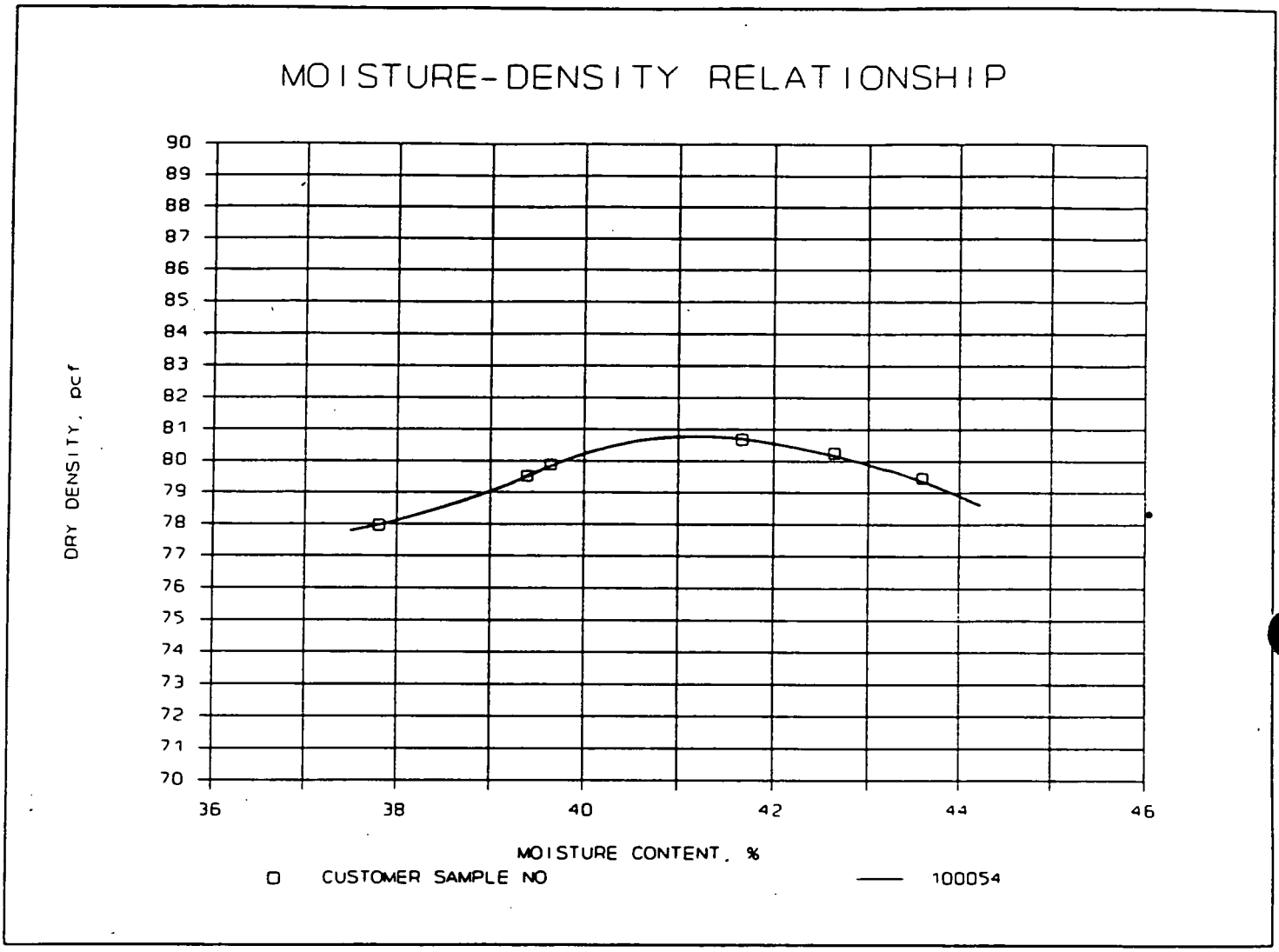

MAXIMUM DRY DENSITY: 80.8 pcf

OPTIMUM MOISTURE: 41.2 %

INDIVIDUAL PROCTOR POINTS:

MOISTURE CONTENT	37.8 %	39.4 %	39.7 %	41.7 %	42.6 %	43.6 %
DRY DENSITY	78.0 pcf	79.5 pcf	79.9 pcf	80.7 pcf	80.2 pcf	79.5 pcf

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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	Fernald K-65	USCS SYMBOL:	NONPLASTIC
PROJECT NO.:	313327.40.03.03	WATER CONTENT, %:	59.8
CUST. SAMPLE NO.:	100055	LIQUID LIMIT:	51.0
SPECIFIC GRAVITY:	2.9786 (MEASURED)	PLASTICITY INDEX:	NONPLASTIC
MAXIMUM DRY DENSITY:	77.1 pcf	OPTIMUM MOISTURE:	45.7 %

SIEVE ANALYSIS

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	100.0
NO. 10	2.000	99.3
NO. 20	0.850	94.1
NO. 40	0.425	83.2
NO. 60	0.250	72.5
NO. 140	0.106	62.1
NO. 200	0.075	58.9

HYDROMETER ANALYSIS

DIAMETER (mm)	PERCENT FINER (%)
0.0228	54.7
0.0149	51.3
0.0089	46.6
0.0065	42.0
0.0048	36.9
0.0035	31.7
0.0026	25.9
0.0011	15.5

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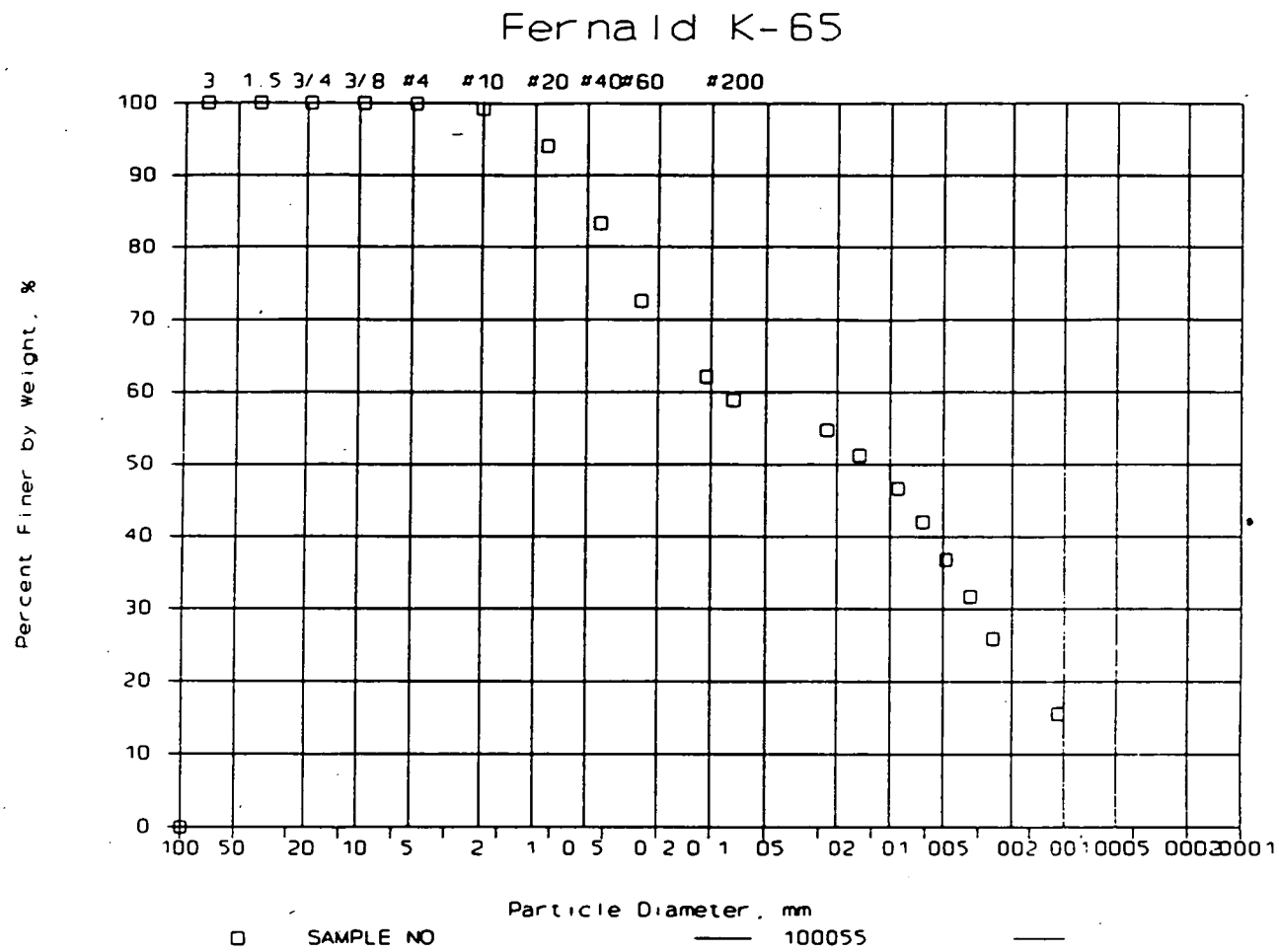

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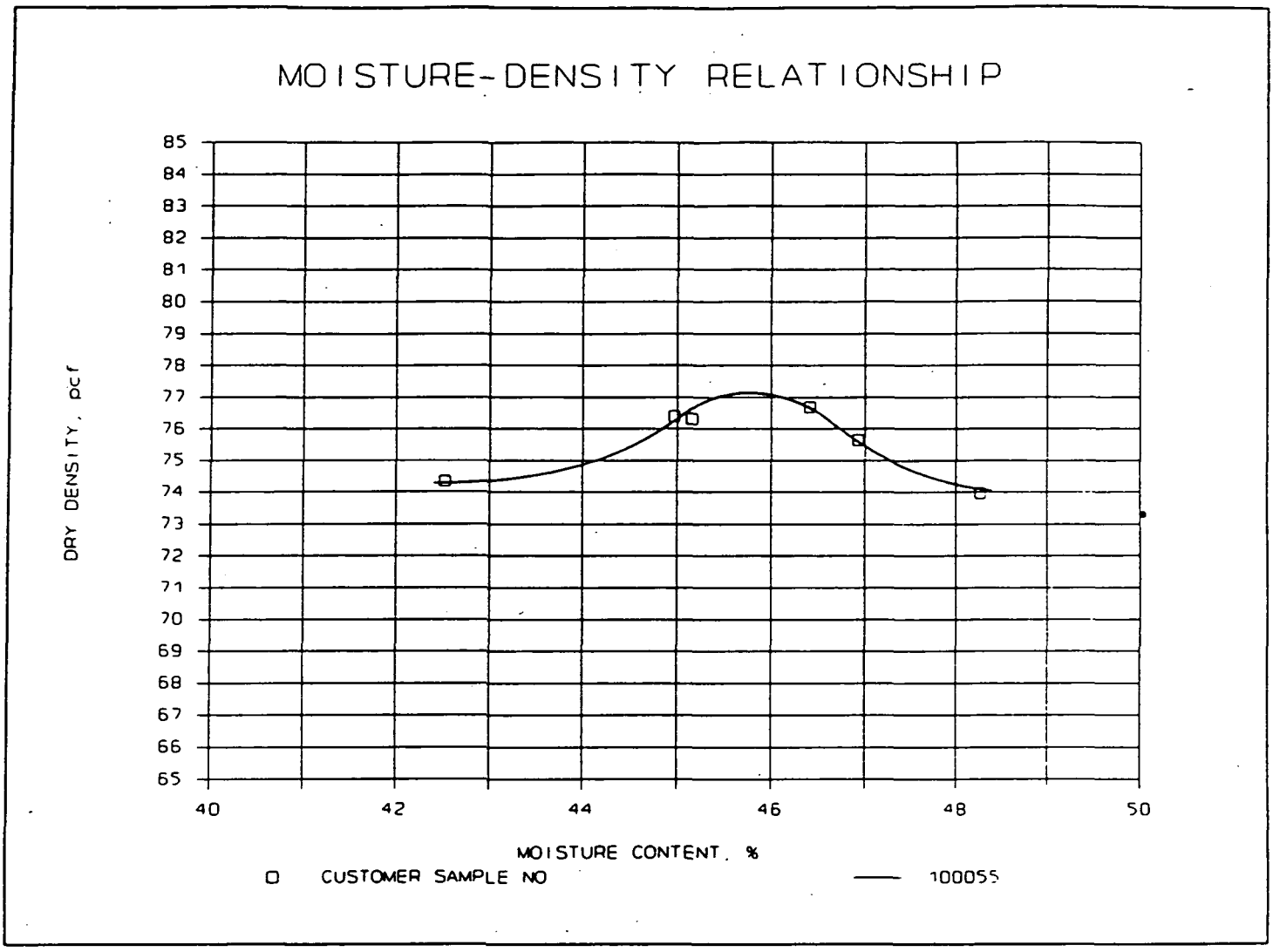

MAXIMUM DRY DENSITY: 77.1 pcf

OPTIMUM MOISTURE: 45.7 %

INDIVIDUAL PROCTOR POINTS:

MOISTURE CONTENT	42.5 %	45.0 %	45.2 %	46.4 %	46.9 %	48.3 %
DRY DENSITY	74.3 pcf	76.4 pcf	76.3 pcf	76.7 pcf	75.7 pcf	74.0 pcf

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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	Fernald K-65	USCS SYMBOL:	NONPLASTIC
PROJECT NO.:	313327.40.03.03	WATER CONTENT, %:	30.5
CUST. SAMPLE NO.:	100068	LIQUID LIMIT:	NONPLASTIC
SPECIFIC GRAVITY:	3.0301 (MEASURED)	PLASTICITY INDEX:	NONPLASTIC
MAXIMUM DRY DENSITY:	100.6 pcf	OPTIMUM MOISTURE:	23.8 %

SIEVE ANALYSIS

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	99.8
NO. 10	2.000	98.5
NO. 20	0.850	92.7
NO. 40	0.425	84.0
NO. 60	0.250	72.3
NO. 140	0.106	45.1
NO. 200	0.075	35.2

HYDROMETER ANALYSIS

DIAMETER (mm)	PERCENT FINER (%)
0.0360	26.1
0.0266	22.2
0.0173	19.1
0.0103	16.0
0.0074	14.0
0.0053	11.3
0.0038	9.0
0.0028	7.4
0.0011	3.5

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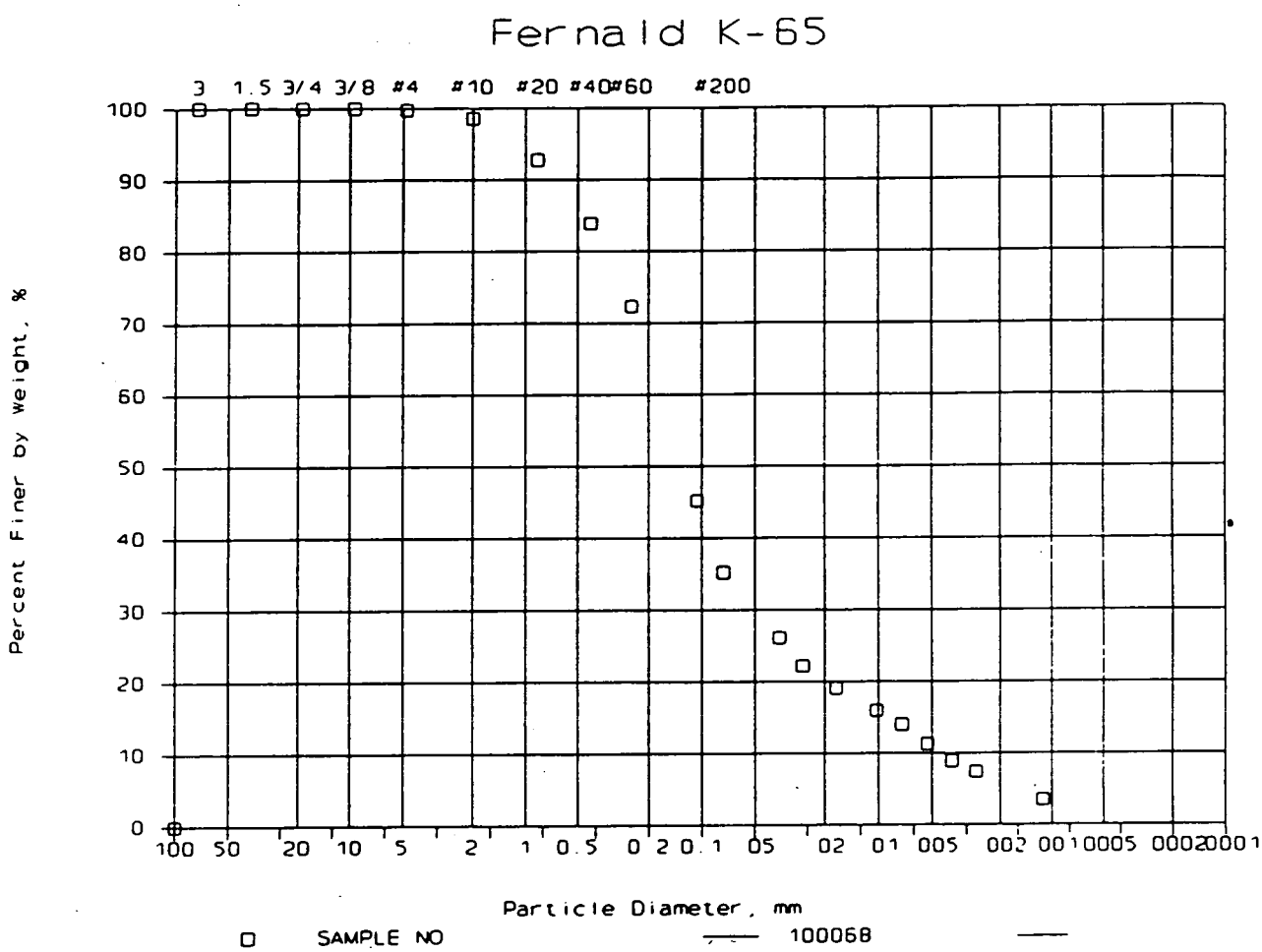

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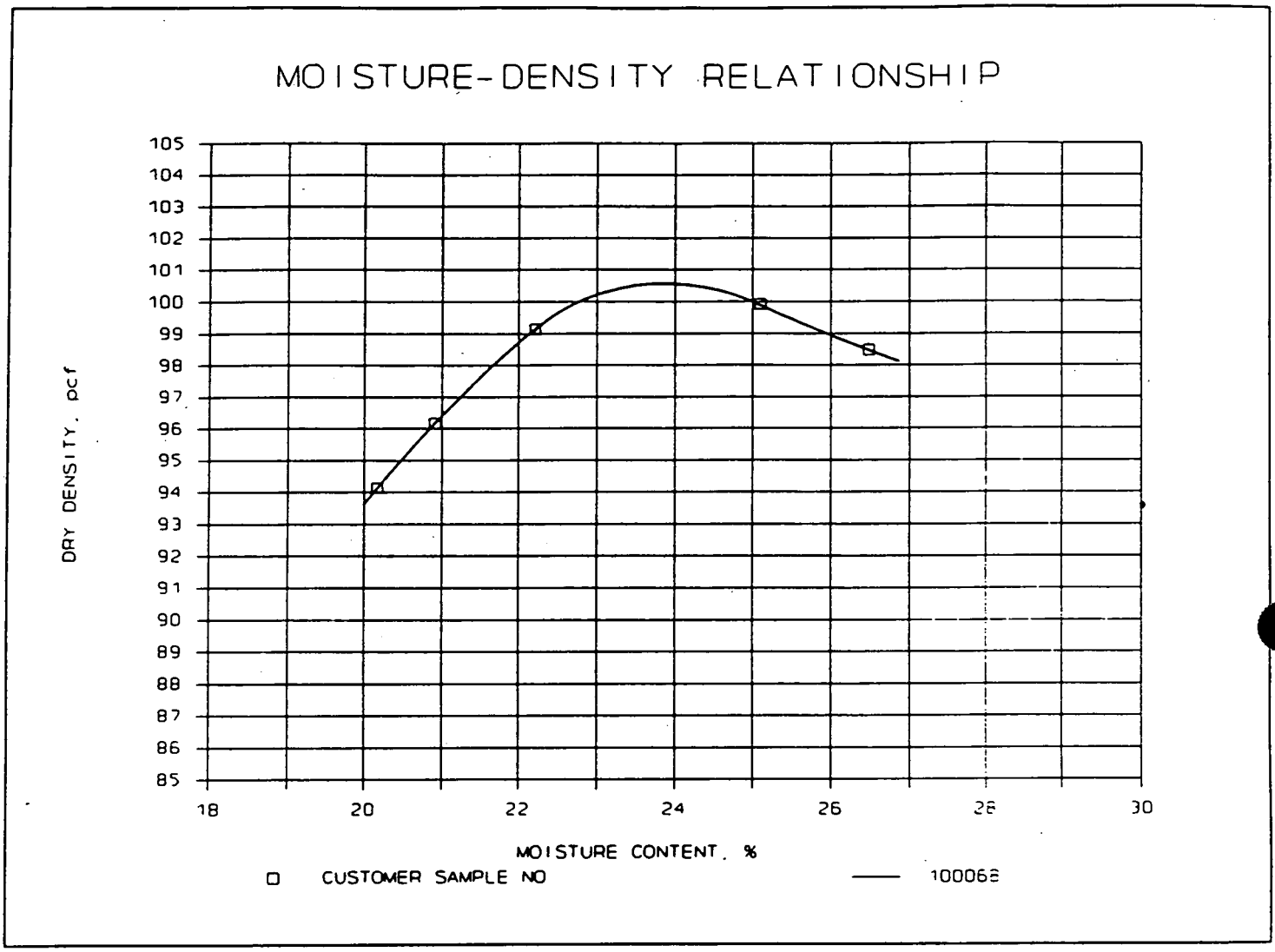

MAXIMUM DRY DENSITY: 100.6 pcf

OPTIMUM MOISTURE: 23.8 %

INDIVIDUAL PROCTOR POINTS:

MOISTURE CONTENT	20.2 %	20.9 %	22.2 %	25.1 %	26.5 %
DRY DENSITY	94.1 pcf	96.2 pcf	99.1 pcf	99.9 pcf	98.5 pcf

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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	Fernald K-65	USCS SYMBOL:	MH
PROJECT NO.:	313327.40.03.03	WATER CONTENT, %:	55.5
CUST. SAMPLE NO.:	100069	LIQUID LIMIT:	58.0
SPECIFIC GRAVITY:	2.9890 (MEASURED)	PLASTICITY INDEX:	9.0
MAXIMUM DRY DENSITY:	79.0 pcf	OPTIMUM MOISTURE:	41.4 %

SIEVE ANALYSIS

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	98.8
NO. 10	2.000	96.0
NO. 20	0.850	85.9
NO. 40	0.425	74.0
NO. 60	0.250	66.3
NO. 140	0.106	57.6
NO. 200	0.075	55.0

HYDROMETER ANALYSIS

DIAMETER (mm)	PERCENT FINER (%)
0.0332	50.2
0.0236	49.7
0.0153	46.9
0.0091	43.5
0.0066	40.1
0.0048	35.6
0.0035	29.9
0.0026	25.4
0.0011	13.0

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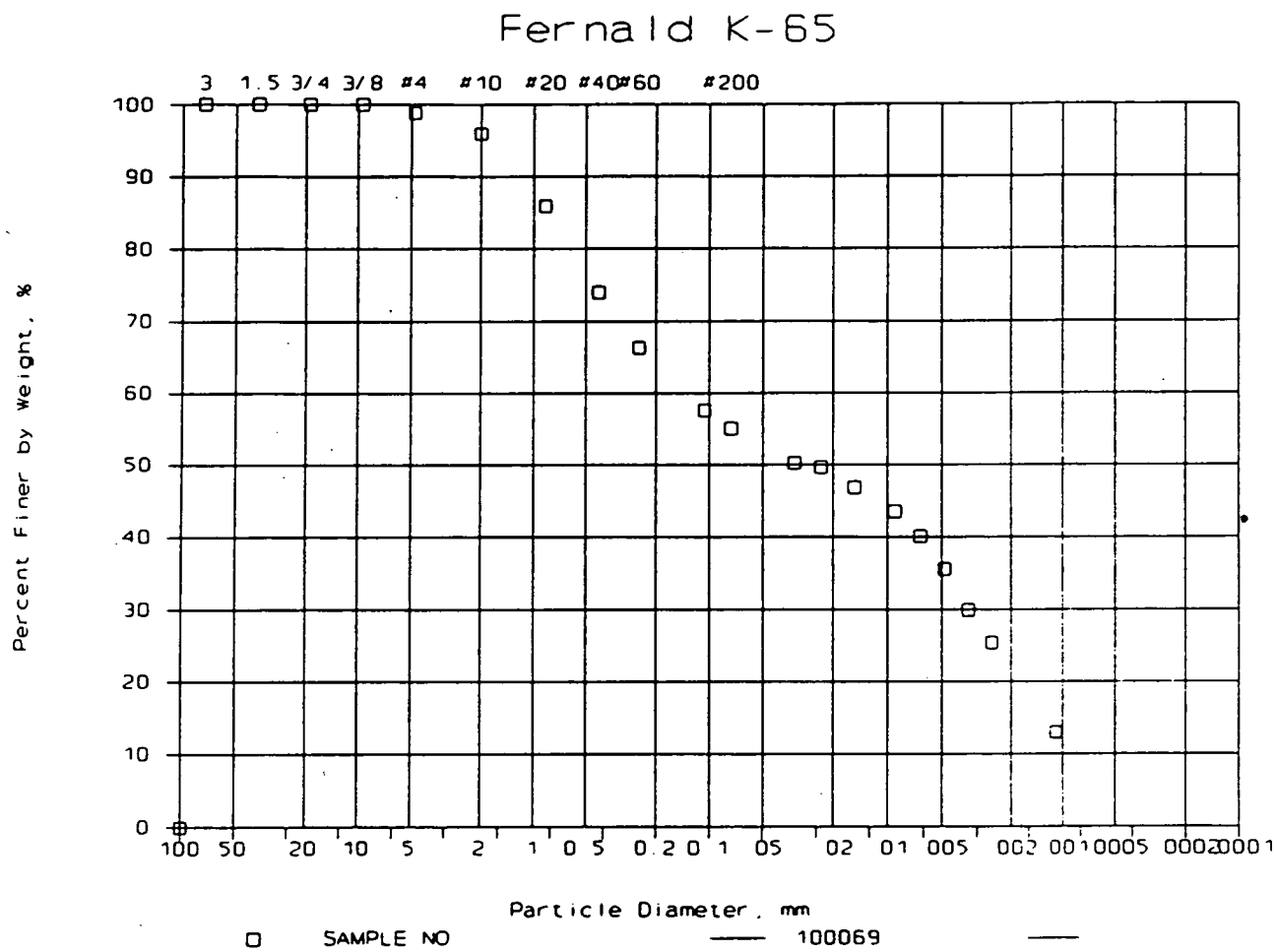

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June 29, 1992
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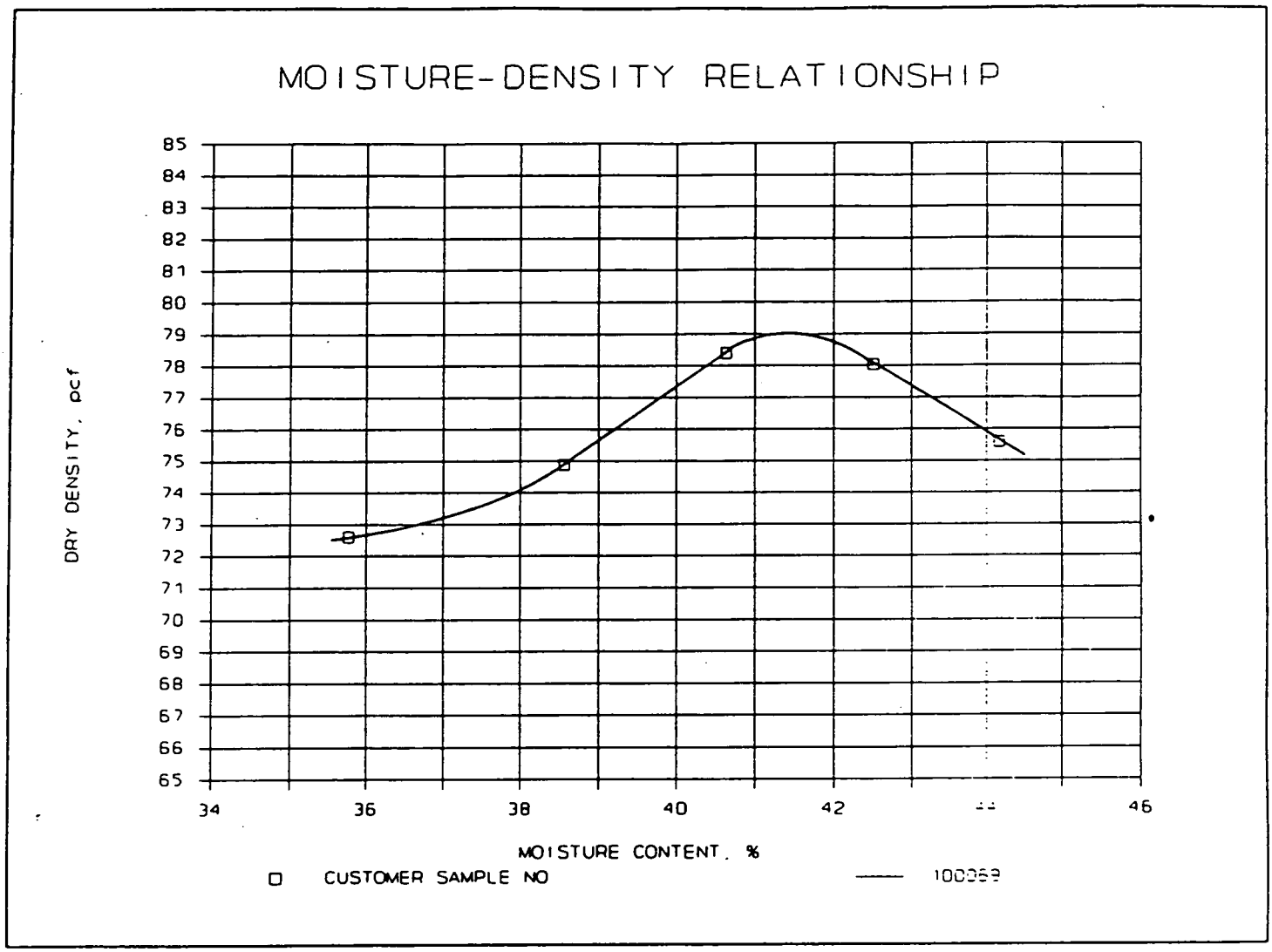

MAXIMUM DRY DENSITY: 79.0 pcf

OPTIMUM MOISTURE: 41.4 %

INDIVIDUAL PROCTOR POINTS:

MOISTURE CONTENT	35.8 %	38.6 %	40.6 %	42.5 %	44.2 %
DRY DENSITY	72.6 pcf	74.9 pcf	78.4 pcf	78.0 pcf	75.6 pcf

682-1-89

June 29, 1992
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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	Fernald K-65	USCS SYMBOL:	ML
PROJECT NO.:	313327.40.03.03	WATER CONTENT, %:	38.5
CUST. SAMPLE NO.:	100070	LIQUID LIMIT:	34.0
SPECIFIC GRAVITY:	2.9894 (MEASURED)	PLASTICITY INDEX:	4.0
MAXIMUM DRY DENSITY:	92.7 pcf	OPTIMUM MOISTURE:	30.1 %

SIEVE ANALYSIS

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	99.4
NO. 10	2.000	98.1
NO. 20	0.850	93.8
NO. 40	0.425	87.5
NO. 60	0.250	79.9
NO. 140	0.106	56.8
NO. 200	0.075	48.2

HYDROMETER ANALYSIS

DIAMETER (mm)	PERCENT FINER (%)
0.0358	41.2
0.0263	36.0
0.0170	32.6
0.0100	29.2
0.0059	24.6
0.0050	22.3
0.0038	19.4
0.0027	15.4
0.0011	8.6

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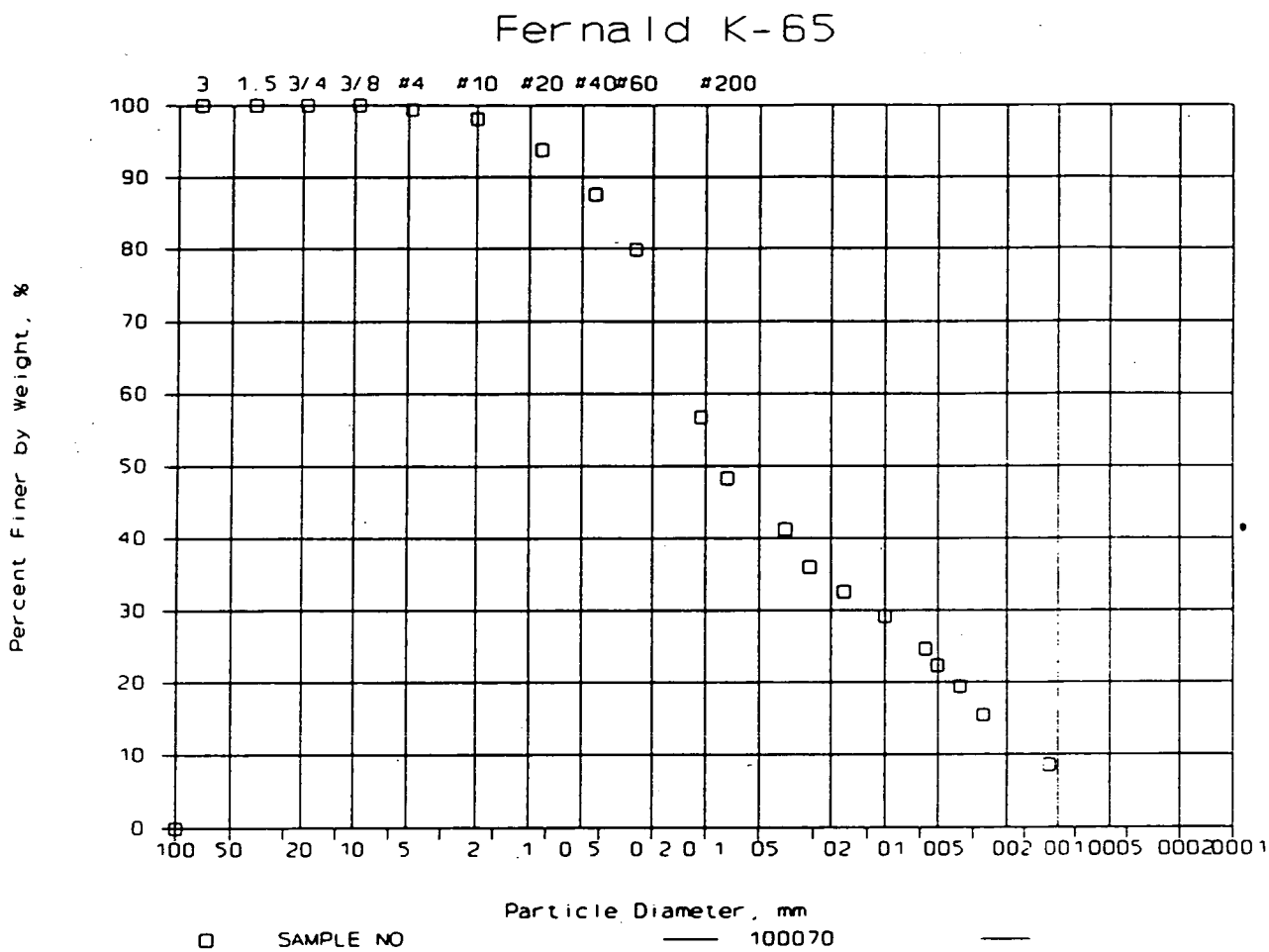

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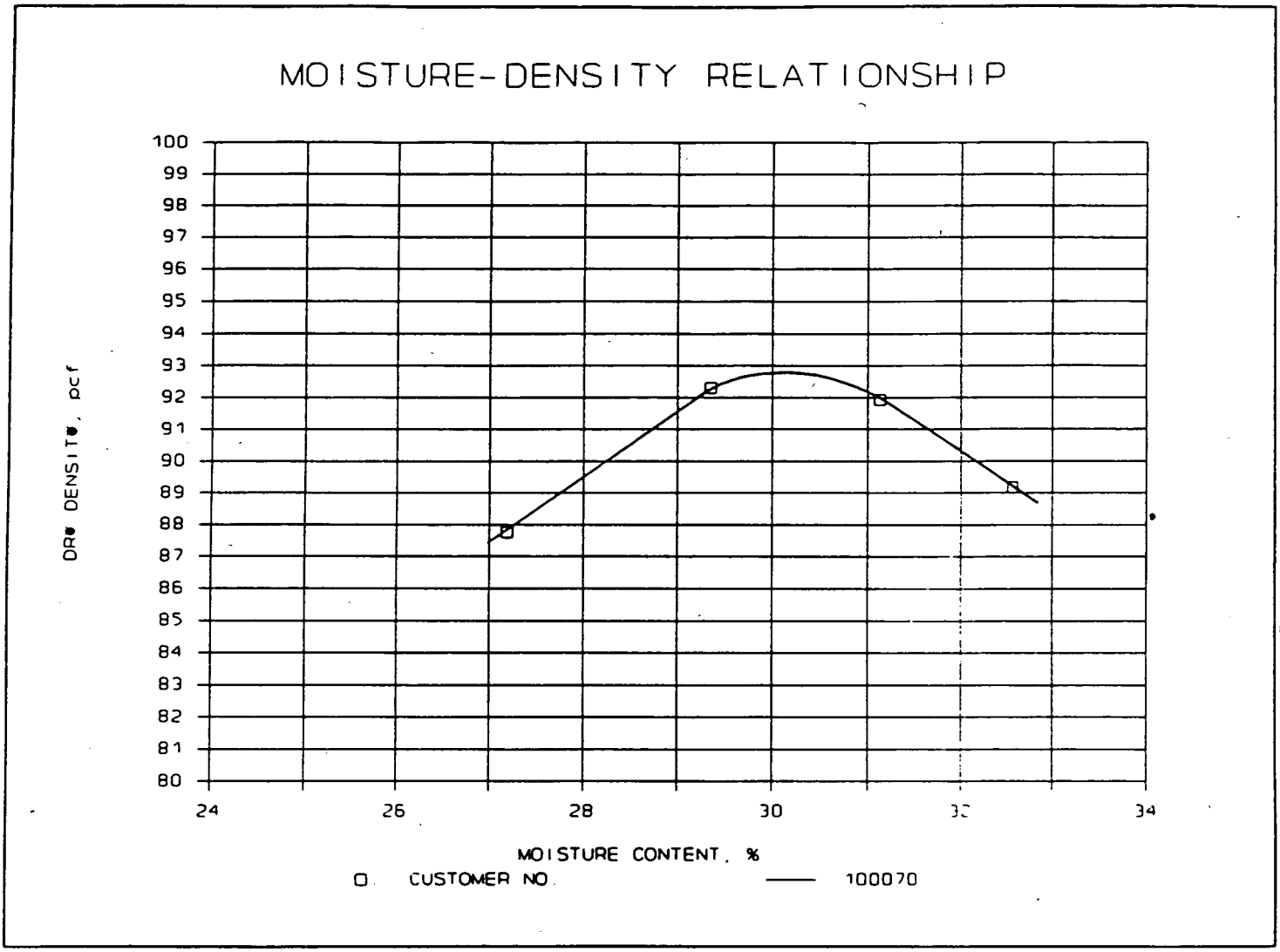

MAXIMUM DRY DENSITY: 92.7 pcf

OPTIMUM MOISTURE: 30.1 %

INDIVIDUAL PROCTOR POINTS:

MOISTURE CONTENT	27.2 %	29.4 %	31.1 %	32.6 %
DRY DENSITY	87.8 pcf	92.3 pcf	91.9 pcf	89.2 pcf

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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	FERNALD K-65	USCS SYMBOL:	NOT REQUESTED
PROJECT NO.:	3133278.40.03.03	WATER CONTENT, %:	56.6
CUST. SAMPLE NO.:	100090	LIQUID LIMIT:	NOT REQUESTED
SPECIFIC GRAVITY:	3.0688 (MEASURED)	PLASTICITY INDEX:	NOT REQUESTED

ONE DIMENSIONAL CONSOLIDATION RESULTS

PRESSURE, tsf	VOID RATIO
0.13	1.82
0.25	1.80
0.50	1.78
1.00	1.74
2.00	1.69
4.00	1.60
8.00	1.49
16.00	1.32
8.00	1.33
4.00	1.34
2.00	1.35
1.00	1.36
0.50	1.36
0.25	1.38
0.13	1.38

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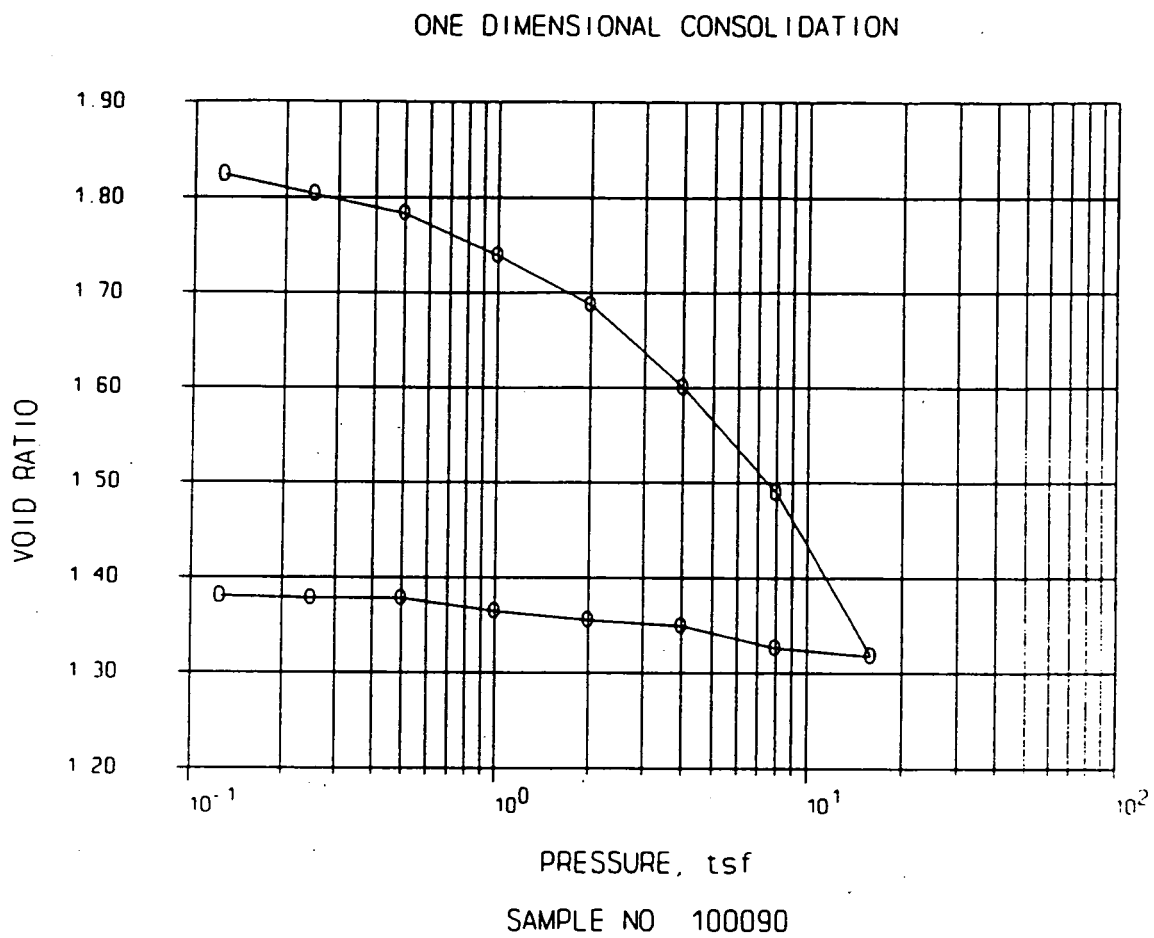

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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	FERNALD K-65	USCS SYMBOL:	NOT REQUESTED
PROJECT NO.:	3133278.40.03.03	WATER CONTENT, %:	74.7
CUST. SAMPLE NO.:	100091	LIQUID LIMIT:	NOT REQUESTED
SPECIFIC GRAVITY:	2.7864 (MEASURED)	PLASTICITY INDEX:	NOT REQUESTED

ONE DIMENSIONAL CONSOLIDATION RESULTS

PRESSURE, tsf	VOID RATIO
0.13	2.16
0.25	2.14
0.50	2.10
1.00	2.05
2.00	1.96
4.00	1.85
8.00	1.70
16.00	1.50
8.00	1.51
4.00	1.52
2.00	1.54
1.00	1.55
0.50	1.56
0.25	1.57
0.13	1.58

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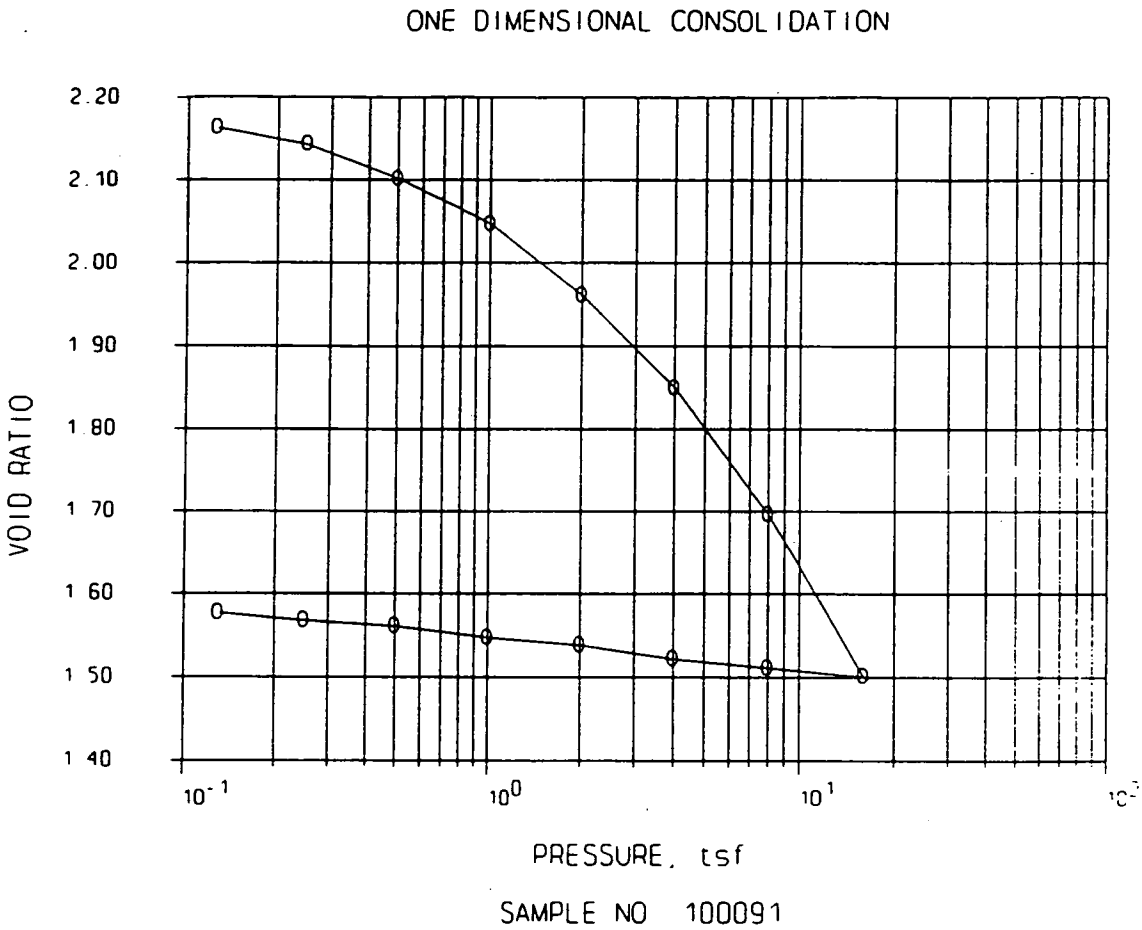

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IT Project No.: 313327.40.03.03

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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	FERNALD K-65	USCS SYMBOL:	NOT REQUESTED
PROJECT NO.:	3133278.40.03.03	WATER CONTENT, %:	59.8
CUST. SAMPLE NO.:	100092	LIQUID LIMIT:	NOT REQUESTED
SPECIFIC GRAVITY:	3.0206 (MEASURED)	PLASTICITY INDEX:	NOT REQUESTED

ONE DIMENSIONAL CONSOLIDATION RESULTS

PRESSURE, tsf	VOID RATIO
0.13	1.90
0.25	1.87
0.50	1.85
1.00	1.80
2.00	1.74
4.00	1.69
8.00	1.53
16.00	1.37
8.00	1.38
4.00	1.39
2.00	1.40
1.00	1.41
0.50	1.41
0.25	1.43
0.13	1.43

June 29, 1992
Susan Rhyne
IT Corporation
Client Project ID: Fernald RI/FS, OU4
IT Project No.: 313327.40.03.03

5448

IT ANALYTICAL SERVICES
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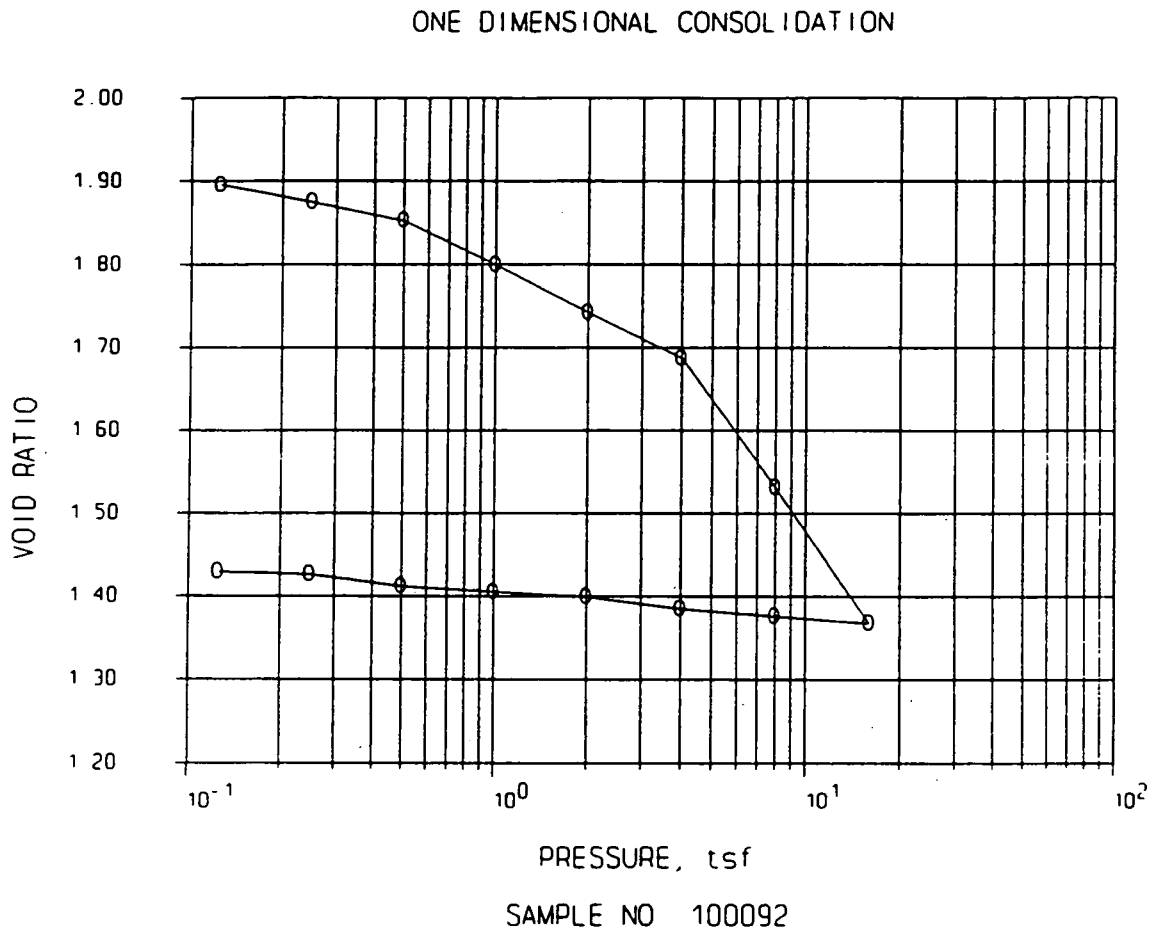

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IT Project No.: 313327.40.03.03

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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	FERNALD K-65	USCS SYMBOL:	NOT REQUESTED
PROJECT NO.:	3133278.40.03.03	WATER CONTENT, %:	65.2
CUST. SAMPLE NO.:	100093	LIQUID LIMIT:	NOT REQUESTED
SPECIFIC GRAVITY:	2.9027 (MEASURED)	PLASTICITY INDEX:	NOT REQUESTED

ONE DIMENSIONAL CONSOLIDATION RESULTS

PRESSURE, tsf	VOID RATIO
0.13	2.06
0.25	2.05
0.50	2.02
1.00	1.99
2.00	1.94
4.00	1.88
8.00	1.69
16.00	1.50
8.00	1.51
4.00	1.52
2.00	1.54
1.00	1.55
0.50	1.56
0.25	1.56
0.13	1.57

682-1-89

June 29, 1992
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Client Project ID: Fernald RI/FS, OU4
IT Project No.: 313327.40.03.03

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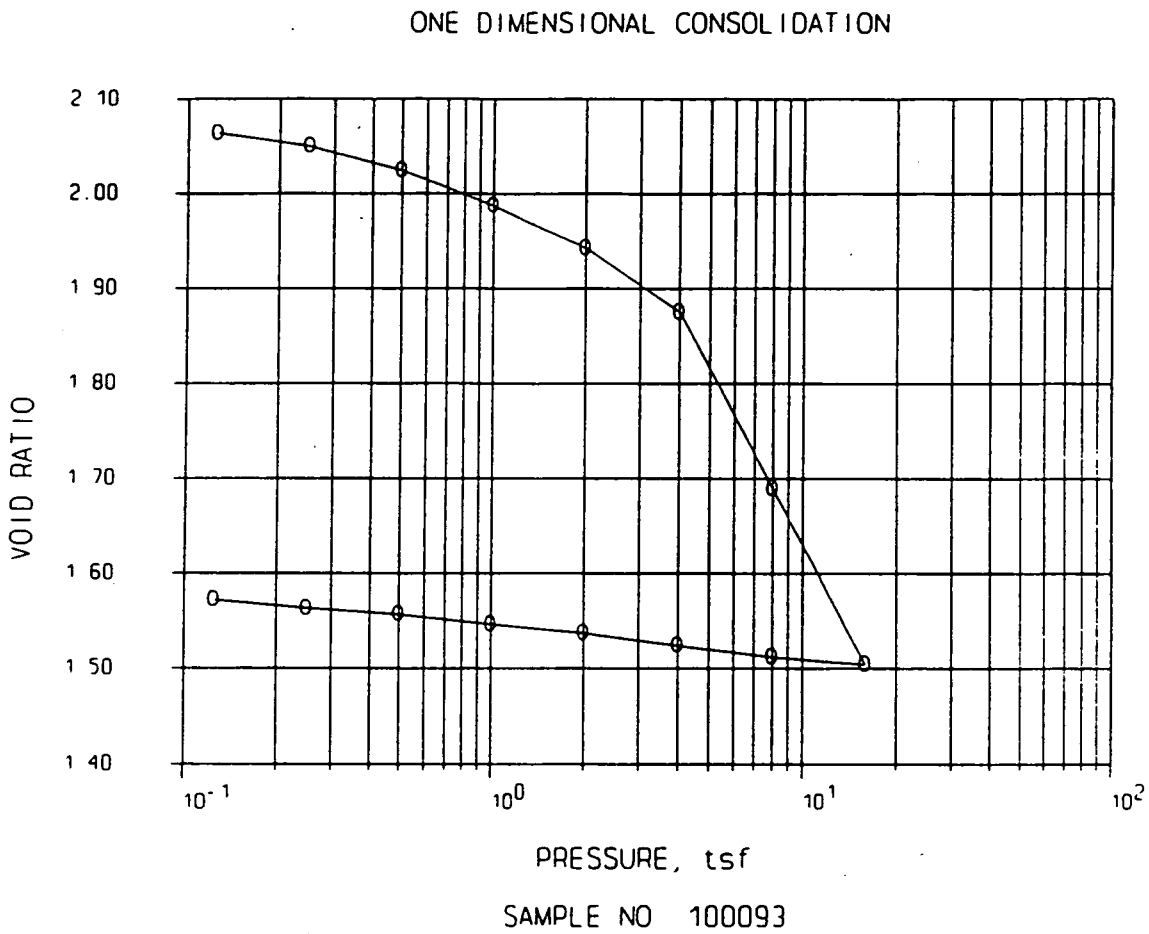

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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	FERNALD K-65	USCS SYMBOL:	NOT REQUESTED
PROJECT NO.:	3133278.40.03.03	WATER CONTENT, %:	57.0
CUST. SAMPLE NO.:	100094	LIQUID LIMIT:	NOT REQUESTED
SPECIFIC GRAVITY:	3.0837 (MEASURED)	PLASTICITY INDEX:	NOT REQUESTED

ONE DIMENSIONAL CONSOLIDATION RESULTS

PRESSURE, tsf	VOID RATIO
0.13	2.04
0.25	2.02
0.50	1.97
1.00	1.93
2.00	1.84
4.00	1.73
8.00	1.60
16.00	1.45
8.00	1.46
4.00	1.47
2.00	1.48
1.00	1.50
0.50	1.50
0.25	1.52
0.13	1.52

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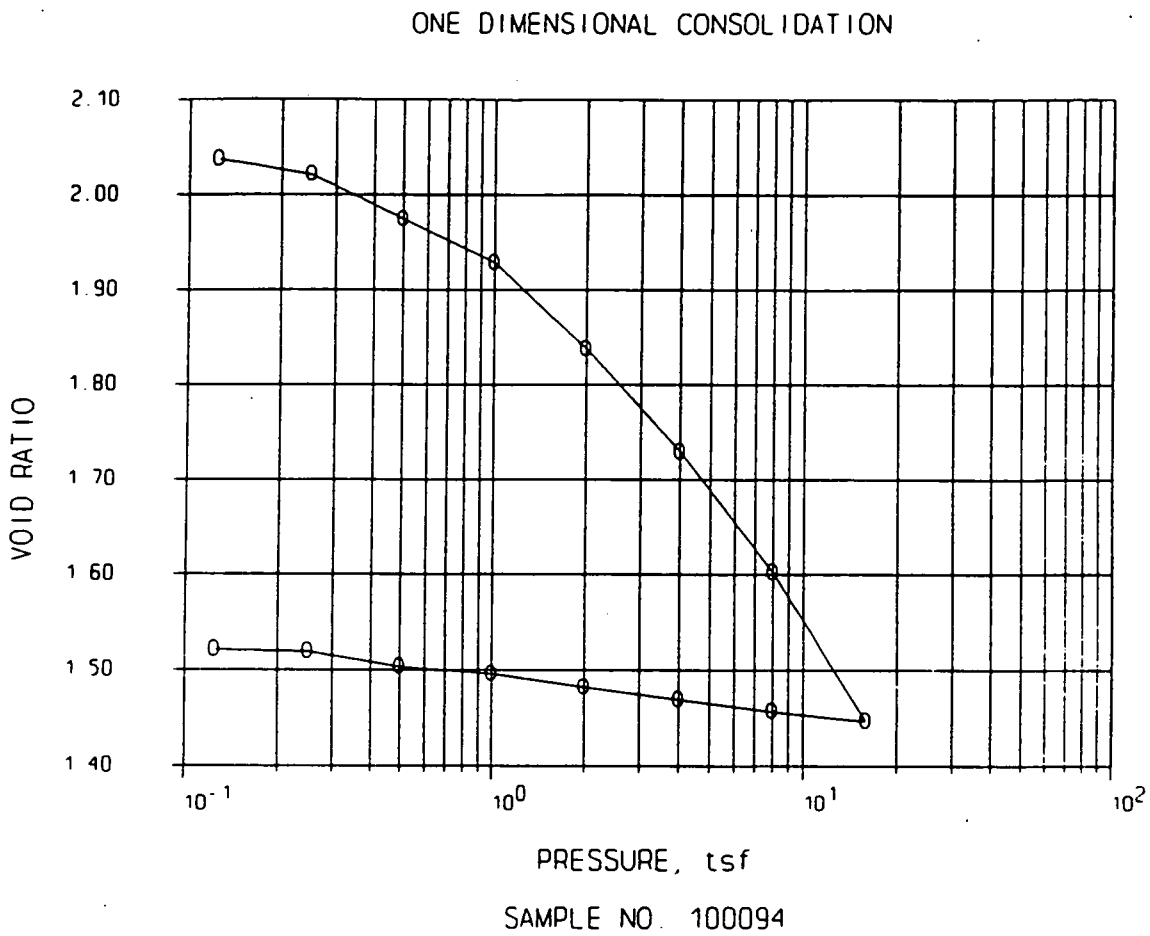

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IT Project No.: 313327.40.03.03

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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	FERNALD K-65	USCS SYMBOL:	NOT REQUESTED
PROJECT NO.:	3133278.40.03.03	WATER CONTENT, %:	82.2
CUST. SAMPLE NO.:	100095	LIQUID LIMIT:	NOT REQUESTED
SPECIFIC GRAVITY:	3.2556 (MEASURED)	PLASTICITY INDEX:	NOT REQUESTED

ONE DIMENSIONAL CONSOLIDATION RESULTS

PRESSURE, tsf	VOID RATIO
0.13	2.76
0.25	2.73
0.50	2.68
1.00	2.63
2.00	2.52
4.00	2.38
8.00	2.18
16.00	1.93
8.00	1.94
4.00	1.96
2.00	1.97
1.00	1.99
0.50	2.00
0.25	2.02
0.13	2.03

June 29, 1992
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IT Project No.: 313327.40.03.03

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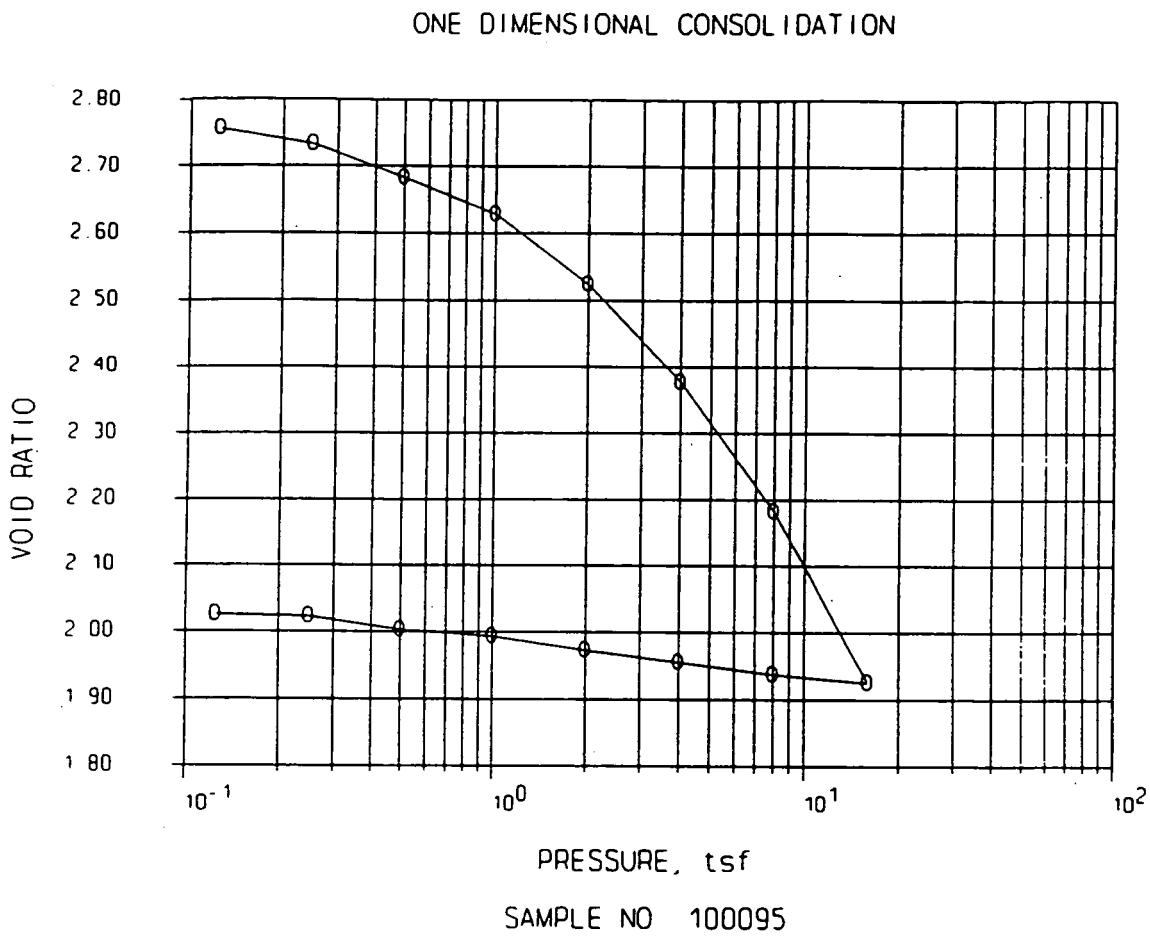

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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	FERNALD K-65	USCS SYMBOL:	NOT REQUESTED
PROJECT NO.:	3133278.40.03.03	WATER CONTENT, %:	64.6
CUST. SAMPLE NO.:	100096	LIQUID LIMIT:	NOT REQUESTED
SPECIFIC GRAVITY:	3.1562 (MEASURED)	PLASTICITY INDEX:	NOT REQUESTED

ONE DIMENSIONAL CONSOLIDATION RESULTS

PRESSURE, tsf	VOID RATIO
0.13	2.20
0.25	2.18
0.50	2.15
1.00	2.11
2.00	2.01
4.00	1.91
8.00	1.71
16.00	1.55
8.00	1.56
4.00	1.58
2.00	1.59
1.00	1.60
0.50	1.62
0.25	1.63
0.13	1.64

June 29, 1992
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IT Project No.: 313327.40.03.03

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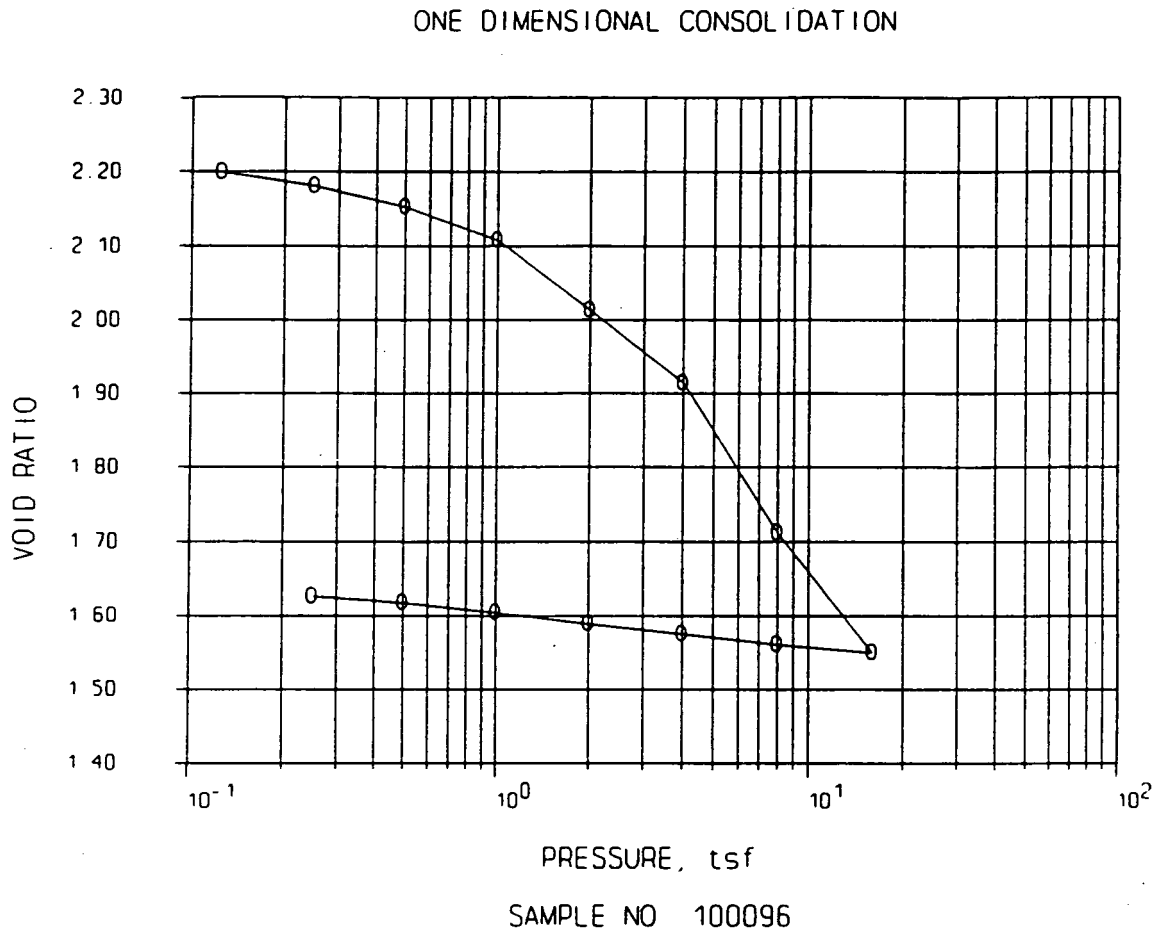

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IT Project No.: 313327.40.03.03

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SAMPLE ANALYSIS RESULTS

PROJECT NAME:	FERNALD K-65	USCS SYMBOL:	NONPLASTIC
PROJECT NO.:	3133278.40.03.03	WATER CONTENT, %:	48.9
CUST. SAMPLE NO.:	100097	LIQUID LIMIT:	46.0
SPECIFIC GRAVITY:	3.0351 (MEASURED)	PLASTICITY INDEX:	NONPLASTIC

SIEVE ANALYSIS

SIEVE NO.	DIAMETER (mm)	PERCENT FINER (%)
3.0 in	75.000	100.0
1.5 in	37.500	100.0
0.75 in	19.000	100.0
0.375 in	9.500	100.0
NO. 4	4.750	99.7
NO. 10	2.000	98.6
NO. 20	0.850	94.9
NO. 40	0.425	86.6
NO. 60	0.250	77.7
NO. 140	0.106	67.4
NO. 200	0.075	63.7

HYDROMETER ANALYSIS

DIAMETER (mm)	PERCENT FINER (%)
0.0298	59.9
0.0220	55.4
0.0145	51.0
0.0087	47.0
0.0064	41.4
0.0047	35.8
0.0034	30.8
0.0026	24.6
0.0011	14.0

682-1-89

June 29, 1992
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IT Project No.: 313327.40.03.03

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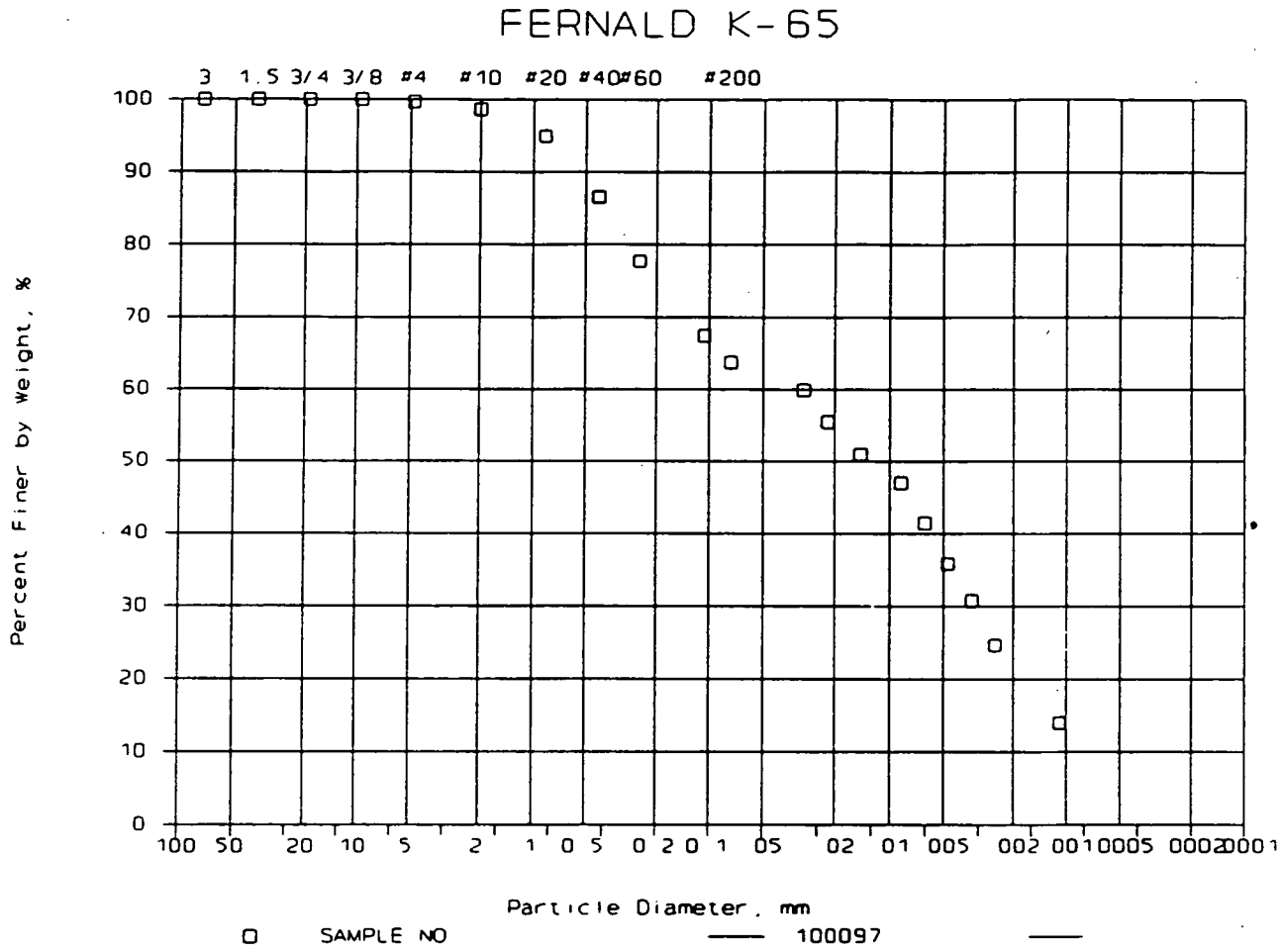

June 29, 1992
Susan Rhyne
IT Corporation
Client Project ID: Fernald RI/FS, OU4
IT Project No.: 313327.40.03.03

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SAMPLE ANALYSIS DATES

CLIENT SAMPLE NUMBER	MOISTURE CONTENT	ATTERBERG LIMITS	GRAIN SIZE DISTRIBUTION
100053	12/13/91	02/04/92	12/19/91
100054	12/13/91	02/04/92	12/19/91
100055	12/13/91	02/04/92	12/19/91
100068	12/13/91	02/05/92	12/19/91
100069	12/13/91	02/05/92	12/19/91
100070	12/13/91	02/05/92	12/19/91
100090	01/09/92	NOT TESTED	NOT TESTED
100091	01/27/92	NOT TESTED	NOT TESTED
100092	01/09/92	NOT TESTED	NOT TESTED
100093	01/27/92	NOT TESTED	NOT TESTED
100094	01/16/92	NOT TESTED	NOT TESTED
100095	01/16/92	NOT TESTED	NOT TESTED
100096	01/15/92	NOT TESTED	NOT TESTED
100097	12/13/91	02/04/92	12/19/91

682-1-89

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IT ANALYTICAL SERVICES
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SAMPLE ANALYSIS DATES CONTINUED

CLIENT SAMPLE NUMBER	SPECIFIC GRAVITY	ONE DIMENSIONAL CONSOLIDATION	STANDARD PROCTOR
100053	12/17/91	NOT TESTED	06/05/92
100054	12/17/91	NOT TESTED	06/09/92
100055	12/17/91	NOT TESTED	06/09/92
100068	12/17/91	NOT TESTED	06/09/92
100069	12/17/91	NOT TESTED	06/03/92
100070	12/17/91	NOT TESTED	06/09/92
100090	01/22/92	01/09/92	NOT TESTED
100091	02/05/92	01/27/92	NOT TESTED
100092	02/05/92	01/09/92	NOT TESTED
100093	02/05/92	01/27/92	NOT TESTED
100094	01/22/92	01/16/92	NOT TESTED
100095	01/22/92	01/16/92	NOT TESTED
100096	01/22/92	01/15/92	NOT TESTED
100097	12/17/91	NOT TESTED	NOT TESTED

APPENDIX C

FERNALD RI/FS

CHAIN-OF-CUSTODY RECORD

R/A Control No. 56386

C/C Control No. 51298

PROJECT NAME/NUMBER K-65 Geotech Content / 313327.40.03.03

LAB DESTINATION WEMCO Lab Facility

SAMPLE TEAM MEMBERS D Clarvis

CARRIER/WAYBILL NO. N/A

	Sample Number	Sample Location and Description	Date and Time Collected	Sample Type	Container Type	Condition on Receipt (Name and Date)	Disposal Record No
	100053	K65 Silo 1 Zone A	9-12-91	Silo Material	8oz Clear Glass	OK REC'D 11-25-91	
	100054	K65 Silo 1 Zone B	9-12-91		8oz Clear Glass		
	100055	K65 Silo 1 Zone C	9-12-91		8oz Clear Glass		
	100068	K65 Silo 2 Zone A	9-12-91		8oz Clear Glass		
	100069	K65 Silo 2 Zone B	9-12-91		8oz Clear Glass		
	100070	K65 Silo 2 Zone C	9-13-91		8oz Clear Glass		
7351	100090	K65 Silo 1 Zone A	11-2-90		Lexan tube	MAT'L INSIDE TUBE SOMEWHAT DISTURBED: SOME FREE SPACE	
9359	100091	K65 Silo 2 Zone A	12/12/90		Lexan tube	REC'D 1-07-92	
52-NE-B-3	100092	K65 Silo 2 Zone B	8-2-91		Lexan tube		
ILO 2, SW-A/B	100093	K65 Silo 1 Zone A/B	~~B~~ 11-27-90 DA 2/18/92		Lexan tube		

Special Instructions:

Possible Sample Hazards:

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: [signature] IT 2/19/92 1530

Received By: [signature] IT 2-26-92 1135

2 Relinquished By.

Received By:

3 Relinquished By

Received by

4 Relinquished By

Received By

WHITE - To accompany samples
YELLOW - Field copy

000657

5448

FERNALD RI/FS

CHAIN-OF-CUSTODY RECORD

R/A Control No. 56387

C/C Control No 51297

PROJECT NAME/NUMBER K65 Geotech/313327.40.03.03

LAB DESTINATION WEMCO Lab Facility

SAMPLE TEAM MEMBERS D. Jarvis

CARRIER/WAYBILL NO. N/A

	Sample Number	Sample Location and Description	Date and Time Collected	Sample Type	Container Type	Condition on Receipt (Name and Date)	Disposal Record No
EC-3	100094	K65 Silo 2 Zone B	8-2-91	SILO Material	Lexan Tube	MATERIAL INSIDE TUBE SOMEWHAT DISTURBED: SOME FREE SPACE	
EC-4	100095	K65 Silo 1 Zone C	8-20-91		Lexan Tube	REC'D 1-07-AL	
/AR/HR	100096	K65 Silo 1 Zone C	8-20-91		Lexan Tube		
BC Composite	100097	K65 Silo 1 Zone A,B,C	9-30-91		9oz Clear Glass	REC'D 11-25-91	

Special Instructions:

Possible Sample Hazards:

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By [signature] IT 2/19/92 1530

   Received By: [signature] IT 2-26-92 [illegible]

2. Relinquished By:

   Received By:

3. Relinquished By

   Received by

4. Relinquished By

   Received By

000658

5448

WHITE - To accompany samples
YELLOW - Field copy

FERNALD RI/FS

REQUEST FOR ANALYSIS

R/A Control No. 56386 51298
C/C Control No. ~~5638609~~ 2/11

PROJECT NAME: OU4-K65 Content Geotechnical
PROJECT NUMBER: 313327.40.03.03
PROJECT MANAGER: Susan Rhyne
BILL TO: ASI
6239 Academy Rd. NE
Albuquerque NM. 87109-3345
PURCHASE ORDER NO. Attn: Accounts Payable

DATE SAMPLES SHIPPED: N/A
LAB DESTINATION: WEMCO Lab. Facility
LABORATORY CONTACT: Ralph Cole
SEND LAB REPORT TO: Gretta Lenby, Susan Rhyne
ASI Fernald IT Knoxville
Ross OH
DATE REPORT REQUIRED: As Per Work Plan
PROJECT CONTACT: Dan Jarvis
PROJECT CONTACT PHONE NO. 615/680-3211

	Sample No.	Sample Type	Sample Volume	Preservative	Requested Testing Program	Special Instructions
	100053	Site Material	300gm	None	ASTM / Work Plan sec SAP 3/15/91 Table ~~B-1~~ 9-3	pg 37 of 46
	100054					
	100055					
	100068					
	100069					
	100070					
19351	100090		11 3/4" Lexan tube			
19359	100091		8 1/2" Lexan tube			
S2-NE-0-3	100092		6 1/4" Lexan tube			
LOZ SW-N/B	100093		7 1/2" Lexan tube			

TURNAROUND TIME REQUIRED (Rush must be approved by the Project Manager.)
Normal ✓ Rush ____ (Subject to rush surcharge)

POSSIBLE HAZARD IDENTIFICATION (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)
Nonhazard ____ Flammable ____ Skin Irritant ____ Highly Toxic ____ Other Rad (Please Specify)

SAMPLE DISPOSAL (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, and disposal.)
Return to Client ✓ Disposal by Lab ____ On Site Work

FOR LAB USE ONLY
Received By [signature] IT Date/Time 2-26-92 / 1135

WHITE - Original, to accompany samples
YELLOW - Field copy

5448

FERNALD RI/FS

REQUEST FOR ANALYSIS

R/A Control No. 56387
C/C Control No. 51297

PROJECT NAME: 044-K65 Contrait Geotech
PROJECT NUMBER: 313327.40.03.03
PROJECT MANAGER: Susan Ryan
BILL TO: ASI
6739 Academy Rd.
Albuquerque NM 87109-3345
PURCHASE ORDER NO. Attn: Accounts Payable

DATE SAMPLES SHIPPED: N/A
LAB DESTINATION: WEMCO Lab Facility
LABORATORY CONTACT: Ralph Cole
SEND LAB REPORT TO: Gretta Louby, Susan Ryan
ASI Fernald, IT Knoxville
Ross OH
DATE REPORT REQUIRED: As Per Work Plan
PROJECT CONTACT: Dan Jarvis
PROJECT CONTACT PHONE NO. 615/690-3211

	Sample No.	Sample Type	Sample Volume	Preservative	Requested Testing Program	Special Instructions
SEC-3	100094	Silo Material	7" Lexan tube	None	ASTM/Work Plan SEC Table 3-3 pg 32 of 46	SAP 7/15/92
SEC-4	100095	↓	7" Lexan tube	None	↓	↓
10 MR/HR	100096	↓	6½" Lexan tube	None	↓	↓
40C COMPOSITE	100097	↓	300 gm	None	↓	↓

TURNAROUND TIME REQUIRED (Rush must be approved by the Project Manager.)

Normal ✓ Rush ____ (Subject to rush surcharge)

POSSIBLE HAZARD IDENTIFICATION (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)

Nonhazard ____ Flammable ____ Skin Irritant ____ Highly Toxic ____ Other Rad (Please Specify)

SAMPLE DISPOSAL (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, and disposal.)

Return to Client ✓ Disposal by Lab ____ On Site Work

FOR LAB USE ONLY

Received By [signature] IT Date/Time 2-26-92 1135

WHITE - Original, to accompany samples
YELLOW - Field copy

000660

1.8

5448

APPENDIX H

APPENDIX H

Reagents used as additives in the Treatability Study test were analyzed to determine the extent to which they were contributing to the analytical results. Sand was used as a substitute for waste in these tests. The analyses and results were performed under the OU2 Treatability Study. The same reagents were used for both OUs.

The cement loading of these sand samples was as low as 12 percent of the waste by weight. Since the cement loading of the OU4 treatability samples was 27 percent or higher, the results of the same samples with cement loadings of less than 26 percent (Runs 2, 4, 6) were not considered in the following comparisons.

The results of a comparison of the data to the LALs is presented in Table 4-35. Numbers greater than 100 indicate that the LAL was exceeded.

In order to make the comparison, the units must be the same. The analytical results from thorium and uranium in Appendix H are given as µg/L. Since the uranium in the reagents would be naturally occurring, and since the weight function of U-235 is significant, the conversion of the LALs was made for the two isotopes. The weight conversion for thorium results in a number that is essentially 100 percent Th-232, and so it is not presented isotopically.

Table H-1. Fernald Environmental Management Project OU2 Inorganic TCLP Results for Clean Reagents

		Cement Stabilization Reagents								Cement Stabilized Samples Made With Clean Sand													
FEMP Sample No.		none		none		none		none		75209		75209		75209		75209		75209		75209		75209	
Treat. Sample No.		10162301		10162302		10162306		10162307		10312613		10312813		10313013		10313213		10313413		10313613		10313813	
Sample ID/Run No.		PC Type I		PC Type II		Comm. Flyash		Attap. & Clinopt		Run 1		Run 2		Run 3		Run 4		Run 5		Run 6		Run 7	
	Element	Conc. (µg/L)	Q	Conc. (µg/L)	Q	Conc. (µg/L)	Q	Conc. (µg/L)	Q	Conc. (µg/L)	Q	Conc. (µg/L)	Q	Conc. (µg/L)	Q	Conc. (µg/L)	Q	Conc. (µg/L)	Q	Conc. (µg/L)	Q	Conc. (µg/L)	Q
Raw Data	Al	494		478		7510		517		1090		1330		690		783		823		522		803	
	Sb	114		102		38.8	B	225		84.1		110		107		85.9		85.1		94.3		84.3	
	As	U	WN	U	WN	55.4	SN	4.6	BWN	U	WN	U	N	U	WN	U	WN	U	WN	U	WN	U	WN
	Ba	891		1180		754		657		941		673		596		614		855		515		800	
	Be	3.4	B	3.4	B	9.9		2.6	B	3.3	B	3.5	B	3.2	B	3.3	B	3.2	B	3.3	B	3.3	B
	Cd	U		U		5.5		84.6		U		U		U		U		U		U		U	
	Ca	373000		2680000		55300		862000		1960000		1830000		1780000		1980000		1990000		1990000		1910000	
	Cr	418		428		303		92		163		229		222		206		177		239		185	
	Co	22.8	B	20.1	B	31	B	30.5	B	14.3	B	22.4	B	20.3	B	12.8	B	13.5	B	15.5	B	15.4	B
	Cu	46.9		45.8		1460		36.7		44.5		46.7		39.9		43.7		41.3		39.7		37.8	
	Fe	99.6	B	97.6	B	857		136		96.2	B	575		220		80.7	B	86.1	B	96.1	B	79.1	B
	Pb	U	W	U	W	6.9		2.0	B	U		U		U		U		U		U		U	
	Mg	791	B	750	B	5800		412000		705	B	29100		32400		774	B	769	B	1920	B	764	B
	Mn	19.9		19.1		142		3170		18.1		85.1		80.7		17.7		17.5		18.0		17.1	
	Hg	U		U		U		U		U		U		U		U		U		U		U	
	Ni	29.3	B	26.5	B	73.9		75.6		U		72.9		73.5		U		20.6	B	U		U	
	K	348000		294000		22900		23300		64600		24700		26600		65600		55900		34000		53500	
	Se	U	W	U		U	W	U	W	U	W	U	W	U	W	U	W	U	W	U	W	U	W
	Ag	118		114		14.2		86.9		99.8		97.4		96.5		99.3		100		101		99.4	
	Na	51400		38000		2110000		196000		25200		60400		114000		83600		33900		51900		32400	
	Tl	U		U		8.9	B	U		U		U		U		U		U	W	U	W	U	W
	V	78.4		74.5		107		81.1		62.3		67.6		64.7		62.2		63.1		79.0		62.6	
	Zn	10.1	B	112		305		310		96.9		162		126		53.7		90.3		78.2		21.8	
	CN	U		4.7	B	U		U		U		U		U		U		U		U		U	
	Mo	76.6		80.6		182		58.3		22.7		27.4		29.3		26.7		22.0		28.9		23.9	
	B	770		782		1490		688		229		591		539		198		234		435		202	
	Si	673		666		5920		31900		2540		64200		56000		3190		3430		15800		3080	

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Table H–2. Fernald Environmental Management Project OU2 Radiological Results for Clean Reagents

		Cement Stabilization Reagents				Cement Stabilized Samples Made With Clean Sand						
FEMP Sample No.		Attap. & Clinopt	Comm. Flyash	PC Type I	PC Type II	75209	75209	75209	75209	75209	75209	75209
Treat. Sample No.		10162307	10162306	10162301	10162302	10312613	10312813	10313023	10313213	10313413	10313613	10313813
Radiological Data	Ru–106 (pCi/L)	<150	<150	<150	<150	<150	<150	<150	<150	<150	<150	<150
	Cs–137 (pCi/L)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	Pb–210 (pCi/L)	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	3.57	3.09
	Pu–238 (pCi/L)	<1.0	<1.0	<1.0	<1.0	<1.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	Pu–239/240 (pCi/L)	<1.0	<1.0	<1.0	<1.0	<1.7	<1.0	1.28	<1.0	<1.0	<1.0	<1.0
	Ra–226 (pCi/L)	<1.0	<1.0	4.48	7.77	2.00	1.04	1.28	1.57	4.03	<1.0	1.88
	Ra–228 (pCi/L)	8.58	<5.9	<6.5	<9.4	<5.1	<4.4	<5.3	<5.5	<7.1	<6.6	<5.4
	Sr–90 (pCi/L)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<7.8	<5.0	5.43	<6.9
	Th–Total (μg/L)	<1.4	<5.2	<1.4	<4.7	8.19	13.1	<6.5	<4.5	<5.3	7.81	<6.6
	U–Total (μg/L)	4.32	8.04	<1.0	<1.0	<1.0	6.03	4.74	<1.0	<1.0	<1.0	<1.0
	Gross alpha (pCi/L)	77.3	<3.2	<6.3	<16	<45.4	<94.5	<17.8	<73.6	<7.2	<45.6	<17.9
	Gross beta (pCi/L)	<10	14.9	290	278	<42.9	<42.0	<40.0	<40.0	4.4	<40.2	64.6

APPENDIX I

APPENDIX I

CEMENT STABILIZATION - REMEDY SCREENING (PRELIMINARY PHASE) RESULTS AND DISCUSSION

I.1.0 INTRODUCTION

In order to determine trends of the response variables (e.g., UCS values) as a function of the reagent loadings and to determine the envelope of reagents that would meet the performance criteria, Remedy Screening (preliminary phase) experiments were statistically designed to yield widely varying values of the response variables. This was accomplished by including a wide range of reagent loadings. The range of cement and flyash loadings varied from 26 to 68 percent as expressed as weight of reagent divided by wet weight of waste (w/w). The adsorbents (attapulgite and clinoptilolite) and set/strength accelerator (sodium silicate) percentages ranged from 0 to 12 and 0 to 7 w/w percent respectively. Blast furnace slag and ferrous chloride were used in Stage III experiments. The blast furnace slag was added to decrease the permeability of the treated waste, provide silicates for metal retention, reduce the effects of sulfate on the cement, and lower rate of set. Ferrous chloride was added as a reducing agent to control the chromium leachability in Silo 3. Details of these experiments are given in Chapter 3.

The formulations used and the results from UCS, bulking factor (BF), and MTCLP are presented in Tables I-1 through I-6 for Silos 1 through 3. The units for the reagent loadings are grams of reagent added to each 100 g of wet weight of waste. The first column in each table is the formulation number assigned to each test. The formulation number will be used in subsequent tables and graphs as an identification of the formula. Data for RCRA metals in the MTCLP leachates are not presented if all measured values were non-detectable for all formulations in Stages II and III. The data in these tables are sorted by the TS Work Plan stage number (2 and 3), cement loading, and flyash loading. In these tables, the Group 1 samples have attapulgite and clinoptilolite at 6 normalized percent. The Group 3 samples use attapulgite and clinoptilolite loadings at zero or 12 percent.

The feeds for these experiments are assumed to be heterogeneous. Due to the limitations in the treatability laboratory radiological license, the entire sample of silo waste could not be homogenized together and tested in the normal procedure applied to waste. Instead, the waste was mixed in a stainless steel tray on-site after collection. Then separate 100 g samples were sent to the laboratory for investigation. Generally, the separate 100 g samples were used for each set of tests. Using small sample sizes, which were mixed individually during the Remedy Screening experiments, likely introduced considerable variability to the testing program.

I.1.1 Data Analysis and Interpretation

I.1.1.1 Data Plots

Most of the plot and regression analysis follows taken directly from the SYSTAT® and SYGRAPH® manuals. (Wilkinson, Leland, SYSTAT: The System for Statistics Evaluation, IL: SYSTAT, Inc., 1988.) Two types of plots were used to assist in analysis of the data, i.e., bar graphs and scatterplots. Bar graphs indicate the relative magnitude of a variable by the height of each bar. Scatterplots show relationships between two of three variables.

Data was also smoothed to assist in determining trends. Linear regression and inverse squared distance smoothing were used.

I.1.1.2 Smoothing of Plotted Data

Regression fits a function to data such that the value predicted by the function at each observed value of X is as close as possible to the observed value of Y at the same value of X. Ordinary linear regression uses a straight line for the function and makes the squared discrepancies between predicted and observed Y values as small as possible. The general equation for this function is:

$$Y = a + bX,$$

where a is a constant term and b is a slope coefficient.

With inverse squared distance smoothing, the height of the curve at a smoothing point is the weighted average of the Y values at X values, where the weights are the squared Euclidean distances from the data points to the smoothing point on the X axis. This is sometimes called Shepard's method of interpolation.

I.2.0 CEMENT STABILIZATION

The following sections discuss the measured UCS, BF, MTCLP values, effect of MTCLP pH on metal's leachability, the processability of the treated waste, and the effects of addition of adsorbents and sodium silicate on the grout mixture.

I.2.1 Unconfined Compressive Strength

The UCS values for Silos 1 and 2 are all above the performance criteria of 500 psi except for one Silo 1 sample that had cracks in it prior to analysis. The UCS values for Silo 3 ranged from about 100 psi to 780 psi. See Tables I-1, I-3, and I-5 for the listing of the measured UCS values. Bar graphs of the UCS values for material from all three silos are presented in Figures I-1, I-2, and I-3. The bar graphs are ordered by the Formulation Numbers from Tables I-1, I-3, and I-5. The cement and flyash loadings are increasing from Formulation Numbers 1 through 15 (Silos 1 and 2) and 1 through 14

(Silo 3). The Formulation Number 6 for Silo 1 was not presented since the sample had cracks in it prior to analysis. A horizontal line is added to Figures I-1, I-2, and I-3 at 500 psi to assist in visualizing the number of formulations that had UCS values greater than 500 psi.

For material from Silos 1 and 2, the UCS value was not a criterion in selection of the formulations for the Remedy Selection (advance phase) investigation, since the UCS values were all above 500 psi (see Figures I-1 and I-2). The selection of reagent loading to produce treated samples with UCS values greater than 500 psi was a criterion for the Silo 3 material (see Figure I-3). Generally, greater than 45 to 50 percent normalized cement loadings were required to meet the UCS requirement for Silo 3.

The effects of flyash and cement loadings on the UCS values are illustrated in Figures I-4 through I-9. The data were smoothed by using the linear and inverse regression routines. Only data for samples which contained adsorbents (clinoptilolite and attapulgite) normalized loading of 6 percent and which contained no BFs were used in these figures. For Silos 1 and 2, there are no statistically significant trends for the UCS data as a function of cement and flyash loadings. This is the result of the relatively small range of UCS values observed and of the variability of the values. The variability of the data can probably be attributed to the heterogeneity of the waste feed. The range of UCS values measured for the Silo 3 waste was larger than that measured for Silos 1 and 2 waste. A general trend of increasing UCS with increasing cement loading was observed. There may be a small detrimental effect of flyash on the UCS value (see Figures I-8 and I-9).

In the Stage III studies, formulations containing activated blast furnace slag combined with cement or with cement-flyash were investigated (see Tables I-1, I-3, and I-5). The mixtures containing blast furnace slag had UCS similar to the cement-flyash formulations.

I.2.2 Bulking Factor

The bulking factors for Silos 1 and 2 wastes were approximately equal for formulations investigated. In contrast, the bulking factor for Silo 3 material was normally less than half of the Silos 1 and 2 material. See Tables I-1, I-3, and I-5 for the listing of the bulking factor data. The BF data is illustrated in bar graphs (Figures I-10 , I-11, and I-12). The data is ordered by Formulation Number.

The same general trends for bulking factor were observed for the waste from the three silos. The bulking factor was increased by addition of all solid reagents. Typically, flyash, attapulgite, and clinoptilolite had larger effects on the bulking factor than cement and blast furnace slag.

The effects of flyash and cement loadings on the bulking factor are illustrated in Figures I-13 through I-18. The data were smoothed by using the linear and inverse regression routines. Only data for samples which contained adsorbents (clinoptilolite and attapulgite) at a normalized loading of 6 percent and which contained no BFS were used in these figures. The lowest bulking factors were measured

with the lowest loading of reagents. Therefore, to minimize the bulking factor, if higher cement or flyash loadings are required, it is preferable to increase cement loading instead of flyash.

I.2.3 MTCLP - RCRA metals

There were no RCRA metals' leachability concerns for the treated Silo 2 waste. There were RCRA metals' leachability concerns for Silos 1 and 3. The treated wastes had lead (Silo 1), arsenic, and chromium (Silo 3) concentrations greater than one-half the TC regulatory criteria. See Tables I-2, I-4, and I-6 for the MTCLP results for the three silos.

Control of the leachability of arsenic and lead was achieved by using formulations with at least 43 and 50 percent normalized cement loadings, respectively for Silos 3 and 1. Addition of BFS with cement or with cement-flyash to the Silo 3 wastes was also an effective treatment for arsenic. Addition of BFS with cement-flyash to the Silo 1 waste reduced the lead concentration to nondetectable levels. However, the lead concentration exceeded the TC regulatory criteria by a factor of three when BFS with only cement was used.

The leachability of chromium was not controlled by increasing the reagent loadings. Since the Silo 3 material was calcined, it is assumed that part of the chromium is present in the VI oxidation state. Compounds containing chromium (VI) are generally more soluble than those containing chromium (III). Therefore, a reducing agent, $FeCl_2$, was added to the waste to convert the chromium (VI) to chromium (III). The addition of $FeCl_2$ successfully lowers the solubility of chromium in the MTCLP tests. Also, the addition of activated blast furnace slag mixed with cement or cement-flyash reduced the measured chromium concentration to nondetectable values without the addition of a reducing agent.

The concentration of lead in the Silo 1 MTCLP leachate exceeded the TC regulatory limit in approximately two-thirds of the formulations. This is illustrated in Figure I-19, which includes a horizontal line at five (5) ppm lead to indicate the TC regulatory limit for lead. Twelve of the 18 formulations had lead concentrations greater than five ppm.

The leachability of lead from the treated Silo 1 waste was a strong function of the final pH of the MTCLP leachate. When the pH of the leachate was greater than 8, the lead concentration was less than 1.5 ppm, normally less than 0.1 ppm. At lower pH values, the lead concentration significantly increased. This leachability trend is illustrated in Figure I-20 . The leachability of the arsenic and chromium from the Silo 3 waste does not appear to be a strong function of leachate pH.

I.2.4 MTCLP - Radionuclides

Indicators of radionuclides leachability for the MTCLP leach test include gross alpha, gross beta, and uranium concentrations in the MTCLP leachates. See Tables I-2, I-4 and I-6 for the MTCLP results for the three silos.

The uranium concentrations in the MTCLP leachate were less than 0.5 ppm for the treated Silo 1 waste. Through interpolation of the data (see Figures I-21 and I-22), normalized cement loadings greater than 40 percent were required to minimize the uranium leachability. Analysis of the uranium data interpolated using the inverse smoothing routine indicates that higher flyash loading may have a detrimental effect on uranium leachability. The addition of BFS may have a small detrimental effect on uranium leachability. More data is needed to quantify the effect of BFS.

For Silo 2, the uranium concentration was generally less than 0.1 ppm. The data for the two samples with larger uranium concentrations in the MTCLP are not depicted in Figures I-23 and I-24 since they had adsorbent loadings other than six percent. Only data for samples which contained adsorbents (clinoptilolite and attapulgite) normalized loading of 6 percent and which contained no BFS were used in these figures. There were two values greater than 1.6 ppm. These latter two values were at the lower cement loadings (27 percent) and with no addition of adsorbents (attapulgite and clinoptilolite). The addition of BFS may have a small detrimental affect on uranium leachability. More data is needed to quantify the effect of BFS.

The uranium concentrations in all but one of the MTCLP leachates were less than 0.3 ppm for the treated Silo 3 waste. There was one sample with a uranium concentration of 0.85 ppm. This sample contained high (12 percent) attapulgite with no clinoptilolite added. The high uranium may be due to the higher attapulgite concentration or to the heterogeneity of the waste. The effects of flyash and cement loadings on the uranium concentration are illustrated in Figures I-25 and I-26. Only data for samples which contained adsorbents (clinoptilolite and attapulgite) normalized loading of 6 percent and which contained no BFS were used in these figures. Analysis of the data interpolated by using the inverse smoothing routine indicates that the cement and flyash loading have little effect on the uranium concentration in the leachate. Addition of blast furnace slag to the reagent mixture lowered the uranium concentration in the MTCLP leachate.

For waste from Silos 1 and 3, the gross alpha and beta are minimized at high cement loadings (greater than 50-60 normalized percent) and low flyash loadings (less than 30 normalized percent) (see Figures I-27 through I-34). For Silo 2 wastes, the gross alpha and beta are minimized by using less than 40 normalized percent cement and higher loadings of flyash (see Figures I-35 and I-38).

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I.2.5 Processability

The processability of the treated waste was determined by measuring the shear strength, penetration resistance, and temperature rise when the reagents were added to the waste. With Silos 1 and 2 waste, the mixture had low shear strength when mixed, had moderate structural integrity (penetration resistance at 24 hour cure time), and low temperature rise (less than or equal to $2^{o}C$). These wastes are considered processible. The Silo 3 waste also had reasonable shear strengths and penetration resistance measurements. However, there was generally at least $7^{o}C$ temperature rise when water was added to the waste. This temperature rise was likely due to the hydration of material produced in the calcining process. Typical materials that may be present in the calcined material and which have moderate heats of hydration are activated aluminum and silicon hydroxides and calcium sulfate. In addition, the Silo 3 waste had to be agitated during mixing to retard the rate of set. The higher temperature rise and more rapid rate of set do not preclude processing of the waste, but indicate that process controls will need to be added to control the temperature rise and rate of set.

I.2.6 Effect of Attapulgite, Clinoptilolite, and Sodium Silicate

The effects of attapulgite, clinoptilolite, and sodium silicate additions to the reagent mixtures are summarized in Table I-7. These effects are listed for UCS, BF, and the pertinent aspects of the MTCLP performance. Generally, the effects of all three reagents are small or ambiguous. Notably, the higher loadings of the adsorbents increase the bulking factor for all three silos and decrease the leachability of lead in Silo 1. In the MTCLP, the gross alpha and beta values are lowered by increasing the sodium silicate loadings from zero to 7 percent for Silos 1 and 2 wastes. Also, the leachability of lead was decreased by addition of sodium silicate to the Silo 1 waste.

I.3.0 SUMMARY

The performance of the Remedy Screening (preliminary phase) samples are summarized in Table I-8 . Analysis of the results indicates that solidification of the waste in Silos 1 and 2 can readily achieve the desired UCS. Silo 3 requires higher loadings of reagents to solidify the waste since 43 percent of the formulations do not achieve a 500 psi UCS. For Silo 2, all formulations passed the TC regulatory requirements. However, stabilized samples of Silos 1 and 3 had a significant number of failures for lead (Silo 1) or arsenic and chromium (Silo 3). The leachability of chromium was controlled in Stage III by the addition of a reducing agent ($FeCl_2$) or addition of BFS to the reagents. The table also lists the maximum and minimum values for uranium and screening gross alpha and beta. Uranium was more leachable from the Silo 2 waste than either Silo 1 or 3 waste. The values for gross alpha and beta decreased in the order of Silo 1, Silo 2, and Silo 3. The two most promising formulations derived from the Remedy Screening (advanced phase) testing program were used in the Remedy Selection phase of the program. The most promising formulations had UCS values greater than 500 psi, met the TC regulatory limits, had relatively low gross alpha and beta values in the MTCLP extraction fluid, and had a relatively low bulking factor.

I.4.0 RECOMMENDATIONS FORMULATIONS FOR REMEDY SELECTION (ADVANCED PHASE)

As explained above, the UCS values for Silos 1 and 2 were not a criteria for determining the formulations for the advanced phase studies. The leachability in the MTCLP tests and the values of the bulking factors were used to determine the Remedy Selection (advance phase) formulations. The leachability of the treated Silo 1 waste was generally greater than that of the Silo 2 treated waste material. In order to minimize leachability of the Silo 1 waste, cement loadings greater than 50 percent were required. In addition, the effect of blast furnace slag was promising on reducing the RCRA metals' leachability of the treated waste. Choosing from the formulations presented in Table I-1, formulation numbers 11 and 16 were selected since they had cement loadings greater than 50 percent and relatively low bulking factors. See Tables 4-5 and 4-6 for the formulations investigated for each of the three zones in the three silos during the Remedy Selection (advanced phase) work.

The UCS values and MTCLP leachate concentration values were evaluated for determining the formulations for the Remedy Selection (advanced phase) studies for Silo 3. Greater than 50 percent cement loadings were required to minimize leachability and obtain a 500 psi UCS value when blast furnace slag was not used. In addition, a reducing agent, e.g., $FeCl_2$, was needed to lower the leachability of chromium. When blast furnace slag was added to the reagent mixture, at least 40 percent cement loadings were needed to meet the UCS and RCRA metals' leachability criteria. On the basis of these UCS and leachability requirements, formulation numbers 16 and 20 (see Table I-5) were selected. See Tables 4-5 and 4-6 for the formulations investigated for each of the three zones in the three silos during the Remedy Selection (advanced phase) work.

TABLE I - 1

FORMULATIONS* WITH UCS AND BULKING FACTOR RESULTS

SILO 1 - REMEDY SCREENING (PRELIMINARY PHASE) - CEMENT STABILIZATION

Formulation Number	Waste	Type II Portland Cement	Type F Flyash	Sodium Silicate	Attapulgite	Clinoptilolite	Water	Blast Furance Slag	Group**	Stage**	UCS (psi)	Bulking Factor (%)
1	100	26	26	0	6	6	41	0	1	2	609	109
2	100	26	26	0	6	6	41	0	1	2	780	109
3	100	27	27	7	6	6	41	0	1	2	780	122
4	100	27	27	7	0	0	24	0	3	2	633	83
5	100	31	51	0	6	6	54	0	1	2	652	158
6	100	33	54	7	6	6	60	0	1	2	397	173
7	100	43	43	7	0	0	40	0	3	2	695	128
8	100	43	43	4	0	12	55	0	3	2	780	168
9	100	43	43	4	6	6	50	0	1	2	780	154
10	100	43	43	4	12	0	59	0	3	2	780	167
11	100	51	31	0	6	6	54	0	1	2	780	150
12	100	54	33	7	6	6	55	0	1	2	780	164
13	100	64	64	7	0	0	60	0	3	2	543	192
14	100	64	64	0	6	6	74	0	1	2	696	220
15	100	68	68	7	6	6	74	0	1	2	780	233
16	100	50	15	0	0	0	39	25	1	3	660	111
17	100	50	0	0	0	0	46	50	1	3	671	127
18	100	51	31	10	0	0	40	0	1	3	746	125

* Reagent loadings per 100 grams of wet weight of waste
** As listed in the Operable Unit 4 Treatability Study Work Plan

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TABLE I - 2

FORMULATIONS* WITH ANALYTICAL RESULTS**

SILO 1 - REMEDY SCREENING (PRELIMINARY PHASE) - CEMENT STABILIZATION

Formulation Number	Gross Alpha (dpm/4cc)	Gross Beta (dpm/4cc)	Uranium by IC (ppm)	pH of MTCLP Extraction Fluid (std. units)	Barium (ppm)	Chromium (ppm)	Lead (ppm)	Selenium (ppm)
1	205.4	90.1	0.17	3.6	10.4	ND	236.5	ND
2	299.7	179	0.1896	4.02	0.172	ND	252.8	ND
3	310.9	274.4	ND	5.09	0.158	0.04	282.4	ND
4	280.9	116	0.3922	3.92	0.2126	ND	182.4	ND
5	1365	783	0.4855	6.58	0.52	ND	81.37	ND
6	815.6	303.1	0.5245	6.86	0.656	ND	27.47	ND
7	151.8	56.5	ND	3.85	0.198	ND	90.74	ND
8	176.3	63.6	ND	3.96	0.2023	ND	86.4	ND
9	283.9	208	ND	5.14	0.262	0.048	86.3	ND
10	210	89.7	ND	3.69	0.4205	0.0636	41.1	0.5406
11	398.9	112.5	ND	10.26	0.419	ND	ND	ND
12	227.9	63.5	ND	9.79	0.208	ND	ND	ND
13	230.5	76.9	ND	4.04	0.2519	0.061	30.45	ND
14	365	113.3	0.4606	8.4	0.4753	ND	1.496	ND
15	237.6	69	ND	10.44	0.291	ND	ND	ND
16	776.9	625.4	0.0901	11.52	0.314	ND	ND	ND
17	781.6	501.9	0.4366	11.08	0.474	ND	17.8	ND
18	477.4	318.3	ND	11.49	0.118	ND	ND	ND

* Reagent loadings per 100 grams of wet weight of waste
** Only metals the have results above detection limits are shown
ND Not detected

TABLE I - 3

FORMULATIONS* WITH UCS AND BULKING FACTOR RESULTS

SILO 2 - REMEDY SCREENING (PRELIMINARY PHASE) - CEMENT STABILIZATION

Formulation Number	Waste	Type II Portland Cement	Type F Flyash	Sodium Silicate	Attapulgite	Clinoptilolite	Water	Blast Furance Slag	Group**	Stage**	UCS (psi)	Bulking Factor (%)
1	100	26	26	0	6	6	44	0	1	2	623	102
2	100	27	27	7	6	6	42	0	1	2	660	107
3	100	27	27	7	0	0	27	0	3	2	704	74
4	100	27	27	7	0	0	27	0	3	2	622	75
5	100	31	51	0	6	6	54	0	1	2	507	136
6	100	33	54	7	6	6	59	0	1	2	532	166
7	100	43	43	4	6	6	54	0	1	2	689	142
8	100	43	43	4	0	0	43	0	3	2	738	117
9	100	43	43	4	0	12	49	0	3	2	532	136
10	100	43	43	4	12	0	57	0	3	2	634	149
11	100	51	31	0	6	6	55	0	1	2	662	138
12	100	54	33	7	6	6	56	0	1	2	602	150
13	100	64	64	7	0	0	64	0	3	2	522	182
14	100	65	64	0	6	6	65	0	1	2	528	181
15	100	68	68	7	6	6	65	0	1	2	675	204
16	100	50	0	0	0	0	51	50	1	3	728	115
17	100	50	15	0	0	0	46	25	1	3	648	105
18	100	51	31	11	0	0	40	0	1	3	700	112

* Reagent loadings per 100 grams of wet weight of waste
** As listed in the Operable Unit 4 Treatability Study Work Plan

TABLE I - 4

FORMULATIONS* WITH ANALYTICAL RESULTS**

SILO 2 - REMEDY SCREENING (PRELIMINARY PHASE) - CEMENT STABILIZATION

Formulation Number	Gross Alpha (dpm/4cc)	Gross Beta (dpm/4cc)	Uranium by IC (ppm)	pH of MTCLP Extraction Fluid (std. units)	Barium (ppm)	Chromium (ppm)	Lead (ppm)
1	350	181.3	ND	5.23	0.641	0.068	ND
2	70.9	30.7	ND	5.16	0.132	0.044	ND
3	209.5	73.7	1.8936	7.92	0.204	0.024	0.97
4	167.3	60.9	1.66	7.75	0.199	0.033	0.52
5	358.8	173.6	ND	5.24	0.809	0.08	ND
6	154.6	16.3	ND	5.22	0.241	0.079	ND
7	168.7	ND	ND	9.18	0.515	0.055	ND
8	259.3	68.7	ND	9.65	0.533	0.064	ND
9	119.2	43.9	ND	9.47	0.361	0.077	ND
10	95.2	44.6	ND	9.62	0.29	0.084	ND
11	724.2	243.8	ND	3.87	1.214	0.09	ND
12	213.4	96.7	ND	3.92	0.483	0.094	ND
13	250.4	79.7	ND	10.77	0.574	0.095	ND
14	506.5	184.6	0.0917	3.85	1.057	0.092	0.009
15	187.5	88	ND	4.05	0.4547	0.086	ND
16	388	206.8	ND	11.56	0.621	ND	ND
17	589	364.1	0.087	11.6	0.662	ND	ND
18	319.7	213.9	ND	11.63	0.171	ND	ND

* Reagent loadings per 100 grams of wet weight of waste
** Only metals the have results above detection limits are shown
ND Not detected

TABLE I - 5

FORMULATIONS* WITH UCS AND BULKING FACTOR RESULTS

SILO 3 - REMEDY SCREENING (PRELIMINARY PHASE) - CEMENT STABILIZATION

Formulation Number	Waste	Type II Portland Cement	Type F Flyash	Sodium Silicate	Attapulgite	Clinoptilolite	Water	Ferrous Chloride	Blast Furance Slag	Group**	Stage**	UCS (psi)	Bulking Factor (%)
1	100	26	26	0	6	6	100	0	0	1	2	110	62
2	100	27	27	0	6	6	102	0	0	1	2	114	64
3	100	31	52	0	6	6	115	0	0	1	2	131	90
4	100	33	54	0	6	6	117	0	0	1	2	235	94
5	100	43	43	0	6	6	105	0	0	2	2	328	87
6	100	43	43	4	0	12	110	0	0	3	2	456	101
7	100	43	43	4	12	0	123	0	0	3	2	443	101
8	100	43	43	0	6	6	110	0	0	1	2	315	88
9	100	43	43	0	6	6	106	0	0	2	2	348	88
10	100	51	31	0	6	6	113	0	0	1	2	742	86
11	100	54	33	0	6	6	119	0	0	1	2	554	95
12	100	54	33	0	6	6	119	0	0	1	2	714	96
13	100	64	64	0	6	6	140	0	0	1	2	704	132
14	100	68	68	0	6	6	136	0	0	1	2	780	131
15	100	40	0	0	0	0	101	0.75	40	1	3	670	64
16	100	40	0	0	0	0	95	0	40	1	3	675	60
17	100	50	0	0	0	0	108	0	50	1	3	780	80
18	100	50	15	0	0	0	100	0	25	1	3	684	73
19	100	51	31	0	0	4	108	0.75	0	1	3	657	77
20	100	51	31	0	0	0	108	0.75	0	1	3	583	77

* Reagent loadings per 100 grams of wet weight of waste
** As listed in the Operable Unit 4 Treatability Study Work Plan

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TABLE I - 6

FORMULATIONS* WITH ANALYTICAL RESULTS**

SILO 3 - REMEDY SCREENING (PRELIMINARY PHASE) - CEMENT STABILIZATION

Formulation Number	Gross Alpha (dpm/4cc)	Gross Beta (dpm/4cc)	Uranium by IC (ppm)	pH of MTCLP Extraction Fluid (std. units)	Arsenic (ppm)	Barium (ppm)	Chromium (ppm)
1	19	3.5	0.0852	5.59	2.36	0.09	2.41
2	19.2	11.2	0.1591	5.58	2.49	0.08	2.47
3	11.8	11.2	0.124	5.62	1.66	0.11	2.17
4	21	11.2	0.0819	5.59	1.51	0.11	2.07
5	21.7	9.8	0.2539	8.22	0.59	0.11	2.14
6	22.8	5	0.1044	2	0.88	0.115	1.815
7	19	7.2	0.8503	2	0.56	0.133	1.851
8	16.7	8.4	0.0482	6.07	1.01	0.11	2.17
9	24.3	12	0.1198	6.85	0.64	0.12	2.06
10	22	7.1	0.0718	7.2	0.3	0.13	2.2
11	10.1	7.1	0.0672	7.07	0.24	0.11	1.89
12	22	5.6	0.0693	6.24	0.36	0.11	1.84
13	17.4	9.2	0.1183	7.2	ND	0.08	1.6
14	17.2	4.9	0.0807	7.23	0.21	0.08	1.65
15	7.4	1.9	ND	8.34	ND	0.14	ND
16	5	2.6	ND	8.82	ND	0.13	ND
17	4.4	3.8	ND	9.65	ND	0.15	ND
18	7.6	3.9	0.1376	8.42	ND	0.12	ND
19	ND	7	0.0972	7.52	ND	0.12	0.43
20	6.9	3.2	ND	7.49	ND	0.13	0.54

* Reagent loadings per 100 grams of wet weight of waste
** Only metals the have results above detection limits are shown
ND Not detected

TABLE I - 7

REMEDY SCREENING (PRELIMINARY PHASE) - CEMENT STABILIZATION AFFECT OF ATTAPULGITE, CLINOPTILOLITE, AND SODIUM SILICATE

	Silo	UCS (psi)	Bulking Factor (%)	Gross Alpha (dpm/4cc)	Gross Beta (dpm/4cc)	Uranium by IC (ppm)	Lead (ppm)	Selenium (ppm)	Chromium (ppm)	Arsenic (ppm)
Attapulgite	1	↔	↓★	↓	↓	↔	↑	↔	↔	ND
	2	↔	↓★	↑	↑	↔	↔	ND	↔	ND
	3	↔	↓★	↔	↔	↔	ND	ND	↔	↔
Clinoptilolite	1	↔	↓★	↓	↓	ND	↔	↔	↔	ND
	2	↔	↓★	↑	↑	↔	↔	ND	↔	ND
	3	↔	↓★	↔	↔	↔	ND	ND	↔★★	↔★★
Sodium Silicate	1	↔	↔	↑	↑	↔	↑	↔	↔	ND
	2	↔	↔	↑	↑	↔	↔	ND	↔	ND
	3	↔	↔	↔	↔	↔	ND	ND	↔	↔

Notes:

- ↔ Ambiguous
- ↑ Positive affect
- ↓ Negative affect
- ↓★ Attapulgite and clinoptilolite have approximately the same affect on bulking factor
- ↔★★ Possible small positive improvement in arsenic and chromium leachability

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TABLE I-8

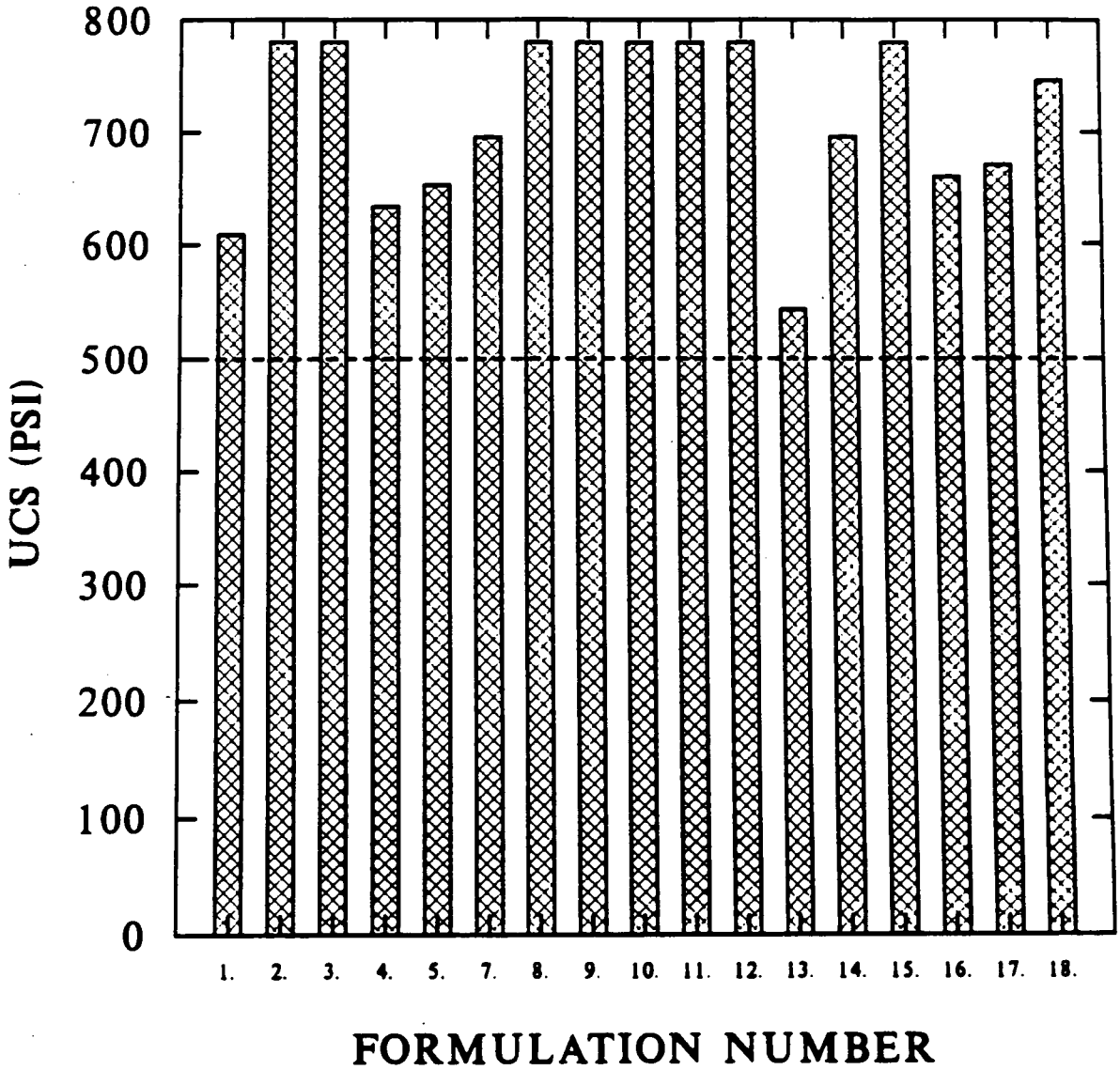
REMEDY SCREENING (PRELIMINARY PHASE) - CEMENT STABILIZATION MTCLP SUMMARY

Contaminant	Adjusted TC Level[a]	Units	Percentage of Failures		
			Silo 1	Silo 2	Silo 3
As	0.43	ppm	3	0	43
Ba	43	ppm	0	0	0
Cd	0.43	ppm	0	0	0
Cr	2.15	ppm	0	0	24
Pb	2.15	ppm	22	0	0
Se	0.43	ppm	6	0	0
Ag	2.15	ppm	0	0	0
UCS	500	psi	3	3	43

[a]TC regulatory level assumes maximum dilution adjustment for addition of reagents to waste.

Contaminant	Units	Minimum - Maximum Values		
		Silo 1	Silo 2	Silo 3
U	ppm	0.0-0.53	0.0-1.9	0.0-0.85
Alpha	dpm/4 cc	151-1365	71-724	0-24
Beta	dpm/4 cc	56-783	0-364	2-12

FIGURE I-1



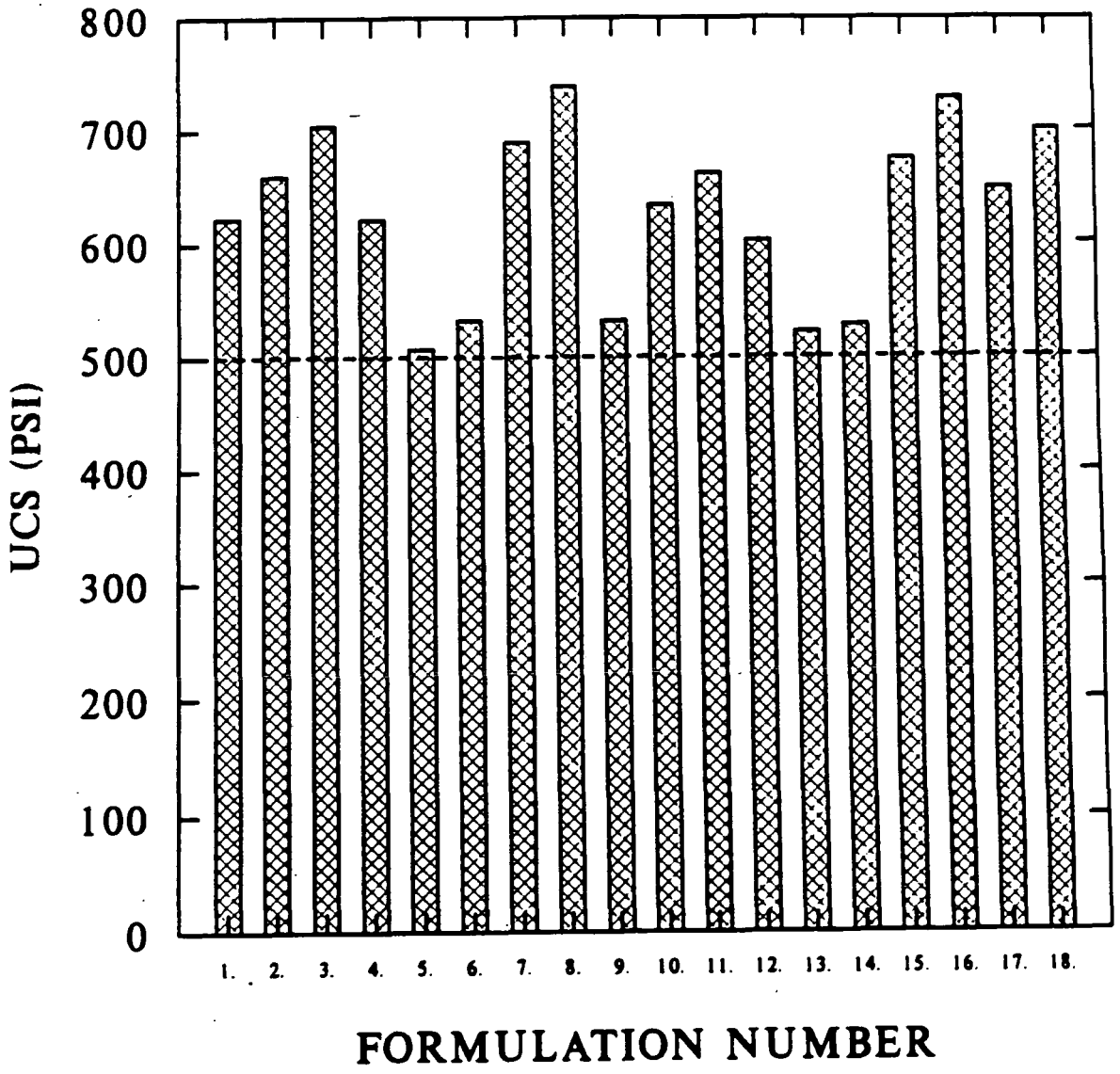
BAR GRAPH

UCS VS. FORMULATION NUMBER

SILO 1. STAGES II & III

3/26/92

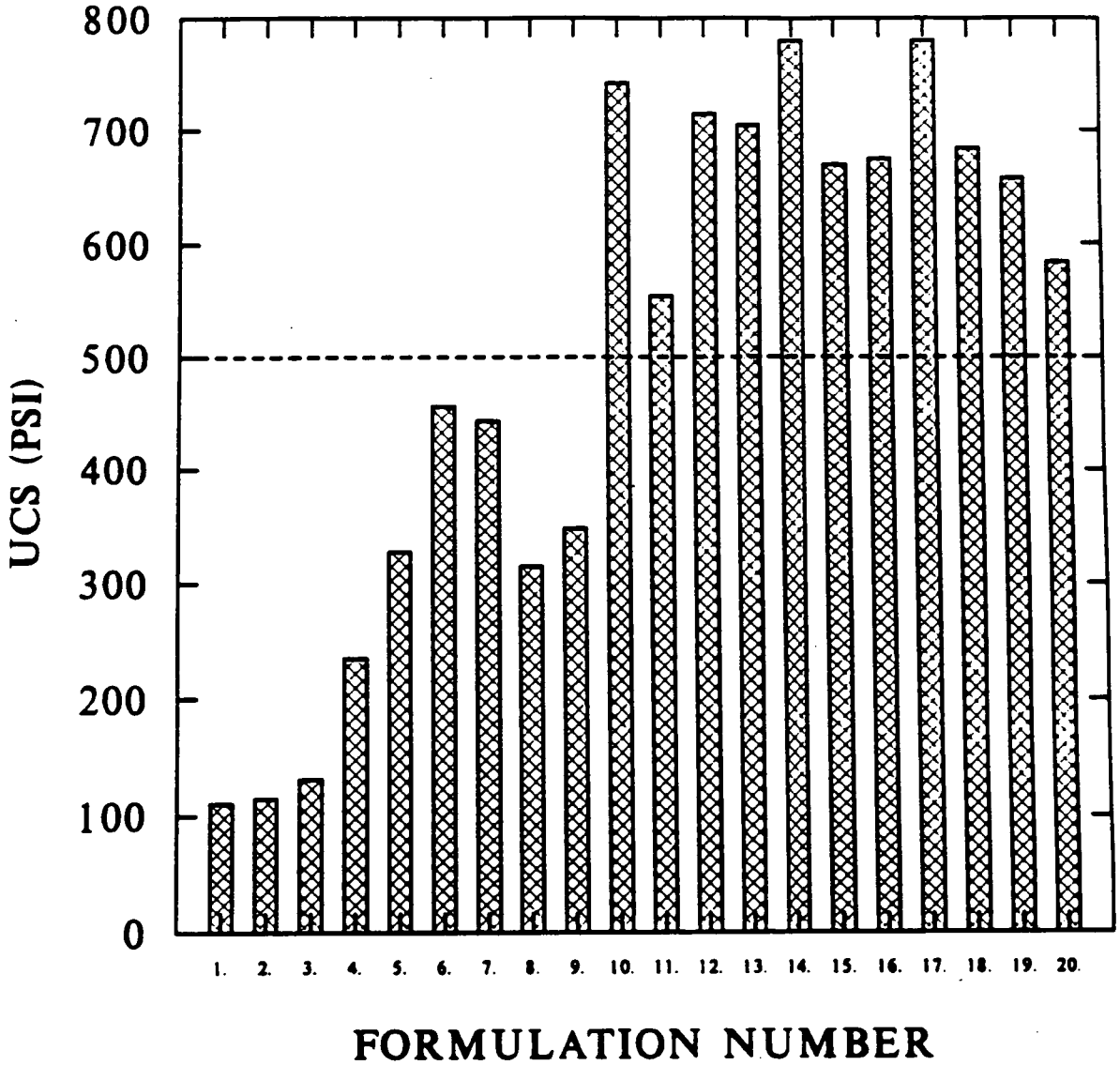
FIGURE I-2



BAR GRAPH
UCS VS. FORMULATION NUMBER
SILO 2, STAGES II & III

3/26/92

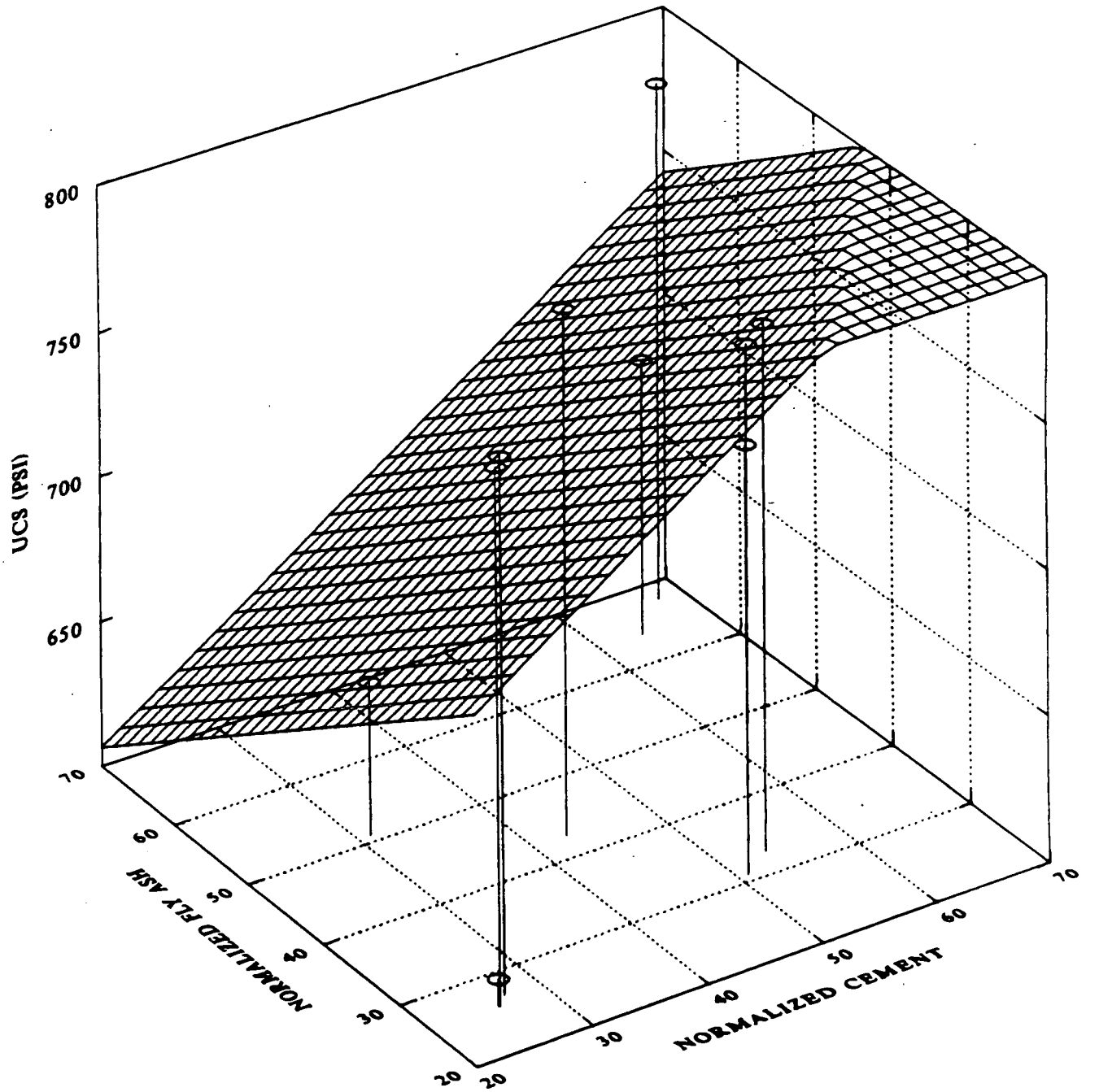
FIGURE I-3



BAR GRAPH
UCS VS. FORMULATION NUMBER
SILO 3, STAGES II & III

3/26/92

FIGURE I-4



SILO 1. STAGES II AND III. UCS

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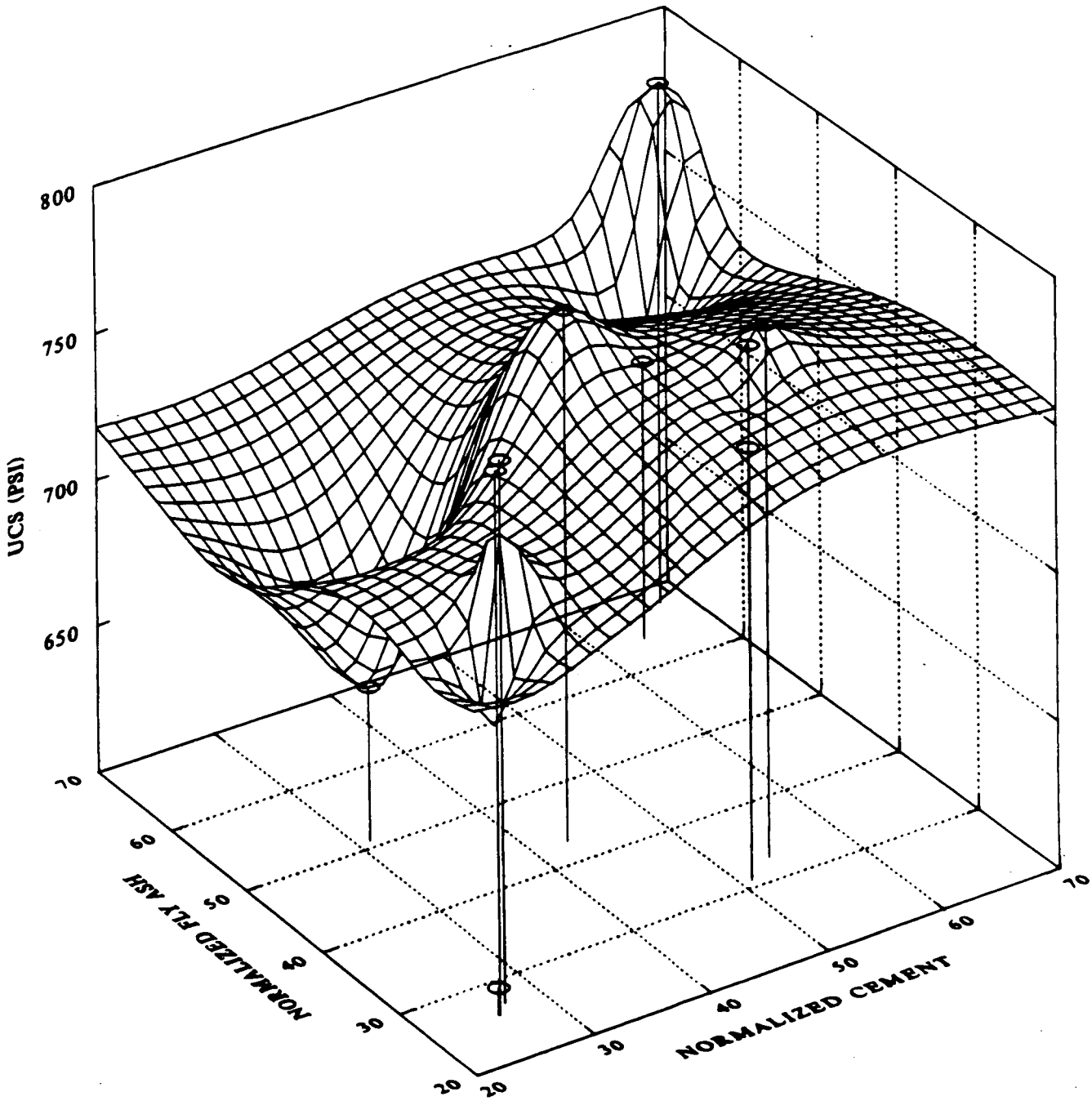
3/20/93

FIGURE I-5



SILO 1, STAGES II AND III, UCS

INV
3/20/93

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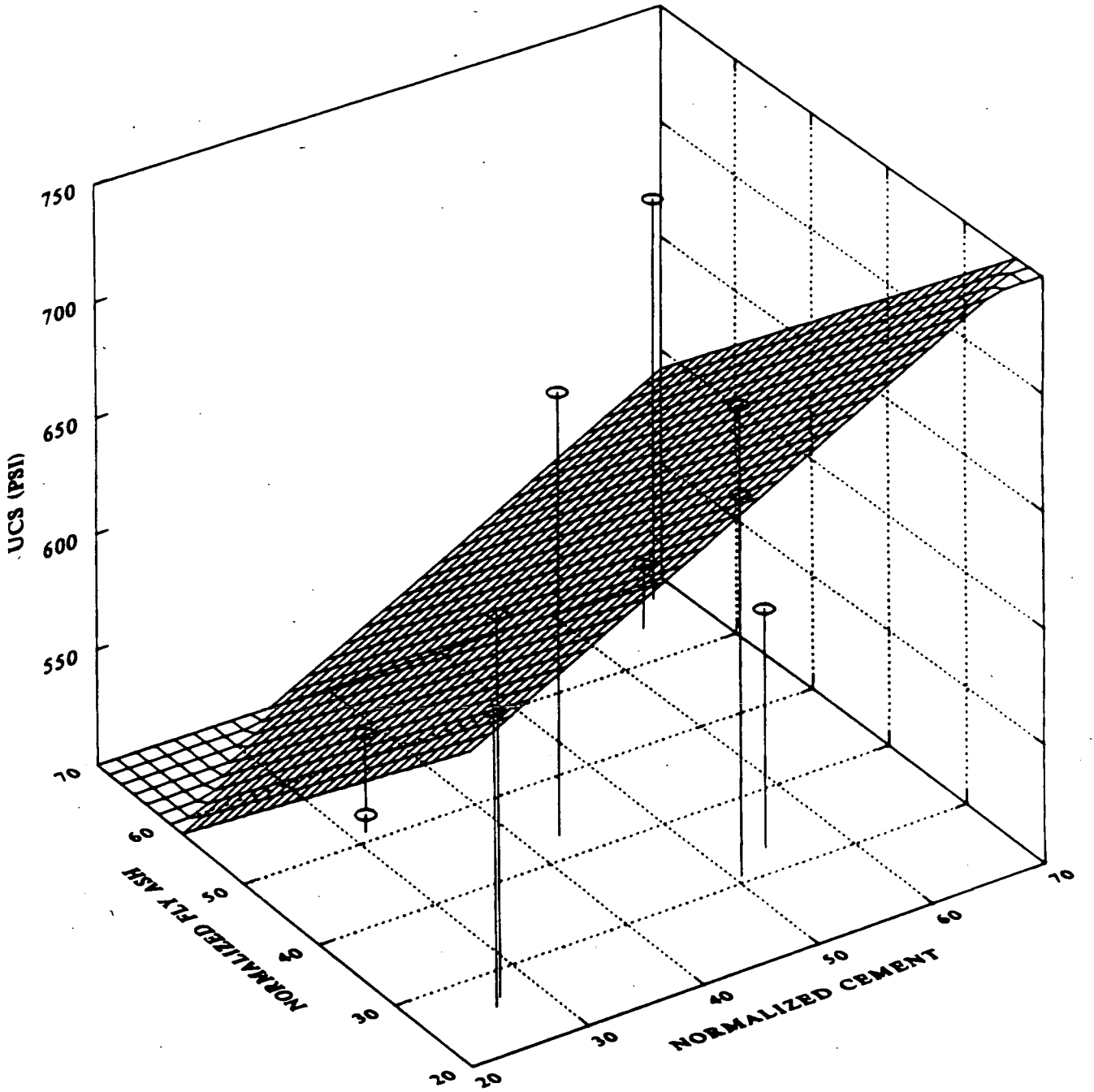
FIGURE I-6



SILO 2. STAGES II AND III. UCS

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3/20/93

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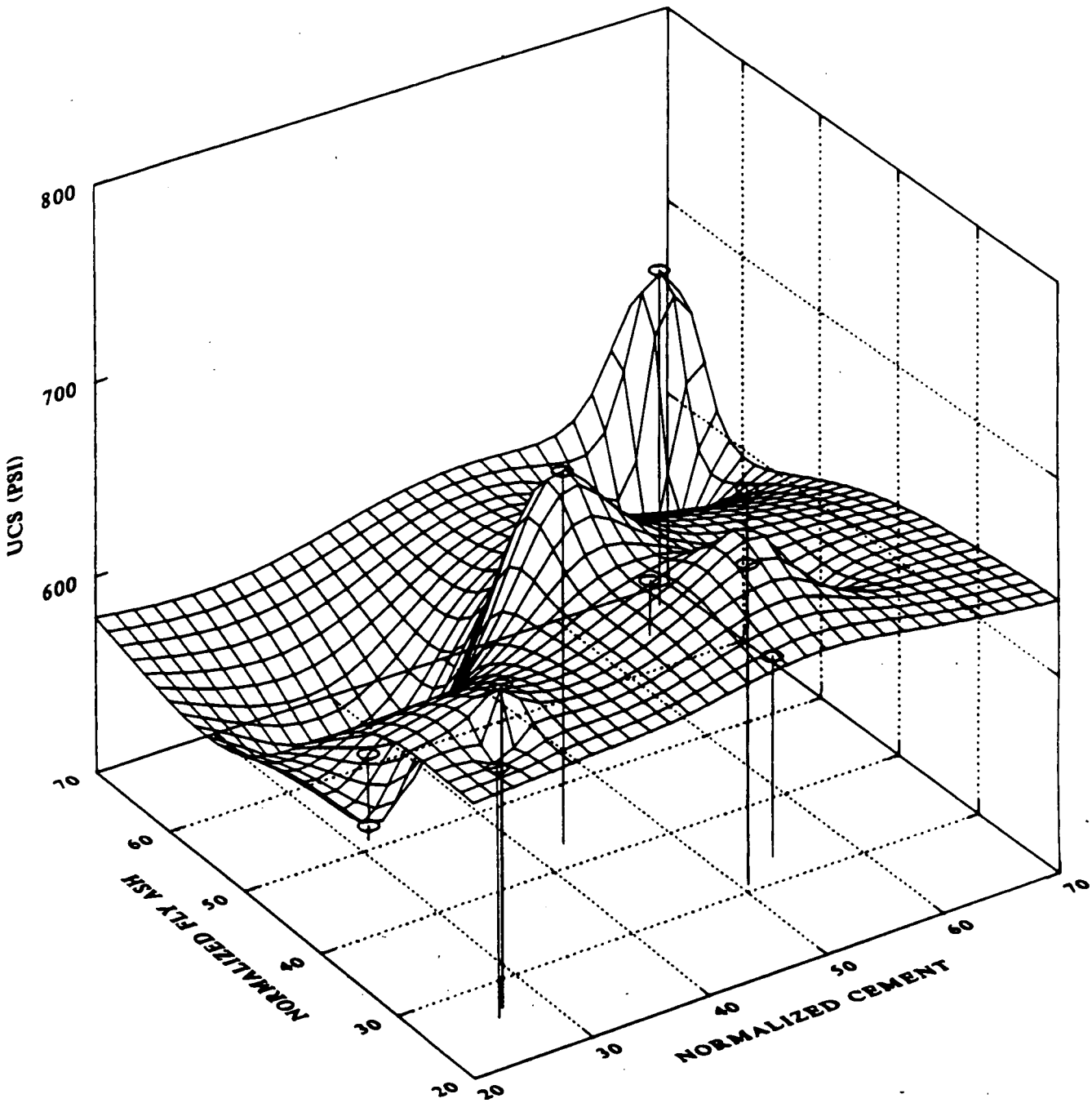
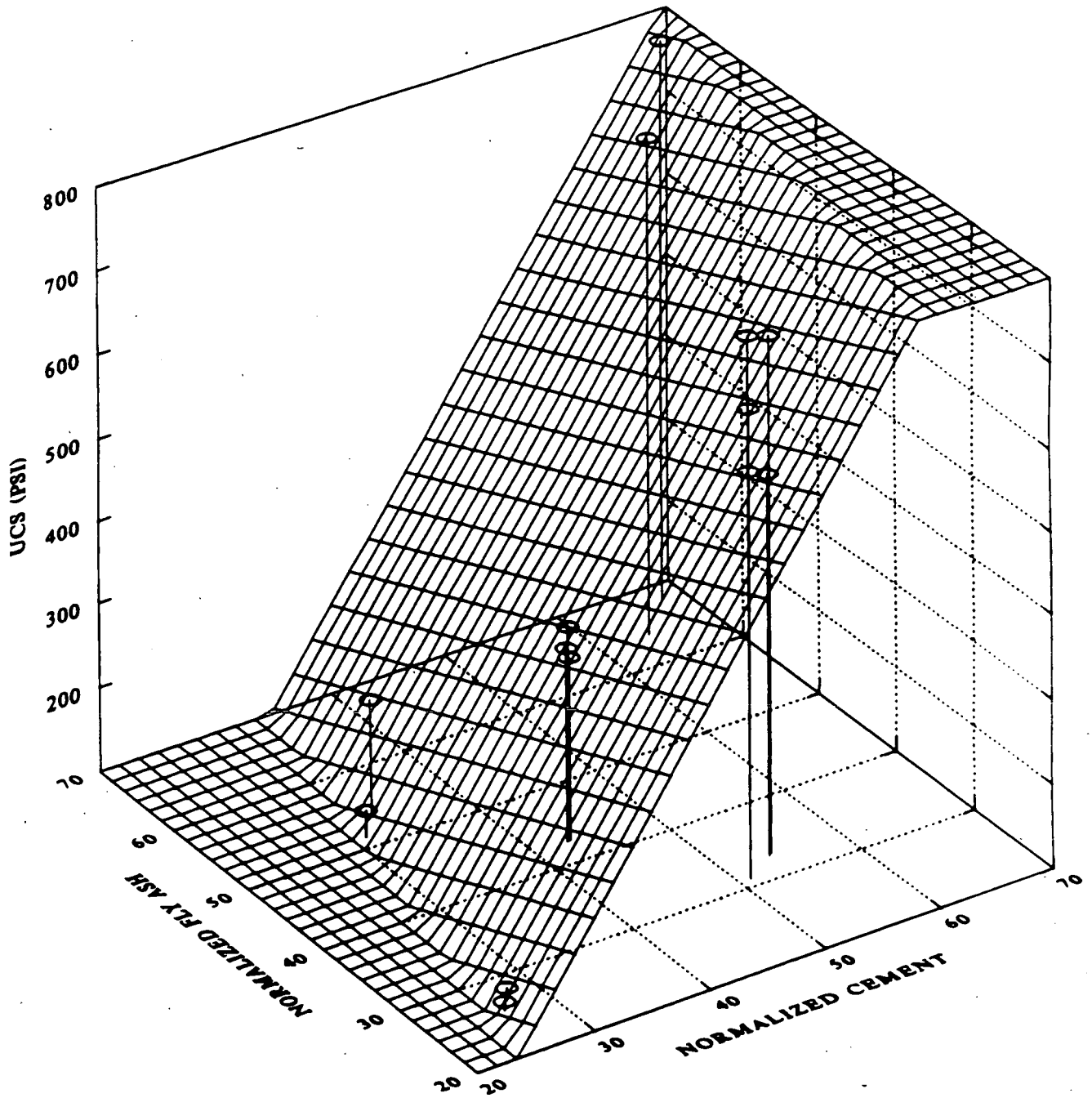
FIGURE I-7



SILO 2, STAGES II AND III, UCS

INV
3/20/93

FIGURE I-8



SILO 3. STAGES II AND III. UCS

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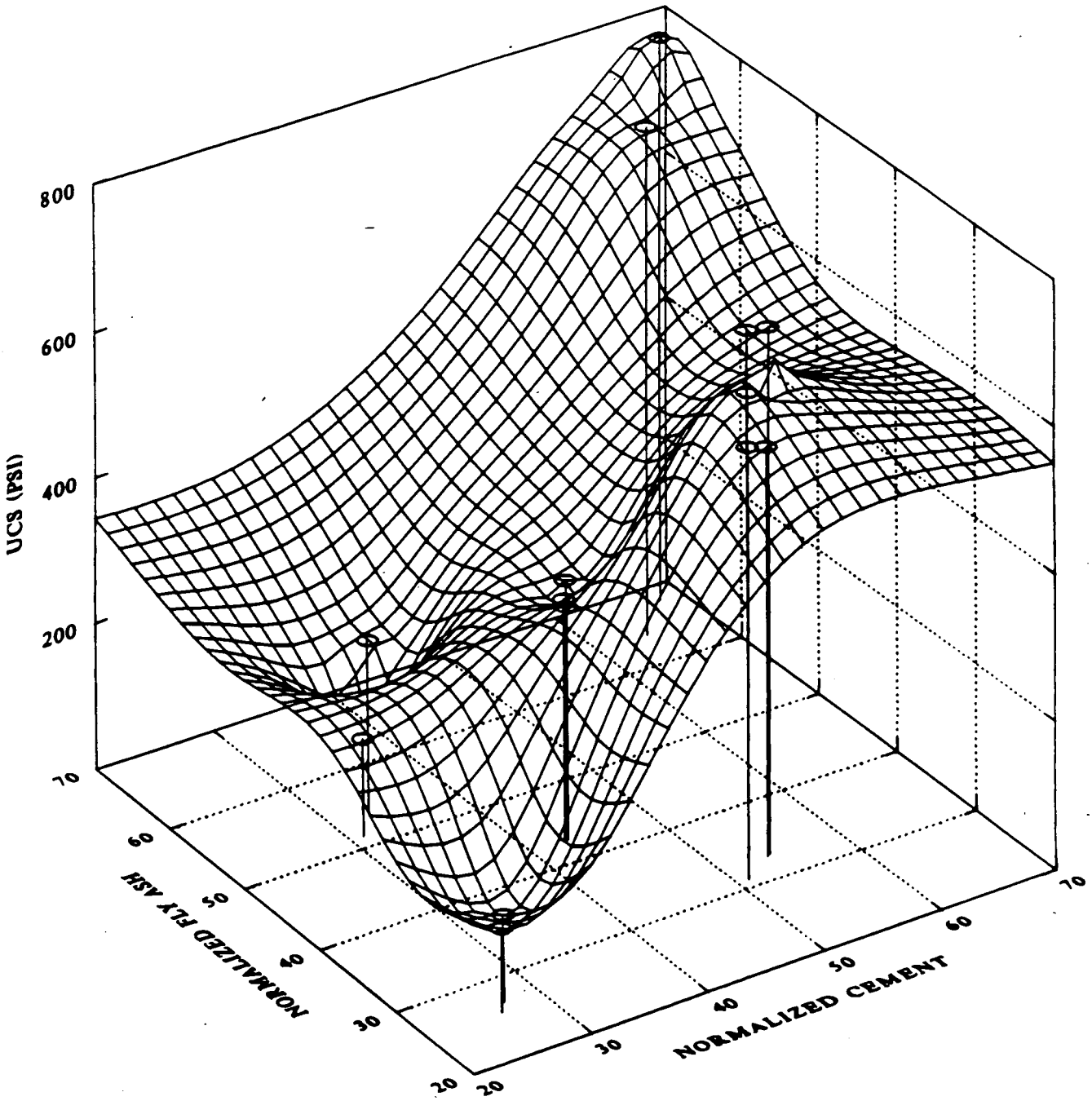
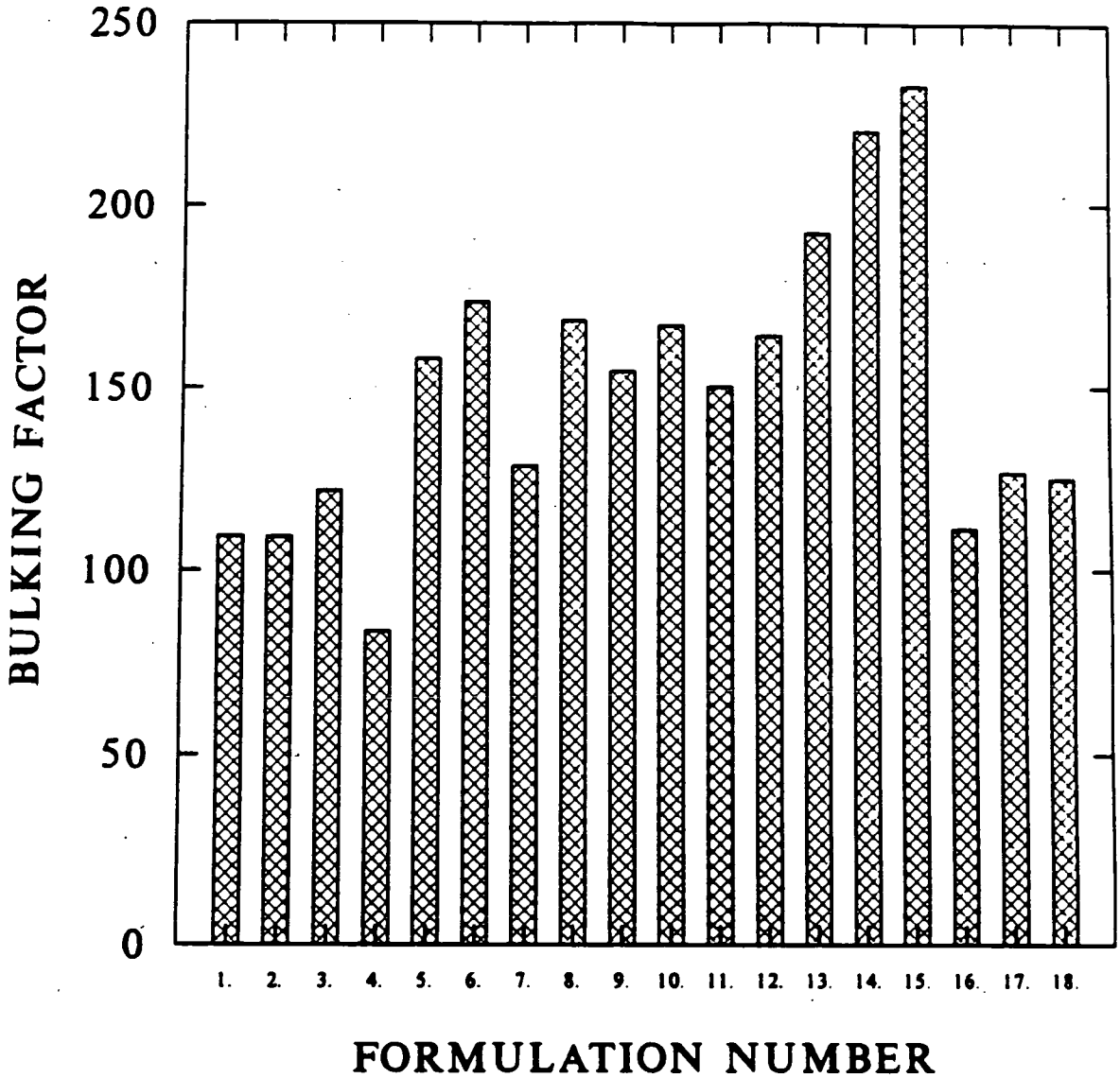
FIGURE I-9



SILO 3, STAGES II AND III, UCS

INV
3/30/93

FIGURE I-10



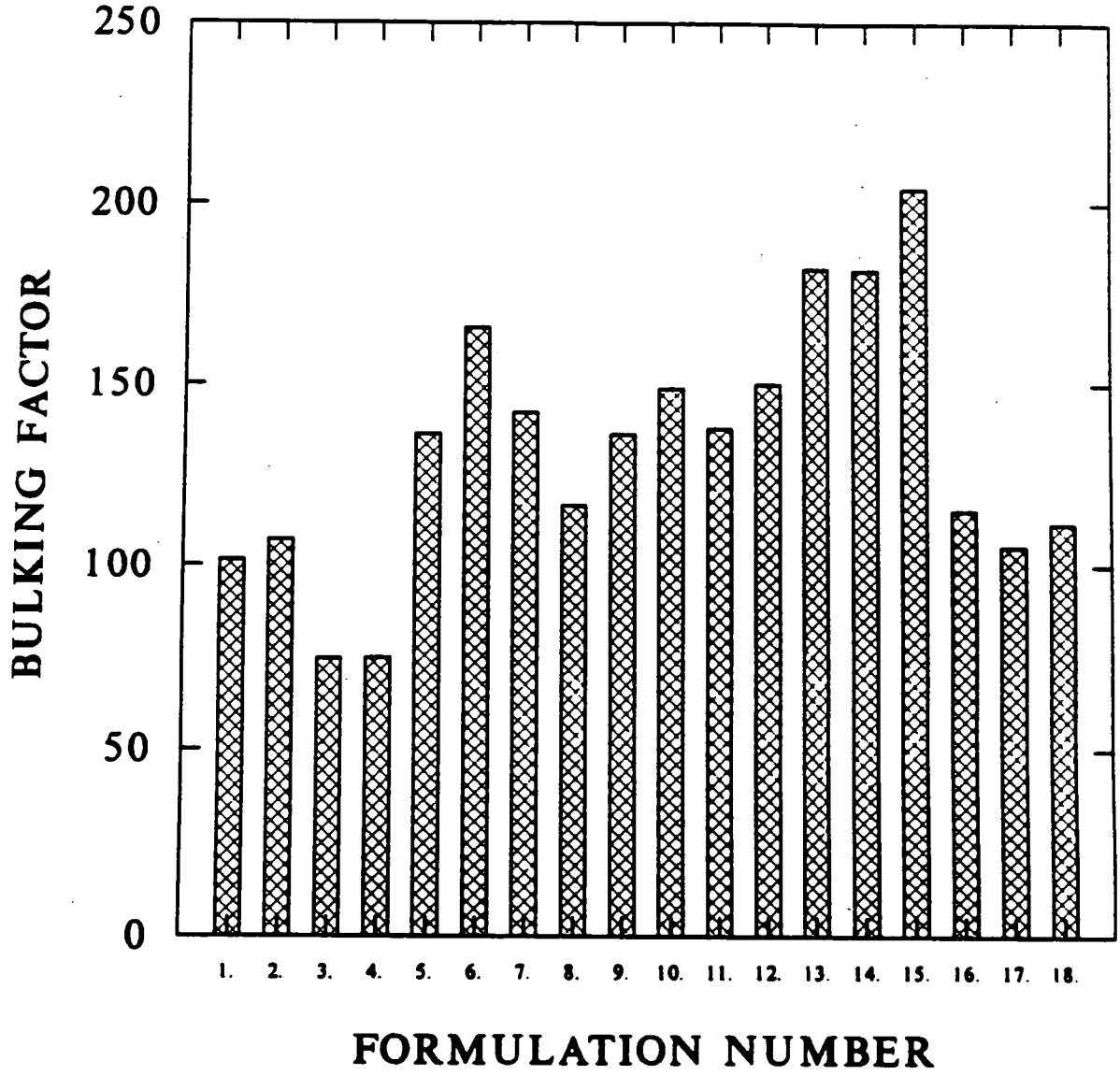
BAR GRAPH

BULKING FACTOR VS. FORMULATION NO.

SILO 1, STAGES II & III

3/29/92

FIGURE I-11



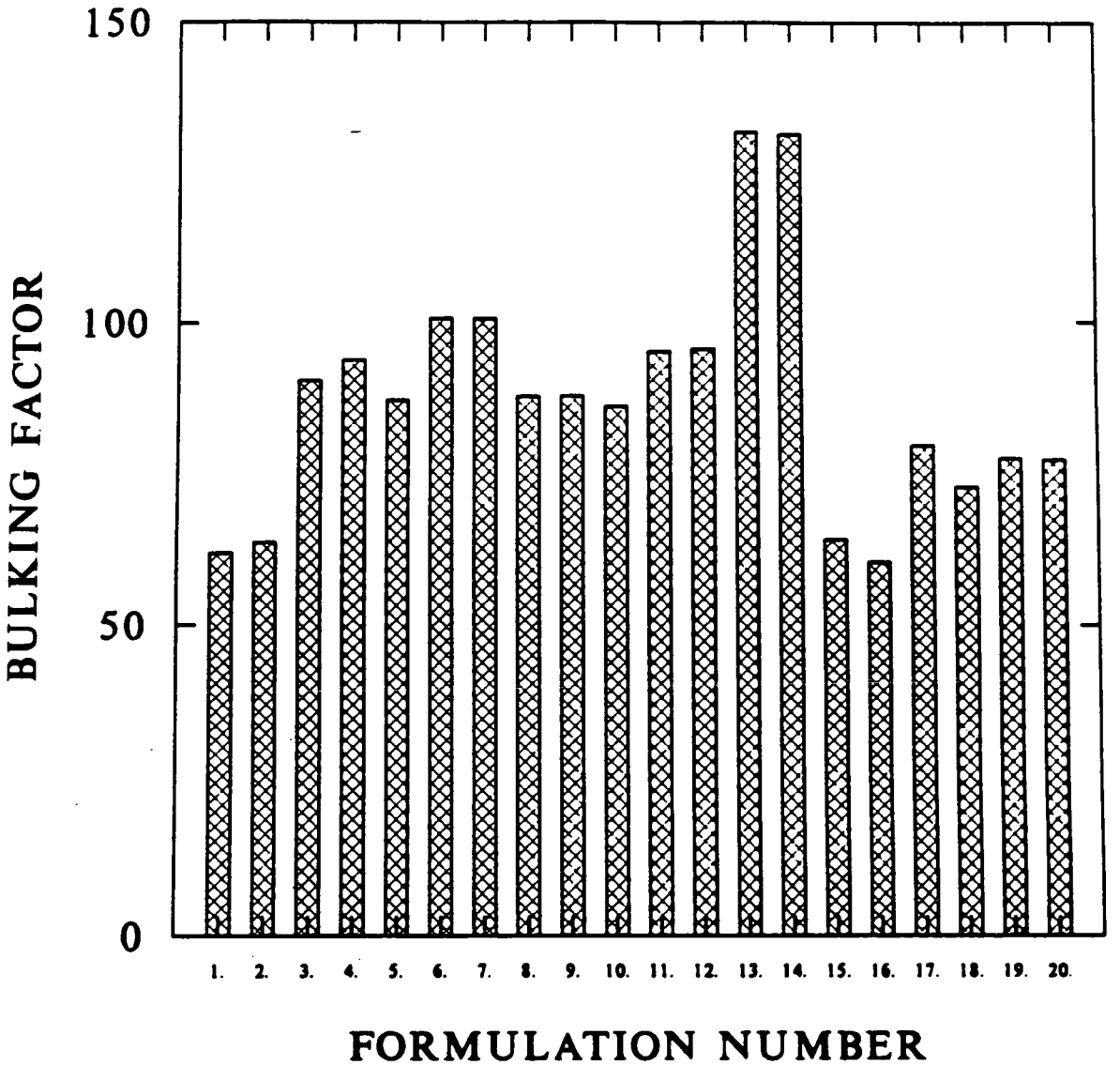
BAR GRAPH

BULKING FACTOR VS. FORMULATION NO.

SILO 2. STAGES II & III

3/29/92

FIGURE I-12



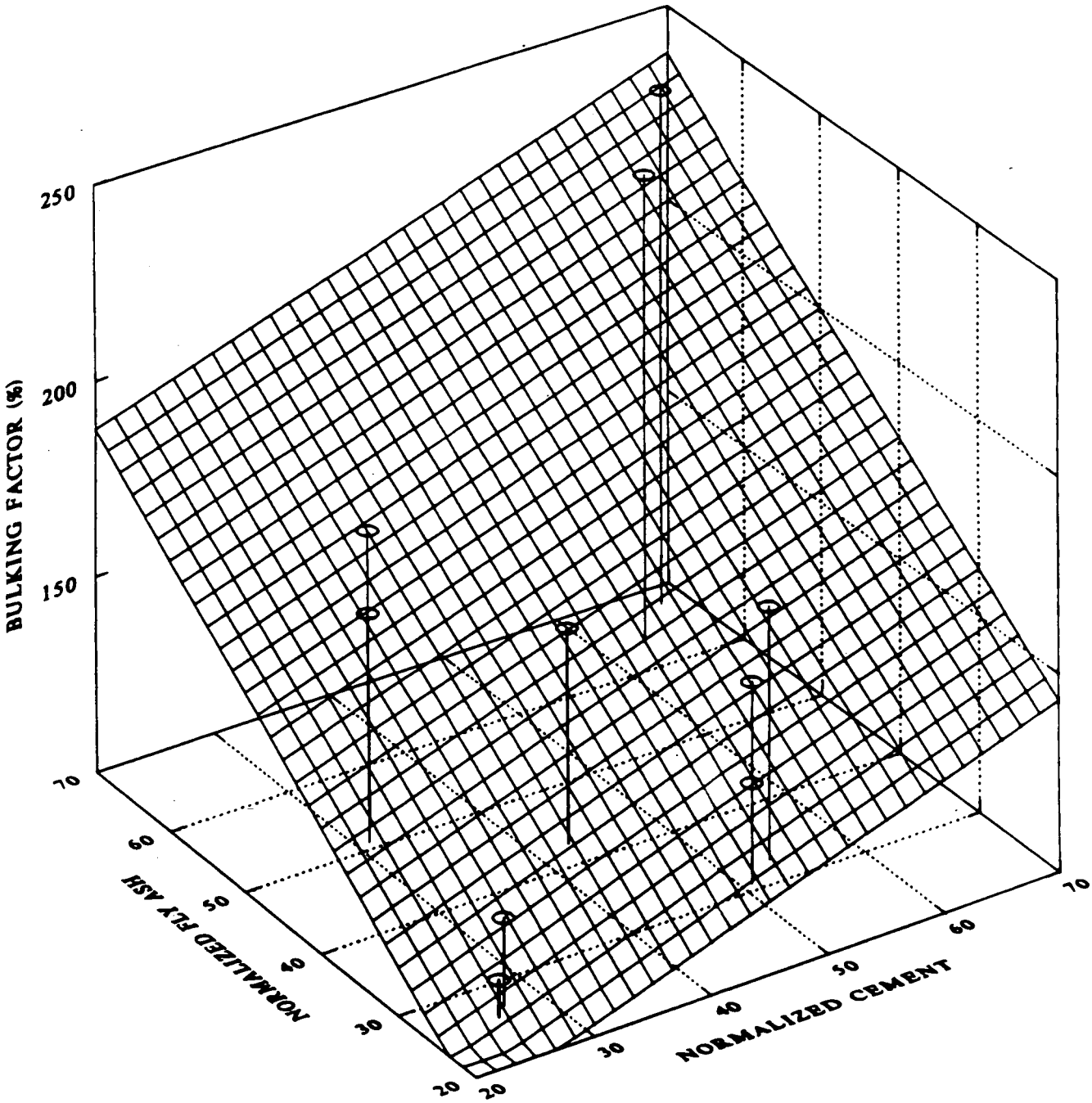
BAR GRAPH

BULKING FACTOR VS. FORMULATION NO.

SILO 3, STAGES II & III

3/29/92

FIGURE I-13



SILO 1. STAGES II AND III. BF

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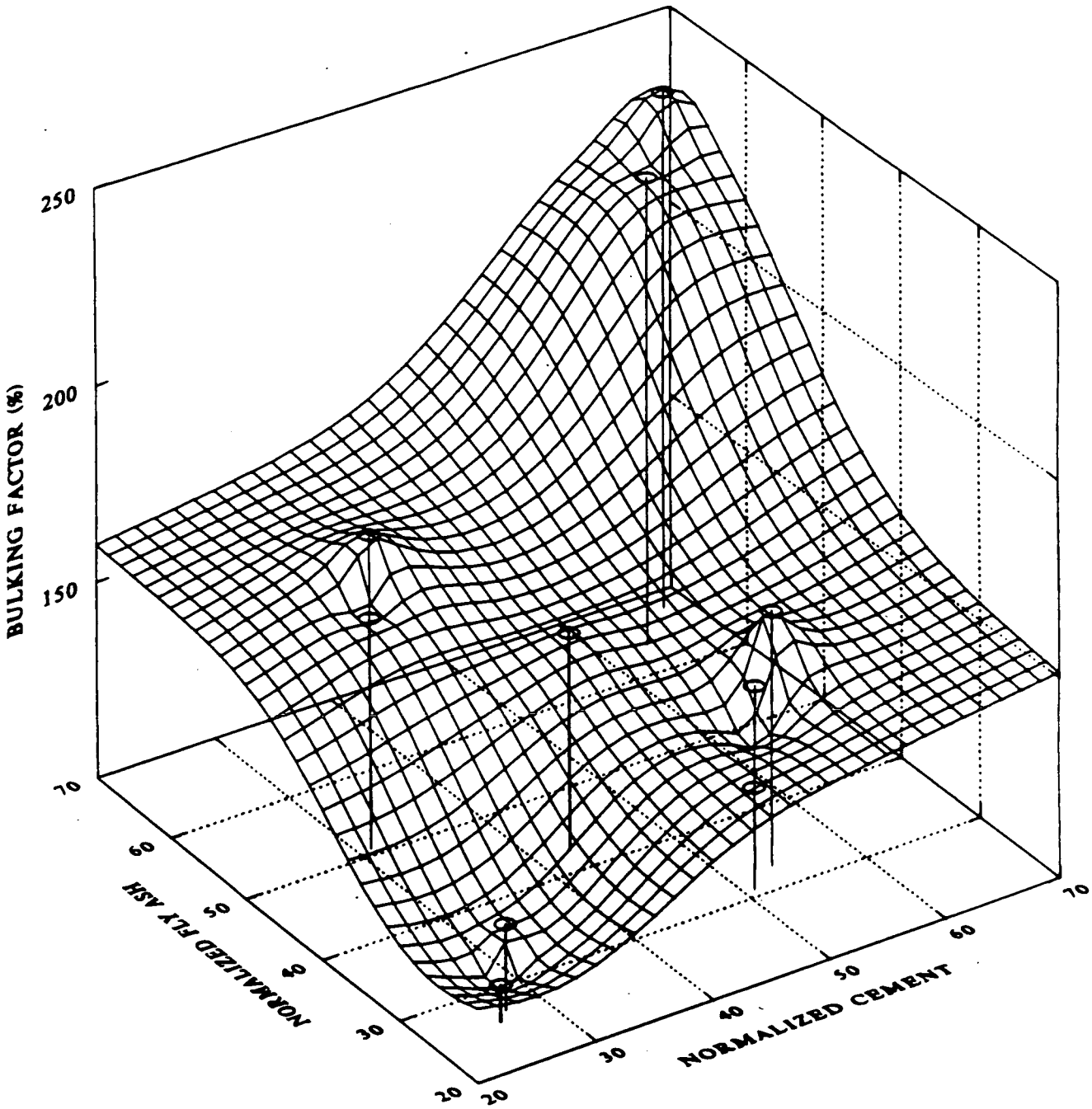
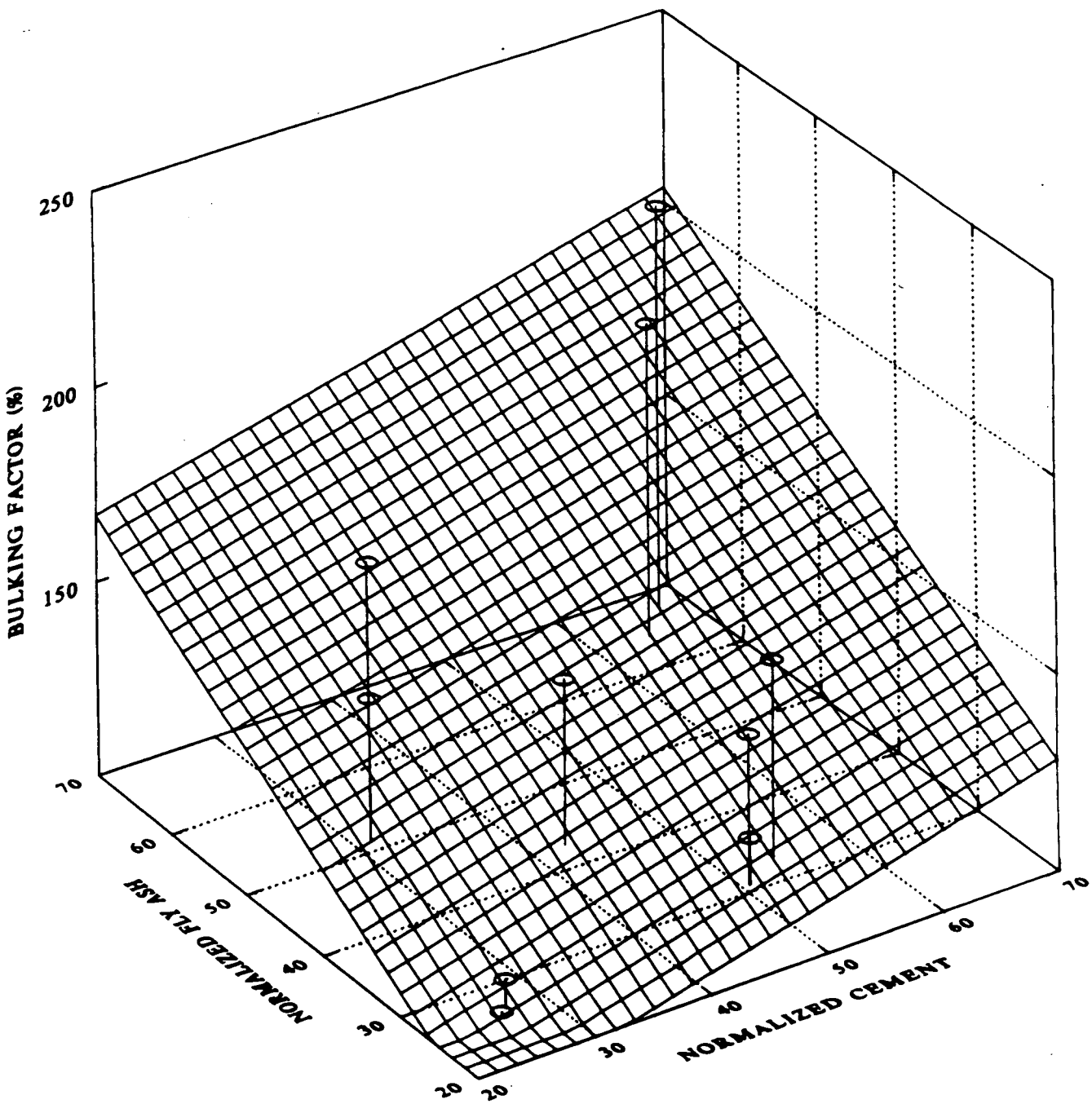
FIGURE I-14



SILO 1. STAGES II AND III. BF

INV
3/20/93

FIGURE I-15



SILO 2. STAGES II AND III. BF

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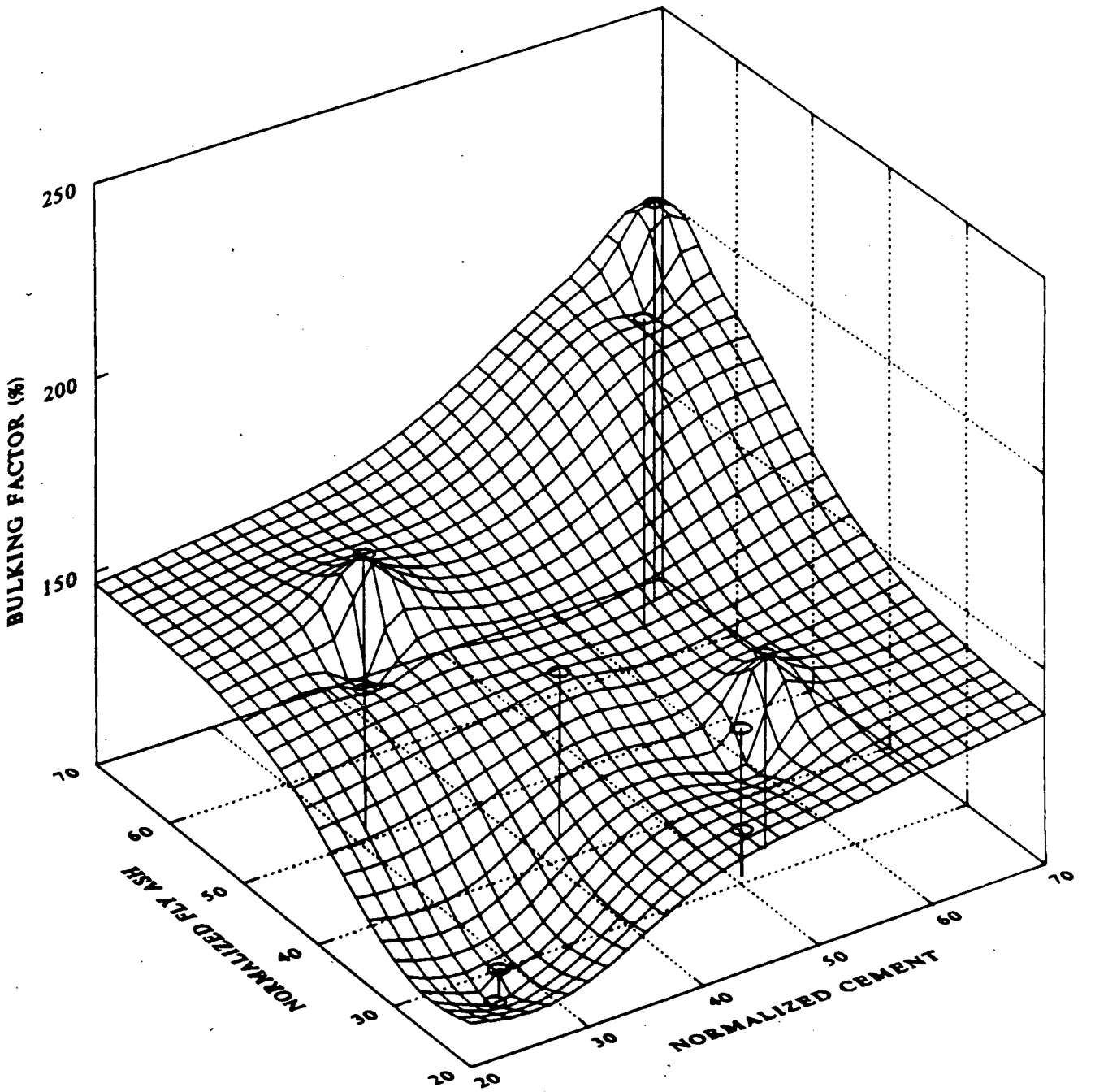
3/20/93

FIGURE I-16



SILO 2, STAGES II AND III, BF

INV
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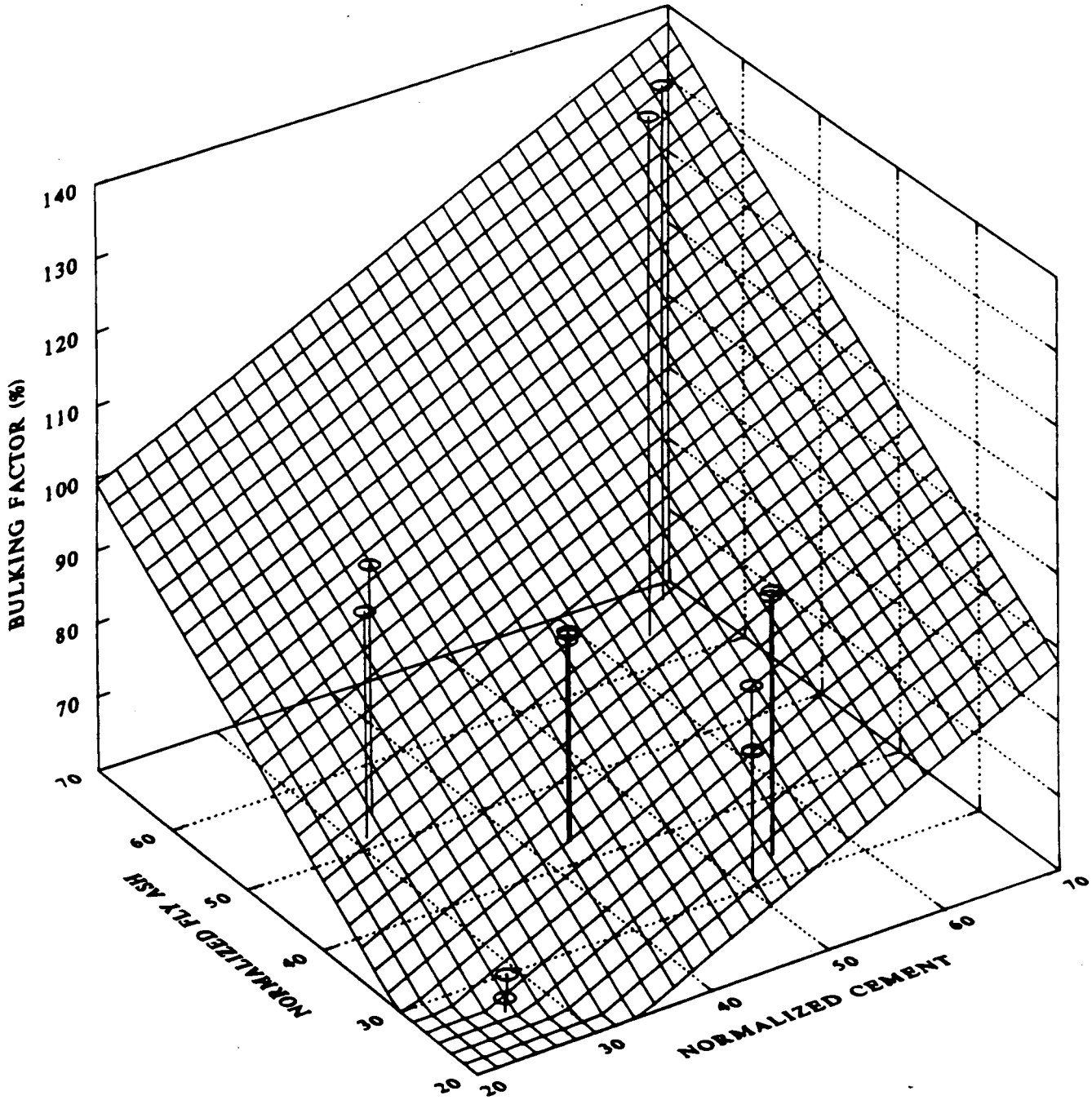
FIGURE I-17



SILO 3, STAGES II AND III, BF

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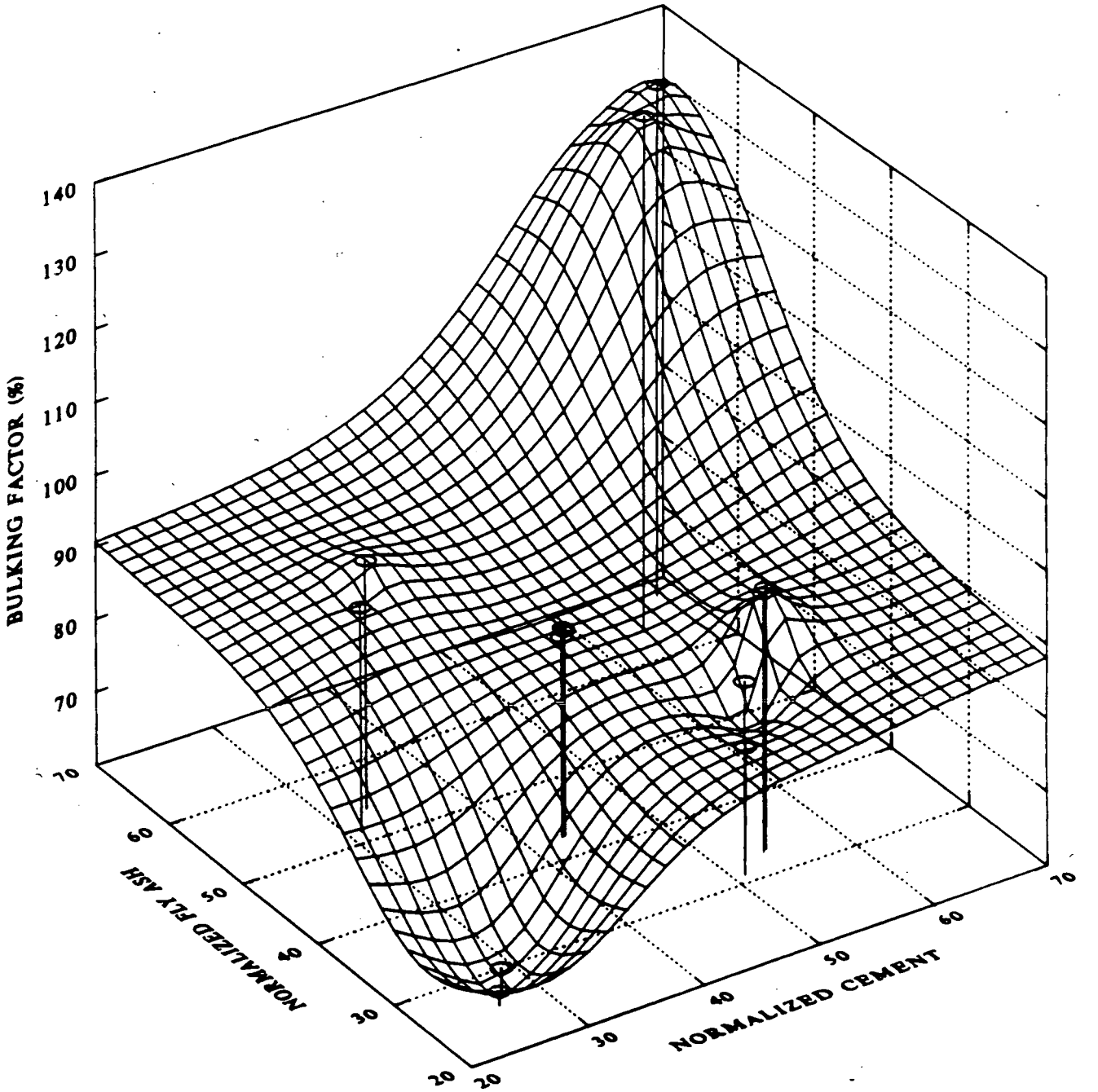
3/20/93

FIGURE I-18



SILO 3. STAGES II AND III. BF

INV
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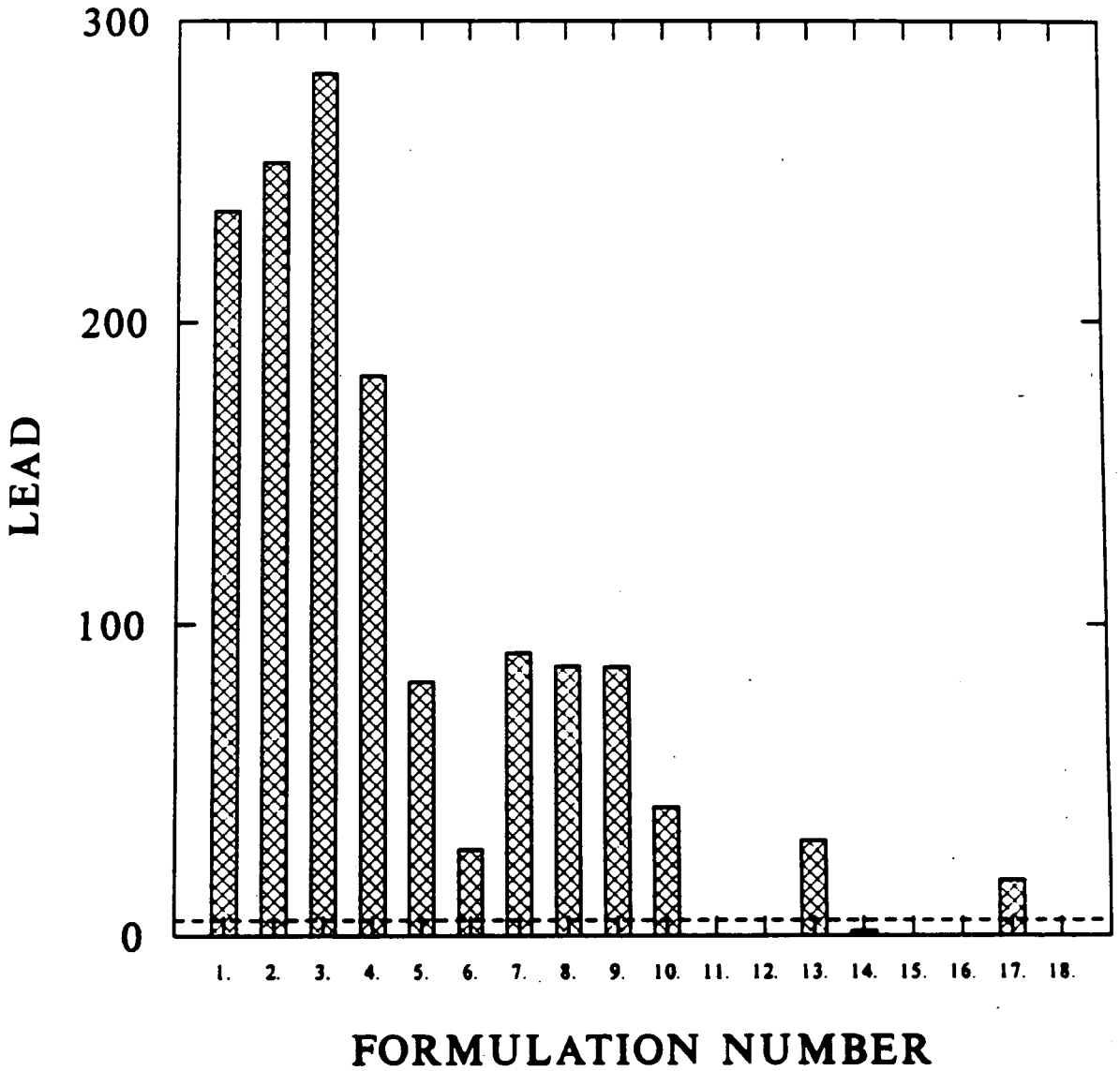
FIGURE I-19



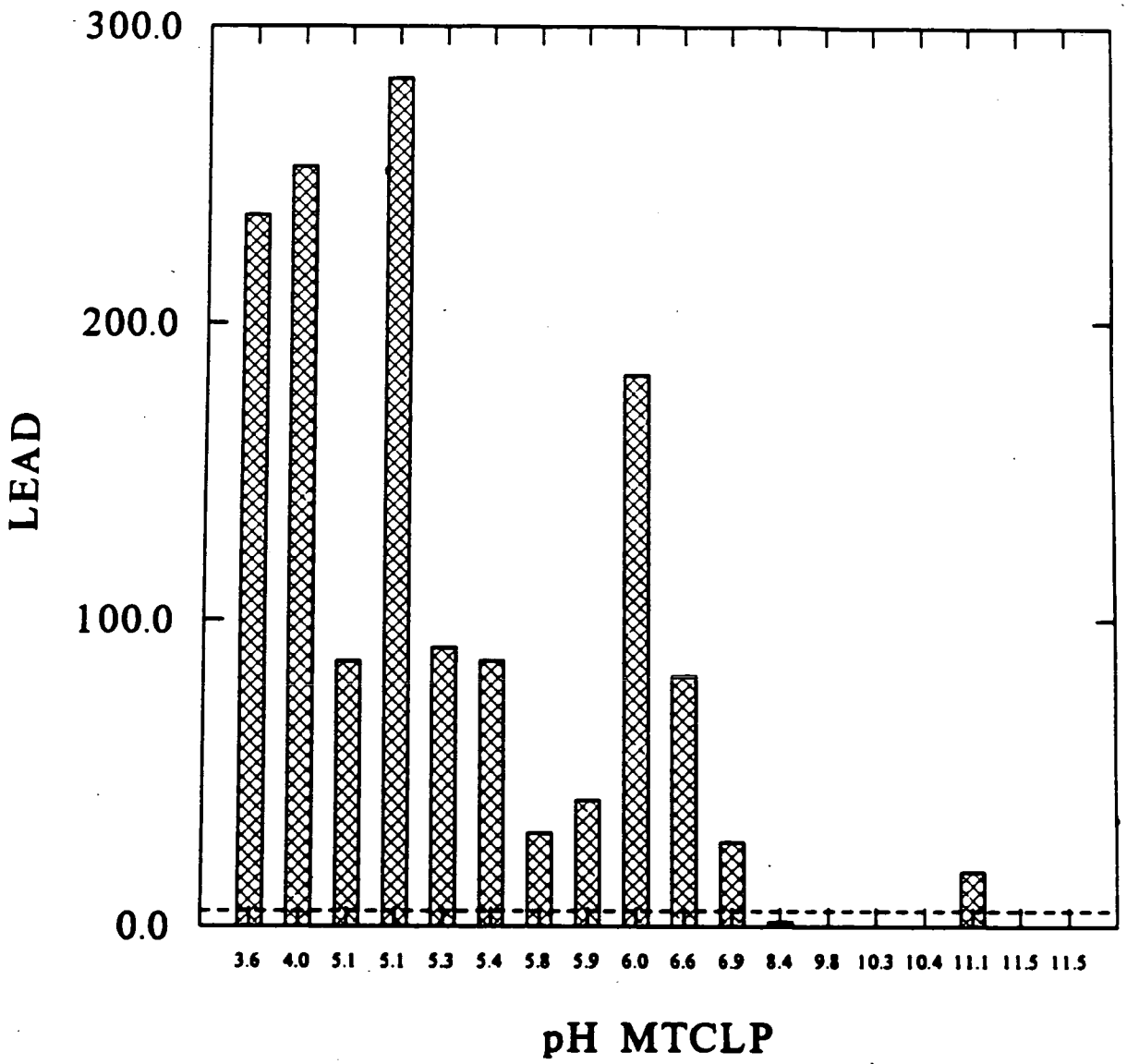
BAR GRAPH

LEAD VS. FORMULATION NO.

SILO 1, STAGES II & III

3/29/92

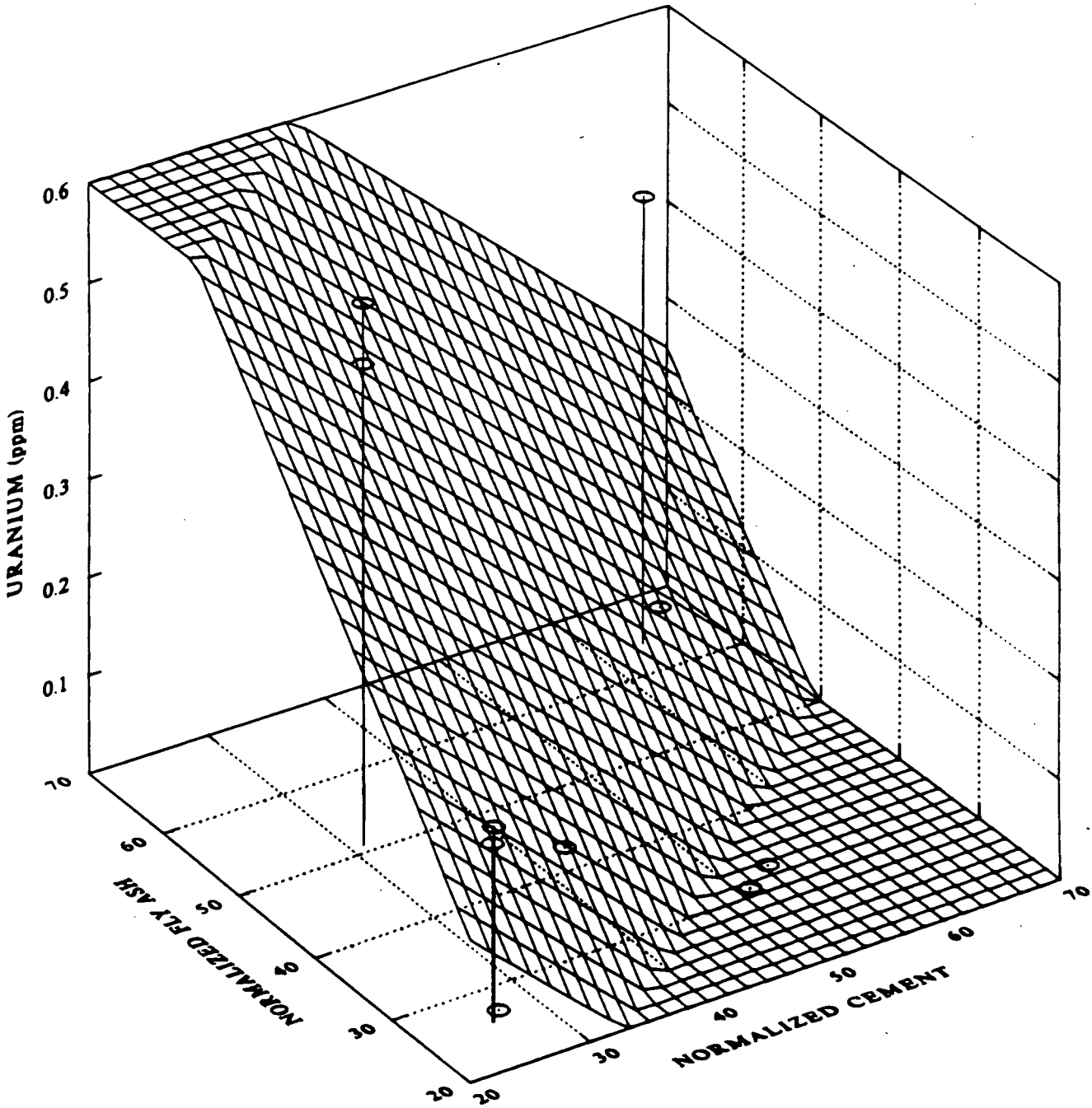
FIGURE I-20



BAR GRAPH
LEAD VS. pH MTCLP
SILO 1, STAGES II & III

3/29/92

FIGURE I-21



SILO 1, STAGES II AND III, URANIUM

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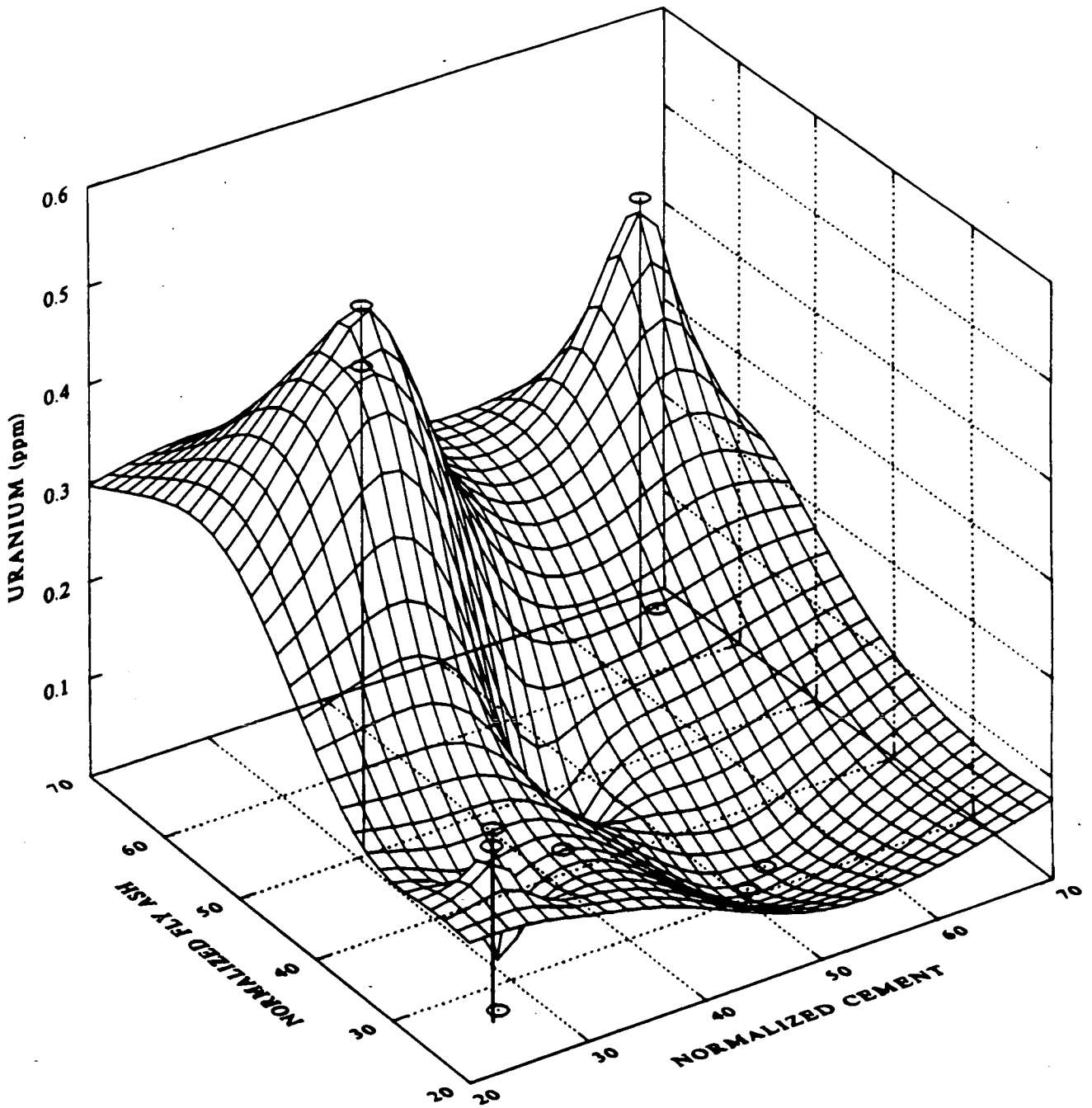
3/30/93

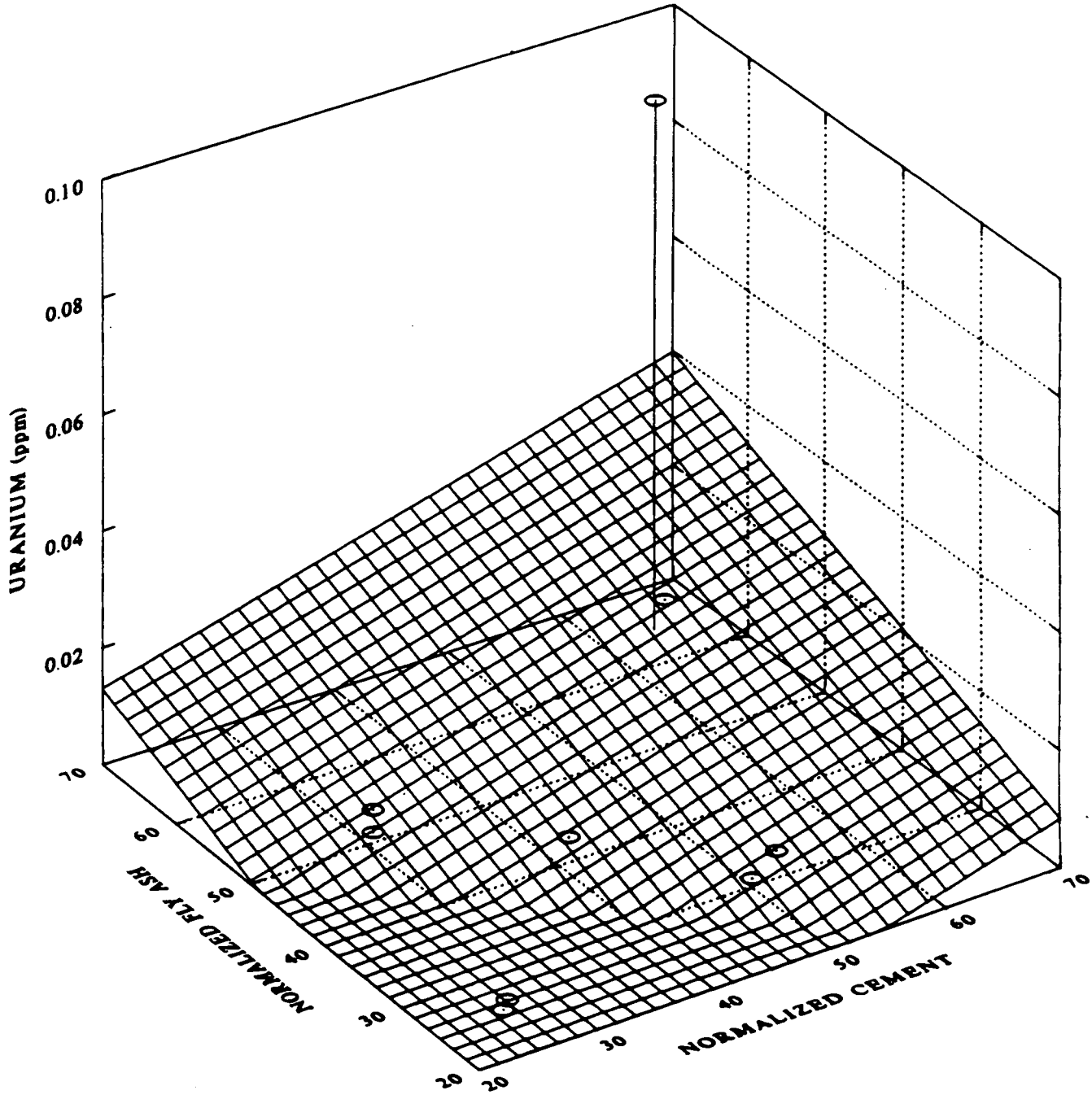
FIGURE I-22



SILO 1, STAGES II AND III, URANIUM

INV
3/30/93

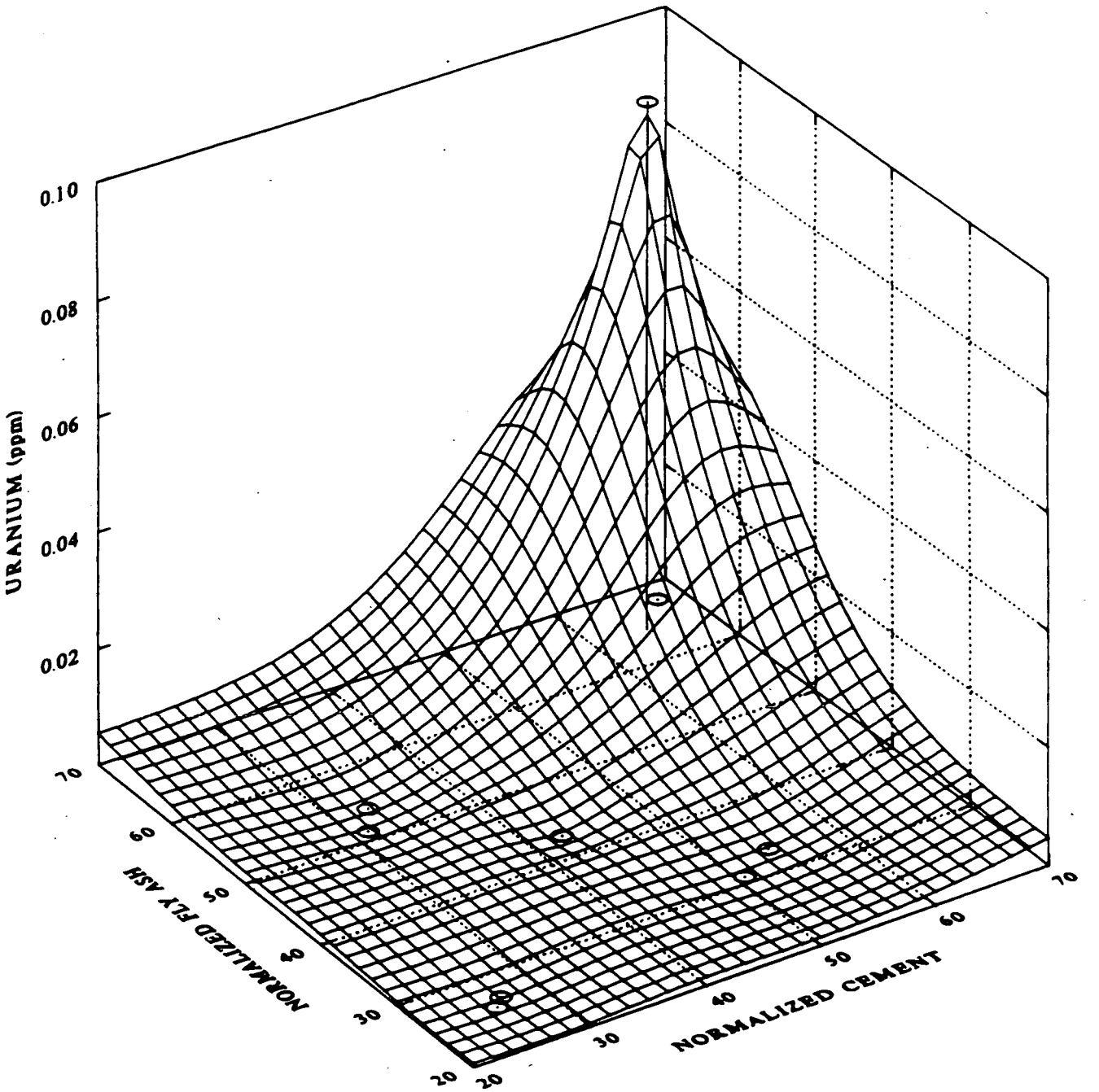
FIGURE I-23



SILO 2, STAGES II AND III, URANIUM

LIN
3/30/93

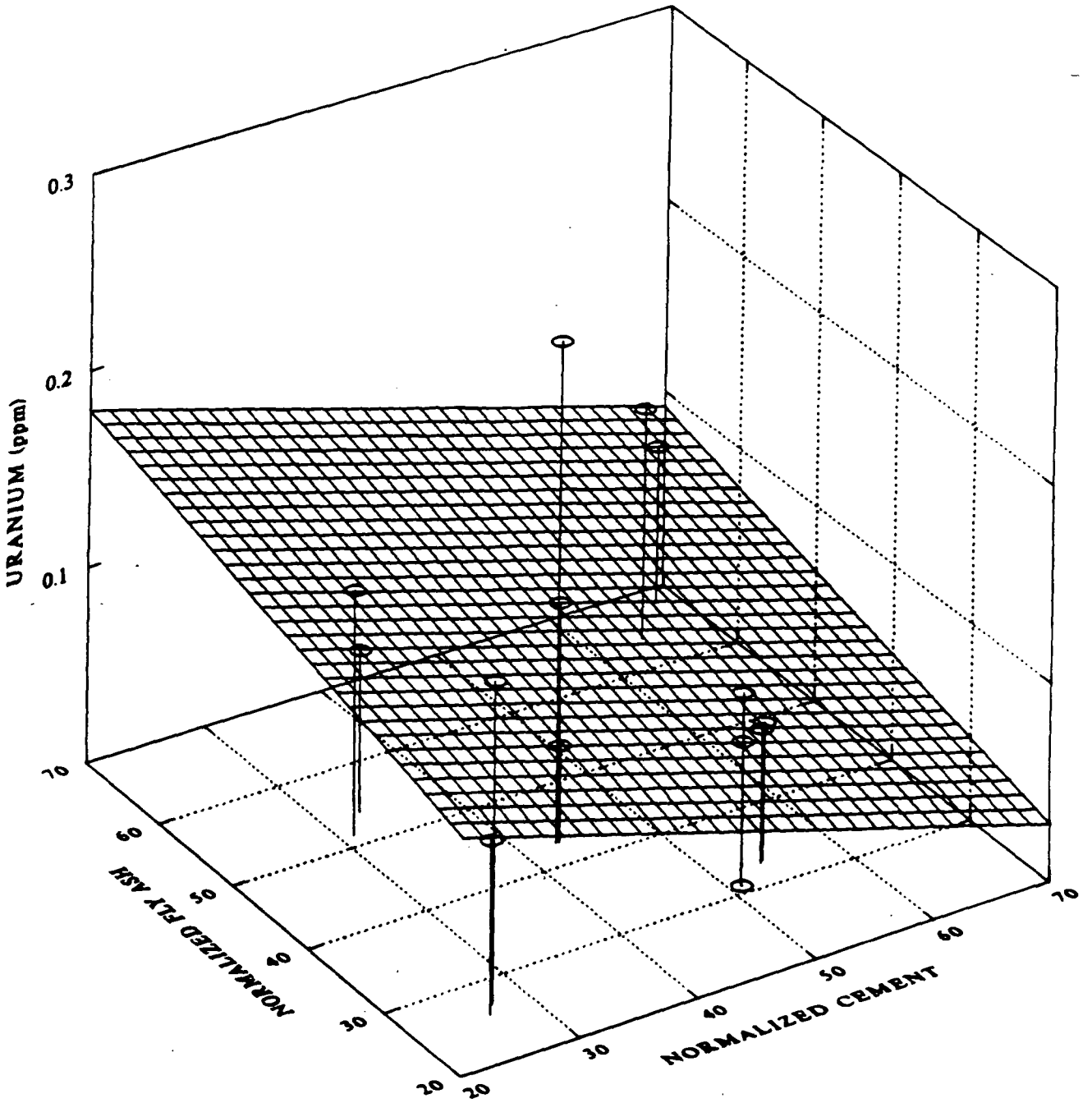
FIGURE I-24



SILO 2, STAGES II AND III, URANIUM

INV
3/30/93

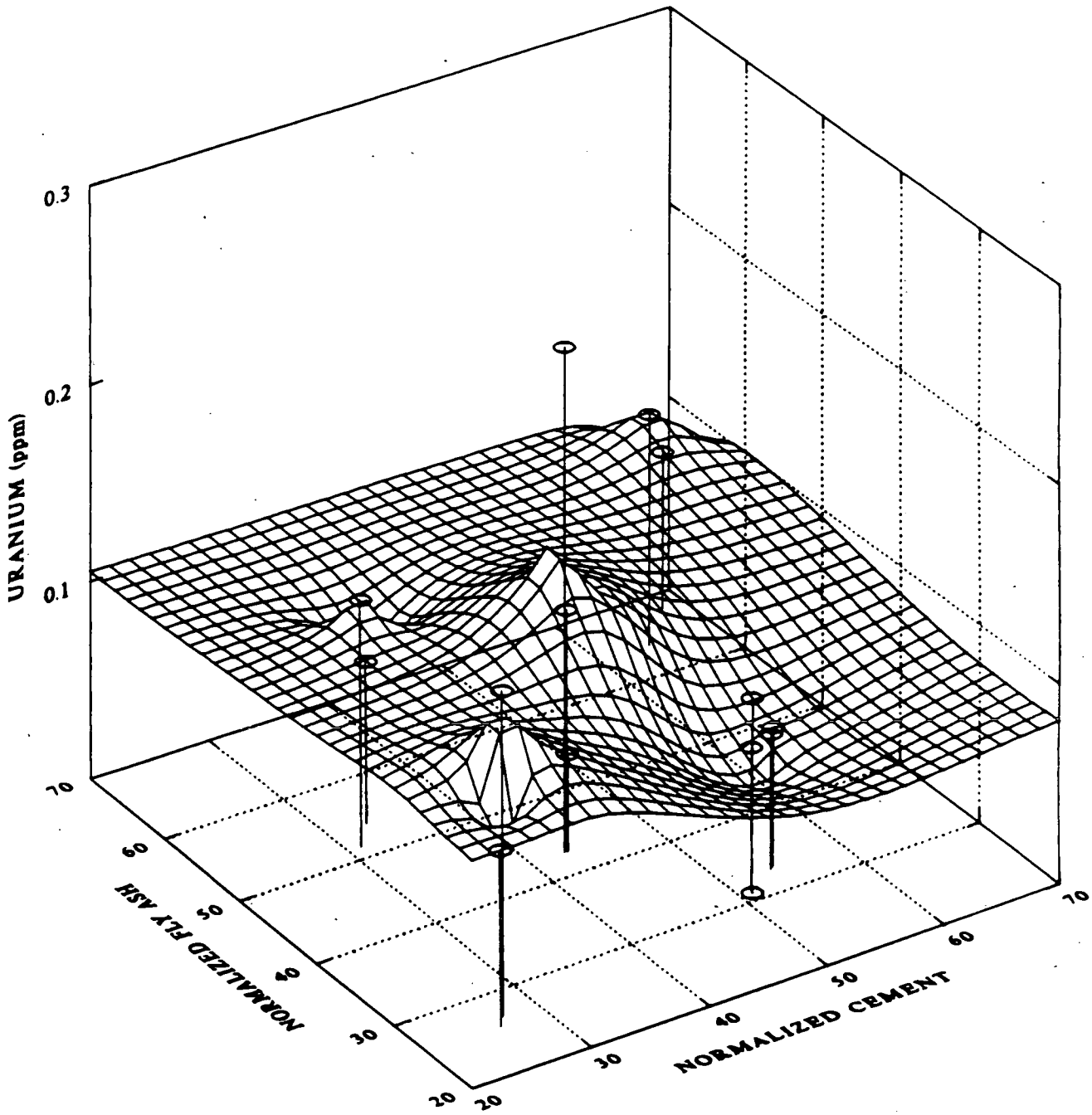
FIGURE I-25



SILO 3, STAGES II AND III, URANIUM

LIN
3/30/93

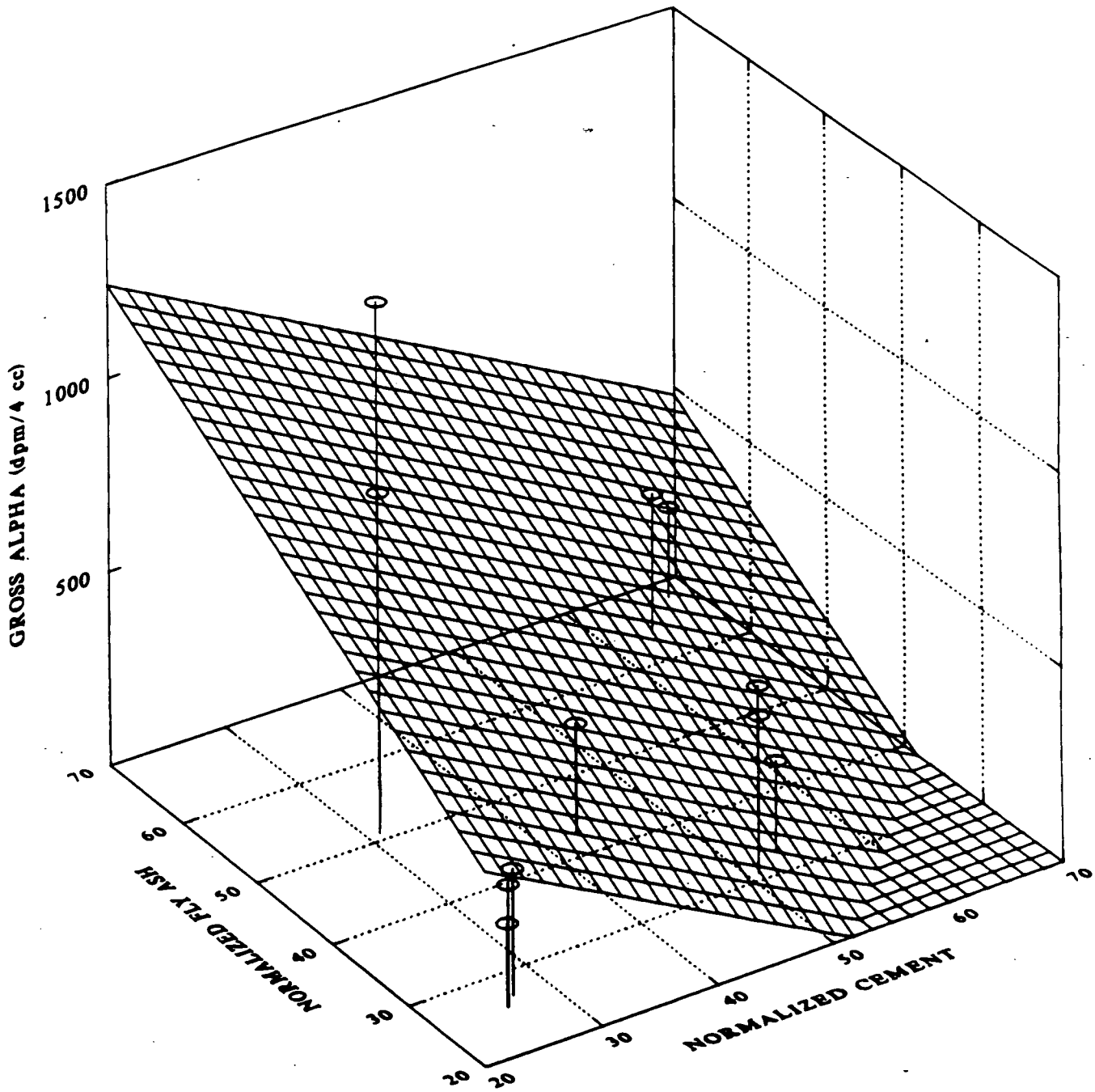
FIGURE I-26



SILO 3, STAGES II AND III, URANIUM

INV
3/30/93

FIGURE I-27



SILO 1, STAGES II AND III, G. ALPHA

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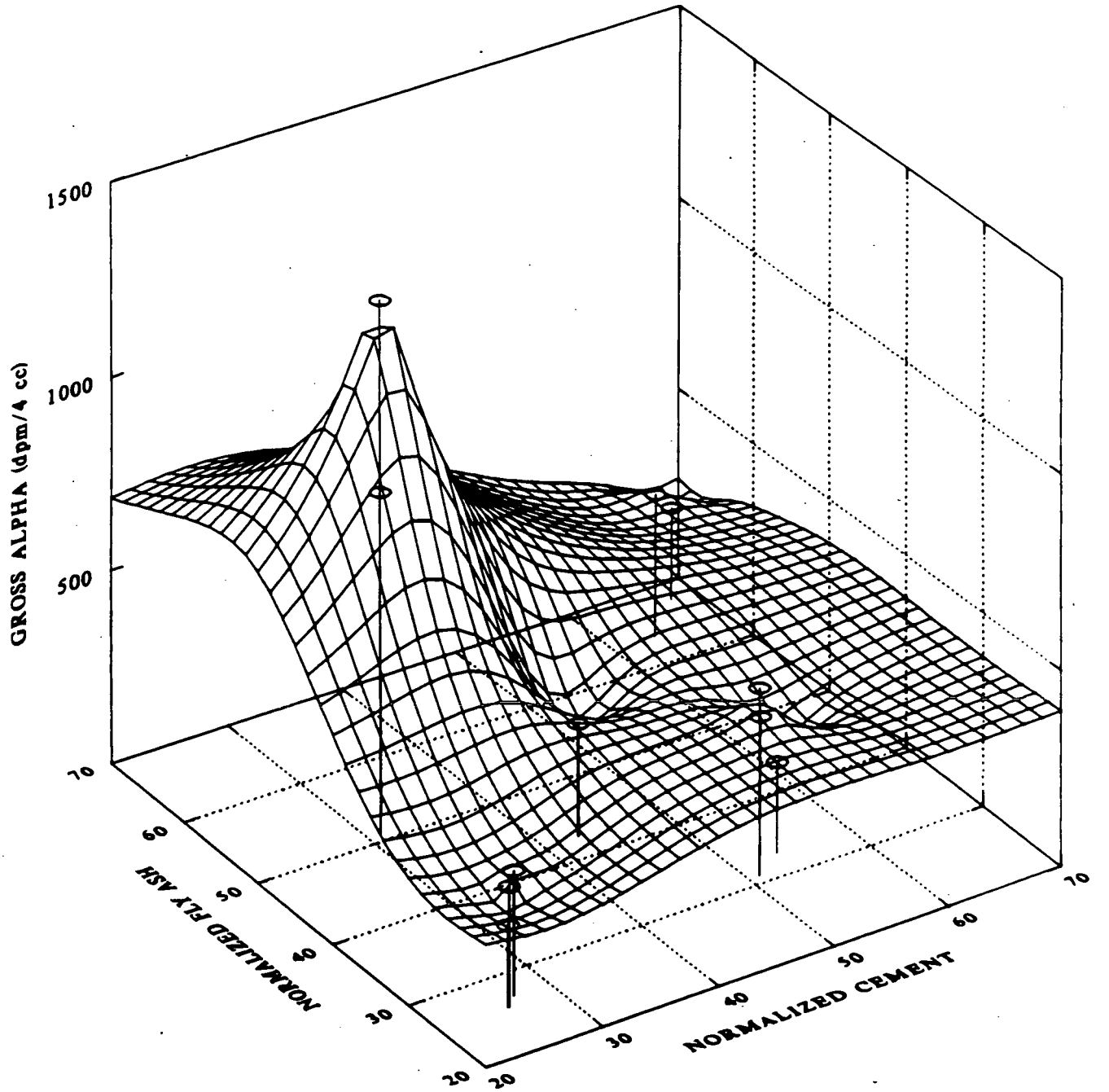
3/20/93

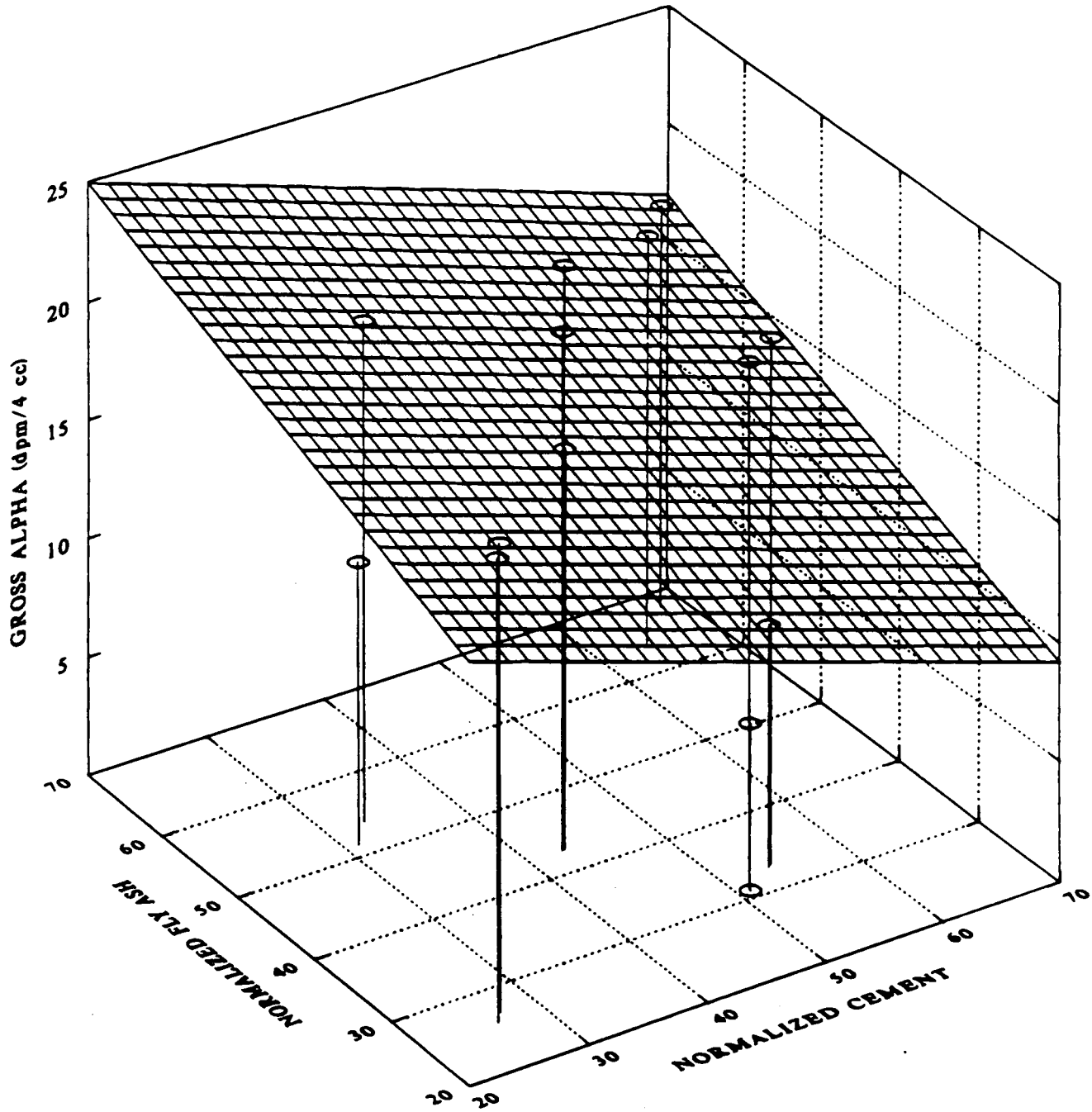
FIGURE I-28



SILO 1. STAGES II AND III. G. ALPHA

INV
3/20/93

FIGURE I-29



SILO 3, STAGES II AND III, G. ALPHA

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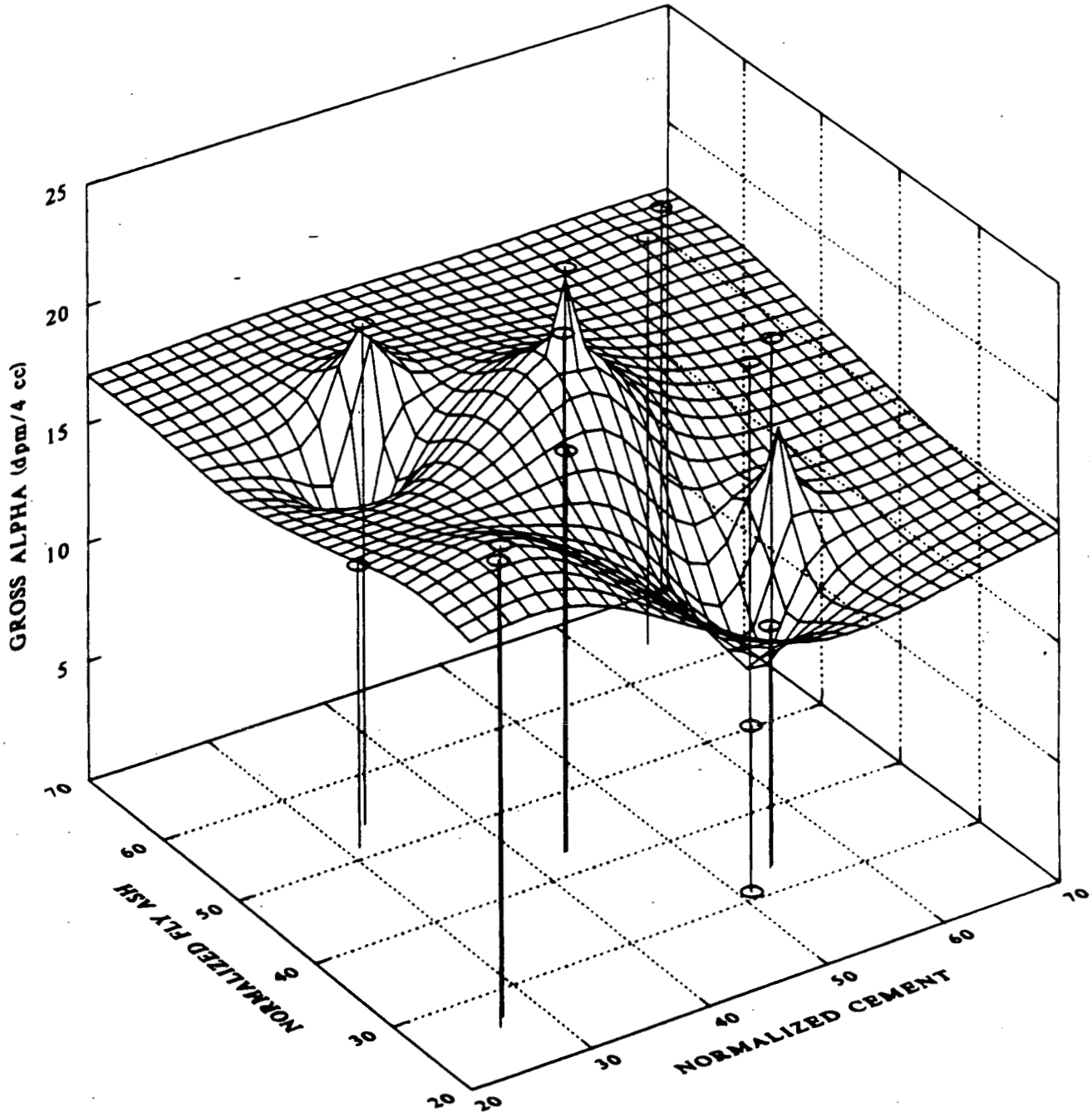
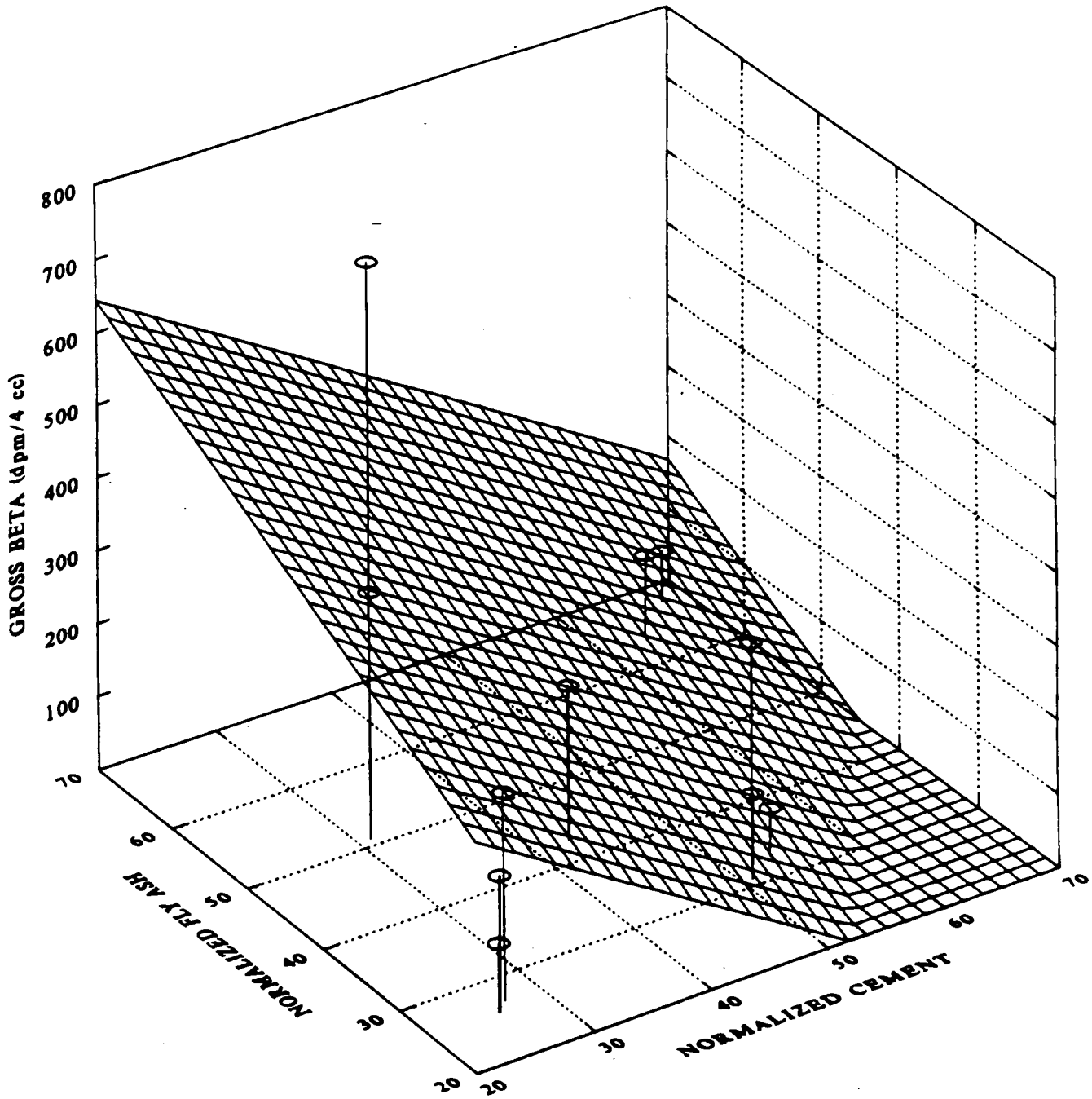
FIGURE I-30



SILO 3, STAGES II AND III, G. ALPHA

INV
3/30/93

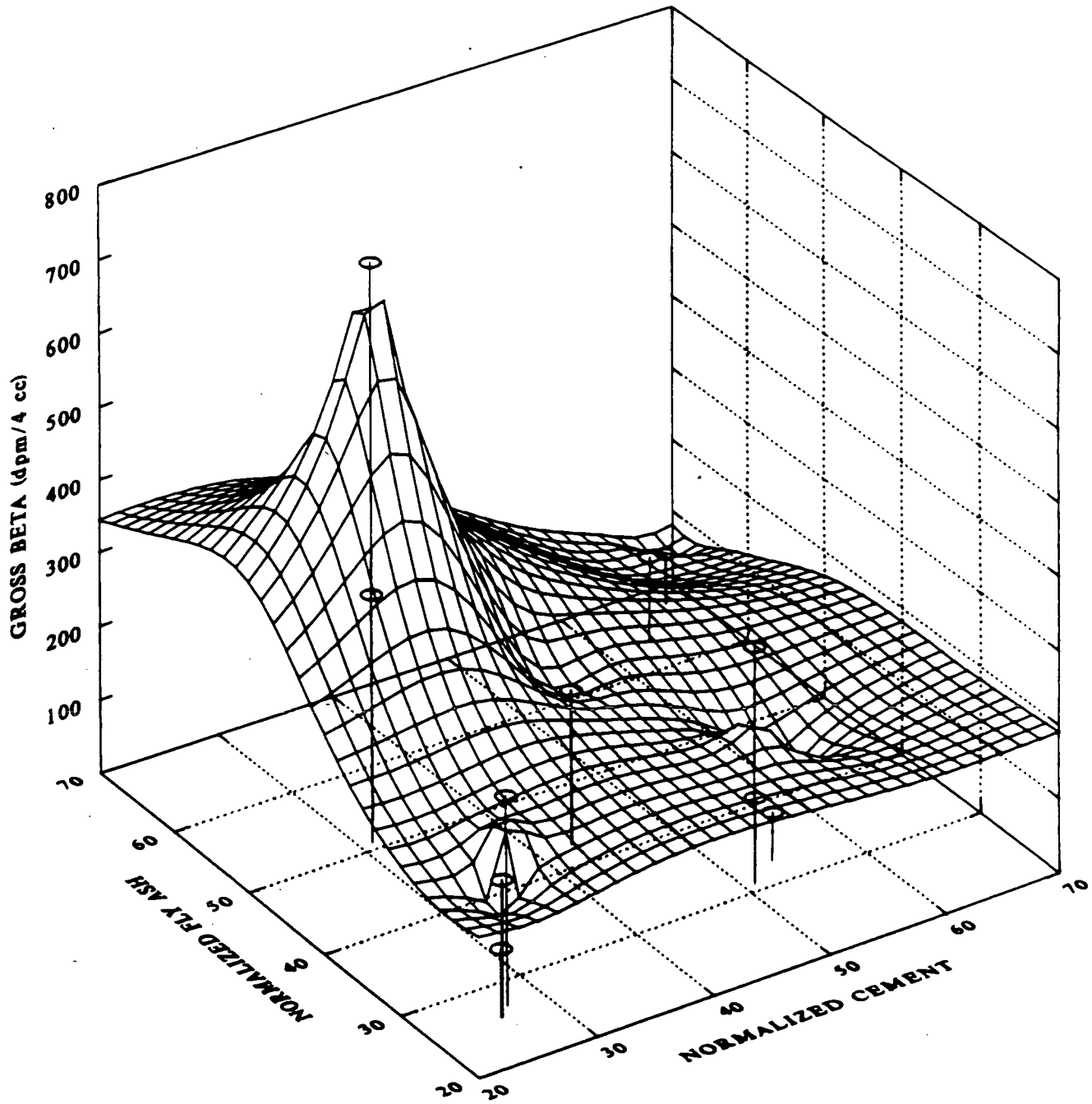
FIGURE I-31



SILO 1. STAGES II AND III. G. BETA

LIN
3/23/93

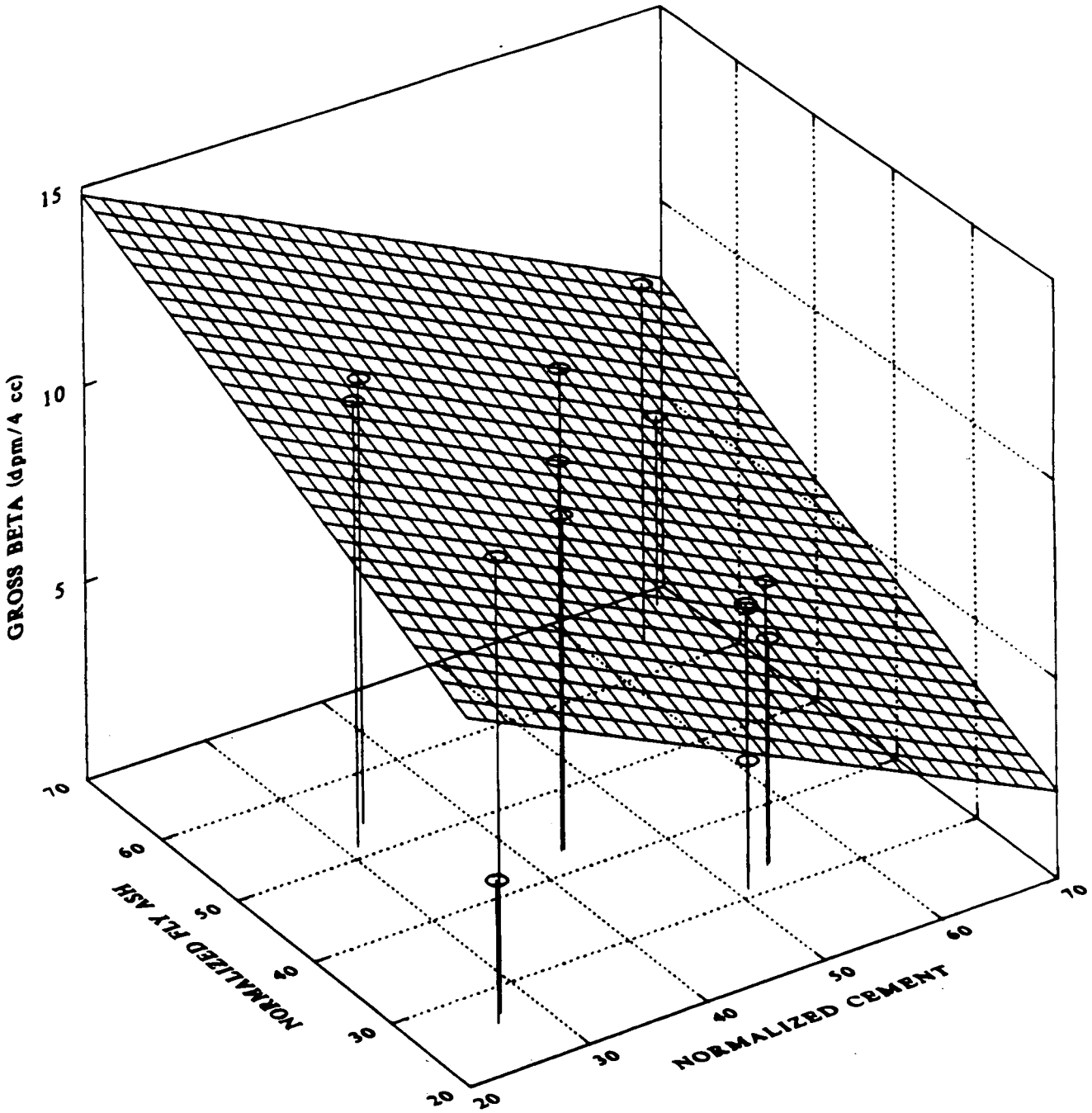
FIGURE I-32



SILO 1. STAGES II AND III. G. BETA

INV
3/23/93

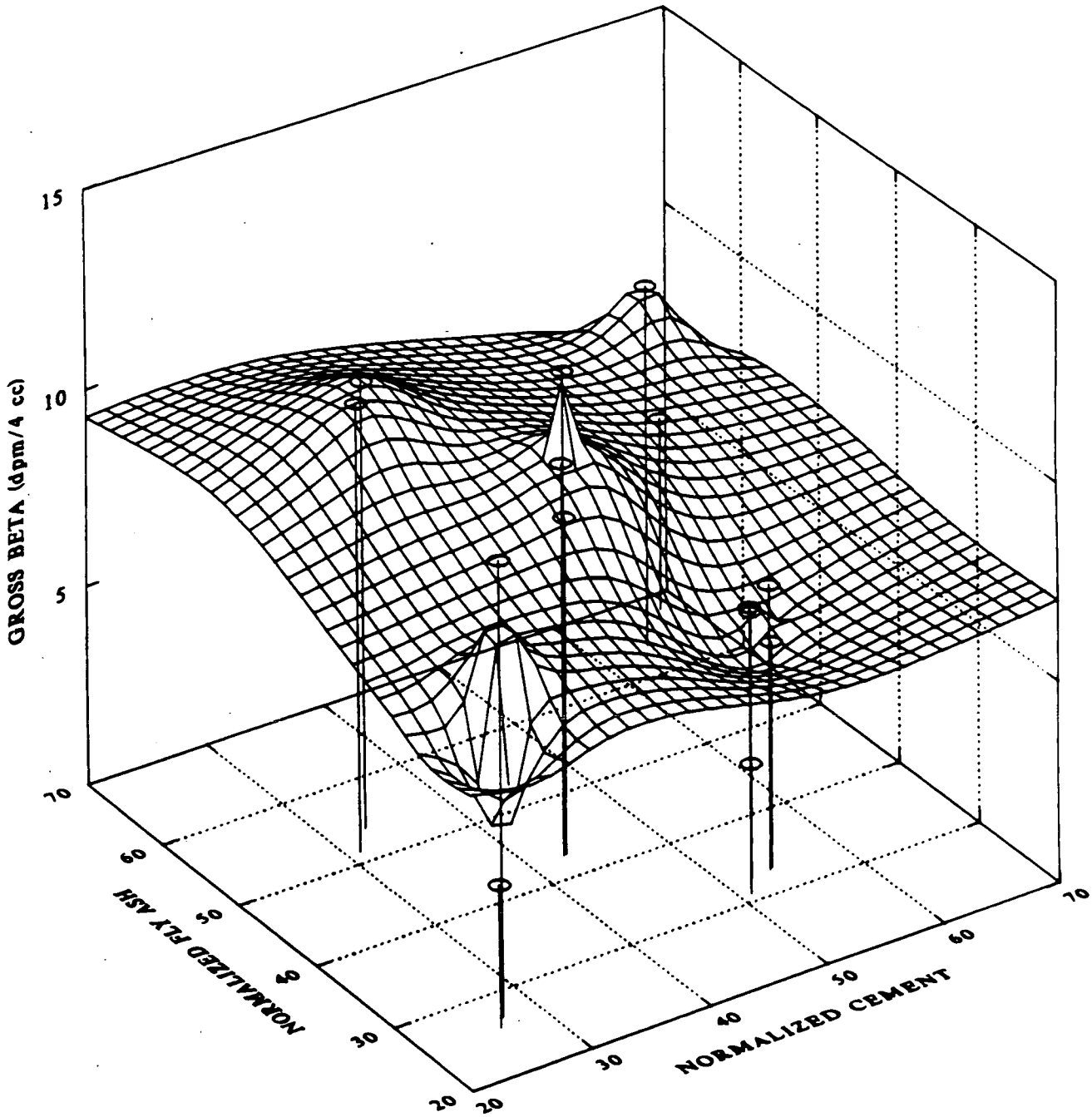
FIGURE I-33



SILO 3, STAGES II AND III, G. BETA

LIN
3/23/93

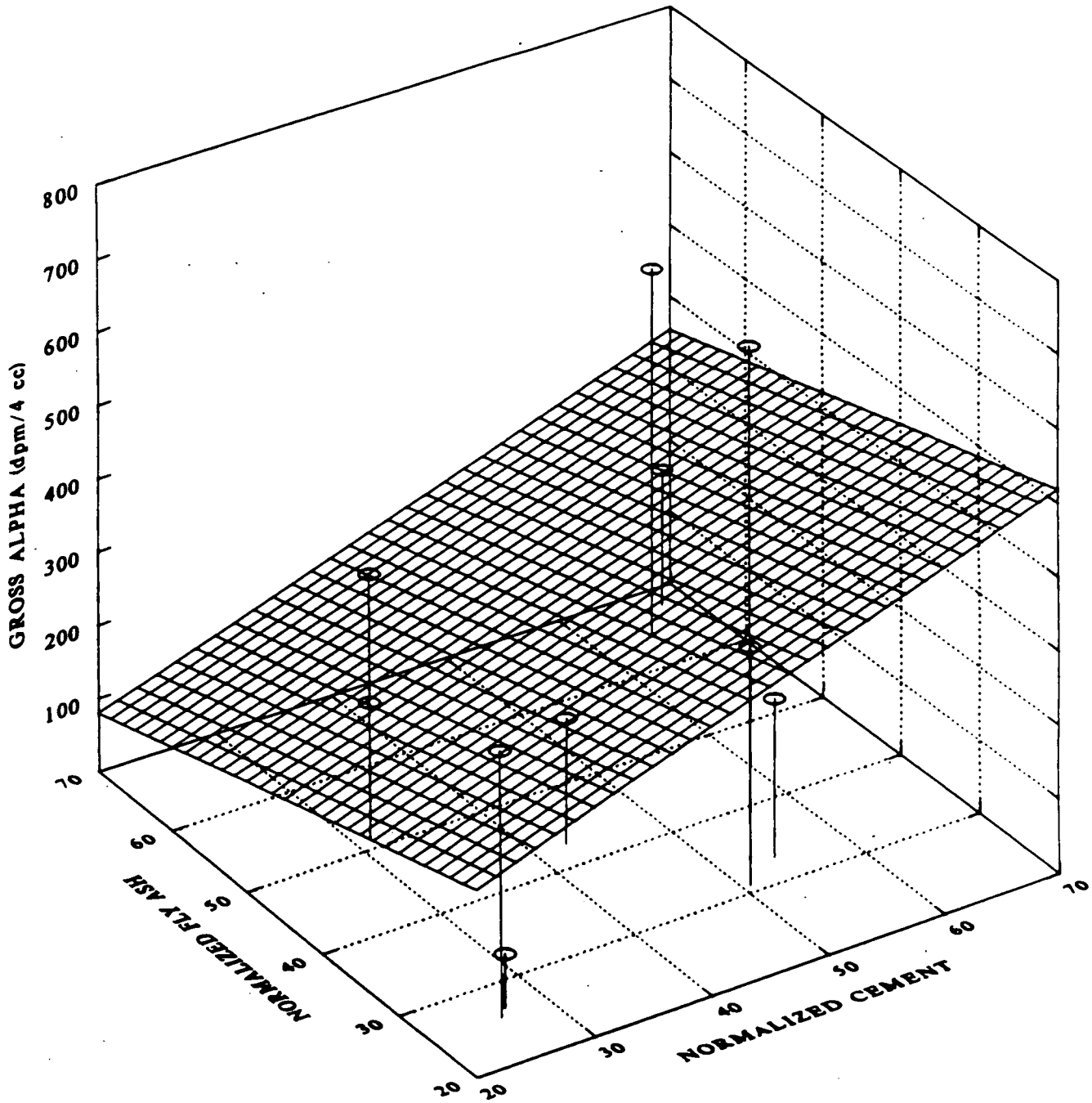
FIGURE I-34



SILO 3, STAGES II AND III, G. BETA

INV
3/20/93

FIGURE I-35



SILO 2, STAGES II AND III, G. ALPHA

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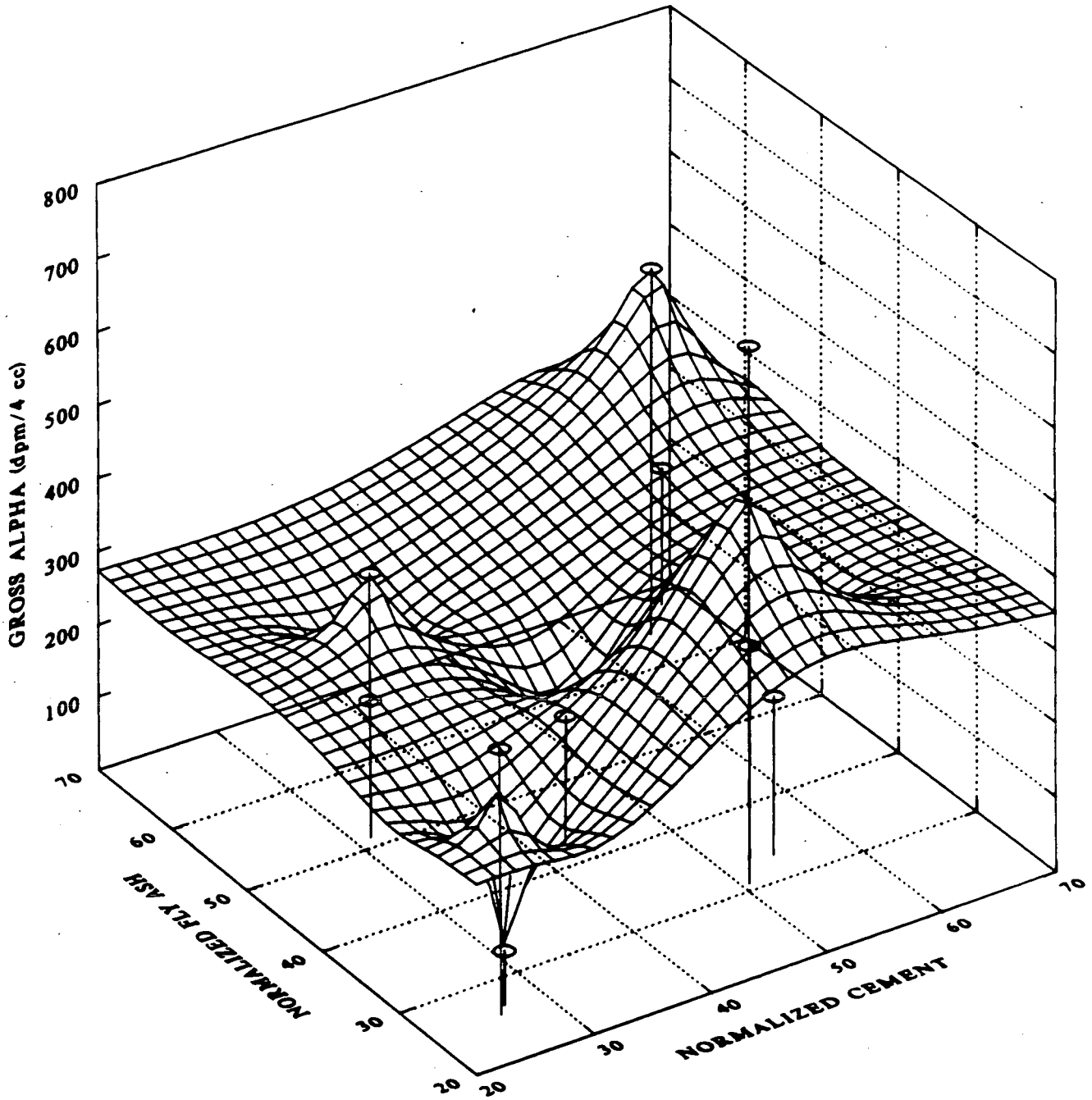
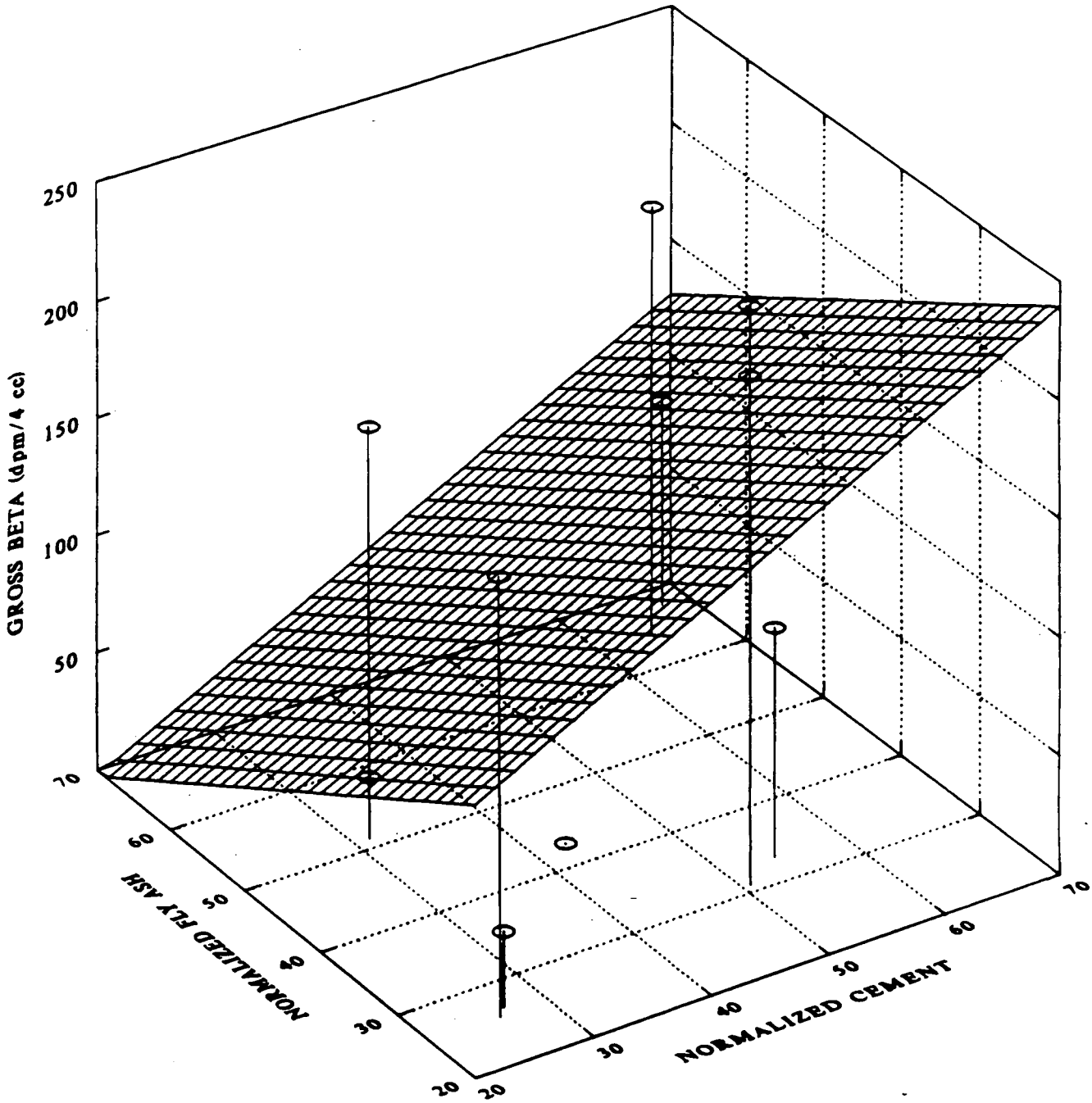
FIGURE I-36



SILO 2. STAGES II AND III. G. ALPHA

INV
3/20/93

FIGURE I-37



SILO 2. STAGES II AND III. G. BETA

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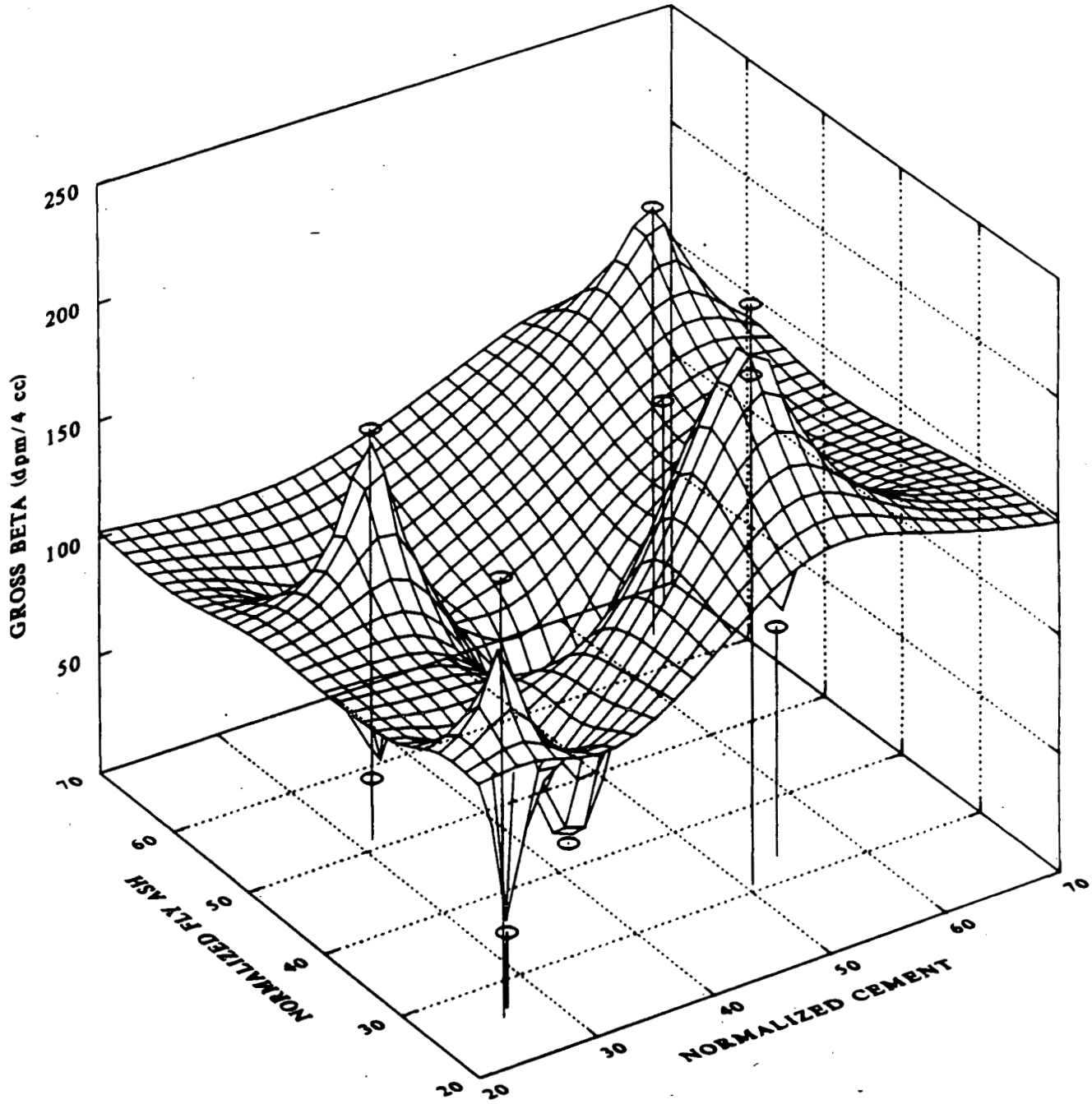
3/30/93

FIGURE I-38



SILO 2. STAGES II AND III. G. BETA

INV
3/30/93

APPENDIX J

TABLE J - 1
CHEMICAL EXTRACTION
REMEDY SCREENING (PRELIMINARY PHASE) STAGE I

Silo	Temperature	Time	Name	Acid Concentration	Liquid/Solid Ratio	Residual Solids Gross Alpha (µCi/g)	Residual Solids Gross Beta (µCi/g)
1	80°C	2 HRS	Nitric	13N	4:1	-	-
1	80°C	2 HRS	HCl	11.6N	4:1	3.700	1.320
1	80°C	2 HRS	Acetic	8.8N	4:1	4.440	1.500
1	80°C	2 HRS	Nitric	5.6N	4:1	7.490	2.890
1	80°C	2 HRS	HCl	5.4N	4:1	5.680	2.070
1	80°C	2 HRS	Acetic	4.3N	4:1	4.000	1.160
1	80°C	2 HRS	Acetic	8.8N	4:1	3.910	1.220
1	80°C	2 HRS	Nitric	2.6N	4:1	4.230	1.570
1	80°C	2 HRS	HCl	2.6N	4:1	4.080	1.530
1	80°C	2 HRS	Acetic	2 N	4:1	4.430	1.550
1	Ambient	2 HRS	Nitric	13N	2:1	3.130	0.970
1	Ambient	2 HRS	Nitric	13N	4:1	3.330	1.080
1	80°C	2 HRS	Nitric	13N	2:1	3.170	1.110
1	80°C	2 HRS	Nitric	2.6N	2:1	3.940	1.340
1	Ambient	2 HRS	HCl	11.6N	2:1	3.670	1.310
1	Ambient	2 HRS	HCl	11.6N	4:1	3.440	1.250
1	80°C	2 HRS	HCl	11.6N	2:1	3.640	1.290
1	80°C	2 HRS	HCl	2.6N	2:1	3.060	1.090
1	Ambient	2 HRS	Acetic	8.8N	2:1	1.710	0.630
1	Ambient	2 HRS	Acetic	8.8N	4:1	1.490	0.550
1	80°C	2 HRS	Acetic	8.8N	2:1	1.850	0.640
1	80°C	2 HRS	Acetic	2N	2:1	1.280	0.430
1		Untreated Feed				2.95	1.21

TABLE J - 2
CHEMICAL EXTRACTION
REMEDY SCREENING (PRELIMINARY PHASE) STAGE I

Silo	Temperature	Time	Name	Acid Concentration	Liquid/Solid Ratio	Residual Solids Gross Alpha (µCi/g)	Residual Solids Gross Beta (µCi/g)
2	80°C	2 HRS	HCl	11.6N	4:1	2.520	0.890
2	80°C	2 HRS	Acetic	8.8N	4:1	2.660	0.910
2	80°C	2 HRS	Nitric	5.6N	4:1	2.380	0.780
2	80°C	2 HRS	HCl	5.4N	4:1	2.480	0.880
2	80°C	2 HRS	Acetic	4.3N	4:1	2.250	0.760
2	80°C	2 HRS	Acetic	8.8N	4:1	2.650	0.900
2	80°C	2 HRS	Nitric	2.6N	4:1	2.010	0.710
2	80°C	2 HRS	HCl	2.6N	4:1	2.260	0.740
2	80°C	2 HRS	Acetic	2 N	4:1	1.460	0.490
2	Ambient	2 HRS	Nitric	13N	2:1	1.590	0.590
2	Ambient	2 HRS	Nitric	13N	4:1	1.550	0.580
2	80°C	2 HRS	Nitric	13N	2:1	1.830	0.670
2	80°C	2 HRS	Nitric	2.6N	2:1	1.680	0.590
2	Ambient	2 HRS	HCl	11.6N	2:1	1.810	0.680
2	Ambient	2 HRS	HCl	11.6N	4:1	1.630	0.600
2	80°C	2 HRS	HCl	11.6N	2:1	1.610	0.580
2	80°C	2 HRS	HCl	2.6N	2:1	1.750	0.630
2	Ambient	2 HRS	Acetic	8.8N	2:1	1.720	0.640
2	Ambient	2 HRS	Acetic	8.8N	4:1	1.450	0.490
2	80°C	2 HRS	Acetic	8.8N	2:1	1.600	0.590
2	80°C	2 HRS	Acetic	2N	2:1	1.710	0.610
2		Untreated Feed				1.78	0.757

TABLE J-3
CHEMICAL EXTRACTION[1]
REMEDY SCREENING (PRELIMINARY PHASE) STAGE II

Sample ID	Test No.	Silo No.	Temp	Time	Liquid/ Solid Ratio	Extractant 1[2] Name	Conc	Extracts # of	Rinses # of	Residual Solids Gross Alpha(uCi/g)	Gross Beta(uCi/g)
10321401	1	1	80°C	2 HRS	4:1	HCl	5.4N	1	3	2.830	1.080
10321402	2	1	80°C	2 HRS	4:1	Nitric	5.6N	1	3	2.270	0.760
10321403	3	1	80°C	2 HRS	4:1	Acetic	8.8N	1	3	2.590	0.900
10321404	4	1	80°C	2 HRS	4:1	Acetic	4.3N	1	3	2.700	0.890
10321601	1dup	1	80°C	2 HRS	4:1	HCl	5.4N	1	3	2.670	0.986
10321602	6	1	80°C	2 HRS	4:1	HCl	9N	1	3	2.950	1.020
10321603	7	1	80°C	2 HRS	4:1	HCl + Cl2	9N	1	3	2.890	1.040
10321801	2dup	1	80°C	2 HRS	4:1	Nitric	5.6N	1	3	2.490	0.920
10321802	3dup	1	80°C	2 HRS	4:1	Acetic	8.8N	1	3	3.140	1.020
10321803	4dup	1	80°C	2 HRS	4:1	Acetic	4.3N	1	3	2.710	0.900
10321405	1	2	80°C	2 HRS	4:1	HCl	5.4N	1	3	1.720	0.610
10321406	2	2	80°C	2 HRS	4:1	Nitric	5.6N	1	3	1.500	0.480
10321407	3	2	80°C	2 HRS	4:1	Acetic	8.8N	1	3	1.430	0.450
10321408	4	2	80°C	2 HRS	4:1	Acetic	4.3N	1	3	1.390	0.470
10321604	1dup	2	80°C	2 HRS	4:1	HCl	5.4N	1	3	1.570	0.580
10321605	6	2	80°C	2 HRS	4:1	HCl	9N	1	3	1.450	0.510
10321606	7	2	80°C	2 HRS	4:1	HCl + Cl	9N	1	3	1.550	0.530
10321804	2dup	2	80°C	2 HRS	4:1	Nitric	5.6N	1	3	1.510	0.510
10321805	3dup	2	80°C	2 HRS	4:1	Acetic	8.8N	1	3	1.730	0.570
10321806	4dup	2	80°C	2 HRS	4:1	Acetic	4.3N	1	3	1.530	0.530

[1] Feeds were Silos 1 and 2 1990-91 composites with 20% bentonite added.

[2] Only one extractant was performed during remedy screening.

TABLE J-4
CHEMICAL EXTRACTION
REMEDY SCREENING (PRELIMINARY PHASE) STAGE II
(Feeds Were Silos 1 and 2 1990-91 Composites with 20% Bentonite Added)

Test No	Silo No	Temp	Extractant 1 Time	Name	Conc	Extracts #	Rinses #	Liquid/ Solid Ratio	Extractant 2 Time	Name	Conc	Extracts #	Rinses #	Residual Solids Gross Alpha (µCi/g)	Gross Beta (µCi/g)
8	1&2	80°C	4 HRS	HCl	9N	6	3	4:1	N/A	N/A	N/A	N/A	N/A	2.710	1.010
9	1&2	80°C	4 HRS	HCl	9N	3	3	4:1	N/A	N/A	N/A	N/A	N/A	2.450	0.920
10	1&2	80°C	4 HRS	Nitric	5.6N	6	3	4:1	N/A	N/A	N/A	N/A	N/A	1.720	0.670
11	1&2	80°C	4 HRS	Nitric	5.6N	3	3	4:1	N/A	N/A	N/A	N/A	N/A	2.170	0.780
12	1&2	80°C	4 HRS	EDTA	0.2M	6	3	4:1	N/A	N/A	N/A	N/A	N/A	0.410	0.100
13	1&2	80°C	4 HRS	EDTA	0.2M	3	3	4:1	N/A	N/A	N/A	N/A	N/A	1.330	0.420
14	1&2	80°C	4 HRS	EDTA	0.8M	6	3	4:1	N/A	N/A	N/A	N/A	N/A	0.260	0.080
15	1&2	80°C	4 HRS	EDTA	0.8M	3	3	4:1	N/A	N/A	N/A	N/A	N/A	0.340	0.080
16	1&2	80°C	4 HRS	HCl	9N	3	3	4:1	N/A	N/A	N/A	N/A	N/A	3.040	1.130
17	1&2	80°C	4 HRS	EDTA	0.8M	1	3	10:1	N/A	N/A	N/A	N/A	N/A	0.610	0.180
18	1&2	80°C	4 HRS	EDTA	0.8M	2	3	10:1	N/A	N/A	N/A	N/A	N/A	0.270	0.070
19	1&2	80°C	4 HRS	EDTA	0.8M	3	3	10:1	N/A	N/A	N/A	N/A	N/A	0.220	0.060
20	1&2	80°C	24 HRS	EDTA	0.8M	1	3	10:1	N/A	N/A	N/A	N/A	N/A	0.310	0.060
21	1&2	80°C	24 HRS	EDTA	0.8M	2	3	10:1	N/A	N/A	N/A	N/A	N/A	0.340	0.120
22	1&2	80°C	24 HRS	EDTA	0.8M	3	3	10:1	N/A	N/A	N/A	N/A	N/A	0.240	0.090
23	1&2	80°C	15 HRS	KCl	15%	1	3	10:1	24 HRS	EDTA	0.8M	1	3	0.480	0.100
24	1&2	80°C	15 HRS	KCl	15%	1	3	10:1	24 HRS	EDTA	0.8M	2	3	0.230	0.080
25	1&2	80°C	15 HRS	KCl	15%	1	3	10:1	24 HRS	EDTA	0.8M	3	3	0.180	0.050
26	1&2	80°C	4 HRS	ETDA	0.8M	6	3	4:1	4 HRS	Nitric	5.6N	1	3	0.140	0.030
27	1&2	80°C	4 HRS	HCl	9N	6	3	4:1	4 HRS	EDTA	0.8M	1	3	3.060	1.100
28	1&2	80°C	4 HRS	Nitric	5.6N	6	3	4:1	4 HRS	EDTA	0.8M	1	3	1.510	0.530

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