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PILOT PLANT SUMP REMOVAL ACTION NO. 24 (ABANDONED SUMP WEST OF PILOT PLANT) FINAL REPORT DECEMBER 1993

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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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Pilot Plant Sump Removal Action No. 24 (Abandoned Sump West of Pilot Plant)

FINAL REPORT

December 1993

U.S. DEPARTMENT OF ENERGY

4987

Fernald Environmental Management Project

FINAL REPORT

PILOT PLANT SUMP
Removal Action No. 24
(Abandoned Sump West of Pilot Plant)

December 1993

FERNALD ENVIRONMENTAL RESTORATION
MANAGEMENT CORPORATION

4987

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ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R.	Code of Federal Regulations
CPID	closure plan information and data
CRU3	CERCLA/RCRA Unit 3
DI	de-ionized
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
FEMP	Fernald Environmental Management Project
FERMCO	Fernald Environmental Restoration Management Corporation
HSL	Hazardous Substance List
HWMU	hazardous waste management unit
LLRW	low level radioactive waste
msl	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
OEPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
OU3	Operable Unit 3
OU5	Operable Unit 5
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PPE	personal protective equipment
ppm	parts per million
QA	quality assurance
QC	quality control
RAWP	Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RSE	Removal Site Evaluation
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SOP	Standard Operating Procedure
SACD	Stipulated Amendment to the Consent Decree
SVOC	semivolatile organic compound

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ACRONYMS (continued)

TCA	1,1,1-trichloroethane
TCLP	Toxicity Characteristic Leaching Procedure
USEPA	U.S. Environmental Protection Agency
UTL	upper tolerance limit
VOA	volatile organic analysis
VOC	volatile organic compound

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EXECUTIVE SUMMARY

The Pilot Plant Sump Removal Action No. 24 Work Plan (RAWP) described actions encompassing removal of the sump and its contents, cutting and capping the drain line supplying the sump, removal of contaminated soils immediately surrounding the sump and drain line, and inspection of the remaining drain line prior to backfilling the excavation. Field operations began in August 1993 and were completed in October 1993. All wastes resulting from this action have been properly dispositioned, as described in the sections that follow.

ES.1 BACKGROUND

Fernald Environmental Management Project (FEMP) site personnel noted during 1991 that the liquid level in the temporary sump west of the Pilot Plant was rising and falling (letter from S.W. Coyle to R.E. Tiller, WEMCO:EMT 91-634, October 16, 1991). This fluctuation was reported to the U.S. Environmental Protection Agency (USEPA) and Ohio Environmental Protection Agency (OEPA) as a potential release to the environment. Although there was no direct evidence of leakage from the sump, sampling and analysis was performed on the sump contents and existing data from the sampling and analysis of surrounding soils and groundwater were reviewed. The sump was identified in U.S. Department of Energy (DOE) letter DOE-667-92, "Proposed Phase III Removal Actions," dated January 14, 1992.

The magnitude of the potential threat was subsequently evaluated in a Removal Site Evaluation (RSE) based on the sump contents sampling information. Consistent with Title 40 Code of Federal Regulations (C.F.R.) § 300.415 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the DOE determined that the removal action was appropriate, and issued an action memorandum.

The Pilot Plant Temporary Sump (identified as the Abandoned Sump West of Pilot Plant) was also declared to be a hazardous waste management unit (HWMU). The sump was included in the list of HWMUs in the latest Resource Conservation and Recovery Act (RCRA) Part A and Part B Permit Applications submitted to the OEPA. The sump was also identified as a HWMU in the RCRA compliance schedule submitted pursuant to the 1988 Consent Decree between the State of Ohio and the DOE, as amended by the Stipulated Amendment to the Consent Decree (SACD) in January 1993. The RCRA

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compliance schedule requires that closure plan information and data (CPID) be submitted for all identified HWMUs.

Removal of the sump was an interim action required to remove the sump and its contents as a source of hazardous wastes, determine if the sump was a source of release to the environment, determine the condition of the drain line system, and evaluate the potential need for further action. It was not the intention to close the sump HWMU at this time. Removal of the sump was also necessary to determine if the sump was still physically connected to the abandoned and covered drain system under the Pilot Plant. Further, the sump's removal was necessary from a physical standpoint to provide access for exploration of the inlet drain line and more effective characterization of contamination associated with the Pilot Plant floor drain system. Final remediation of the Pilot Plant area will be addressed in the Records of Decision (RODs) for Operable Unit 3 (OU3) and Operable Unit 5 (OU5).

ES.2 SUMMARY OF FIELD ACTIONS

As a precursor to the removal action, the contents of the Pilot Plant Sump were pumped on a monthly basis using FEMP Standard Operating Procedure (SOP) 20-C-916. This was done to reduce the threat of release, as well as provide additional information to determine the specific actions necessary to remove the sump.

The sump was again pumped and its contents sampled on August 5, 1993. The sump pump and associated piping were subsequently lifted out of the sump by crane, rinsed to remove gross contamination, and placed into white metal boxes. Following the pump and hardware removal, initial efforts were conducted to clean the drain line using a "snake" to pull contamination from the drain line into the sump. A clay-like sediment was found deposited on the bottom of the pipe, and an obstruction was encountered approximately 3 feet into the line.

The concrete apron surrounding the sump was broken up and removed prior to initiating excavation to uncover the inlet drain line. Soil was excavated from around the sump and pipe using a small backhoe and shovels. During excavation around the drain line, liquids were observed flowing into the excavation from beneath and around the drain line. These liquids were pumped into drums prior to completing the excavation. The exposed inlet drain pipe was cut using a circular pipe cutter, and the sump and attached segment of drain line were removed as a unit and placed on a prepared laydown area.

Visual inspection showed the sump to be structurally intact. All removed materials, including soil and liquids, were placed in drums or white metal boxes as appropriate.

After the sump was removed, an inflatable pipe plug was used to seal the drain line pending the drain line inspection. The interior of the drain line was inspected by inserting a track mounted video camera into the line. As mentioned above, a clay-like sediment was found along the bottom of the pipe that restricted the in-pipe inspections to the first 4 to 6 feet of drain line. Final capping of the drain line consisted of, first, a pneumatic plug (moved further into the line) and, second, a compression-type plug placed in the line after the pneumatic plug. Following capping of the drain line, soil backfill was brought in from soil stockpiles established under Removal Action No. 17, Improved Storage of Soil and Debris, to return the excavation area to grade.

The field actions for the Pilot Plant Sump included characterization of liquids and sediment within the sump, removal of the sump and associated inlet pipe, and characterization of soil adjacent to and beneath the sump. Liquid samples were analyzed for metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides/PCBs, and radionuclides (uranium and thorium). After the sump had been pumped and rinsed, sediment and debris present in the bottom of the sump were removed and sampled. In addition, sediment accumulation observed within the inlet pipe was removed and sampled prior to plugging the pipe. The sediment samples were analyzed for metals, VOCs, SVOCs, pesticides/PCBs, and radionuclides (uranium and thorium).

The liquid from the sump, and the sediment from the sump and pipe all exhibited detectable levels of contaminants. Metals and radionuclides were detected in both media. Various VOCs and SVOCs were detected in both media, with consistently high values for 1,1,1-trichloroethane (TCA) and tetrachloroethene (PCE). In addition, one PCB (Aroclor-1254) was detected in the sediment and one pesticide (Endrin) was detected in liquid. Analytical results are discussed in greater detail in Section 5.0.

Soil samples were collected to determine if releases to the environment had occurred. Prior to removal of the sump, soil samples were collected at depths of 6 to 12 feet from borings made adjacent to the sump at the four primary compass points, as well as for a 2-foot interval beneath the inlet pipe. Following the sump removal, two additional soil samples were collected from beneath the former sump. Soil samples were analyzed for metals, VOCs, SVOCs, pesticides/PCBs, and radionuclides (uranium, thorium, and

radium isotopes). The four samples from around the sump also were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals and volatile organics.

Results for the soil samples indicated the presence of contamination. The reported concentrations for metals generally are below the upper tolerance limit (UTL), as determined by the *FEMP Soil Background Study* (FERMCO 1993), with concentrations observed for some sample at slightly greater than the UTL for barium, cadmium, lead, and selenium. Results for VOCs indicate low levels of TCA, toluene, and xylenes in samples around the sump, with increased VOC detections in soil beneath the sump. Analysis for SVOCs beneath the inlet pipe and beneath the sump indicates low-level detections for polynuclear aromatic hydrocarbons (PAHs). One PCB (Aroclor-1254) was detected at low concentrations at several locations. TCLP analyses for the soil indicate values below the regulatory level except for PCE in one sample (4.7 mg/L) that exceeds the criteria (0.7 mg/L).

ES.3 CONCLUSIONS

The Pilot Plant Sump Removal Action No. 24 encompassed removal of the sump and its contents, cutting and capping the drain line supplying the sump, removal of contaminated soils immediately surrounding the sump and drain line, and an inspection of the drain line prior to backfilling the excavation. As detailed in this report, all objectives of the Pilot Plant Sump removal action have been met. Each of the three removal action objectives are summarized below.

Objective 1. To remove the Pilot Plant Temporary Sump, its contents, and associated equipment in a manner meeting applicable regulatory criteria.

The Pilot Plant Temporary Sump was successfully removed from the ground, eliminating this collection point for hazardous wastes. The terminus of the pipe was subsequently plugged to prevent further outflow. Further, the series of pre-excavation pumpouts were effective in reducing the concentrations of contaminants in the sump liquids. Contaminant concentration data, presented in Table 2-1 of this report, illustrate this reduction during the course of pumping operations. These results are consistent with decreases in measured (HNU) airborne volatile organic vapor concentrations during pumping operations.

The sump liquid and sediment were pumped and contained in drums for storage. Other soil and sump materials generated by the removal action were either drummed or placed in white metal boxes and managed as mixed waste.

Objective 2. To determine if the sump had released hazardous materials into the environment.

The sump was examined immediately following its removal, and more closely during subsequent size reduction and decontamination operations. Through these observations it was determined that the sump was structurally intact and leak tight, and was, therefore, not a point of release into the environment.

Objective 3. To investigate the condition of the Pilot Plant floor drain line and the potential need for additional action.

Interior camera inspection of the drain line was restricted to the first 4 to 6 feet by sediment within the pipe, however, the existence of a crack near the terminus indicates the possibility that a similar loss of integrity may exist elsewhere along its length. Reinforcing this possibility was the liquid flow into the excavation pit from beneath and along the drain line. At one point during the excavation activities, six (6) drums of liquid were removed from the excavation pit.

Sampling and analysis conducted during this action confirmed the presence of radiological and hazardous contaminants in the materials removed from the sump and drain line, as well as the soil surrounding the sump and line. These results confirm the Pilot Plant and its floor drain system to be the source of contamination with the potential for ongoing release to the environment.

Groundwater seepage into the drain line is now considered to be one probable source of the drain line liquids, in addition to the Pilot Plant itself, because of the following: the repeated refilling of the sump to a level of approximately 30 inches below grade level; the total liquid volume removed (over 1,200 gallons) greatly exceeds the calculated volume capacity of the drain line; and finally, the apparent gradual dilution of sump liquid contaminants (based on observation and subsequent analysis). It is considered a reasonable possibility that water is entering the drain line from within the layer of construction backfill beneath and around the Pilot Plant.

ES.4 RECOMMENDATION (FUTURE ACTIVITIES)

Based on the conclusions presented above, a RSE will be performed addressing the contamination present in soils around the Pilot Plant, and the Pilot Plant drain line system as a potential source of ongoing release to the environment.

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1.0 INTRODUCTION

In 1991, Fernald Environmental Management Project (FEMP) site personnel noted that the liquid level was rising and falling in the Pilot Plant Temporary Sump, located in the southwest corner of Operable Unit 3 (OU3) (letter from S.W. Coyle to R.E. Tiller, WEMCO: EMT 91-634, October 16, 1991). The sump was sampled and liquids from the sump were found to have a flash point of approximately 118°F, and an acidic pH of 3. The liquid was also found to contain high levels of heavy metals and radioactive thorium and uranium. In addition, Toxicity Characteristic Leaching Procedure (TCLP) limits for lead, barium, benzene, and mercury, were exceeded. Carbon tetrachloride, 1,1,1-trichloroethane (TCA), and o-xylene were also found. Adjacent soils and water sampled from nearby peizometers also contained these contaminants.

The sump was identified in U.S. Department of Energy (DOE) letter DOE-667-92, "Proposed Phase III Removal Actions," dated January 14, 1992. The magnitude of the potential threat was subsequently evaluated in a Removal Site Evaluation (RSE) based on the sump sampling information. Consistent with Title 40 Code of Federal Regulations (C.F.R.) § 300.415 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the DOE determined that the removal action was appropriate, and issued an action memorandum. Additional details regarding sump contaminants and the RSE are found in the Removal Action Work Plan (RAWP) for the Pilot Plant Sump.

The sump was also declared to be a hazardous waste management unit (HWMU) based on its management of Resource Conservation and Recovery Act (RCRA) regulated hazardous wastes (F002, F003, D001, D005, D008, D009, and D018). The sump was, therefore, included in the list of HWMUs in the latest RCRA Part A and Part B Permit Applications submitted to the Ohio Environmental Protection Agency (OEPA). The sump was also identified as a HWMU in the RCRA compliance schedule submitted pursuant to the 1988 Consent Decree between the State of Ohio and the DOE, as amended by the Stipulated Amendment to the Consent Decree (SACD) in January 1993. The RCRA compliance schedule requires that closure plan information and data (CPID) be submitted for all identified HWMUs.

Removal of the sump was an interim action required to remove the sump and its contents as a source of hazardous wastes, determine if the sump was a source of release to the environment, determine the condition of the drain line system and evaluate the

potential need for further action. It was not the intention to close the sump HWMU at this time. Removal of the sump was also necessary to determine if the sump was still physically connected to the abandoned and covered drain system under the Pilot Plant. Further, the sump's removal was necessary from a physical standpoint to provide access for exploration of the inlet drain line and more effective characterization of contamination associated with the Pilot Plant floor drain system. Final remediation of the Pilot Plant area will be addressed in the Records of Decision (RODs) for OU3 and Operable Unit 5 (OU5).

This Removal Action Final Report describes removal of the sump and its contents, cutting and capping the drain line supplying the sump, removal of contaminated soils immediately surrounding the sump and drain line, inspection of the remaining drain line prior to backfilling and excavation, and the results of the sampling program. Section 2.0 describes the physical and contaminant characteristics of the HWMU. Section 3.0 summarizes the field activities. Section 4.0 discusses waste management procedures and disposition for the Pilot Plant Sump equipment, contents, rinseates, excavated soils, sampling waste, and personal protective equipment. Section 5.0 discusses the results of sampling and analysis, including validation of the analytical data. Section 6.0 summarizes the health and safety controls instituted during the field actions, and Section 7.0 provides references.

2.0 PILOT PLANT SUMP BACKGROUND INFORMATION

Pilot Plant operations began in October 1951. Over the 36 years of operation, Pilot Plant processes included aqueous/organic extractions of uranium and thorium, calcining, vacuum furnace casting, reduction of UF_6, reduction of UF_4 to uranium and metal, briquetting, heat treating, centrifugal casting, reject core reclamation, and various wet tankage processes. Pilot Plant processes could produce purified thorium nitrate, oxalate, hydroxide, or metal.

The Pilot Plant sump addressed in this removal action was a temporary floor drain collection point constructed and connected to the floor drain system for use from 1968 to 1970. During this time, the main sump was refurbished, and the facility floor drains and floor drain system were also covered over and replaced by a new collection system using "dead-end" sumps.

2.1 UNIT DESCRIPTION

The temporary Pilot Plant Sump was located adjacent to the Pilot Plant which is located in the southwest corner of the OU3 Production Area (Figure 2-1). The sump was located outside, approximately 15 feet west from the southwest corner of the Pilot Plant (Figure 2-2). The sump was a 9-foot long by 2-foot diameter stainless steel Schedule 10 pipe, buried vertically in the ground, welded closed at the bottom and open at the top, extending approximately 4 inches above grade within a 4-foot square concrete apron. It had a single entry line of stainless steel approximately 4 feet below grade connected to the original floor drain line of Duriron pipe. Floor drain liquids flowed by gravity to the sump where they accumulated until pumped to a processing system for uranium/ thorium recovery.

2.2 WASTE CHARACTERIZATION AND INVENTORY

Inspection of the temporary sump during 1991 indicated that the liquid level within the sump was rising and falling. This fluctuation was reported to the U.S. Environmental Protection Agency (USEPA) and OEPA as a potential release to the environment. Although there was no direct evidence of leakage from the sump, sampling and analysis was performed on the sump contents. Two grab samples of sump liquid revealed that the sump liquid was ignitable (118°F flash point), had a pH of 3, contained heavy

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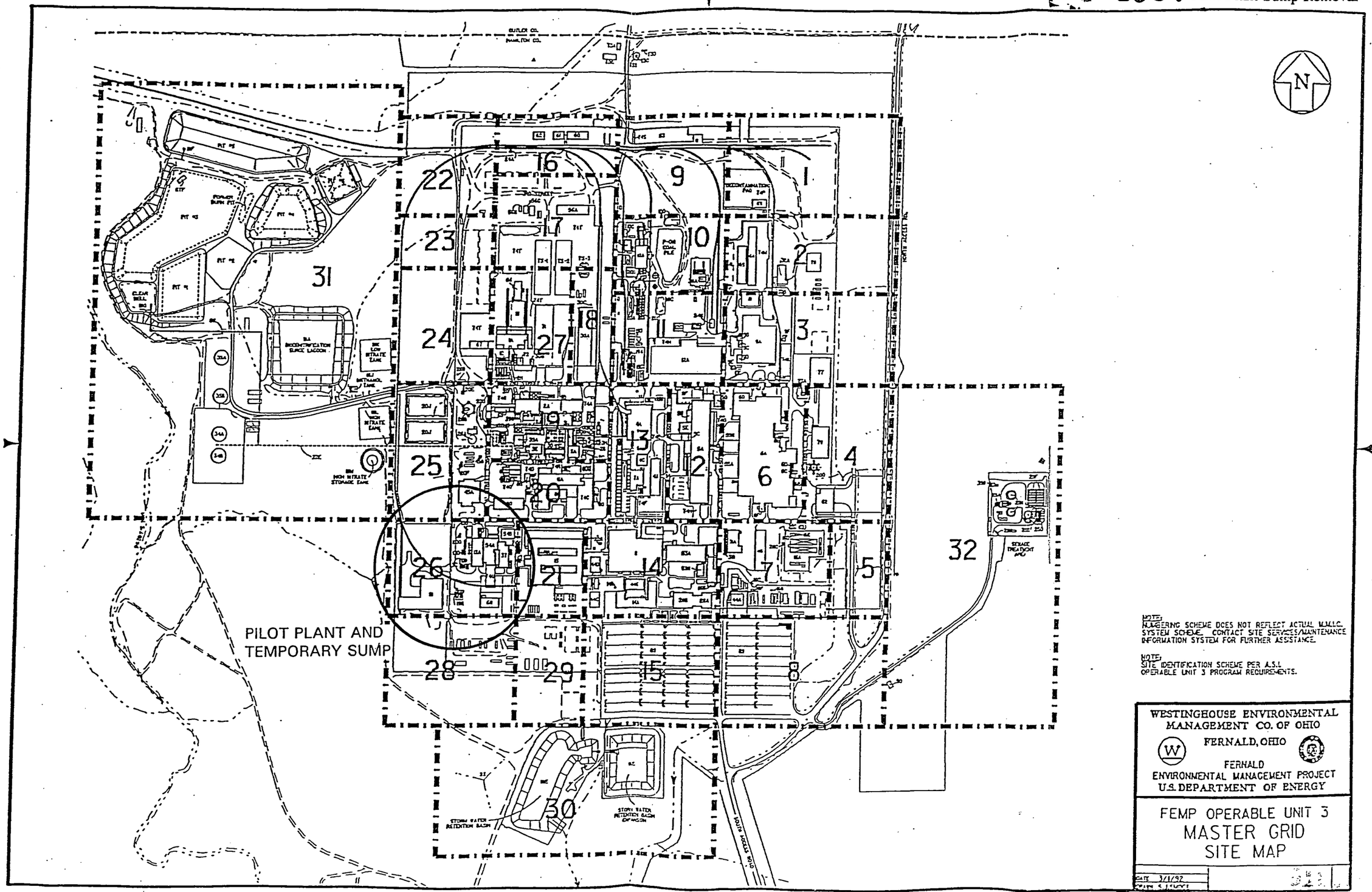

Figure 2-1. Master grid site map.

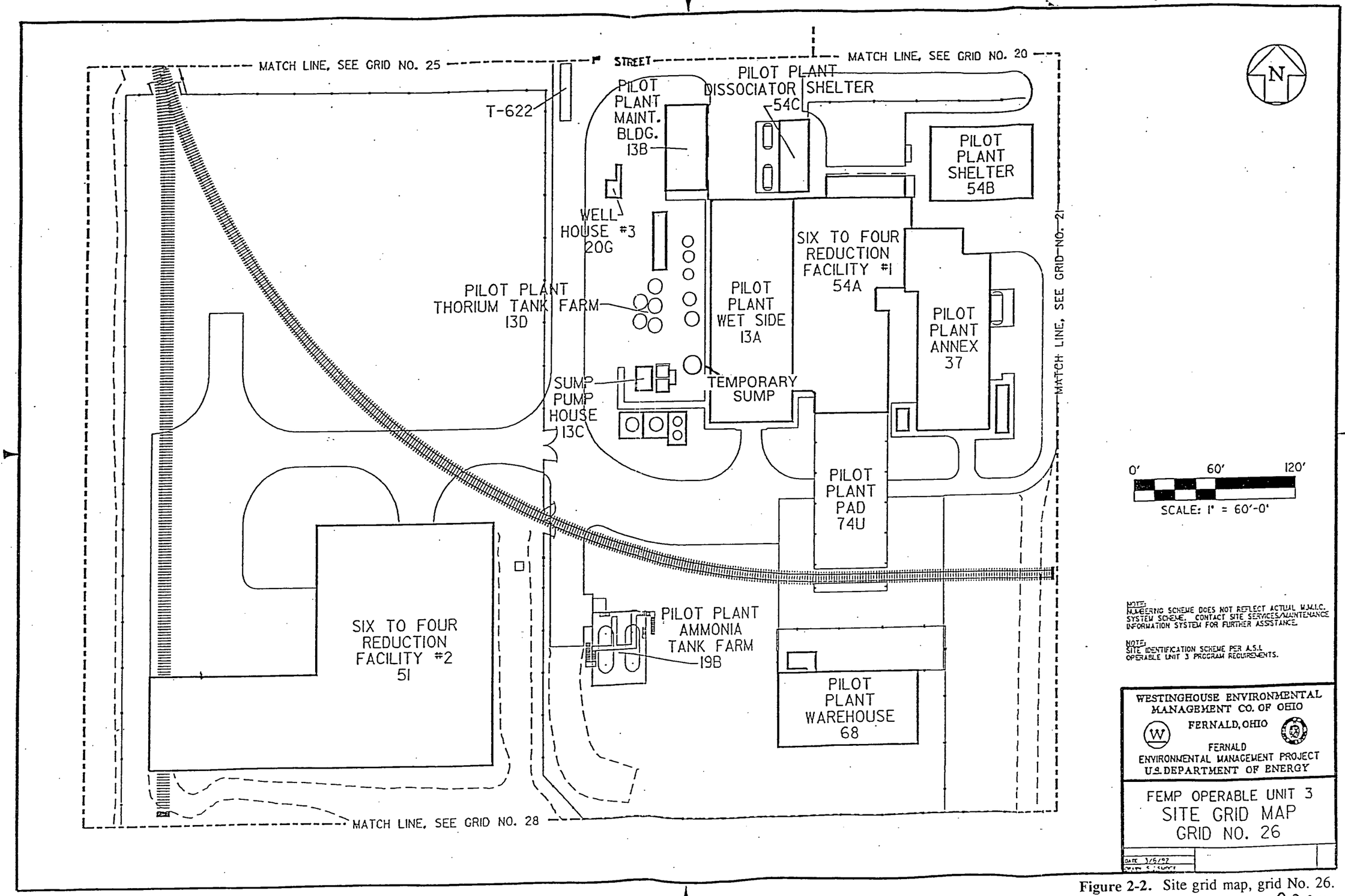

Figure 2-2. Site grid map, grid No. 26.

metals, and radioactive uranium and thorium. These samples also exceeded the TCLP level for lead, barium, benzene, and mercury. The samples indicated appreciable levels of TCA (200 parts per million [ppm] maximum), carbon tetrachloride (30 ppm maximum), and o-xylene (21 ppm maximum). These constituents are consistent with the by-products from operations known to have occurred in the Pilot Plant. In addition, the sump liquid is an "F" listed waste, numbers F002 and F003, under 40 C.F.R. § 261.3.

As a precursor to the removal action, the contents of the Pilot Plant Sump were pumped into 55-gallon polyethylene drums, and transferred from the Pilot Plant to the KC2 Warehouse, a RCRA Storage area on site, on a monthly basis using FEMP Standard Operating Procedure (SOP) 20-C-916. This was done to reduce the threat of release, as well as provide additional information to determine the specific actions necessary to remove the sump. Air sparging was used to agitate solids within the sump and facilitate their removal. Results of analyses conducted for the pre-removal action pumping activities (detections only) are summarized in Table 2-1.

All samples were collected from the drums following pumping. Analytical results appear to vary between sampling events as a result of differing time intervals between pumping and sampling with lower concentrations observed in those instances where the time intervals were longest and suspended solids had settled to the bottom of the drums. Certain results presented in Table 2-1 should be viewed cautiously as a result of analytical interferences. The relatively high levels of solids in the sump liquid, thorium in particular, are known to produce erroneous results for other metals. Further, the relatively high levels of certain contaminants required significant dilution of the sample prior to analysis, resulting in an increased degree of potential error in the final result.

An evaluation of the initial liquid level elevation within the sump (575.5 feet mean sea level [msl]) and the layout and elevation of the floor drain piping (579 feet msl and 574.5 feet msl starting and ending elevations, respectively) resulted in approximately 500 gallons of liquid within the sump and attached drain line. It was anticipated that a series of pump-outs would empty the sump and inlet line. The first of the monthly pump-outs described above occurred on July 31, 1992, while the eighth occurred on May 20, 1993. A total of 1,245 gallons of liquid were removed from the sump during the course of these pump-outs. Within 24 to 48 hours after each pump out, the sump would recharge to a depth of 27 to 34 inches from the top of the sump (approximately 576 feet msl). As a result of the rapid refill, and the dilution of sump liquid

Table 2-1. Drummed water detections from monthly sump pumping.

Analytes	Sample Identification						
Pump out date	July 27, 1992		September 4, 1992			October 30, 1992	
Analis No.	930427-134	930427-136	930427-131	930428-109	930428-110	930422-094	930422-095
Inorganics (μg/L):							
Arsenic	66.5	--	--	--	--	--	--
Barium	18290	436.1	--	1705	1554	--	--
Cadmium	311.2	136.1	7.3	12.9	15	7.8	7.2
Chromium	1410	23.6	12.5	299.6	308	--	--
Lead	31130	1.31	203.7	4734	4908	4.7	6.8
Mercury	86.6	1.73	2.74	413.6	167.7	0.22	0.23
Selenium	20.7	89.6	11.04	24.9	21.9	6.9	9.5
Silver	740	--	--	93.5	104	--	--
VOCs (μg/L):							
Acetone	--	--	990	--	--	430	320
1,1,1-Trichloroethane (TCA)	16,800	1810	4670	4600	6500	1480	1650
Tetrachloroethene (PCE)	1,660	740	460	3700	4300	440	470
o-Xylene	--	420	340	900	1000	--	--
Cyclohexanone	--	--	--	--	--	--	--
Methyl Ethyl Ketone	--	--	--	--	--	--	--
2-Nitropropane	--	--	--	--	--	--	--
Trichlorofluoromethane	--	--	--	--	--	--	--
Radionuclides:							
Total Uranium (mg/L)	410	14.5	6.9	84	83	3.4	3.3
Total Thorium (mg/L)	980	7	3	640	870	--	--
Flash Point (°F):	>200	>200	>200	>200	>200	>200	>200

Table 2-1. Drummed water detections from monthly sump pumping.

Analytes	Sample Identification								
	October 30, 1992		Jan 25, 1993			March 29, 1993			
Pump out date Analis No.	930422-096	930423-135	930422-098	930422-099	930422-100	930423-136	930423-137	930426-141	930426-142
Inorganics (μg/L):									
Arsenic	--	--	--	--	--	--	--	--	--
Barium	--	--	--	--	--	278.3	288.9	1.14	247.9
Cadmium	--	--	--	--	--	--	--	--	5.8
Chromium	55.8	--	--	--	--	--	--	--	--
Lead	657.2	--	23.4	18.8	18.8	10.5	25.1	9	34.9
Mercury	10.56	--	0.44	0.59	0.57	2.24	2.98	0.69	4.8
Selenium	--	8	5.4	--	5.2	--	--	11.4	8.1
Silver	10.4	--	--	--	--	--	--	--	--
VOCs (μg/L):									
Acetone	480	1900	--	1190	2660	--	11000	690	--
1,1,1-Trichloroethane (TCA)	3580	3000	7000	2520	2370	21000	23000	2600	1700
Tetrachloroethene (PCE)	400	--	1910	820	780	--	--	180	--
o-Xylene	190	540	560	320	300	--	--	--	--
Cyclohexanone	--	--	--	--	--	--	--	24000	--
Methyl Ethyl Ketone	--	--	--	--	--	--	--	360	--
2-Nitropropane	--	--	--	--	--	--	--	1800	--
Trichlorofluoromethane	--	--	--	--	--	--	--	160	--
Radionuclides:									
Total Uranium (mg/L)	7.3	6.3	7.4	14.2	14.0	4.2	4.3	4.7	6.1
Total Thorium (mg/L)	50	1.4	18	4.5	1.2	8	8	2	18
Flash Point (°F):	>200	>200	>200	>200	>200	>200	>200	>200	>200

Note: -- = Not detected above method detection limit

contaminants (based on observation and subsequent analysis), groundwater flowing into the drain line from the surrounding soil is now considered to be one probable source of the sump liquids.

3.0 DESCRIPTION OF PILOT PLANT SUMP REMOVAL ACTION

The immediate goal of the Pilot Plant Sump Removal Action was to remove the sump and its contents; cut and cap the drain line supplying the sump; remove contaminated soils immediately surrounding the sump and drain line; and inspect the drain line prior to backfilling the excavation. The secondary goals of the action were 1) to investigate the potential presence of contamination in the soil surrounding the sump and drain line, as evidence of releases to the environment, and 2) evaluate the need for additional action.

The RAWP for the Pilot Plant Sump, Removal Action No. 24, was approved by the USEPA on February 22, 1993. Concurrence with the RAWP was received from OEPA on May 26, 1993. RAWP field activities commenced during the week of August 2, 1993 and were concluded the week of October 11, 1993. Activities followed appropriate FEMP Standard Operating Procedures (SOPs) and the Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ) (FEMP 1992) to provide consistency with other FEMP actions. All sampling events included the full implementation of quality assurance/quality control (QA/QC) procedures to ensure that high quality data were collected.

Prior to project start-up, the required site documentation was completed and work permits were obtained. The documentation consisted of:

- Safety Assessment/Risk Assessment Report
- Hazard Analysis
- National Environmental Policy Act (NEPA) Documentation
- Task-Specific Health and Safety Plan
- Penetration and Excavation Permit identifying underground/overhead utilities in the work area
- Radiation Work Permit

- Material Evaluation Forms identifying the waste streams that would result from the activity.

Additional work permits were obtained as needed during the project. These work permits included FEMP Work Permits, Confined Space Evaluation/Permit, Chemical Hazardous Material Work Permits, and an Open Flame and Welding Hazardous Work Permit.

The site procedures applicable to this project included:

RM-0005:	FEMP Lot Marking and Color Coding Systems
SPR-5-13:	Confined Space Entry
SSOP-0060:	Package Radioactive Material for Off Site Shipment
SSOP 20-C-606:	Hazardous Material Spill Cleanup
SSOP-0035:	Accumulating Hazardous Waste in Satellite Accumulation Areas and Interim Containers
SOP 20-C-700:	Norclean Portable Vacuum Operation
SSOP-0075:	Packaging Low Level Radioactive Waste (LLRW) in Drums for Offsite Shipment
SSOP-0079:	Packaging Low Level Radioactive Waste (LLRW) in Boxes for Off Site Shipment
SOP 20-C-916:	Cleaning Sump Systems
SSOP-0008:	Preparing and Transferring Uncharacterized Waste to the Controlled Holding Area
SSOP-0044:	Management of Soil, Debris and Waste from a Project.

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The approved RAWP prepared for the removal action identified ten (10) field activities required to complete the removal of the Pilot Plant Sump. This section describes the implementation of each of those activities. The activities are as follows:

1) Site preparation - remove access barriers.
2) Remove liquids from the sump.
3) Remove sump pump and associated equipment.
4) Clean out drain line - partial.
5) Remove concrete apron around sump opening.
6) Excavate to uncover drain line; continue excavation to loosen sump.
7) Cut drain line and remove elbow; cap the severed end.
8) Remove the sump.
9) Inspect the drain line internally.
10) Backfill the site.

A chronological summary of activities conducted for the Pilot Plant Sump Removal Action is presented in Table 3-1.

Activities 2, 4 through 6, and 8 in the above list included sample collection activities. The sampling conducted during the implementation of this removal action is discussed in Section 3.11, Sample Collection, of this report. Wastes and contaminated soils removed during the removal action were containerized, characterized, and placed into appropriate storage based on the waste characterizations. Waste management and disposition is discussed in Section 4.0 of this report.

During the course of the removal action, several conditions were encountered that lengthened the time required for completion. These conditions are identified and discussed in the following subsections as they apply to the individual field activities. For example, the 1969 drawings used in the removal planning process did not fully detail the drain system as installed. As a result, additional planning efforts and field changes to the work plan were required during the course of implementation to ensure the successful completion of the project. However, these field changes to the activities as originally identified in the work plan did not compromise either the attainment of the removal action objectives or compliance with regulatory requirements applicable to the project. The Fernald Environmental Restoration Management Corporation (FERMCO) advised USEPA of these changes in early October 1993.

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Table 3-1. Chronological summary of Pilot Plant Sump Removal Action. Page 1 of 3

Activity Date	Activity Description	Sample Point Number
February 22, 1993	The RAWP for the Pilot Plant Sump, Removal Action No. 24, was approved by the U.S. Environmental Protection Agency (USEPA).	
May 26, 1993	Concurrence with the RAWP was received from OEPA.	
August 2, 1993	RAWP field activities commenced.	
August 3 & 4, 1993	Soil samples were collected at four points (north, south, east, and west) around the sump. Samples were collected in 1-foot intervals and screened for volatiles and radiological contamination. The 1-foot segment for each boring exhibiting the highest readings on the field instruments was submitted for analysis. Although the RAWP stated that these samples would be collected after the sump was excavated, the samples were collected before the sump was removed and the soil disturbed to provide better representation of contamination around the sump and to allow the samples to be processed in time to meet RAWP milestones.	SP-2, -3, -4, -5
August 5, 1993	Liquids in sump were collected before initiation of field activities. Visual inspection at the time could not determine if the sump contained solid residues, and no sediment sample was collected.	SP-1
August 11, 1993	The sump pump and its associated piping and support structure were removed from the sump.	
August 19, 1993	The concrete apron around the top of the sump was broken apart and removed from around the sump. These materials were placed in 55-gallon U.S. Department of Transportation (DOT) approved steel drums for storage.	
August 23, 1993	A soil sample was collected adjacent to and beneath sump drain inlet. Although the RAWP stated that this sample would be collected after the sump was excavated, the samples were collected before the sump was removed and the soil disturbed to provide better representation of contamination around the drain line and to allow the samples to be processed in time to meet RAWP milestones.	SP-6
August 25, 1993	The liquids in the sump were removed. Various solid materials (sand, rocks, sample jars) were observed in the bottom of the sump after the liquid had been pumped out. These solid materials were removed at a later date, prior to removal of the sump. Because liquids continued to flow into the sump, additional pump-out operations were performed during the course of subsequent field activities as necessary.	

Table 3-1. Chronological summary of Pilot Plant Sump Removal Action. Page 2 of 3

Activity Date	Activity Description	Sample Point Number
August 26, 1993	Excavation of the drain line was started. Initial excavation of the drain line was accomplished with a small backhoe. In order to prevent damage to the line, laborers using hand tools assisted in the excavation in the areas close to the lines. Excavation began at the sump above the stainless steel elbow and then extended outward following the direction of the run of the line.	
August 27 & 30, 1993	The excavation crews encountered concrete that apparently had been poured on the drain line when it was originally installed in 1969. These concrete pours were not marked on the 1969 drawings of the Pilot Plant drainage system. When concrete was encountered, the work was halted until appropriate changes in field activities could be developed, reviewed, and confirmed.	
September 3, 1993	Liquids, which were observed flowing from beneath and along the drain line and into the excavation pit, were pumped from the pit to allow work to continue.	
September 14, 1993	Excavation of the drain line was completed.	
September 17, 1993	The Duriron drain line was cut and the stainless steel elbow was removed with the sump. A temporary inflatable plug was inserted into the Duriron line until an internal compression plug could be obtained. The sump and attached elbow were lifted by crane from the excavation and placed on an impermeable ground cover sheeting. The stainless steel sump and elbow were wrapped in the sheeting to protect against run-off until they could be separated and cut.	
September 22, 1993	After the sump was pumped for the final time, solid residues were observed in the bottom of the sump. These residues were slurried and pumped into a drum from which a sample was obtained.	Sump-3
September 22, 1993	After the sump was removed, two soil samples beneath the sump were collected. Samples SP-2, -3, -4, -5 were recollected for analysis of pesticides because the laboratory missed its holding time.	SP-1a SP-1b SP-2, -3, -4, -5
September 23, 1993	A pneumatic pipe plug was inserted into the drain line, partially inflated, then pulled out of the line in an attempt to clear materials from the drain line. Sediment removed from the line was placed in a drum.	
September 23, 1993	The camera crew performed the internal line inspection. The camera was inserted into the line, but encountered a clay-like material blocking the line. After several attempts, the camera was successfully inserted 4 to 6 feet into the drain line, but was obstructed from further insertion.	
October 4, 1993	A sample was collected from the drum containing material removed from the drain line on September 23.	D-1

Table 3-1. Chronological summary of Pilot Plant Sump Removal Action. Page 3 of 3

Activity Date	Activity Description	Sample Point Number
October 11-15, 1993	The Pilot Plant Sump area excavations were backfilled.	
October 11 & 12, 1993	The sump was cut in half and the size-reduced elbow and sump sections were placed into a white metal box for storage.	
October 12, 1993	The permanent internal compression plug was installed in the Duriron line.	

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3.1 SITE PREPARATION - REMOVE ACCESS BARRIERS

Site preparation began in August 1993. The radiological control barrier consisting of link chain around the sump perimeter was removed so that work crews could begin work. Additionally, a control point was set up for personal decontamination of workers prior to exiting the work site. Impermeable ground cover sheeting (herculite) was placed on the ground to prevent excavated soil contact with adjacent undisturbed soils.

3.2 REMOVE LIQUIDS FROM THE SUMP

Prior to the implementation of this removal action, it was suspected that the source of the liquids in the sump was residual process residue heldup in the abandoned floor drain system under the Pilot Plant. A series of pump-outs of the sump were implemented to empty the sump and drain line. In planning for these pumping activities, the liquid capacity of the drain lines was estimated. It was estimated that 500 gallons could be present based on the volume capacity of drain lines located at or below the elevation of liquid within the sump, as shown on available drawings of the system. The first of these pre-removal action pump-outs occurred in July 1992, while the eighth occurred in May 1993. A total of 1,245 gallons of liquid were removed from the sump during the course of these pump-outs. Within 24 to 48 hours after each pump-out, the sump would refill to a depth of 27 to 34 inches from the top of the sump.

Groundwater seepage into the drain line is now considered to be one probable source of the sump liquids because of the following: the repeated refilling of the sump to a level of approximately 30 inches below grade level; the total liquid volume removed (over 1,200 gallons); and finally, the apparent gradual dilution of sump liquid contaminants (based on observation and subsequent analysis). It is considered possible that the water potentially entering the drain line may consist of rainwater that accumulates in the layer of construction backfill beneath and around the Pilot Plant.

The liquids removed during these pump-outs were collected in 55-gallon polyethylene drums and transferred from the Pilot Plant to the KC2 Warehouse, a RCRA storage area on site. Summary information including dates, volume, and documentation of the liquids removed during the eight pre-removal pump-outs is provided in Section 4.0.

For Removal Action No. 24, the liquids in the sump were removed on August 25, 1993. Various solid materials (sand, rocks, sample jars) were observed after the liquid had

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been pumped out. These solid materials were removed at a later date, prior to removal of the sump. Because liquids continued to flow into the sump, additional pump-out operations were performed during the course of subsequent field activities as necessary.

3.3 REMOVE SUMP PUMP AND ASSOCIATED EQUIPMENT

The sump pump and its associated piping and support structure were removed from the sump on August 11, 1993. The sump pump and piping were rinsed to remove contaminants, and samples of the rinseate were collected and analyzed for chemical and radiological contaminants. The results of the analyses indicated that these items were still contaminated and required management as mixed waste. They were placed in white metal boxes and transferred to storage.

3.4 CLEAN OUT DRAIN LINE - PARTIAL

After removal of the sump liquids, sump pump and supports, the work crew performed cleaning of the drain line. An obstruction was encountered in the stainless steel elbow, and a "snake" was inserted into the line in an unsuccessful attempt to remove it. As a result, the drain line camera inspection was rescheduled to take place following removal of the sump, elbow, and obstruction.

On September 23, prior to beginning the camera inspection, a pneumatic pipe plug was inserted into the drain line (Figure 3-1), partially inflated, then pulled out of the line in an attempt to clear materials from the drain line (Figure 3-1 also shows the final configuration of the drain line with both plugs in-place) (Section 3.7).

3.5 REMOVE CONCRETE APRON AROUND SUMP OPENING

The concrete apron around the top of the sump was broken apart and removed from around the sump. These materials were placed in 55-gallon U.S. Department of Transportation (DOT) approved steel drums for storage (see Section 4.0 for current location). This activity was completed on August 19, 1993. Characterization of this material for disposition is in progress. Until completed, the concrete is being managed as mixed waste.

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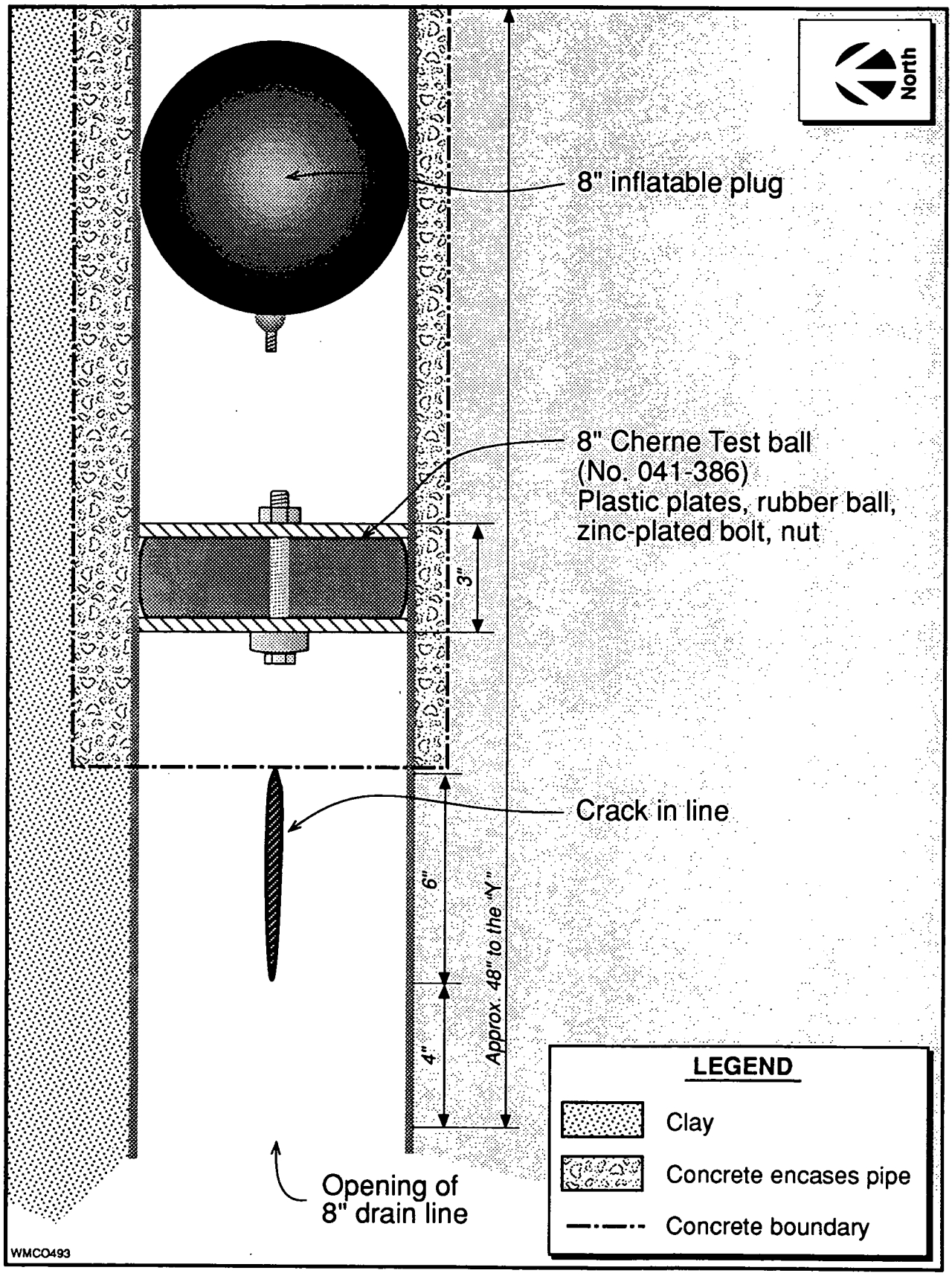

Figure 3-1. Schematic drawing of drain line and crack.

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3.6 EXCAVATE TO UNCOVER DRAIN LINE; CONTINUE EXCAVATION TO LOOSEN SUMP

The work plan details two excavation activities for this removal action. One was to uncover the drain line so that it could be cut and capped. The second was to loosen the sump so that it could be lifted from the ground by a crane.

Excavation of the drain line was started on August 26, 1993 (Figure 3-2) and was completed on September 14, 1993. Initial excavation of the drain line was accomplished with a small backhoe. In order to prevent damage to the line, laborers using hand tools assisted in the excavation in the areas close to the line. Excavation began at the sump above the stainless steel elbow and then extended outward following the direction of the run of the line (Figure 3-3).

On two different occasions (August 27 and 30, 1993), the excavation crews encountered concrete that apparently had been poured on the drain line when it was originally installed in 1969. These concrete pours were not marked on the 1969 drawings of the Pilot Plant drainage system. When concrete was encountered, the work was halted until appropriate changes in field activities could be developed, reviewed, and confirmed.

The first concrete section encountered covered the portion of the line where the stainless steel and Duriron pipe were connected. This section of concrete was chipped away by hand to prevent damage to the Duriron, which is very brittle. After the removal of the concrete, it was observed that the stainless steel line and the Duriron pipe diameters were different from what was shown on the drawings. The 1969 drawings used for planning and removal had indicated that the two lines were both 8 inches in diameter and joined by a Duriron double hub. Each of the two line diameters was measured. The stainless steel was found to be 10 inches and the Duriron pipe was found to be 8 inches. Furthermore, there was no hub between the stainless and Duriron sections of the drain line. The Duriron pipe, being the smaller diameter, had been inserted into the stainless steel line and then the two sections of pipe had been wrapped with tape. Apparently, the concrete had been poured around the tape to provide a type of seal.

The second section of concrete was encountered on the drain line approximately 6 to 8 inches beyond the first one. This section of concrete covered the Duriron line extending toward the building, and only a small section of concrete over the Duriron drain line was removed to enable the sump and elbow containing the blockage to be removed. It

Figure 3-2. Excavation of drain line.

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Figure 3-3. Excavated drain line.

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was observed that the exposed Duriron line had a 3 to 4 inch crack in it (see Figure 3-1). To excavate further would require additional chipping of the concrete around the Duriron drain line with the accompanying risk of damaging the brittle Duriron. It was concluded that further excavation would not be prudent (see Section 3.7) and would only cause further degradation of the drain line. The excavation work was completed on September 14, 1993.

During the course of excavation activities, liquids were observed flowing from beneath and along the drain line and into the excavation pit. On September 3, 1993, liquids were pumped from the excavation pit (6 drums) to allow work to continue.

3.7 CUT DRAIN LINE AND REMOVE ELBOW; CAP END OF DRAIN LINE

The work plan called for making two line cuts using a cutting torch. Both cuts were to be in the stainless steel elbow. The first cut would sever the elbow just below where a coupling was thought to connect it with the Duriron line. The second cut would sever the elbow from the sump, allowing the sump to be lifted from the ground.

As previously discussed, the construction of the drain line was not as indicated on the available drawings. An obstruction was found in the elbow and low levels of organic vapors were detected inside the line. In addition, the only suitable location for capping the line was the exposed section of Duriron that had a limited clearance for affixing the external compression plug and included a crack beyond the area that could be sealed by the external cap. Exposing additional Duriron pipe would have required chipping away the concrete surrounding the pipe. It was concluded that the risk of further damage to the Duriron pipe during concrete removal could prevent capping of the line as required in the RAWP. As a result, the original plan to cut the stainless steel pipe with a torch and affix the external compression cap could not be implemented and field changes were implemented as follows:

- Using a manual circular pipe cutter, the Duriron drain line was cut on September 17, 1993 prior to removing the sump. The cut was made approximately 8 inches from the point at which the Duriron line entered the stainless steel elbow connected to the sump. The stainless steel elbow was removed with the sump.

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- A temporary inflatable plug was inserted into the Duriron line until an internal compression plug could be obtained. For added assurance, the temporary plug was left in place and the internal compression plug was installed in the Duriron line on October 12, 1993. Both plugs were placed beyond the crack in the line (Figure 3-1).

3.8 REMOVE SUMP

On September 17, 1993 preparations were made to remove the sump. Holes were cut in the top of the sump for attachment of lift slings. Impermeable ground cover sheeting was spread out for placement of the sump once it was removed. Accumulated solid material had been removed from the bottom of the sump the previous day and the sump had been triple rinsed. Limited excavation (augering) around the sump to loosen the soil was completed previously.

The lift harnesses were connected to the sump, and the sump and attached elbow were lifted by crane from the excavation and placed on the prepared impermeable ground cover sheeting (Figure 3-4). The stainless steel sump and elbow were wrapped in the impermeable ground cover sheeting to protect against run-off until they could be separated and cut. The elbow was cleaned prior to cutting it from the sump. On October 11 and 12, 1993, the sump was cut in half and the size reduced elbow and sump sections were placed into a white metal box for storage (see Section 4.0 for current location).

3.9 INSPECT DRAIN LINE INTERNALLY

The camera crew returned to the site on September 23, 1993 to perform the internal line inspection. The equipment was checked and prepared for insertion into the sump drain line. The cable was inserted into a protective sleeve. The camera and portions of the explosion proof tractor were taped to minimize contamination. Preparation of the line for insertion of the camera required that the accumulated water in the line be drained and containerized. This was accomplished by slowly deflating the plug in the line and allowing the accumulated water to collect on the impermeable ground cover sheeting beneath the drain. The water was then pumped into drums and placed into a RCRA storage area (see Section 4.0 for location).

Figure 3-4. Sump removal.

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Next, the camera was mounted onto the tractor and inserted into the line. The camera traveled a few inches before encountering a clay-like material blocking the line. The camera lens became coated with this material and no visual images could be displayed on the TV monitor. The camera was removed from the line and its lens cleaned. Additional material was raked from the line and the camera reinserted for a second inspection attempt. After several attempts, the camera was successfully inserted 4 to 6 feet into the drain line. The camera inspection showed the branching connection approximately 6 feet into the line which confirmed the lateral drain intersection shown in the 1952 drawing. No further evidence of cracks or openings were detected by the inspection.

The camera inspection indicated the line blockage was not local but rather appeared to extend throughout the length of the line. Because of the volume and extent of this material in the drain line, the internal inspection could not be performed beyond approximately 4 to 6 feet from the open end of the drain line. The drain line plug discussed in Section 3.7 was reinserted. The small amount of clay-like material removed from the drain line was collected and sent to the laboratory for analysis (described in Section 3.11.1).

3.10 BACKFILL THE SITE

The Pilot Plant Sump area excavations were backfilled during the week of October 11, 1993. The soils used met the management guidelines established for soils used for backfill under Removal Action No. 17, "Improved Storage of Soil and Debris." The conditions of the site following placement of the backfill are shown on Figure 3-5.

3.11 SAMPLE COLLECTION

Samples of both the sump contents (liquids and sediments) and surrounding soil (immediately adjacent to and underlying the sump and piping) were collected and submitted to laboratories for analysis. Table 3-1 provides an overview of the sampling activities. Compounds included in the Hazardous Substance List (HSL) specified for various analyses are presented in Table 3-2. QA/QC samples and procedures (described in Section 3.11.3) accompanied all water and soil sampling events. Complete data packages, including full QA/QC results are maintained in the CERCLA/RCRA Unit 3 (CRU3) project files and are available upon request.

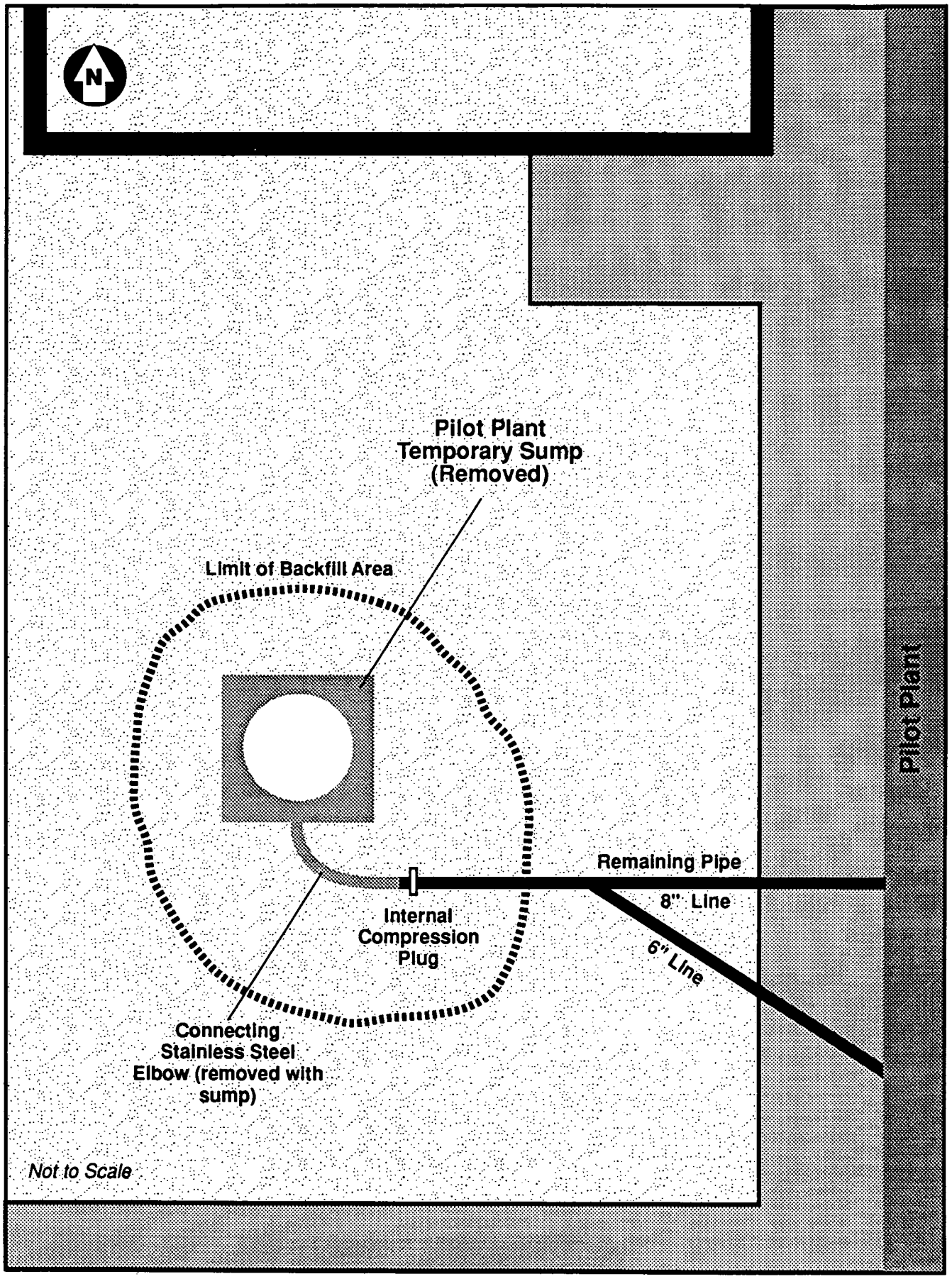

Figure 3-5. Pilot Plant Sump post-removal conditions.

Table 3-2. Hazardous Substance List (HSL) analytes.

CAS Number	Compound
HSL Inorganics:	
7429-90-5	Aluminum
7440-36-0	Antimony
7440-38-2	Arsenic
7440-39-3	Barium
7440-41-7	Beryllium
7440-43-9	Cadmium
7440-70-2	Calcium
7440-47-3	Chromium
7440-48-4	Cobalt
7440-50-8	Copper
7439-89-6	Iron
7439-92-1	Lead
7439-95-4	Magnesium
7439-96-5	Manganese
7439-97-6	Mercury
7440-02-0	Nickel
7440-09-7	Potassium
7782-49-2	Selenium
7440-22-4	Silver
7440-23-5	Sodium
7440-28-0	Thallium
7440-62-2	Vanadium
7440-66-6	Zinc
151-50-8, 143-33-9	Cyanide
7439-98-7	Molybdenum
7440-21-3	Silicon
HSL VOCs:	
74-87-3	Chloromethane
74-83-9	Bromomethane
75-01-4	Vinyl Chloride
75-00-3	Chloroethane
75-09-2	Methylene Chloride
67-64-1	Acetone
75-15-0	Carbon Disulfide
75-35-4	1,1-Dichloroethene
75-34-3	1,1-Dichloroethane
540-59-0	1,2-Dichloroethene (total)
67-66-3	Chloroform
107-06-2	1,2-Dichloroethane
78-93-3	2-Butanone
71-55-6	1,1,1-Trichloroethane
56-23-5	Carbon Tetrachloride
108-05-4	Vinyl Acetate
75-27-4	Bromodichloromethane

Table 3-2. Hazardous Substance List (HSL) analytes.

CAS Number	Compound
78-87-5	1,2-Dichloropropane
10061-01-5	cis-1,3-Dichloropropene
79-01-6	Trichloroethene
124-48-1	Dibromochloromethane
79-00-5	1,1,2-Trichloroethane
71-43-2	Benzene
10061-02-6	trans-1,3-Dichloropropene
75-25-2	Bromoform
108-10-1	4-Methyl-2-pentanone
591-78-6	2-Hexanone
127-18-4	Tetrachloroethene
79-34-5	1,1,2,2-Tetrachloroethane
108-88-3	Toluene
108-90-7	Chlorobenzene
100-41-4	Ethylbenzene
100-42-5	Styrene
1330-20-7	Xylene (total)
HSL SVOCs:	
108-95-2	Phenol
111-44-4	bis(2-Chloroethyl)Ether
95-57-8	2-Chlorophenol
541-73-1	1,3-Dichlorobenzene
106-46-7	1,4-Dichlorobenzene
100-51-6	Benzyl alcohol
95-50-1	1,2-Dichlorobenzene
95-48-7	2-Methylphenol
108-60-1	bis(2-Chloroisopropyl) ether
106-44-5	4-Methylphenol
621-64-7	N-Nitroso-di-n-propylamine
67-72-1	Hexachloroethane
98-95-3	Nitrobenzene
78-59-1	Isophorone
88-75-5	2-Nitrophenol
105-67-9	2,4-Dimethylphenol
65-85-0	Benzoic acid
111-91-1	bis(2-Chloroethyoxy)methane
120-83-2	2,4-Dichlorophenol
120-82-1	1,2,4-Trichlorobenzene
91-20-3	Naphthalene
106-47-8	4-Chloroaniline
87-68-3	Hexachlorobutadiene
59-50-7	4-Chloro-3-methylphenol
91-57-6	2-Methylnaphthalene
77-47-4	Hexachlorocyclopentadiene
88-06-2	2,4,6-Trichlorophenol
95-95-4	2,4,5-Trichlorophenol

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Table 3-2. Hazardous Substance List (HSL) analytes.

CAS Number	Compound
91-58-7	2-Chloronaphthalene
88-74-4	2-Nitroaniline
131-11-3	Dimethylphthalate
208-96-8	Acenaphthylene
606-20-2	2,6-Dinitrotoluene
99-09-2	3-Nitroaniline
83-32-9	Acenaphthene
51-28-5	2,4-Dinitrophenol
100-02-7	4-Nitrophenol
132-64-9	Dibenzofuran
121-14-2	2,4-Dinitrotoluene
84-66-2	Diethylphthalate
7005-72-3	4-Chlorophenyl-phenyl ether
86-73-7	Fluorene
100-01-6	4-Nitroaniline
534-52-1	4,6-Dinitro-2-methylphenol
86-30-6	N-Nitrosodiphenylamine
101-55-3	4-Bromophenyl-phenyl ether
118-74-1	Hexachlorobenzene
87-86-5	Pentachlorophenol
85-01-8	Phenanthrene
120-12-7	Anthracene
86-74-8	Carbazole
84-74-2	Di-n-butylphthalate
206-44-0	Fluoranthene
129-00-0	Pyrene
85-68-7	Butylbenzylphthalate
91-94-1	3,3'-Dichlorobenzidine
56-55-3	Benzo(a)anthracene
218-01-9	Chrysene
117-81-7	bis(2-Ethylhexyl)phthalate
117-84-0	Di-n-octylphthalate
205-99-2	Benzo(b)fluoranthene
207-08-9	Benzo(k)fluoranthene
50-32-8	Benzo(a)pyrene
193-39-5	Indeno(1,2,3-cd)pyrene
53-70-3	Dibenzo(a,h)anthracene
191-24-2	Benzo(g,h,i)perylene
HSL Pesticides/PCBs:	
319-84-6	alpha-BHC
319-85-7	beta-BHC
319-86-8	delta-BHC
58-89-9	gamma-BHC
76-44-8	Heptachlor
309-00-2	Aldrin
1024-57-3	Hept Epoxide

Table 3-2. Hazardous Substance List (HSL) analytes.

CAS Number	Compound
959-98-8	Endosulfan I
60-57-1	Dieldrin
72-55-9	4,4'-DDE
72-20-8	Endrin
33213-65-9	Endosulfan II
72-54-8	4,4'-DDD
1031-07-8	Endosulfan Sulfate
50-29-3	4,4'-DDT
72-43-5	Methoxychlor
53494-70-5	Endrin Ketone
7421-36-3	Endrin Aldehyde
5103-71-9	A-Chlordane
5103-74-2	G-Chlordane
8001-35-2	Toxaphene
12674-11-2	Aroclor-1016
11104-28-2	Aroclor-1221
11141-16-5	Aroclor-1232
53469-21-9	Aroclor-1242
12672-29-6	Aroclor-1248
11097-69-1	Aroclor-1254
11096-82-5	Aroclor-1260

Liquid samples were collected from the drums following pumping and followed the FEMP SCQ Section K.5.5 procedure for drum sampling. Table 3-3 presents the date, identification, and analyses for liquid samples. Soil sampling followed the SCQ Section K.5.3 procedure for subsurface sampling and included soil surrounding the sump and piping. Sediment accumulated in the sump and pipe was removed and collected in drums before being sampled. Samples collected for soil and sediment are presented in Table 3-4 with sample locations shown on Figure 3-6.

Six differences in the details of the sampling and analysis identified in the RAWP occurred in the plan implementation, although the overall RAWP sampling program was fully implemented. Soil sampling presented in the RAWP was to occur following removal of the sump. However, soil sampling was conducted prior to the removal to allow soil characterization from undisturbed locations. Soil sampling from beneath the sump did occur following the sump removal. Soil and sediment sample requests for analysis of pesticides also included polychlorinated biphenyls (PCBs), although this was not included in the RAWP. Resampling was required for locations SP-3 and SP-4 because the original samples exceeded the holding time limit for pesticide analysis. Because excavation had occurred prior to resampling, the resampled locations were moved 5 feet further out from the sump. TCLP metals and volatiles analyses were added to characterize the soil likely to be excavated to provide characterization for disposal purposes. The full HSL volatile organic analyses (VOAs) and HSL inorganics were requested rather than the more limited list of contaminants specified in the RAWP. Lead 210 was not analyzed for any samples as it is not easily analyzed by the laboratory and is considered of lower importance for the site because of its low position in the uranium decay chain.

3.11.1 Collection and Analysis of Sump Contents

Samples were collected from drums filled during pumping of the sump to characterize the sump contents. Liquid contents of the sump were collected for analysis on August 5, 1993. Water from within the sump was collected by use of a sludge judge (a sampling device similar to a colliwasa with a trap valve at the base) from which containers were filled. A trip blank, field blank, rinseate blank, and duplicate also were submitted. Samples of the sump liquid contents were submitted to laboratories for analysis as described in Table 3-3.

Table 3-3. Liquid samples and analyses.

Location Identification	Sample Number	Analis Number	Sample Pt No	ASL Level	Date Collected	Analyses Requested[1/]
Sampling Event—Sump Liquid Contents:						
Trip blank	93-300-8562	930809-132	TB	D	8/5/93	HSL VOCs
Field blank	93-300-8563	930807-018	FB	D	8/5/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, HSL Pesticides/PCBs, HSL SVOCs, HSL VOCs, HSL Inorganics,
Rinse blank	93-300-8564	930807-017	RB	D	8/5/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, HSL Pesticides/PCBs, HSL SVOCs, HSL VOCs, HSL Inorganics
Sump Contents	93-300-8565	930807-015	SP-1	D	8/5/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, HSL Pesticides/PCBs, HSL SVOCs, HSL VOCs, HSL Inorganics, Flash Point
Duplicate (SP-1)	93-300-8566	930807-016	SP-1d	D	8/5/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, HSL Pesticides/PCBs, HSL SVOCs, HSL VOCs, HSL Inorganics, Flash Point

Notes:
1/ HSL Inorganics, HSL VOCs, HSL SVOCs, and HSL Pesticides/PCBs are identified on Table 3-2

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Table 3-4. Soil and sediment samples and analyses.

Location Identification	Sample Number	Analis Number	Sample Pt No	ASL Level	Date Collected	Analyses Requested
Sampling Event—Soil Around Sump Perimeter:						
Trip Blank	93-300-8507	930804-030	TB	C	8/2/93	HSL VOCs
Rinse blank	93-300-8508	930804-031	RB	C	8/2/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, Ra-226, Ac-227[1/], Pa-231[1/], HSL VOCs, HSL Pesticides/PCBs, metals[2/]
Field blank	93-300-8509	930804-032	FB	C	8/2/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, Ra-226, Ac-227[1/], Pa-231[1/], HSL VOCs, HSL Pesticides/PCBs, metals[2/]
North, 6' depth	93-300-8510	930804-033	SP-2	C	8/3/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, Ra-226, Ac-227[1/], Pa-231[1/], HSL VOCs, HSL Pesticides/PCBs, metals[2/], TCLP metals, TCLP Volatiles
East, 12' depth	93-300-8511	930804-034	SP-3	C	8/3/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, Ra-226, Ac-227[1/], Pa-231[1/], HSL VOCs, HSL Pesticides/PCBs, metals[2/], TCLP metals, TCLP Volatiles
South, 11' depth	93-300-8512	930805-014	SP-4	C	8/4/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, Ra-226, Ac-227[1/], Pa-231[1/], HSL VOCs, HSL Pesticides/PCBs, metals[2/], TCLP metals, TCLP Volatiles
West, 6' depth	93-300-8513	930805-015	SP-5	C	8/4/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, Ra-226, Ac-227[1/], Pa-231[1/], HSL VOCs, HSL Pesticides/PCBs, metals[2/], TCLP metals, TCLP Volatiles
Duplicate (SP-3)	93-300-8514	930804-035	SP-7	C	8/3/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, Ra-226, Ac-227[1/], Pa-231[1/], HSL, VOCs, HSL Pesticides/PCBs, metals[2/], TCLP metals, TCLP Volatiles
Sampling Event—Soil Under Drain Line:						
Trip blank	93-300-8641	930825-022	TB	C	8/23/93	HSL VOCs
Field blank	93-300-8642	930825-023	FB	C	8/23/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, Ra-226, Ac-227[1/], Pa-231[1/], HSL Pesticides/PCBs, HSL SVOCs, HSL VOCs, HSL Inorganics
Rinse blank	93-300-8643	930825-024	RB	C	8/23/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, Ra-226, Ac-227[1/], Pa-231[1/], HSL Pesticides/PCBs, HSL SVOCs, HSL VOCs, HSL Inorganics
Drain Line, 3-4' depth	93-300-8646	930825-025	SP-6	C	8/23/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, Ra-226, Ac-227[1/], Pa-231[1/], HSL Pesticides/PCBs, HSL SVOCs, HSL VOCs, HSL Inorganics

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Table 3-4. Soil and sediment samples and analyses.

Location Identification	Sample Number	Analis Number	Sample Pt No	ASL Level	Date Collected	Analyses Requested
Sampling Event—Sump Contents, Soil Beneath Sump and Sump Perimeter Re-sample (Pesticides/PCBs):						
Trip blank	93-300-8692	930927-040	TB	D	9/22/93	HSL VOCs
Rinse blank	93-300-8693	930922-073	RB	D	9/22/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, HSL Pesticides/PCBs, HSL VOCs, HSL SVOCs, HSL Inorganics
Field blank	93-300-8694	930922-072	FB	D	9/22/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, HSL Pesticides/PCBs, HSL VOCs, HSL SVOCs, HSL Inorganics
Sump sludge	93-300-8695	930922-076	Sump-3	D	9/22/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, HSL Pesticides/PCBs, HSL VOCs, HSL SVOCs, HSL Inorganics
Under sump-11'	93-300-8644	930922-074	SP-1a	D	9/22/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, HSL Pesticides/PCBs, HSL VOCs, HSL SVOCs, HSL Inorganics
Under sump-12'	93-300-8645	930922-075	SP-1b	D	9/22/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, HSL Pesticides/PCBs, HSL VOCs, HSL SVOCs, HSL Inorganics
North, 6' depth	93-300-8510	930804-033	SP-2	C	9/22/93	HSL Pesticides/PCBs
East, 12' depth	93-300-8511	930804-034	SP-3	C	9/22/93	HSL Pesticides/PCBs
South, 11' depth	93-300-8512	930805-014	SP-4	C	9/22/93	HSL Pesticides/PCBs
West, 6' depth	93-300-8513	930805-015	SP-5	C	9/22/93	HSL Pesticides/PCBs
Duplicate (SP-3)	93-300-8514	930804-035	SP-7	C	9/22/93	HSL Pesticides/PCBs
Sampling Event—Drain Line Sediment:						
Trip blank	93-300-8828	931005-022	TB	C	10/4/93	HSL VOCs
Drain line	93-300-8829	931005-021	D-1	C	10/4/93	Gross Alpha/Beta, Isotopic U, Isotopic Th, HSL Inorganics, HSL VOCs, HSL SVOCs, HSL Pesticides/PCBs

Notes:
1/ Ac-227 and Pa-231 are quantified indirectly based on U-235 activity
2/ Metals include arsenic, barium, cadmium, chromium, lead, mercury, selenuim, and silver

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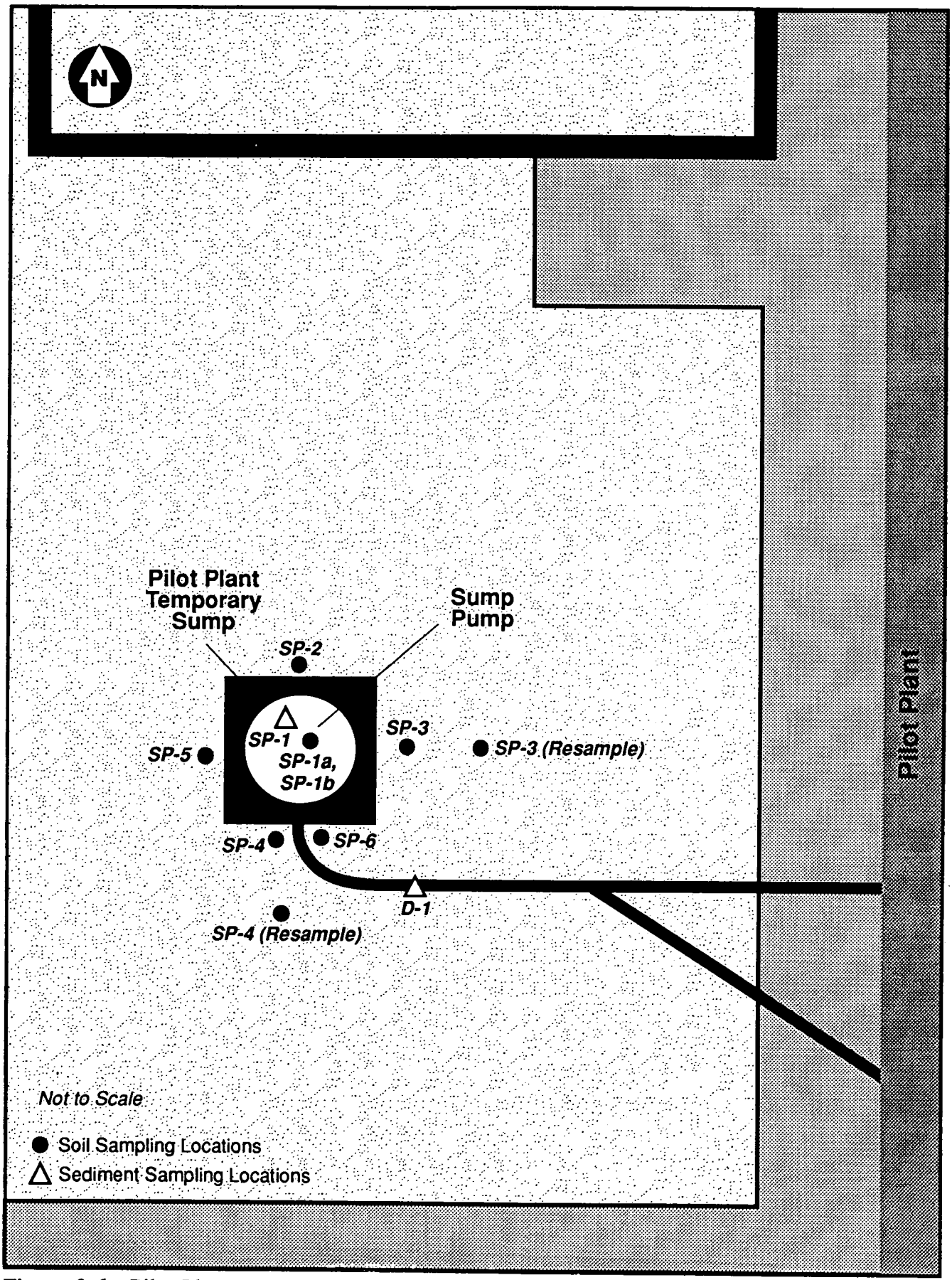

Figure 3-6. Pilot Plant Sump soil and sediment sampling locations.

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Following removal of the sump rinseates, sediment residues were observed on the sump bottom and sampled on September 22, 1993. Water was added to the sediment to form a slurry, which was then pumped into a drum. The sediment sample was collected from the drum and analyzed as described in Table 3-4.

Internal inspection of the drain line that remains revealed the presence of sediment. The drain line sediment was sampled on October 4, 1993 along with a rinse blank and a field blank. The sample was collected from material that was removed to facilitate the in-pipe camera inspection. The sediment was placed into a drum from which the sample was collected and submitted for analysis as described in Table 3-4.

3.11.2 Collection and Analysis of Soil Samples

Samples were collected to characterize the soil adjacent to and beneath the sump and pipe. On August 3 and 4, 1993, augering was conducted adjacent to the sump at the four primary compass points to depths of 12 feet. At each of the four locations, samples were collected continuously at 1-foot intervals and field screened for organic vapors, and alpha, beta, and gamma activities. The interval with the highest indication of contamination for each boring was submitted for analysis. Sample depths are indicated on Table 3-4. These samples were collected prior to the sump removal rather than afterwards (as specified in the RAWP) to allow collection of undisturbed samples. A trip blank, field blank, rinseate blank, and duplicate also were submitted. Samples were analyzed as described in Table 3-4.

On August 23, 1993, a soil sample was collected from the 3- to 4-foot depth interval that underlays the sump drain inlet. The sample was proposed in the RAWP to be collected following removal of the sump, but was conducted beforehand to provide better representation of conditions by collecting an undisturbed sample. A trip blank, field blank, rinseate blank, and duplicate also were submitted. The samples were analyzed as described in Table 3-4.

Following sump removal, samples were collected on September 22, 1993, from the 10- to 11-foot and 11- to 12-foot depth intervals that underlay the sump. A trip blank, field blank, rinseate blank, and duplicate also were submitted. These samples were analyzed as described in Table 3-4. In addition, samples SP-2 through SP-5 were recollected on September 22 for analysis of pesticides because the laboratory had exceeded its holding time for pesticides. Sample points SP-3 and SP-4 were relocated approximately 5 feet

further out from the sump because drain line excavation had already occurred in the original sampling locations.

3.11.3 Quality Assurance/Quality Control

QA/QC samples followed specifications presented in the RAWP and are indicated on Tables 3-2 and 3-3. QA/QC samples comprised trip blanks, field blanks, rinseate blanks, and duplicate samples for all sampling activities conducted, including a complete set of QA/QC samples for each day that sampling occurred. QA/QC samples were analyzed for the same analytes as the environmental samples. Trip blanks for volatile organic compounds (VOCs) analysis are laboratory-filled samples that accompany sample containers during shipping and sampling. Field blanks were collected by filling sample containers directly with laboratory-grade de-ionized (DI) water prior to the collection of environmental samples. Rinseate blanks were collected by pouring DI water over the sampling equipment into the containers. Duplicate liquid samples were collected by filling additional containers at the same time as the environmental sample. Duplicate soil samples were collected along with environmental samples by dividing the sample and filling two sets of containers.

3.11.4 Decontamination of Sampling Equipment

Sampling equipment was decontaminated prior to use and following sample collection by washing and rinsing. The procedure involved two washes and a rinse. Wash buckets contained tap water with a laboratory-grade detergent. The rinse bucket contained DI water.

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4.0 WASTE MANAGEMENT AND DISPOSITION

Several work activities associated with this removal action produced waste. Management of the wastes followed the guidance of existing FEMP waste minimization and management programs. Types of wastes produced include the following:

- Sump contents
- Sump hardware
- Excavated soil
- Sampling waste
- Decontamination waste
- Personal protective equipment (PPE).

Wastes and contaminated soils removed during the removal action were containerized and placed into appropriate storage based on the waste characterization. The appropriate storage for each category is presented below.

4.1 SUMP CONTENTS

Prior to the implementation of this removal action, it was suspected that the source of the liquids in the sump was process residues remaining in the abandoned and concrete covered floor process drains under the Pilot Plant. A series of eight pump-outs of the sump were implemented to empty the drain line between July 31, 1992 and May 20, 1993. A total of 1,245 gallons of liquid were removed from the sump during the course of these pump outs. Air sparging was used to agitate solids within the sump and facilitate their removal. Within 24 to 48 hours after each pump out, the sump would refill to a depth of 27 to 34 inches from the top of the sump. The liquid capacity of the drain lines, based on line lengths and diameters as shown on available drawings of the area, was estimated to be 500 gallons.

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Groundwater seepage into the drain line is now considered to be one probable source of the sump liquids because of the following: the repeated refilling of the sump; the total liquid volume removed (over 1,200 gallons); and, the apparent dilution of sump liquid contaminants (based on observation and subsequent analysis). The liquids removed during these eight pre-removal pump-outs were collected in 55-gallon polyethylene drums and transferred from the Pilot Plant to the KC2 Warehouse, a RCRA storage area on site.

For Removal Action No. 24, the liquids in the sump were removed on several occasions during the work process. Solid materials in the bottom of the sump were removed prior to removal of the sump from the ground. As discussed above, the suspected source of the sump liquids also included groundwater. Regardless, another pump out of the sump was necessary because the liquid had to be removed from the sump to access the drain line opening in the sump for the line clean out and internal inspection of the drain line. The liquids from this sump pump-out were also collected in 55-gallon polyethylene drums and transferred from the Pilot Plant to the KC2 Warehouse like the previous sump pump-outs. The solids from the bottom of the sump were collected in 55-gallon DOT approved steel drums for storage.

4.2 SUMP HARDWARE

Sump hardware includes the sump with attached inlet pipe stub, the installed pump and its associated piping, and the concrete sump apron. The sump hardware was placed in a white metal box for storage and is being managed as mixed waste pending further decontamination/characterization.

The concrete sump apron and the concrete from around the drain line were broken apart and removed. These materials were placed into six 55-gallon DOT approved steel drums for storage.

The sump was lifted by a crane from the excavation and placed on prepared impermeable ground cover sheeting. The stainless steel sump was wrapped in an impermeable ground cover sheeting to protect against run-off until the attached elbow could be separated from the sump. The sump was then cut in half, the size reduced elbow and sump sections placed into a white metal box, and all were taken to the Decommissioning and Decontamination facility. Subsequent attempts at decontamination of the sump sections to achieve a clean debris surface, as defined in 40 C.F.R. 268.45,

were not successful and the boxed sections are being moved to the designated RCRA storage area for management as mixed waste.

4.3 EXCAVATED SOIL

The initial excavation of the soil from around the sump and the drain line was accomplished with a small backhoe. To prevent damage to the line, laborers using hand tools assisted in the excavation in the areas close to the lines. The excavated soil was placed into thirty-eight 55-gallon DOT approved steel drums and transferred from the Pilot Plant to the Building 64 for storage. Materials in 90-day storage at Building 64 are automatically transferred to the Plant 1 pad RCRA storage area before 90 days.

4.4 SAMPLING WASTE

Samples were collected from the liquid contents of the sump prior to removing it, and from the soil surrounding the sump prior to its removal. Additional soil samples were collected from beneath the sump after it had been removed. Sampling wastes consisted of excess material retrieved from each sample that was not used for chemical and radiological characterization analyses. These wastes were generated primarily from loose material that clung to the sampling equipment as it was retracted from the sample collection point. Although some residual material clung to the exterior of the sampler and was transferred to the laboratory, the bulk of this material fell back into the sump or soil sample casing, or was collected within the plastic sheeting used to surround and contain the sampling apparatus.

The sampling wastes were left in place and subsequently removed with the soil excavated from around the sump. This soil was placed in 55-gallon DOT approved steel drums and stored in Building 64.

4.5 DECONTAMINATION WASTE

Decontamination wastes were generated by field decontamination activities. These decontamination activities consisted of dry or wet wipe downs, simple two-stage soap and water stations, and high or low pressure water/detergent spray systems. Field decontamination was only performed on materials that contacted the sump contents and were suspected to be radiologically and chemically contaminated. The decontamination

wastes were handled, treated (e.g., absorbed), labeled, and stored in the KC2 Warehouse as mixed waste.

These wastes consisted of water (approximately 200 gallons) and were placed in 55-gallon polyethylene drums with the liquid waste from the groundwater around the sump and accumulated rain water from the excavation. They were stored in the KC-2 Warehouse.

4.6 PERSONAL PROTECTIVE EQUIPMENT

PPE was worn during field activities. Two categories of protective clothing wastes were generated: disposable and reusable. Examples of disposable protective clothing were surgeon's gloves, and examples of clothing that could be decontaminated and reused were booties and respirators. The small quantities of PPE wastes generated by the activities were managed, or cleaned and reused, in accordance with existing SOPs (FMPC-0515, FMPC-2128, RM-0009I, FMPC-2152).

5.0 ANALYTICAL RESULTS

5.1 DATA VALIDATION

Analytical results from samples taken in connection with the Pilot Plant Sump removal action were validated to establish their usefulness and defensibility. Results for inorganics/metals, VOCs, SVOCs, pesticides/PCBs, TCLP metals, and volatile organics were validated according to the criteria contained in Section D of the *FEMP Sitewide CERCLA Quality Assurance Project Plan* (SCQ [FD-1000, 7/15/92]). Results from total uranium and thorium, isotopic uranium, thorium, and radium, and gross alpha and gross beta analyses were validated according to *Guidelines for ASL C (and D) Validation of TCT/CORE Laboratory Radiological Data Packages* (Ebasco Environmental) developed for FEMP data validation efforts.

A summary of the data qualifiers assigned to sample results is presented in Attachment A, along with data validation reports. Although a number of analytical results were qualified as estimated due to various minor deficiencies, the overall data quality is sufficient for use to characterize the removal action. However, caution should be exercised in the use of data qualified as nondetects due to the presence of method or field blank contamination. Complete data packages, including laboratory QC results, are maintained in the CRU3 project files.

Certain results presented in the results tables should be viewed cautiously as a result of analytical interferences. The relatively high levels of solid materials in the sump liquid, thorium in particular, are known to produce erroneous results for other metals. Further, the relatively high levels of certain contaminants required significant dilution of the sample prior to analysis, resulting in an increased degree of potential error in the final result. As a further example of analytical interference, thorium isotopic analyses were unable to be completed as a result of the formation of an insoluble gel-like fluoride during the final co-precipitation for sample mounting.

Protactinium-231 and Actinium-227 were identified as analytes in the RAWP. However, they will be quantified indirectly based on the Uranium-235 activity level. Lead-210 was also identified, but could not be analyzed by the laboratory. This radionuclide is low on the uranium decay chain and should not have been included in the RAWP.

5.2 ANALYTICAL RESULTS FOR WATER SAMPLES

Water samples were collected for the sump contents and rinseates from equipment/ materials decontamination. Results of these analyses are summarized for detected compounds in Table 5-1.

The liquid sump contents were sampled on one occasion during the removal action. One sample and a duplicate were collected. Overall, the sample indicates elevated levels of metals and radionuclides as well as the presence of numerous organic compounds in the water. Results of metals analyses indicate generally high concentrations of metals. The duplicate sample has reported concentrations in which some are consistent with the environmental sample (e.g., aluminum, lead, magnesium) and some contrast by up to one order in magnitude (e.g., antimony, nickel, molybdenum). Because these are unfiltered samples, the results that show discrepancies between the sample and its duplicate may reflect different amounts of suspended sediment within the samples. The two samples show fairly consistent reporting of 1,1,1-trichloroethane (TCA), tetrachloroethene (PCE), several semivolatile organic compounds (SVOCs), and Endrin. The results are consistent with sampling that preceded the removal action (see Table 2-1).

The results from analysis of the sump liquid contents were compared to TCLP regulatory levels, and the SP-1 and SP-1d samples were found to exceed the criteria for lead (5 mg/L) and PCE (0.7 mg/L).

5.3 ANALYTICAL RESULTS FOR SOIL AND SEDIMENT SAMPLES

Soil samples were collected adjacent to and beneath the sump and associated piping. Sediment samples were collected from within the sump and the inlet pipe. Results of these analyses are summarized for detected compounds in Table 5-2.

5.3.1 Soil

Soil samples were collected at four locations adjacent to the sump at depth varying between 6 and 12 feet (SP-2 to -5), beneath the sump at depth of 11 and 12 feet (SP-1a, -1b), and beneath the inlet pipe at 3 to 4 feet (SP-6). The metals distribution, when compared to the FEMP Background Soil Study (FERMCO 1993) values for the upper tolerance limit (UTL) as shown in Table 5-2, appears within the normal background

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Table 5-1. Detections in liquid samples.

Analytes	Sample Identification	
	930807-015 Sump Contents (SP-1)	930807-016 Duplicate SP-1 (SP-1d)
Inorganics (mg/L):		
Aluminum	554000 J	482000 J
Antimony	11.9 J	257 J
Arsenic	120 J	68.8 J
Barium	31900 J	27600 J
Cadmium	84 J	87 J
Calcium	80500 J	87900 J
Chromium	3770 J	3320 J
Cobalt	84 J	76 J
Copper	34800 J	30600 J
Iron	703000 J	491000 J
Lead	30600 J	28800 J
Magnesium	53500 J	56400 J
Manganese	936 J	958 J
Mercury	1.6 J	--
Molybdenum	1260 J	9710 J
Nickel	5.5 J	562 J
Potassium	9790	8930
Selenium	36.4 J	12.2 J
Sodium	28400	29100
Vanadium	1770 J	1520 J
Zinc	1280 J	1250 J
Cyanide[1/]	172000 J	324000 J
VOCs (μg/L):		
1,1,1-Trichloroethane (TCA)	81000	78000 J
Tetrachloroethene (PCE)	6600 J	6100
SVOCs (μg/L):		
Napthalene	350	50 J
2-Methylnaphthalene	82 J	--
2-Nitrophenol	--	31 J
Di-n-butylphthalate	120 J	2000 J
Fluoranthene	1000	18 J
Pyrene	91 J	--
Butylbenzylphthalate	190 J	20 J
3,3'-Dichlorobenzidine	200 U	--

Table 5-1. Detections in liquid samples.

Analytes	Sample Identification	
	930807-015 Sump Contents (SP-1)	930807-016 Duplicate SP-1 (SP-1d)
Benzo(a)anthracene	27 J	--
Chrysene	36 J	--
Benzo(b)fluoranthene	36 J	--
Benzo(k)fluoranthene	26 J	--
Pesticides/PCBs (μg/L):		
Endrin	15	5.5 J
Radionuclides:		
Gross Alpha (pCi/L)	3100	4100
Gross Beta (pCi/L)	1500	2000
Total Uranium (mg/L)	183000	NA
U-234 (pCi/L)	71100 ±50100	NA
U-235 (pCi/L)	8580 ±6610	NA
U-238 (pCi/L)	41900 ±29700	NA
Th-228 (pCi/L)2/	56000 ±58100	111000 ±94200
Th-230 (pCi/L)2/	29700 ±99000	12500 ±103000
Th-232 (pCi/L)	101000±78100	174000 ±115000
Flash Point (°F):	>200	>200

Laboratory Data Qualifiers:
U = The analyte concentration was not greater than the minimum detectable concentration (MDC) reported for the method
UJ = The analyte concentration was not greater than the MDC but deficiencies in data quality make the nondetect estimated
J = The analyte concentration was detected at a level greater than the MDC but deficiencies in data quality make the detection estimated
R = Deficiencies in data qulaity make the results unusable
N = Presumptive evidence exists for the presence of the analyte but the concentration cannot be quantified due to deficiencies in data quality

Notes:
NA = Not analyzed
-- = Not detected above method detection limit
1/ High reported concentrations for cyanide may be due to sulfide interference
2/ High concentrations of Th-232 caused interference in the detection of Th-228 and Th-230.

Table 5-2. Detections in soil and sediment.

Analytes	Sample Identification										
	Background (UTL)[1/]	930804-033 North, 6' depth (SP-2)	930804-034 East, 12' depth (SP-3)	930805-014 South, 11' depth (SP-4)	930805-015 West, 6' depth (SP-5)	930804-035 Duplicate-SP-3 (SP-7)	930825-025 3-4' depth (SP-6)	930922-076 Sump sediment (Sump-3)	930922-074 Under sump-11' (SP-1a)	930922-075 Under sump-12' (SP-1b)	931005-021 Drain line sediment (D-1)
Inorganics (mg/kg):											
Aluminum	20098	NA	NA	NA	NA	NA	2300	16700	8100	7380	13200
Antimony	6.7	NA	NA	NA	NA	NA	--	20.5 J	--	--	3.6 J
Arsenic	12.52	4.8	3.1	1.7	4.9	1.6	3.3	30.8 J	8.6 J	4.6 J	--
Barium	140.89	142	35.3	42.7	69.8	50.9	85.5 J	884	86.4	93.6	369 J
Beryllium	0.89	NA	NA	NA	NA	NA	1.1	--	--	--	4.7 J
Cadmium	0.59	1.5	--	--	1.4	1.2	--	8.4	--	--	8 J
Calcium	335000	NA	NA	NA	NA	NA	79000 J	11400 J	79300	35800 J	46100 J
Chromium	25.40	24.4	4.5	4.1	14.1	9.7		4780	13.2	11.7	75.8 J
Cobalt	20.96	NA	NA	NA	NA	NA	3	30.4	3.1	9.7	--
Copper	18.55	NA	NA	NA	NA	NA	11	1510	13.6	10.3	444 J
Iron	35315	NA	NA	NA	NA	NA	5700	69200	14000	15800	29900
Lead	17.71	106	6.9	6.4	45.6	19.8	18.4 J	2820	19.4 J	12.3 J	308 J
Magnesium	51599	NA	NA	NA	NA	NA	24900 J	2290 J	31200 J	16800 J	16400 J
Manganese	1279	NA	NA	NA	NA	NA	203	342 J	441 J	823 J	697 J
Mercury	0.29	--	--	--	--	--	--	53.9	0.19	0.15	13.5
Molybdenum	2.7	NA	NA	NA	NA	NA	--	213	--	--	--
Nickel	35.97	NA	NA	NA	NA	NA	--	2350	--	20.3	208 J
Potassium	2946	NA	NA	NA	NA	NA	259	146	1020	881	786
Selenium	0.61	--	--	--	2.6 J	--	--	--	--	--	--
Silicon	2252	NA	NA	NA	NA	NA	169	1250	421	278	--
Silver	2.2	--	--	--	--	--	--	--	--	--	6 J
Sodium	258.94	NA	NA	NA	NA	NA	--	--	520	--	401
Thallium	0.43	NA	NA	NA	NA	NA	0.21	--	--	--	--
Vanadium	49.63	NA	NA	NA	NA	NA	--	74.2	20.5	22.9	40.3
Zinc	66.84	NA	NA	NA	NA	NA	80.6 J	391	--	--	97.5 J
Cyanide	0.11	NA	NA	NA	NA	NA	--	33.5	--	--	1.9

Table 5-2. Detections in soil and sediment.

Analytes	Sample Identification										
	Background (UTL)[1/]	930804-033 North, 6' depth (SP-2)	930804-034 East, 12' depth (SP-3)	930805-014 South, 11' depth (SP-4)	930805-015 West, 6' depth (SP-5)	930804-035 Duplicate-SP-3 (SP-7)	930825-025 3-4' depth (SP-6)	930922-076 Sump sediment (Sump-3)	930922-074 Under sump-11' (SP-1a)	930922-075 Under sump-12' (SP-1b)	931005-021 Drain line sediment (D-1)
TCLP Metals (µg/L):											
Barium	NA	1570	902	868	1330	926	NA	NA	NA	NA	NA
Lead	NA	243 J	--	--	--	--	NA	NA	NA	NA	NA
VOCs (µg/kg):											
1,1-Dichloro-ethane	NA	--	--	--	--	--	--	--	4 J	--	--
2-Butanone	NA	--	--	--	--	--	--	--	19 J	--	--
1,1,1-Trichlor-oethane (TCA)	NA	4 J	--	--	--	--	5 J	1,220,000 NV	18	--	420000 J
Trichloro-ethene	NA	--	--	--	--	--	--	--	6 J	--	--
Tetrachloro-ethene (PCE)	NA	--	--	--	--	--	--	360,000 NV	190	7.49 NV	7500000
Toluene	NA	--	--	--	1	--	--	--	6 J	--	
Xylenes (total)	NA	20	6 J	--	--	5 J	--	185,000 NV	--	--	520000 J
TCLP VOCs (µg/L)											
Trichloro-ethene	NA	--	10 J	9 J	20 J	--	NA	NA	NA	NA	NA
Tetrachloro-ethene (PCE)	NA	4700 J	150 J	72 J	250 J	9 J	NA	NA	NA	NA	NA

Table 5-2. Detections in soil and sediment.

Analytes	Sample Identification										
	Background (UTL)[1/]	930804-033 North, 6' depth (SP-2)	930804-034 East, 12' depth (SP-3)	930805-014 South, 11' depth (SP-4)	930805-015 West, 6' depth (SP-5)	930804-035 Duplicate-SP-3 (SP-7)	930825-025 3-4' depth (SP-6)	930922-076 Sump sediment (Sump-3)	930922-074 Under sump-11' (SP-1a)	930922-075 Under sump-12' (SP-1b)	931005-021 Drain line sediment (D-1)
SVOCs (μg/kg):											
1,4-Dichloro-benzene	NA	NA	NA	NA	NA	NA	NA	89000	--	--	--
1,2,4-Trichlor-obenzene	NA	NA	NA	NA	NA	NA	NA	64000	--	--	--
Napthalene	NA	NA	NA	NA	NA	NA	NA	51000	--	--	12000 J
2-Methylnaph-thalene	NA	NA	NA	NA	NA	NA	NA	11000 J	--	--	--
Hexachloro-benzene	NA	NA	NA	NA	NA	NA	NA	--	--	--	3400 J
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	--	79 J	--	3200 J
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	79000	--	--	--
Di-n-butylph-thalate	NA	NA	NA	NA	NA	NA	NA	1100000 J	--	--	200000
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	24000 J	170 J	--	3400 J
Pyrene	NA	NA	NA	NA	NA	NA	NA	95000	140 J	--	1500 J
Butylbenzyl-phthalate	NA	NA	NA	NA	NA	NA	NA	14000 J	--	--	--
Benzo(a)an-thracene	NA	NA	NA	NA	NA	NA	NA	5400 J	47 J	--	--
Chrysene	NA	NA	NA	NA	NA	NA	NA	7400 J	87 J	--	--
Bis(2-ethyl-hexyl)phtha-late	NA	NA	NA	NA	NA	NA	NA	--	--	--	1900 J
Benzo(b)fluor-anthene	NA	NA	NA	NA	NA	NA	NA	5600 J	87 J	--	--
Benzo(k)fluor-anthene	NA	NA	NA	NA	NA	NA	NA	5000 J	69 J	--	--
Benzo(a)py-rene	NA	NA	NA	NA	NA	NA	NA	--	58 J	--	--

Table 5-2. Detections in soil and sediment.

Analytes	Sample Identification										
	Background (UTL)[1/]	930804-033 North, 6' depth (SP-2)	930804-034 East, 12' depth (SP-3)	930805-014 South, 11' depth (SP-4)	930805-015 West, 6' depth (SP-5)	930804-035 Duplicate-SP-3 (SP-7)	930825-025 3-4' depth (SP-6)	930922-076 Sump sediment (Sump-3)	930922-074 Under sump-11' (SP-1a)	930922-075 Under sump-12' (SP-1b)	931005-021 Drain line sediment (D-1)
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	--	48 J	--	--
Benzo(g,h,i)-perylene	NA	NA	NA	NA	NA	NA	NA	--	48 J	--	--
Pest./PCBs (µg/kg):											
Aroclor-1254	NA	78	--	--	100	--	37	11000	68	--	7500
Radionuclides:											
Gross Alpha (pCi/g)	NA	520	110	29	76	72	250	13000	70	120	5600
Gross Beta (pCi/g)	NA	300	84	36	61	87	140	6000	53	43	2800
Total Uranium (mg/kg)	4.64	461 J	53.9 J	64.7 J	123 J	53.9 J	--	--	--	--	--
U-234 (pCi/g)	1.061	62.8 ±10.4J	12.5 ±1.7J	14.4 ±1.8J	--	--	2.6±1.9 J	208±44 J	39.0±8.5 J	42.5±9.2 J	2760±600
U-234/236 (pCi/g)	NA	--	--	--	--	--	--	--	1.40±0.43 J	--	119±36
U-235 (pCi/g)	NA	3.6 ±5.8 J	0.5 ±0.8 J	0.8 ±1.1 J	--	--	--	--	--	--	--
U-235/236 (pCi/g)	0.177	--	--	--	--	--	--	17.2±3.7 J	--	1.47±0.44 J	--
U-238 (pCi/g)	1.533	62.6 ±10.6J	9.1 ±1.3 J	9.5 ±1.4 J	--	--	1.5±0.4 J	119±25 J	28.4±6.2 J	30.4±6.6 J	1810±400
Th-228 (pCi/g)	1.475	11.5 ±5.5 J	8.2 ±4.3 J	1.1 ±0.2 J	3.7 ±2.0 J	5.1 ±3.1 J	10.2±5.1 J	--	30.5±6.8	25.8±5.6	8500±1880
Th-230 (pCi/g)	2.153	4.3 ±2.1 J	2.3 ±1.3 J	0.7 ±0.2 J	3.6 ±1.9 J	1.7 ±1.1 J	1.5 ±0.9 J	--	10.6±2.4	9.09±2.04	2600±620
Th-232 (pCi/g)	1.458	10.2 ±4.9 J	3.7 ±2.0 J	0.5 ±0.1 J	1.1 ±0.7 J	2.6 ±1.7 J	5.6 ±2.8 J	--	19.6±4.4	17.3±3.8	9240±2040

Table 5-2. Detections in soil and sediment.

Analytes	Sample Identification										
	Background (UTL)[1/]	930804-033 North, 6' depth (SP-2)	930804-034 East, 12' depth (SP-3)	930805-014 South, 11' depth (SP-4)	930805-015 West, 6' depth (SP-5)	930804-035 Duplicate-SP-3 (SP-7)	930825-025 3-4' depth (SP-6)	930922-076 Sump sediment (Sump-3)	930922-074 Under sump-11' (SP-1a)	930922-075 Under sump-12' (SP-1b)	931005-021 Drain line sediment (D-1)
Ra-226 (pCi/g)	1.318	23 ±0.7	5.8 ±0.3	1.1 ±0.2 J	6.2 ±0.3	6.2 ±0.3	5.7 ±0.4 J	--	--	--	--
Pa-231 (pCi/g)[2/]	0.177	3.6 ±5.8 J	0.5 ±0.8 J	0.8 ±1.1 J	--	--	--	17.2 ±3.7 J	--	1.47 ±0.44 J	--
Ac-227 (pCi/g)[2/]	0.177	3.6 ±5.8 J	0.5 ±0.8 J	0.8 ±1.1 J	--	--	--	17.2 ±3.7 J	--	1.47 ±0.44 J	--

Laboratory Data Qualifiers:

U = The analyte concentration was not greater than the minimum detectable concentration (MDC) reported for the method
UJ = The analyte concentration was not greater than the MDC but deficiencies in data quality make the nondetect estimated
J = The analyte concentration was detected at a level greater than the MDC but deficiencies in data quality make the detection estimated
R = Deficiencies in data quality make the results unusable
N = Presumptive evidence exists for the presence of the analyte but the concentration cannot be quantified due to deficiencies in data quality
NV = The analytical result was not validated because laboratory holding times were exceeded for these samples. However, analysis of the samples was pursued and data are reported here as estimated values.

Note:

NA = Not analyzed/Not applicable
-- = Not detected above detection limit

1/ UTL = Upper 95% tolerance limit. Except for cases noted in letter from Dennis Carr (1993), all normally distributed data sets have arithmetic means and all lognormal and undefined data sets have geometric means. The 95 percent tolerance limit is actually the 95 percent confidence limit on the 95th quantile of the data set.

2/ Pa-231 and Ac-227 results are reported as an indirect quantification based on U-235 concentrations and assuming secular equilibrium.

range with a few exceptions. SP-2 exhibits barium just above the UTL and cadmium at slightly higher than the UTL. SP-2, SP-5, and SP-6 exhibit lead concentrations in excess of the UTL, with the highest at SP-2. The only detection for selenium (SP-5) slightly exceeds the UTL. With the exception of sodium at low levels in SP-1a, neither of the soil samples from beneath the sump indicate elevated values with respect to background (Table 5-2).

Analysis of VOCs in the soil resulted in low-level detections of TCA, toluene, and xylenes in SP-2, SP-3, and SP-5. In soil directly beneath the sump, SP-1a yielded more abundant low-level detections for VOCs, while the underlying sample interval represented by SP-1b yielded only a low concentration of PCE, possibly showing diminishing concentrations with depth. While the VOC results for SP-1b are estimated (and potentially low) because of a missed holding time (Table 5-2), the trend of decreasing concentrations is also supported by the results for SVOCs. SVOCs were not analyzed for SP-2 to SP-5, but were for SP-6, SP-1a, and SP-1b. SP-6 and SP-1a exhibit numerous low-level detections of polynuclear aromatic hydrocarbons (PAHs) in the range of 39 to 200 μg/kg, while SP-1b exhibited no detections. One PCB (Aroclor-1254) was detected at low levels in SP-2, SP-5, SP-6, and SP-1a in the range of 37 to 100 μg/kg.

The distribution of radionuclides in comparison to the background soil UTL (FERMCO 1993) indicates that values in almost all cases are elevated with respect to background. Each sample exhibits elevated values for at least one of the radionuclides reported (Table 5-2). Uranium appears to be slightly more elevated than thorium. It is undetermined from these data whether a source other than the Pilot Plant Sump has contributed to these elevated concentrations/activities.

TCLP analyses for metals and volatile organics were conducted for SP-2 to SP-5. Detection of metals included barium and lead in which all values were well below the TCLP regulatory levels (100 mg/L for barium and 5 mg/L for lead). Detection of volatile organics occurred for PCE with 4.7 mg/L reported for SP-2 and a range of 0.009 to 0.25 mg/L for SP-3 to SP-5. PCE in SP-2 exceeds the TCLP regulatory level of 0.7 mg/L. Trichloroethane also was detected in the range of 0.009 to 0.02 mg/L in SP-3, SP-4, and SP-5, but at well below the TCLP regulatory level of 0.5 mg/L.

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5.3.2 Sump and Pipe Sediment

A sample was collected for the sump sediment (Sump-3) and sediment within the remaining inlet pipe that has been plugged (D-1). Both samples exhibit elevated metals and radionuclides. The most notable metals detections that occur at one to two orders of magnitude greater than values for soil samples include chromium, lead, and mercury, with somewhat higher values present in Sump-1 (Table 5-2). The samples also exhibit elevated values for uranium, thorium, and Ra-226, with values in D-1 generally an order of magnitude higher than Sump-3 and two to three orders greater than for soil samples. Detections of VOCs in Sump-3 and D-1 exhibit high values of TCA, PCE, and xylenes (185,000 to 7,500,000 μg/kg). Both samples exhibit numerous detections of PAHs and phthalates, with addition of chlorobenzenes detected in Sump-3 (Table 5-2). Aroclor-1254 was detected at moderate levels in Sump-3 and D-1 (11,000 and 7,500 μg/kg, respectively).

6.0 HEALTH AND SAFETY CONTROLS

Health and safety controls and monitoring were conducted in accordance with the work plan. Monitoring of materials, work spaces, and personnel was conducted as specified in the applicable Project Health and Safety documentation.

For worker protection, Level B or Level C protection was used during the course of the work as appropriate. Real time monitoring for airborne contaminants was performed whenever workers were in the work area. A radiological technician and an industrial hygiene technician assigned to the work crew conducted the monitoring. Actions were taken in accordance with the real-time monitoring results during the performance of the work. A limited number of personal air samples were collected for non-radioactive contaminants during the project, and all results were less than the appropriate Occupational Safety and Health Administration (OSHA) exposure limits.

Due to higher levels of radioactive contamination, a radiological buffer area was established to provide a reduction zone. For protection from radioactive contamination, personnel in the work area were provided a double layer of protective clothing. The outer layer of protective clothing was removed at the entrance/egress point to the immediate work area. At the exit of the buffer area the inner layer of protective clothing was removed. There were no personnel contaminations, or uptake, of radioactive contaminants.

During demolition activities with the potential for creating airborne radioactive contamination, material wet-down methods were used to minimize degradation of the air quality in the work area.

Personnel and general air sample data were collected for the determination of radioactive airborne contamination. Analytical data from these samples indicated no elevated presence of airborne contaminants in accordance with the DOE Radiological Control Manual.

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7.0 REFERENCES

Ebasco Environmental. *Guidelines for ASL C (and D) Validation of TCT/CORE Laboratory Radiological Data Packages.*

FEMP. 1992. *FEMP Sitewide CERCLA Quality Assurance Project Plan.*

FERMCO (Fernald Environmental Restoration Management Corporation). 1993. *FEMP Soil Background Study.*

State of Ohio. 1988. Stipulated Amendment to the Consent Decree.

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4987

ATTACHMENT A
ANALYTICAL DATA VALIDATION

ATTACHMENT A

ANALYTICAL DATA VALIDATION

Analytical results from samples taken in connection with the Pilot Plant Sump removal/closure action were validated to establish their usefulness and defensibility for assuring that site closure criteria are met. Results for total metals, VOCs, SVOCs, pesticides/PCBs, TCLP metals, and TCLP VOCs were validated according to the criteria contained in Section D of the *FEMP Sitewide CERCLA Quality Assurance Project Plan* (SCQ [FD-1000, 7/15/92]). Results from total uranium and thorium, isotopic uranium, thorium, and radium, and gross alpha and gross beta analyses were validated according to *Guidelines for ASL C (and D) Validation of TCT/CORE Laboratory Radiological Data Packages* developed for FEMP data validation efforts. Gross alpha and gross beta results are reported but were not validated due to the semiquantitative nature of these data. Data validation included a review of the following information:

- Instrument initial and continuing calibration
- Duplicate sample results
- Laboratory control sample results
- Matrix spike and matrix spike duplicate results
- Method blank sample results
- Instrument background (radiochemical analyses)
- Chemical and radiometric recovery
- Reported vs. raw data results.

A summary of the data qualifiers assigned to each sample result is presented in the ensuing data validation reports. The data validation qualifiers and codes are defined as follows:

Qualifier	Definition
U	The analyte concentration was not greater than the minimum detectable concentration (MDC) reported for the method.
UJ	The analyte concentration was not greater than the MDC but deficiencies in data quality make the nondetect estimated.

J	The analyte concentration was detected at a level greater than the MDC but deficiencies in data quality make the detection estimated.
R	Deficiencies in data quality make the results unusable.
N	Presumptive evidence exists for the presence of the analyte but the concentration cannot be quantified due to deficiencies in data quality.
NV	The analytical result was not validated.

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # FM05033 Matrix Water ASL level D

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
809132 (VOA)	Methylene chloride	10.0	U	Blank contamination is present.
	2-Butanone	66.0	J	Relative Response Factor < .05.
	Vinyl Acetate	10.0	UJ	Initial and Cont.cal. are outside QC.
807015 (VOA)	Methylene chloride	10000.0	U	Blank contamination is present.
	Acetone	16000.0	UJ	Blank cont., initial and cont.cal are out.
	2-Butanone	10000.0	UJ	Relative Response Factor is < .05.
807016 (VOA)	Acetone	5000.0	UJ	Blank cont.,initial and cont.cal. are out.
	1,2-Dichloroethane	5000.0	UJ	Continuing calibration %D > 25%.
	2-Butanone	5000.0	UJ	Relative Response Factor is < .05.
807017 (VOA)	Methylene chloride	10.0	U	Blank contamination is present.
	Acetone	10.0	UJ	Blank cont.,Initial and cont.cal. are out.
	2-Butanone	12.0	J	Relative Response Factor is < .05.
	Vinyl Acetate	10.0	UJ	Continuing calibration %D > 25%.

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Validator: Abdul Abdi Date: 11-11-93

Concurred by: Roy Darke Date: 11-12-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # FM05033 Matrix Water ASL level D

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
807015 (BNA)	Acid extractable (subsituted phenols) are flagged R, due to acid surrogates that were very low, consequently internal standard areas were below thelower limits, all the compounds were qualified accordingly. In the meantime; the low MS/MSD recoveries for the acid-extractable compounds corroborate the idea that a matrix effect exists for this sample, causing detection limits be unreliable for the phenolic compounds.			
807016 (BNA)	The surrogate recoveries were very low for the base/neutral compounds and the acids, so all the undetected results were qualified with R and detected with J. Furthermore; the internal standard areas were below the lower limits.			
807017 (BNA)	bis(2-Ethylhexyl)phthalate	10.0	U	Blank contamination is present.
807018 (BNA)	Hexachlorocyclopentadiene	10.0	UJ	Continuing calibration %D > 25%.
	Indeno(1,2,3-cd)pyrene	10.0	UJ	Continuing calibration %D > 25%.
	Dibenzo(a,h)anthracene	10.0	UJ	Continuing calibration %D > 25%.
	Benzo(g,h,i)perylene	10.0	UJ	Continuing calibration %D > 25%.
807017 (P/PCB)	All the PCB's compounds were qualified with UJ, due to low DCB surrogate reciveries.			
807018 (P/PCB)	All the single-peak pesticides were qualified with UJ,due to low TCX surrogate recoveries.			

Validator: Abdyl Abdi Date: 11-13-93

Concurred by: Roy Glover Date: 11-15-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # FM05033 Matrix Water ASL level D

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
809132 (VOA)	Methylene chloride	10.0	U	Blank contamination is present.
	2-Butanone	66.0	J	Relative Response Factor < .05.
	Vinyl Acetate	10.0	UJ	Initial and Cont.cal. are outside QC.
807015 (VOA)	Methylene chloride	10000.0	U	Blank contamination is present.
	Acetone	16000.0	UJ	Blank cont., initial and cont.cal are out.
	2-Butanone	10000.0	UJ	Relative Response Factor is < .05.
807016 (VOA)	Acetone	5000.0	UJ	Blank cont.,initial and cont.cal. are out.
	1,2-Dichloroethane	5000.0	UJ	Continuing calibration %D > 25%.
	2-Butanone	5000.0	UJ	Relative Response Factor is < .05.
807017 (VOA)	Methylene chloride	10.0	U	Blank contamination is present.
	Acetone	10.0	UJ	Blank cont.,Initial and cont.cal. are out.
	2-Butanone	12.0	J	Relative Response Factor is < .05.
	Vinyl Acetate	10.0	UJ	Continuing calibration %D > 25%.

00-3

Validator: Abdul Abdi Date: 11-11-93

Concurred by: Roy Parker Date: 11-12-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

2867

Release # FMO5033 Matrix Water ASL level D

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
807015 (BNA)	Acid extractable (subsituted phenols) are flagged R, due to acid surrogates that were very low, consequently internal standard areas were below thelower limits, all the compounds were qualified accordingly. In the meantime; the low MS/MSD recoveries for the acid-extractable compounds corroborate the idea that a matrix effect exists for this sample, causing detection limits be unreliable for the phenolic compounds.			
807016 (BNA)	The surrogate recoveries were very low for the base/neutral compounds and the acids, so all the undetected results were qualified with R and detected with J. Furthermore; the internal standard areas were below the lower limits.			
807017 (BNA)	bis(2-Ethylhexyl)phthalate	10.0	U	Blank contamination is present.
807018 (BNA)	Hexachlorocyclopentadiene	10.0	UJ	Continuing calibration %D > 25%.
	Indeno(1,2,3-cd)pyrene	10.0	UJ	Continuing calibration %D > 25%.
	Dibenzo(a,h)anthracene	10.0	UJ	Continuing calibration %D > 25%.
	Benzo(g,h,i)perylene	10.0	UJ	Continuing calibration %D > 25%.
807017 (P/PCB)	All the PCB's compounds were qualified with UJ, due to low DCB surrogate reciveries.			
807018 (P/PCB)	All the single-peak pesticides were qualified with UJ,due to low TCX surrogate recoveries.			

Validator: Abdul Abdi Date: 11-13-93

Concurred by: Roy Klotz Date: 11-15-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807015	Aluminum	554000	J	The laboratory duplicate RPD and serial dilution analysis results exceeded control limits. The result has been qualified estimated.
	Antimony	11.9	J	The laboratory duplicate RPD and field duplicate RPD exceeded control limits. The result has been qualified estimated. Additionally the low analytical spike recovery indicates that the result should be considered estimated.
	Arsenic	120	J	The laboratory duplicate RPD and field duplicate RPD exceeded control limits. The result has been qualified estimated. The extremely low matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.
	Barium	31900	J	The serial dilution results and laboratory duplicate RPD analyses exceeded control limits. The result has been qualified estimated.
	Beryllium	4.0	R	The matrix spike recovery was extremely low. The detection limit has been qualified unusable and should be considered biased extremely low.

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Date: 11/16/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

0075

2-4-9-2

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807015	Cadmium	84.0	J	The laboratory duplicate RPD analyses exceeded control limits. The result has been qualified estimated. The extremely low matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.
	Calcium	80500	J	The serial dilution analysis and laboratory duplicate RPD analyses exceeded control limits. The result has been qualified estimated.
	Chromium	3770	J	The serial dilution analysis and laboratory duplicate RPD analyses exceeded control limits. The result has been qualified estimated.
	Cobalt	84.0	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Copper	34800	J	The serial dilution analysis and laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.

0016

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Date: 11/16/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

4987

Release # 5033

ASL level D

Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807015	Iron	703000	J	The serial dilution analysis, laboratory duplicate RPD and field duplicate RPD exceeded control limits. The result has been qualified estimated.
	Lead	30600	J	The serial dilution analysis and laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Magnesium	53500	J	The serial dilution analysis and laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Manganese	936	J	The serial dilution analysis and laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Mercury	1.6	J	The field duplicate RPD was outside control limits. The result has been qualified estimated. Additionally, the extremely low matrix spike recovery indicated the result should be considered estimated.

Validator: Dan Q Benedikt Date: 11/14/93

Concurred by: Roy Lehr Date: 11-16-93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

0077

2869

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807015	Nickel	595	J	The serial dilution analysis and laboratory duplicate RPD exceeded control limits. The result has been qualified estimated. The high matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.
	Selenium	36.4	J	The serial dilution analysis, laboratory duplicate RPD and field duplicate RPD exceeded control limits. The result has been qualified estimated. The extremely low matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.
	Silver	2.0	UJ	The laboratory duplicate RPD exceeded control limits. The detection limit has been qualified estimated. Additionally, the low serial dilution, matrix and analytical spike recoveries indicate the result should be considered estimated.
	Thallium	5.0	UJ	The serial dilution exceeded control limits and the matrix spike and analytical spike recoveries were low. The result has been qualified estimated.

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Roy Lake Date: 11/16/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

0078

4982

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807015	Vanadium	1770	J	The serial dilution and laboratory duplicate analyses exceeded control limits. The result has been qualified estimated. The high matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.
	Zinc	1280	J	The serial dilution and laboratory duplicate analyses exceeded control limits. The result has been qualified estimated. The high matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.
	Cyanide	172000	J	The sample pH was reported by the laboratory to be below the required range upon sample receipt. The result has been qualified estimated, and should be considered biased low.
	Molybdenum	1260	J	The serial dilution and laboratory duplicate analyses exceeded control limits. The result has been qualified estimated. The high matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Roy Lohe Date: 11/16/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807016	Aluminum	482000	J	The laboratory duplicate RPD and serial dilution analysis results exceeded control limits. The result has been qualified estimated.
	Antimony	257	J	The laboratory duplicate RPD and field duplicate RPD exceeded control limits. The result has been qualified estimated.
	Arsenic	68.8	J	The laboratory duplicate RPD and field duplicate RPD exceeded control limits. The result has been qualified estimated. The extremely low matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.
	Barium	27600	J	The serial dilution results and laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Beryllium	4.0	R	The matrix spike recovery was extremely low. The detection limit has been qualified unusable and should be considered biased extremely low.

0080

Validator: Dan O Benedikt Date: 11/16/93
Dan O Benedikt

Concurred by: Date: 11/16/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

2084

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807016	Cadmium	87.0	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated. The extremely low matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.
	Calcium	87900	J	The serial dilution analysis and laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
807016	Chromium	3320	J	The serial dilution analysis and laboratory duplicate RPD analyses exceeded control limits. The result has been qualified estimated.
	Cobalt	76.0	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Copper	30600	J	The serial dilution analysis and laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.

0081

Validator: Dan Q Benedikt Date: 11/16/93
Dan Q Benedikt
Concurred by: Roy J Cabra Date: 11/16/93
Qualifier Codes Entered by: Date:
Qualifier Codes Approved by: Date:
* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

4982

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807016	Iron	491000	J	The serial dilution analysis, laboratory duplicate RPD and field duplicate RPD exceeded control limits. The result has been qualified estimated.
	Lead	28800	J	The serial dilution analysis and laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Magnesium	56400	J	The serial dilution analysis and laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Manganese	958	J	The serial dilution analysis and laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.

0082

Validator: Dan Q Benedikt Date: 11/14/93

Concurred by: Roy Lane Date: 11-16-93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

4987

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807016	Mercury	0.97	UJ	The analyte was detected in the field blank and the sample level was within the range attributable to contamination. The result has been qualified undetected. The field duplicate RPD was outside control limits and therefore, the detection limit was further qualified estimated. The extremely low matrix spike recovery suggests sample inhomogeneity that also indicates the ~~result~~ detection limit to be estimated. DQB 11/16/93
	Nickel	562	J	The serial dilution analysis and laboratory duplicate RPD exceeded control limits. The result has been qualified estimated. The high matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.
	Selenium	12.2	J	The serial dilution analysis, laboratory duplicate RPD and field duplicate RPD exceeded control limits. The result has been qualified estimated. The extremely low matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Date: 11/16/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

0083

4987

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807016	Silver	10.0	R	The analytical spike recovery was extremely low. The detection limit had been qualified unusable and should be considered biased extremely low. Additionally, the serial dilution, laboratory duplicate RPD and matrix spike recovery outliers indicate the detection limit should be considered estimated.
	Thallium	5.0	UJ	The serial dilution analysis exceeded control limits and the matrix spike and analytical spike recoveries were low. The detection limit has been qualified estimated.
	Vanadium	1520	J	The serial dilution and laboratory duplicate analyses exceeded control limits. The result has been qualified estimated. The high matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.
	Zinc	1250	J	The serial dilution and laboratory duplicate analyses exceeded control limits. The result has been qualified estimated. The high matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.

0084

Validator: Dan Q B Date: 11/16/93
Dan Q Benedikt

Concurred by: Roy J Lohr Date: 11/16/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807016	Cyanide	324000	J	The sample pH was reported by the laboratory to be below the required range upon sample receipt. The result has been qualified estimated, and should be considered biased low.
	Molybdenum	9710	J	The serial dilution and laboratory duplicate analyses exceeded control limits. The result has been qualified estimated. The high matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.
807017	Arsenic	2.0	UJ	The matrix spike recovery was below control limits. The result has been qualified estimated, and should be considered biased low.
	Beryllium	4.0	R	The matrix spike recovery was extremely low. The detection limit has been qualified unusable and should be considered biased extremely low.
	Cadmium	5.0	UJ	The matrix spike recovery was extremely low and the laboratory duplicate results indicate the low recovery was due to sample inhomogeneity. The detection limit has been qualified estimated.

Validator: Dan Q Benedikt Date: 11/16/93
Dan Q Benedikt

Concurred by: Roy J Lohe Date: 11/16/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

0065

4987

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807017	Calcium	60.0	U	The analyte was detected in the laboratory blanks and the sample result was within the range attributable to blank contamination. The result has been qualified undetected, and should be considered biased high.
	Copper	12.0	U	The analyte was detected in the laboratory blanks and the sample result was within the range attributable to blank contamination. The result has been qualified undetected, and should be considered biased high.
807017	Mercury	0.21	UJ	The analyte was detected in the laboratory blanks and the sample result was within the range attributable to blank contamination. The result has been qualified undetected. The detection limit was further qualified estimated based on a low matrix spike recovery.

9300

Validator: Dan Q Benedikt Date: 11/14/93

Concurred by: Roy J Lake Date: 11/16/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

2867 4987

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807017	Nickel	59.0	UJ	The analyte was detected in the laboratory blanks and the sample result was within the range attributable to blank contamination. The result has been qualified undetected and should be considered biased high. The high matrix spike recovery suggests sample inhomogeneity that also indicates the detection limit to be estimated.
	Selenium	1.0	UJ	The matrix spike recovery was below control limits. The result has been qualified estimated and should be considered biased low.
	Thallium	1.0	UJ	The matrix spike recovery was below control limits. The result has been qualified estimated and should be considered biased low.
807017	Zinc	34.0	UJ	The analyte was detected in the laboratory blanks and the sample result was within the range attributable to blank contamination. The result has been qualified undetected and should be considered biased high. The high matrix spike recovery suggests sample inhomogeneity that also indicates the result to be estimated.

Validator: Dan O Benedikt Date: 11/16/93

Concurred by: Date: 11/16/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807017	Cyanide	5.0	UJ	The sample pH was reported by the laboratory to be below the required range upon sample receipt. The detection limit has been qualified estimated, and should be considered biased low.
807018	Arsenic	2.0	UJ	The matrix spike recovery was below control limits. The result has been qualified estimated, and should be considered biased low.
	Beryllium	4.0	R	The matrix spike recovery was extremely low. The detection limit has been qualified unusable and should be considered biased extremely low.
	Cadmium	5.0	UJ	The matrix spike recovery was extremely low and the laboratory duplicate results indicate sample inhomogeneity. The detection limit has been qualified estimated.
807018	Mercury	0.14	UJ	The analyte was detected in the laboratory blanks and the sample result was within the range attributable to blank contamination. The result has been qualified undetected. The detection limit was further qualified estimated based on a low matrix spike recovery.

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Date: 11/16/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

8300

00584

Release # 5033 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level D

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
807018	Nickel	25.0	UJ	The analyte was detected in the laboratory blanks and the sample result was within the range attributable to blank contamination. The result has been qualified undetected and should be considered biased high. The high matrix spike recovery suggests sample inhomogeneity that also indicates the detection limit to be estimated.
	Selenium	1.0	UJ	The matrix spike recovery was below control limits. The result has been qualified estimated and should be considered biased low.
	Thallium	1.0	UJ	The matrix spike recovery was below control limits. The result has been qualified estimated and should be considered biased low.
	Cyanide	5.0	UJ	The sample pH was reported by the laboratory to be below the required range upon sample receipt. The detection limit has been qualified estimated, and should be considered biased low.

0039

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Roy Slaton Date: 11/16/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

4987

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 5485

ASL level C

Special Comments: (When Necessary - Initial & Date.) CRU3 Pilot Plant Sump

(Reported Measurement Units): ug/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
916122	Selenium	5.0	UJ	The analytical spike recovery was below control limits. The sample was qualified estimated and should be considered biased low.

note: The laboratory submitted a standard CLP Form I to report the results for this task in which only the RCRA eight metals were requested analytes. The additional analytes on the Form I have the validation qualifier section left blank (No results or laboratory qualifiers were reported by the laboratory.).

0090

Validator: Dan Q Benedikt Date: 10/29/93

Concurred by: Roy Hoke Date: 11/1/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

4987

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # FMO5485 Matrix Water ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual	Qualifier Logic (Deficiencies, SOW problems).
916119 (VOA)	Acetone	13.0	UJ	Blank cont.& Initial cal.%RSD > 30%.
916120 (VOA)	Acetone	14.0	UJ	Blank cont.& Initial cal.%RSD > 30%.
916121 (VOA)	Acetone	47.0	UJ	Blank cont.& Initial cal.%RSD > 30%.
916122DL(VOA)	Acetone	25.0	UJ	Blank cont.& Initial cal.%RSD > 30%.
	Carbon Tetrachloride	25.0	UJ	Continuing calibration %D > 25%.

00091

Validator: Abdul Abbi Date: 11-2-93

Concurred by: Roy [illegible] Date: 11-5-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

2867

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # FMO4996 Matrix Water ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
804030 (VOA)	Acetone	10.0	UJ	Initial and Continuing Cal. are out.
	2-Butanone	10.0	UJ	Initial and Continuing Cal. RRF < .05.
	Vinyl Acetate	10.0	UJ	Initial calibration %RSD > 30%.
804031 (VOA)	Acetone	10.0	UJ	Initial and Continuing Cal. are out.
	2-Butanone	10.0	UJ	Initial and Continuing Cal. RRF < .05.
	Vinyl Acetate	10.0	UJ	Initial calibration %RSD > 30%.
804032 (VOA)	Acetone	10.0	UJ	Initial and Continuing Cal. are out.
	2-Butanone	10.0	UJ	Initial and Continuing Cal. RRF < .05.
	Vinyl Acetate	10.0	UJ	Initial calibration %RSD > 30%.
804034 (VOA)	Acetone	10.0	UJ	Initial and Continuing Cal. are out.
	2-Butanone	10.0	UJ	Initial and Continuing Cal. RRF < .05.
	Vinyl Acetate	10.0	UJ	Initial calibration %RSD > 30%.

0092

Validator: Abdul Abdi Date: 11-4-93

Concurred by: Roy Lahen Date: 11-5-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

4987

Release # FMO4996 Matrix SOIL ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
805014 (VOA)	Bromomethane	12.0	UJ	Initial and Continuing Cal. are out.
	Methylene Chloride	6.0	UJ	Continuing calibration %D > 25%.
	Acetone	12.0	UJ	Continuing calibration %D > 25%.
	1,1-Dichloroethane	6.0	R	Continuing calibration %D > 50%.
	1,2-Dichloroethene	6.0	UJ	Continuing calibration %D > 25%.
	2-Butanone	12.0	R	Initial cal.RRF < .05 and Cont.cal.%D > 50%.
	Vinyl Acetate	12.0	R	Continuing calibration %D > 50%.
805015 (VOA)	Bromomethane	11.0	UJ	Initial and Continuing Cal. are out.
	Methylene Chloride	6.0	UJ	Continuing calibration %D > 25%.
	Acetone	11.0	UJ	Continuing calibration %D > 25%.
	1,1-Dichloroethane	6.0	R	Continuing calibration %D > 50%.
	1,2-Dichloroethene	6.0	UJ	Continuing calibration %D > 25%.
	2-Butanone	11.0	R	Initial cal.RRF < .05 and Cont.cal.%D > 50%.
	Vinyl Acetate	11.0	R	Continuing calibration %D > 50%.

0093

Validator: Abdul Aziz Date: 11-4-93

Concurred by: Roy Baker Date: 11/5/93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

4987

Release # FM04996 Matrix SOIL ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
804033 (VOA)	Chloromethane	12.0	UJ	Continuing calibration %D > 25%.
	Bromomethane	12.0	UJ	Initial and Continuing cal. are out.
	Chloroethane	12.0	R	Continuing calibration %D > 50%.
	Methylene Chloride	6.0	R	Continuing calibration %D > 50%.
	Acetone	12.0	UJ	Continuing calibration %D > 25%.
	Carbon Disulfide	6.0	UJ	Continuing calibration %D > 25%.
	1,1-Dichloroethane	6.0	UJ	Continuing calibration %D > 25%.
	2-Butanone	12.0	UJ	Initial and Continuing cal.RRF < .05.
	Vinyl Acetate	12.0	R	Continuing calibration %D > 50%.
804034 (VOA)	Chloromethane	12.0	UJ	Continuing calibration %D > 25%.
	Bromomethane	12.0	UJ	Initial and Continuing cal. are out.
	Chloroethane	12.0	R	Continuing calibration %D > 50%.
	Methylene Chloride	6.0	R	Continuing calibration %D > 50%.
	Acetone	12.0	UJ	Continuing calibration %D > 25%.
	Carbon Disulfide	6.0	UJ	Continuing calibration %D > 25%.
	1,1-Dichloroethane	6.0	UJ	Continuing calibration %D > 25%.
	2-Butanone	12.0	UJ	Initial and Continuing cal.RRF < .05.
	Vinyl Acetate	12.0	R	Continuing calibration %D > 50%.

0094

Validator: Abdul Abdi Date: 11-4-93

Concurred by: Roy Wilder Date: 11-5-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

2867

Release # FMO4996 Matrix SOIL ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
804035 (VOA)	Chloromethane	12.0	UJ	Continuing calibration %D > 25%.
	Bromomethane	12.0	UJ	Initial and Continuing cal. are out.
	Chloroethane	12.0	R	Continuing calibration %D > 50%.
	Methylene Chloride	6.0	R	Continuing calibration %D > 50%.
	Acetone	12.0	UJ	Continuing calibration %D > 25%.
	Carbon Disulfide	6.0	UJ	Continuing calibration %D > 25%.
	1,1-Dichloroethane	6.0	UJ	Continuing calibration %D > 25%.
	2-Butanone	12.0	UJ	Initial and Continuing cal.RRF < .05.
	Vinyl Acetate	12.0	R	Continuing calibration %D > 50%.

0095

Validator: Abdul Abdi Date: 11-4-93

Concurred by: [illegible] Date: 11-5-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 4996

ASL level C

Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
804031	Mercury	0.19 µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Silver	1.0 µg/L	UJ	The matrix spike recovery was below control limits. The detection limit has been qualified estimated and should be considered biased low.
804032	Mercury	0.18 µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Silver	1.0 µg/L	UJ	The matrix spike recovery was low. The detection limit has been qualified estimated and should be considered biased low.
804033	Selenium	0.49 mg/Kg	R	The matrix spike recovery was extremely low. the detection limit has been qualified unusable and should be considered biased extremely low.

Validator: Dan Q Benedikt Date: 11/12/93

Concurred by: Roy Lerner Date: 11/18/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

0036

4987

Release # 4996 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
804034	Selenium	2.5 mg/Kg	R	The matrix spike recovery was extremely low. the detection limit has been qualified unusable and should be considered biased extremely low.
804035	Selenium	2.5 mg/Kg	R	The matrix spike recovery was extremely low. the detection limit has been qualified unusable and should be considered biased extremely low.
805014	Selenium	0.48 mg/Kg	R	The matrix spike recovery was extremely low. the detection limit has been qualified unusable and should be considered biased extremely low.
805015	Selenium	2.6 mg/Kg	J	The matrix spike recovery was extremely low. the detected result has been qualified estimated and should be considered biased extremely low. Additionally, the slightly low analytical spike indicates a low bias.

0097

note: The laboratory submitted a standard CLP Form I to report the results for this task in which only the RCRA eight metals were requested analytes. The additional analytes on the Form I have the validation qualifier section left blank (No results or laboratory qualifiers were reported by the laboratory.).

Validator: Dan Q Benedikt Date: 11/12/93

Concurred by: Roy Cohen Date: 11/15/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 4996

ASL level C

Special Comments: (When Necessary - Initial & Date.) CRU3 Pilot Plant Sump -TCLP

(Reported Measurement Units): µg/L

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
804033	Lead	243	J	The detected serial dilution result but undetected original analysis result suggests contamination may be present. The result has been qualified estimated and should be considered biased high.
804034	Lead	39.0	UJ	The IDL was higher than the CRDL and the sample level was less than five-times the IDL. The reported detection limit has been qualified estimated and should be considered significantly higher than the probable lead level present.
804035	Lead	39.0	UJ	The IDL was higher than the CRDL and the sample level was less than five-times the IDL. The reported detection limit has been qualified estimated and should be considered significantly higher than the probable lead level present.

0008

Validator: Dan Q Benedikt Date: 11/12/93

Concurred by: Roy Koke Date: 11/18/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

4992

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 4996

ASL level C

Special Comments: CRU3 Pilot Plant Sump -TCLP
(When Necessary - Initial & Date.)

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
805014	Lead	39.0	UJ	The IDL was higher than the CRDL and the sample level was less than five-times the IDL. The reported detection limit has been qualified estimated and should be considered significantly higher than the probable lead level present.
	Mercury	0.19	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
805015	Lead	39.0	UJ	The IDL was higher than the CRDL and the sample level was less than five-times the IDL. The reported detection limit has been qualified estimated and should be considered significantly higher than the probable lead level present.

0099

Validator: Dan Q Benedikt Date: 11/12/93

Concurred by: Roy Koh Date: 11/15/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated

4987

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # FMO4996 TCLP Matrix SOIL ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
804033 (VOA)	Acetone	500.0	UJ	Initial calibration %RSD > 30%.
	1,2-Dichloroethane	250.0	UJ	Continuing calibration %D > 25%.
	1,1,1-Trichloroethane	250.0	UJ	Continuing calibration %D > 25%.
	Carbon Tetrachloride	250.0	UJ	Continuing calibration %D > 25%.
	Bromodichloromethane	250.0	UJ	Continuing calibration %D > 25%.
	Dibromochloromethane	250.0	UJ	Continuing calibration %D > 25%.
	Bromoform	250.0	UJ	Continuing calibration %D > 25%.
	Tetrachloroethene	4700.0	J	Continuing calibration %D > 25%.
804034 (VOA)	Acetone	50.0	UJ	Initial calibration %RSD > 30%.
	Carbon Disulfide	25.0	UJ	Continuing calibration %D > 25%.
	1,2-Dichloroethane	25.0	UJ	Continuing calibration %D > 25%.
	Carbon Tetrachloride	25.0	UJ	Continuing calibration %D > 25%.
	Tetrachloroethene	150.0	J	Continuing calibration %D > 25%.
804035 (VOA)	Acetone	50.0	UJ	Initial calibration %RSD > 30%.
	Carbon Disulfide	25.0	UJ	Continuing calibration %D > 25%.
	1,2-Dichloroethane	25.0	UJ	Continuing calibration %D > 25%.
	Carbon Tetrachloride	25.0	UJ	Continuing calibration %D > 25%.
	Tetrachloroethene	9.0	J	Continuing calibration %D > 25%.

0100

Validator: Abdul Abgi Date: 11-2-93

Concurred by: Roy Stokes Date: 11-5-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # FM04996 TCLP Matrix SOIL ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
805014 (VOA)	Acetone	50.0	UJ	Initial calibration %RSD > 30%.
	Carbon Disulfide	25.0	UJ	Continuing calibration %D > 25%.
	1,2-Dichloroethane	25.0	UJ	Continuing calibration %D > 25%.
	Carbon Tetrachloride	25.0	UJ	Continuing calibration %D > 25%.
	Tetrachloroethene	72.0	J	Continuing calibration %D > 25%.
805015 (VOA)	Acetone	50.0	UJ	Initial calibration %RSD > 30%.
	Carbon Disulfide	25.0	UJ	Continuing calibration %D > 25%.
	1,2-Dichloroethane	25.0	UJ	Continuing calibration %D > 25%.
	Carbon Tetrachloride	25.0	UJ	Continuing calibration %D > 25%.
	Tetrachloroethene	250.0	J	Continuing calibration %D > 25%.

0101

Validator: Abdul Abdi Date: 11-2-93

Concurred by: Roy Cohen Date: 11-3-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

2807

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # FM05271 Matrix Water/Soil ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
825-023(BNA)	Hexachlorocyclopentadiene	10.0	UJ	Continuing calibration %D > 25%.
	Indeno(1,2,3-cd)pyrene	10.0	UJ	Continuing calibration %D > 25%.
	Dibenzo(a,h)anthracene	10.0	UJ	Continuing calibration %D > 25%.
	Benzo(g,h,i)perylene	10.0	UJ	Continuing calibration %D > 25%.
	bis(2-Ethylhexyl)phthalate	17.0	U	Blank contamination is present.
825-024(BNA)	bis(2-Ethylhexyl)phthalate	10.0	U	Blank contamination is present.
825-025(BNA)	4,6-Dinitro-2-methylphenol	870.0	UJ	Continuing calibration %D > 25%.
	Indeno(1,2,3-cd)pyrene	49.0	J	Continuing calibration %D > 25%.
	Dibenzo(a,h)anthracene	350.0	UJ	Continuing calibration %D > 25%.
	Benzo(g,h,i)perylene	39.0	J	Continuing calibration %D > 25%.
	bis(2-Ethylhexyl)phthalate	350.0	U	Blank contamination is present.

0102

Validator: Abdul Abdi Date: 11-1-93

Concurred by: Roy [illegible] Date: 11-5-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # FM05271 Matrix Water ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
825-022(VOA)	Chloromethane	10.0	UJ	Continuing calibration %D > 25%.
	Vinyl Chloride	10.0	UJ	Continuing calibration %D > 25%.
	Chloroethane	10.0	UJ	Continuing calibration %D > 25%.
	Methylene Chloride	10.0	UJ	Continuing calibration %D > 25%.
	Acetone	15.0	UJ	Blank cont.,Initial & Continuing Cal. are out
	2-Butanone	10.0	UJ	Continuing calibration %D > 25%.
	Vinyl Acetate	10.0	UJ	Continuing calibration %D > 25%.
	Bromoform	10.0	UJ	Initial calibration %RSD > 30%.
	4-Methyl-2-pentanone	10.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	10.0	UJ	Continuing calibration %D > 25%.
825-023(VOA)	Chloromethane	10.0	UJ	Continuing calibration %D > 25%.
	Vinyl Chloride	10.0	UJ	Continuing calibration %D > 25%.
	Chloroethane	10.0	UJ	Continuing calibration %D > 25%.
	Methylene Chloride	10.0	UJ	Continuing calibration %D > 25%.
	Acetone	18.0	UJ	Blank cont.,Initial & Continuing Cal. are out
	2-Butanone	190.0	J	Continuing calibration %D > 25%.
	Vinyl Acetate	10.0	UJ	Continuing calibration %D > 25%.
	Bromoform	10.0	UJ	Initial calibration %RSD > 30%.
	4-Methyl-2-pentanone	10.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	10.0	UJ	Continuing calibration %D > 25%.

0103

Validator: Abdi Ali Date: 11-1-93

Concurred by: Roy Lake Date: 11-5-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # FM05271 Matrix Water/Soil ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
825-024(VOA)	Chloromethane	10.0	UJ	Continuing calibration %D > 25%.
	Vinyl Chloride	10.0	UJ	Continuing calibration %D > 25%.
	Chloroethane	10.0	UJ	Continuing calibration %D > 25%.
	Methylene Chloride	10.0	UJ	Continuing calibration %D > 25%.
	Acetone	19.0	UJ	Blank cont.,Initial & Continuing Cal. are out
	2-Butanone	17.0	J	Continuing calibration %D > 25%.
	Vinyl Acetate	10.0	UJ	Continuing calibration %D > 25%.
	Bromoform	10.0	UJ	Initial calibration %RSD > 30%.
	4-Methyl-2-pentanone	10.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	10.0	UJ	Continuing calibration %D > 25%.
825-025(VOA)	Acetone	27.0	UJ	Blank cont. and Initial Cal.%RSD > 30%.
	2-Butanone	10.0	R	Initial calibration %RSD > 50%.
	Vinyl Acetate	10.0	R	Continuing calibration %D > 50%.
	4-Methyl-2-pentanone	10.0	R	Initial calibration %RSD > 50%.
	2-Hexanone	10.0	R	Initial calibration %RSD > 50%.

0104

Validator: [signature] Date: 11-1-93

Concurred by: [signature] Date: 11-5-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 5271 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results		DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
825023	Sodium	288	µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Zinc	12.7	µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Silicon	46.9	µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
825024	Iron	56.9	µg/L	UJ	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high. The matrix spike recovery was above control limits. The detectioon limit was further qualified estimated and should additionally be considered biased high.

Validator: Dan Q Benedikt Date: 11/18/93

Concurred by: Roy Lake Date: 11/18/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

WEMCO OU #3
513 738 9402
12-02-1993 11:41
0105
4987

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 5271 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)

ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results		DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
825024	Sodium	170	µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Zinc	15.4	µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Silicon	50.2	µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
825025	Antimony	2.9	µg/L	UJ	The matrix spike and analytical spike recoveries were below control limits. The detection limit has been qualified estimated and should be considered biased low.

Validator: Dan Q Benedikt Date: 11/18/93

Concurred by: Roy [illegible] Date: 11/18/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

P.15
WEMCO OU #3
513 738 9402
12-02-1993 11:42

Release # 5271 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
825025	Barium	85.5 µg/L	J	The matrix spike recovery was above control limits. The result has been qualified estimated and should be considered biased high.
	Beryllium	1.1 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Calcium	79000 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Chromium	5.3 mg/Kg	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Lead	18.4 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Magnesium	24900 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.

0107

Validator: Dan Q Benedikt Date: 11/18/93

Concurred by: Date: 11/18/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated

4987

P.16 WEMCO OU #3 513 738 9402 12-02-1993 11:42

Release # 5271 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
825025	Nickel	8.9 mg/Kg	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Selenium	0.21 mg/Kg	UJ	The matrix spike and analytical spike recoveries were below control limits. The detection limit has been qualified estimated and should be considered biased low.
	Silver	0.42 mg/Kg	UJ	The matrix spike and analytical spike recoveries were below control limits. The detection limit has been qualified estimated and should be considered biased low.
	Sodium	131 mg/Kg	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.

0108

Validator: Dan Q Benedikt Date: 11/18/93

Concurred by: Date: 11/18/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

P.17

Release # 5271 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)

ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
825025	Vanadium	6.8 mg/Kg	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Zinc	80.6 mg/Kg	J	The serial dilution percent difference and duplicate analysis RPD exceeded control limits. The result has been qualified estimated.

WEMCO OU #3

0109

513 738 9402

Validator: Dan Q Benedikt Date: 11/18/93

Concurred by: Date: 11/18/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

12-02-1993 11:43

4987

Release # 5271 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results		DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
825023	Sodium	288	µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Zinc	12.7	µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Silicon	46.9	µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
825024	Iron	56.9	µg/L	UJ	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high. The matrix spike recovery was above control limits. The detectioon limit was further qualified estimated and should additionally be considered biased high.

Validator: Dan Q Benedikt Date: 11/18/93

Concurred by: Roy Lake Date: 11/18/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

0410

2867

Release # 5271 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results		DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
825024	Sodium	170	µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Zinc	15.4	µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Silicon	54.2	µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
825025	Antimony	2.9	µg/L	UJ	The matrix spike and analytical spike recoveries were below control limits. The detection limit has been qualified estimated and should be considered biased low.

0111

Validator: Dan Q Benedikt Date: 11/18/93

Concurred by: Roy [illegible] Date: 11/18/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated

4987

Release # 5271 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
825025	Barium	85.5 µg/L	J	The matrix spike recovery was above control limits. The result has been qualified estimated and should be considered biased high.
	Beryllium	1.1 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Calcium	79000 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Chromium	5.3 mg/Kg	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Lead	18.4 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Magnesium	24900 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.

0112

Validator: Dan Q Benedikt Date: 11/18/93

Concurred by: Date: 11/18/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

2887

Release # 5271 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
825025	Nickel	8.9 mg/Kg	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Selenium	0.21 mg/Kg	UJ	The matrix spike and analytical spike recoveries were below control limits. The detection limit has been qualified estimated and should be considered biased low.
	Silver	0.42 mg/Kg	UJ	The matrix spike and analytical spike recoveries were below control limits. The detection limit has been qualified estimated and should be considered biased low.
	Sodium	131 mg/Kg	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.

0113

Validator: Dan Q Benedikt Date: 11/18/93

Concurred by: Date: 11/18/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

Release # 5271 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C
(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
825025	Vanadium	6.8 mg/Kg	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Zinc	80.6 mg/Kg	J	The serial dilution percent difference and duplicate analysis RPD exceeded control limits. The result has been qualified estimated.

0114

Validator: Dan Q Benedikt Date: 11/18/93

Concurred by: Date: 11/18/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

4987

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # FM05271 Matrix Water/Soil ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
825-023(BNA)	Hexachlorocyclopentadiene	10.0	UJ	Continuing calibration %D > 25%.
	Indeno(1,2,3-cd)pyrene	10.0	UJ	Continuing calibration %D > 25%.
	Dibenzo(a,h)anthracene	10.0	UJ	Continuing calibration %D > 25%.
	Benzo(g,h,i)perylene	10.0	UJ	Continuing calibration %D > 25%.
	bis(2-Ethylhexyl)phthalate	17.0	U	Blank contamination is present.
825-024(BNA)	bis(2-Ethylhexyl)phthalate	10.0	U	Blank contamination is present.
825-025(BNA)	4,6-Dinitro-2-methylphenol	870.0	UJ	Continuing calibration %D > 25%.
	Indeno(1,2,3-cd)pyrene	49.0	J	Continuing calibration %D > 25%.
	Dibenzo(a,h)anthracene	350.0	UJ	Continuing calibration %D > 25%.
	Benzo(g,h,i)perylene	39.0	J	Continuing calibration %D > 25%.
	bis(2-Ethylhexyl)phthalate	350.0	U	Blank contamination is present.

0115

Validator: Abdul Abdi Date: 11-1-93

Concurred by: Roy [illegible] Date: 11-5-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

4987

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # FM05271 Matrix Water ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
825-022(VOA)	Chloromethane	10.0	UJ	Continuing calibration %D > 25%.
	Vinyl Chloride	10.0	UJ	Continuing calibration %D > 25%.
	Chloroethane	10.0	UJ	Continuing calibration %D > 25%.
	Methylene Chloride	10.0	UJ	Continuing calibration %D > 25%.
	Acetone	15.0	UJ	Blank cont.,Initial & Continuing Cal. are out
	2-Butanone	10.0	UJ	Continuing calibration %D > 25%.
	Vinyl Acetate	10.0	UJ	Continuing calibration %D > 25%.
	Bromoform	10.0	UJ	Initial calibration %RSD > 30%.
	4-Methyl-2-pentanone	10.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	10.0	UJ	Continuing calibration %D > 25%.
825-023(VOA)	Chloromethane	10.0	UJ	Continuing calibration %D > 25%.
	Vinyl Chloride	10.0	UJ	Continuing calibration %D > 25%.
	Chloroethane	10.0	UJ	Continuing calibration %D > 25%.
	Methylene Chloride	10.0	UJ	Continuing calibration %D > 25%.
	Acetone	18.0	UJ	Blank cont.,Initial & Continuing Cal. are out
	2-Butanone	190.0	J	Continuing calibration %D > 25%.
	Vinyl Acetate	10.0	UJ	Continuing calibration %D > 25%.
	Bromoform	10.0	UJ	Initial calibration %RSD > 30%.
	4-Methyl-2-pentanone	10.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	10.0	UJ	Continuing calibration %D > 25%.

0110

Validator: Abdi Ali Date: 11-1-93

Concurred by: Roy Lake Date: 11-5-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

Release # FM05271 Matrix Water/Soil ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
825-024(VOA)	Chloromethane	10.0	UJ	Continuing calibration %D > 25%.
	Vinyl Chloride	10.0	UJ	Continuing calibration %D > 25%.
	Chloroethane	10.0	UJ	Continuing calibration %D > 25%.
	Methylene Chloride	10.0	UJ	Continuing calibration %D > 25%.
	Acetone	19.0	UJ	Blank cont.,Initial & Continuing Cal. are out
	2-Butanone	17.0	J	Continuing calibration %D > 25%.
	Vinyl Acetate	10.0	UJ	Continuing calibration %D > 25%.
	Bromoform	10.0	UJ	Initial calibration %RSD > 30%.
	4-Methyl-2-pentanone	10.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	10.0	UJ	Continuing calibration %D > 25%.
825-025(VOA)	Acetone	27.0	UJ	Blank cont. and Initial Cal.%RSD > 30%.
	2-Butanone	10.0	R	Initial calibration %RSD > 50%.
	Vinyl Acetate	10.0	R	Continuing calibration %D > 50%.
	4-Methyl-2-pentanone	10.0	R	Initial calibration %RSD > 50%.
	2-Hexanone	10.0	R	Initial calibration %RSD > 50%.

0117

Validator: [illegible] Date: 11-1-93

Concurred by: [illegible] Date: 11-5-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # FM05533 Matrix Water/Soil ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
927040 (VOA)	Acetone	27.0	J	Initial calibration %RSD > 30%.
	2-Butanone	10.0	UJ	RRF for both Initial and Cont.cal.<.05
	Carbon Tetrachloride	10.0	UJ	Continuing calibration %D > 25%.
922072 (VOA)	Acetone	22.0	J	Initial calibration %RSD > 30%.
	2-Butanone	29.0	J	RRF for both Initial and Cont.cal.<.05
	Carbon Tetrachloride	10.0	UJ	Continuing calibration %D > 25%.
922073 (VOA)	Acetone	47.0	J	Initial calibration %RSD > 30%.
	2-Butanone	10.0	UJ	RRF for both Initial and Cont.cal.<.05
	Carbon Tetrachloride	10.0	UJ	Continuing calibration %D > 25%.
922074 (VOA)	Methylene Chloride	16.0	U	Blank contamination is present
	Acetone	16.0	UJ	Blank cont.,initial and cont.cal. are out
	2-Butanone	19.0	J	RRF < .05 for both initial and cont.cal.
	Bromoform	16.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	16.0	UJ	Continuing calibration %D > 25%.

0118

Validator: Abdul Abdi Date: 11-9-93

Concurred by: Roy Cohen Date: 11-10-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

Release # FMO5533 Matrix Water/Water ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
922072 (BNA)	2-Methylnaphthalene	10.0	UJ	Continuing calibration %D > 25%.
	4,6-Dinitro-2-methylphenol	25.0	UJ	Continuing calibration %D > 25%.
	Pentachlorophenol	10.0	UJ	Continuing calibration %D > 25%.
	bis(2-Ethylhexyl)phthalate	10.0	U	Blank contamination is present
	Indeno(1,2,3-cd)pyrene	5.0	UJ	Continuing calibration %D > 25%.
922073 (BNA)	2-Methylnaphthalene	20.0	UJ	Continuing calibration %D > 25%.
	4,6-Dinitro-2-methylphenol	50.0	UJ	Continuing calibration %D > 25%.
	Pentachlorophenol	20.0	UJ	Continuing calibration %D > 25%.
	bis(2-Ethylhexyl)phthalate	20.0	U	Blank contamination is present
	Indeno(1,2,3-cd)pyrene	10.0	UJ	Continuing calibration %D > 25%.
922074 (BNA)	bis(2-Chloroisopropyl)ether	420.0	UJ	Continuing calibration %D > 25%.
	2-Methylnaphthalene	420.0	UJ	Continuing calibration %D > 25%.
	3,3-Dichlorobenzidine	420.0	UJ	Continuing calibration %D > 25%.
	bis(2-Ethylhexyl)phthalate	420.0	U	Blank contamination is present
	Indeno(1,2,3-cd)pyrene	48.0	UJ	Continuing calibration %D > 25%.

0119

Validator: Abdul Abdi Date: 11-9-93

Concurred by: Roy Cohen Date: 11-9-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

F-4987

Release # FM05533 Matrix SOIL ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
922075 (BNA)	Hexachlorobutadiene	1300.0	UJ	Continuing calibration %D > 25%.
	Diethylphthalate	1300.0	UJ	Continuing calibration %D > 25%.
	4-Chlorophenyl-phenyl ether	1300.0	UJ	Continuing calibration %D > 25%.
	4,6-Dinitro-2-methylphenol	1300.0	UJ	Continuing calibration %D > 25%.
	Hexachlorobenzene	1300.0	UJ	Continuing calibration %D > 25%.
	Pentachlorophenol	1300.0	UJ	Continuing calibration %D > 25%.

922076RE All the compounds were qualified Z.

922076 (BNA)	Hexachlorobutadiene	29000.0	UJ	Continuing calibration %D > 25%.
	Diethylphthalate	29000.0	UJ	Continuing calibration %D > 25%.
	4-Chlorophenyl-phenyl ether	29000.0	UJ	Continuing calibration %D > 25%.
	Hexachlorobenzene	29000.0	UJ	Continuing calibration %D > 25%.
	Di-n-butylphthalate	1100000.0	J	exceeds calibration range
	bis(2-ethylhexyl)phthalate	29000.0	U	blank contamination is present

acid-extractable compounds (phenol and substituted phenols) are all flagged R. Acid surrogates were similarly low in Both analyses for the sample, consequently, results for the second analysis are not technically necessary, and have been coded Z.

922076 (P/PCB) All the single-peak pesticides and PCB were qualified with R, due to very low surrogate recoveries, entire base line is affected, and in both columns, TCX and DCB recoveries are < 10% and all the compounds were undetected.

922079RE for both samples were qualified Z.

Validator: Abdul Abdi Date: 11-9-93

Concurred by: Roy Cohen Date: 11-9-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

Release # FM05533 Matrix SOIL ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).

Although not rejected (F flagged U), the acetone results in samples 927040, 922072, and 922073 are near levels that are considered attributable to blank contamination. Because acetone is found in lab blanks at levels comparable to the value detected in this sample, the user should be aware that these values may, in fact, be attributable to some extend to blank contamination. This compound was also detected in a lab blank analysed a week prior to theses samples.

01121

validator: Arzul Abdi Date: 11-9-93

Concurred by: Roy Kake Date: 11-10-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

Release # FM05533 Matrix Water/Soil ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
927040 (VOA)	Acetone	27.0	J	Initial calibration %RSD > 30%.
	2-Butanone	10.0	UJ	RRF for both Initial and Cont.cal.<.05
	Carbon Tetrachloride	10.0	UJ	Continuing calibration %D > 25%.
922072 (VOA)	Acetone	22.0	J	Initial calibration %RSD > 30%.
	2-Butanone	29.0	J	RRF for both Initial and Cont.cal.<.05
	Carbon Tetrachloride	10.0	UJ	Continuing calibration %D > 25%.
922073 (VOA)	Acetone	47.0	J	Initial calibration %RSD > 30%.
	2-Butanone	10.0	UJ	RRF for both Initial and Cont.cal.<.05
	Carbon Tetrachloride	10.0	UJ	Continuing calibration %D > 25%.
922074 (VOA)	Methylene Chloride	16.0	U	Blank contamination is present
	Acetone	16.0	UJ	Blank cont.,initial and cont.cal. are out
	2-Butanone	19.0	J	RRF < .05 for both initial and cont.cal.
	Bromoform	16.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	16.0	UJ	Continuing calibration %D > 25%.

0122

Validator: Abdul Abdi Date: 11-9-93

Concurred by: Roy Cohen Date: 11-10-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

Release # FMO5533 Matrix Water/Water ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
922072 (BNA)	2-Methylnaphthalene	10.0	UJ	Continuing calibration %D > 25%.
	4,6-Dinitro-2-methylphenol	25.0	UJ	Continuing calibration %D > 25%.
	Pentachlorophenol	10.0	UJ	Continuing calibration %D > 25%.
	bis(2-Ethylhexyl)phthalate	10.0	U	Blank contamination is present
	Indeno(1,2,3-cd)pyrene	5.0	UJ	Continuing calibration %D > 25%.
922073 (BNA)	2-Methylnaphthalene	20.0	UJ	Continuing calibration %D > 25%.
	4,6-Dinitro-2-methylphenol	50.0	UJ	Continuing calibration %D > 25%.
	Pentachlorophenol	20.0	UJ	Continuing calibration %D > 25%.
	bis(2-Ethylhexyl)phthalate	20.0	U	Blank contamination is present
	Indeno(1,2,3-cd)pyrene	10.0	UJ	Continuing calibration %D > 25%.
922074 (BNA)	bis(2-Chloroisopropyl)ether	420.0	UJ	Continuing calibration %D > 25%.
	2-Methylnaphthalene	420.0	UJ	Continuing calibration %D > 25%.
	3,3-Dichlorobenzidine	420.0	UJ	Continuing calibration %D > 25%.
	bis(2-Ethylhexyl)phthalate	420.0	U	Blank contamination is present
	Indeno(1,2,3-cd)pyrene	48.0	UJ	Continuing calibration %D > 25%.

0123

Validator: Abdul Abdi Date: 11-9-93

Concurred by: Roy Cohen Date: 11-9-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

Release # FM05533 Matrix SOIL ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
922075 (BNA)	Hexachlorobutadiene	1300.0	UJ	Continuing calibration %D > 25%.
	Diethylphthalate	1300.0	UJ	Continuing calibration %D > 25%.
	4-Chlorophenyl-phenyl ether	1300.0	UJ	Continuing calibration %D > 25%.
	4,6-Dinitro-2-methylphenol	1300.0	UJ	Continuing calibration %D > 25%.
	Hexachlorobenzene	1300.0	UJ	Continuing calibration %D > 25%.
	Pentachlorophenol	1300.0	UJ	Continuing calibration %D > 25%.
922076RE	All the compounds were qualified		Z.	
922076 (BNA)	Hexachlorobutadiene	29000.0	UJ	Continuing calibration %D > 25%.
	Diethylphthalate	29000.0	UJ	Continuing calibration %D > 25%.
	4-Chlorophenyl-phenyl ether	29000.0	UJ	Continuing calibration %D > 25%.
	Hexachlorobenzene	29000.0	UJ	Continuing calibration %D > 25%.
	Di-n-butylphthalate	1100000.0	J	exceeds calibration range
	bis(2-ethylhexyl)phthalate	29000.0	U	blank contamination is present

acid-extractable compounds (phenol and substituted phenols) are all flagged R. Acid surrogates were similarly low in Both analyses for the sample, consequently, results for the second analysis are not technically necessary, and have been coded Z.

922076 (P/PCB) All the single-peak pesticides and PCB were qualified with R, due to very low surrogate recoveries, entire base line is affected, and in both columns, TCX and DCB recoveries are < 10% and all the compounds were undetected.

922079RE for both samples were qualified Z.

Validator: Abdul Abdi Date: 11-9-93

Concurred by: Roy Cohen Date: 11-9-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

Release # FMO5533 Matrix SOIL ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).

Although not rejected (Flagged U), the acetone results in samples 927040, 922072, and 922073 are near levels that are considered attributable to blank contamination. Because acetone is found in lab blanks at levels comparable to the value detected in this sample, the user should be aware that these values may, in fact, be attributable to some extend to blank contamination. This compound was also detected in a lab blank analysed a week prior to theses samples.

validator: Abdul Abdi Date: 11-9-93

Concurred by: Roy Jake Date: 11-10-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

Release # 5533 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
922072	Antimony	14.0 µg/L	UJ	The matrix spike and analytical spike recoveries were below control limits. The detection limit has been qualified estimated and should be considered biased low.
	Calcium	275 µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Mercury	0.10 µg/L	UJ	The matrix spike recovery was below control limits. The detection limit has been qualified estimated and should be considered biased low.
	Selenium	2.0 µg/L	UJ	The analytical spike recovery was below control limits. The detection limit has been qualified estimated and should be considered biased low.
	Silver	2.0 µg/L	UJ	The analytical spike recovery was below control limits. The detection limit has been qualified estimated and should be considered biased low.

0126

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Date: 11/17/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

4932

Release # 5533 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
922073	Antimony	14.0 µg/L	UJ	The matrix spike and analytical spike recoveries were below control limits. The detection limit has been qualified estimated and should be considered biased low.
	Calcium	39.3 µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Iron	60.6 µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Mercury	0.10 µg/L	UJ	The matrix spike recovery was below control limits. The detection limit has been qualified estimated and should be considered biased low.
	Selenium	2.0 µg/L	UJ	The analytical spike recovery was below control limits. The detection limit has been qualified estimated and should be considered biased low.

0127

Validator: Dan Q Benedikt Date: 11/17/93

Concurred by: Roy Date: 11/17/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

4987

Release # 5533 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
922073	Silver	2.0 µg/L	UJ	The analytical spike recovery was below control limits. The detection limit has been qualified estimated and should be considered biased low.
	Zinc	8.2 µg/L	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
922074	Antimony	3.5 mg/Kg	U	The matrix spike recovery was low. the detection limit has been qualified estimated and should be considered biased low.
	Arsenic	8.6 mg/Kg	J	The MSA correlation coefficient was below control limits and the matrix spike recovery was low. The result has been qualified estimated.
	Beryllium	1.0 mg/Kg	U	The analyte was detected in the field blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.

0128

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Roy John Date: 11/17/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

2867

Release # 5533 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results		DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
922074	Calcium	79300	mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Lead	19.4	mg/Kg	J	The analytical spike recovery was high. The result has been qualified estimated and should be considered biased high.
	Magnesium	31200	mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Manganese	441	mg/Kg	J	The matrix spike recovery was extremely low. The result has been qualified estimated and should be considered biased extremely low.
	Nickel	15.0	mg/Kg	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Selenium	12.5	mg/Kg	R	The matrix spike recovery was extremely low. The detection limit has been qualified unusable and should be considered biased extremely low.

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Date: 11/17/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

0129

2084

Release # 5533 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
922074	Thallium	0.62 mg/Kg	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Zinc	62.3 mg/Kg	U	The analyte was detected in the field blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Silicon	421 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
922075	Antimony	3.5 mg/Kg	UJ	The matrix spike recovery was low. The detection limit has been qualified estimated and should be considered biased low.
	Arsenic	4.6 mg/Kg	J	The MSA correlation coefficient was below control limits and the matrix spike recovery was low. The result has been qualified estimated.

0130

Validator: Dan Q Benedikt Date: 11/17/93

Concurred by: Date: 11/17/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

F-4987

Release # 5533 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
922075	Beryllium	1.0 mg/Kg	U	The analyte was detected in the field blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Calcium	35800 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Lead	12.3 mg/Kg	J	The analytical spike recovery was high. The result has been qualified estimated and should be considered biased high.
	Magnesium	16800 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Manganese	823 mg/Kg	J	The matrix spike recovery was extremely low. The result has been qualified estimated and should be considered biased extremely low.
	Selenium	12.5 mg/Kg	R	The matrix spike recovery was extremely low. The detection limit has been qualified unusable and should be considered biased extremely low.

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Date: 11/17/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

0131

4987

Release # 5533 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results		DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
922075	Sodium	374	mg/Kg	U	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Zinc	51.0	mg/Kg	U	The analyte was detected in the field blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Silicon	278	mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
922076	Antimony	20.5	mg/Kg	J	The matrix spike recovery was low. The result has been qualified estimated and should be considered biased low.
	Arsenic	30.8	mg/Kg	J	The matrix spike recovery was low. The result has been qualified estimated and should be considered biased low.

0132

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Roy Lo Date: 11/17/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

4987

Release # 5533 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
922076	Beryllium	2.3 mg/Kg	U	The analyte was detected in the field blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high.
	Calcium	11400 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Magnesium	2290 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Manganese	342 mg/Kg	J	The matrix spike recovery was extremely low. The result has been qualified estimated and should be considered biased extremely low.
	Selenium	29.2 mg/Kg	R	The matrix spike recovery was extremely low. The detection limit has been qualified unusable and should be considered biased extremely low.
	Silver	1.2 mg/Kg	UJ	The analytical spike recovery was low. The detection limit has been qualified estimated and should be considered biased low.

0133

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Roy Parker Date: 11/17/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 5533

ASL level C

Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results		DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
922076	Silicon	1250	mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.

0134

Validator: Dan Q Benedikt Date: 11/16/93

Concurred by: Date: 11/17/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

4987

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 5639 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results		DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
005021	Antimony	3.6	mg/Kg	J	The matrix spike recovery was below control limits. The result has been qualified estimated and should be considered biased low.
	Arsenic	7.7	mg/Kg	J	The matrix spike recovery was below control limits. The result has been qualified estimated and should be considered biased low.
	Barium	369	mg/Kg	J	The laboratory duplicate RPD exceeded control limits and the matrix spike recovery was below control limits. The result has been qualified estimated.
	Beryllium	4.7	mg/Kg	J	The laboratory duplicate RPD exceeded control limits and the matrix spike recovery was below control limits. The result has been qualified estimated.
	Cadmium	8.0	mg/Kg	J	The laboratory duplicate RPD exceeded control limits and the matrix spike recovery was below control limits. The result has been qualified estimated.
	Calcium	46100	mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.

Validator: Dan Q Benedikt Date: 11/23/93

Concurred by: Date: 11/24/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

WEMCO OU #3
513 738 9402
12-03-1993 07:59
0135
4987

P.03

Release # 5639 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results		DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
005021	Chromium	75.8	mg/Kg	J	The matrix spike recovery was above control limits. The result has been qualified estimated and should be considered biased high.
	Cobalt	8.0	mg/Kg	UJ	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high. The matrix spike recovery was above control limits. The detection limit was further qualified estimated and should additionally be considered biased high.
	Copper	444	mg/Kg	J	The serial dilution %D and duplicate RPD exceeded control limits. The result has been qualified estimated.
	Lead	308	mg/Kg	J	The matrix spike recovery was above control limits. The result has been qualified estimated and should be considered biased high.
	Magnesium	16400	mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.

0136

WEMCO OU #3

513 738 9402

Validator: Dan Q Benedikt Date: 11/22/93

Concurred by: Roy Clark Date: 11/23/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

12-03-1993 07:59

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 5639 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
005021	Manganese	697 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Nickel	208 mg/Kg	J	The matrix spike recovery was above control limits. The result has been qualified estimated and should be considered biased high.
	Selenium	0.86 mg/Kg	UJ	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected. The matrix spike recovery was below control limits. The detection limit has been further qualified estimated.
	Silver	6.0 mg/Kg	J	The matrix spike recovery was below control limits. The result has been qualified estimated and should be considered biased low.
	Thallium	0.28 mg/Kg	R	The matrix spike recovery was extremely low. The result has been qualified unusable and should be considered biased extremely low.

Validator: Dan Q Benedikt Date: 11/22/93

Concurred by: Roy Cole Date: 11/23/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 5639 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
005021	Zinc	97.5 mg/Kg	J	The serial dilution %D and duplicate RPD exceeded control limits. Additionally, the matrix spike recovery was low. The result has been qualified estimated.
	Cyanide	1.9 mg/Kg	J	The matrix spike recovery was high. The result has been qualified estimated and should be considered biased high.

0138

Validator: Dan Q Benedikt Date: 11/22/93

Concurred by: Roy Zahn Date: 11/23/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # CRU 3 PPS FM05639 Matrix SOIL Units: Ug/Kg ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
0050-21 (VOA)	Acetone	870000.0	UJ	Initial and Cont. calib. are outside QC limits.
	Carbon Disulfide	870000.0	UJ	Continuing calibration %D > 25%.
	2-Butanone	870000.0	UJ	Initial and Cont. calib. RRF < .05.
	Carbon Tetrachloride	870000.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	870000.0	UJ	Continuing calibration %D > 25%.
	1,1,2,2-Tetrachloroethane	870000.0	UJ	Continuing calibration %D > 25%.
0050-22 (VOA)	Acetone	12.0	J	Initial and Cont. calib. are outside QC limits.
	Carbon Disulfide	10.0	UJ	Continuing calibration %D > 25%.
	2-Butanone	10.0	UJ	Initial and Cont. calib. RRF < .05.
	Carbon Tetrachloride	10.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	10.0	UJ	Continuing calibration %D > 25%.
	1,1,2,2-Tetrachloroethane	10.0	UJ	Continuing calibration %D > 25%.
0050-21 (BNA)	2,4-Dinitrophenol	34000.0	UJ	Initial calibration %RSD > 30%.

0050-21DL (P/PCB) All the results were qualified with "z".

Validator: Abbi Abbi Date: 11-22-93

Concurred by: Roy Clark Date: 11-23-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # CRU 3 PPB FM05639 Matrix SOIL Units: Ug/Kg ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
0050-21 (VOA)	Acetone	870000.0	UJ	Initial and Cont. calib. are outside QC limits.
	Carbon Disulfide	870000.0	UJ	Continuing calibration %D > 25%.
	2-Butanone	870000.0	UJ	Initial and Cont. calib. RRF < .05.
	Carbon Tetrachloride	870000.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	870000.0	UJ	Continuing calibration %D > 25%.
	1,1,2,2-Tetrachloroethane	870000.0	UJ	Continuing calibration %D > 25%.
0050-22 (VOA)	Acetone	12.0	J	Initial and Cont. calib. are outside QC limits.
	Carbon Disulfide	10.0	UJ	Continuing calibration %D > 25%.
	2-Butanone	10.0	UJ	Initial and Cont. calib. RRF < .05.
	Carbon Tetrachloride	10.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	10.0	UJ	Continuing calibration %D > 25%.
	1,1,2,2-Tetrachloroethane	10.0	UJ	Continuing calibration %D > 25%.
0050-21 (BNA)	2,4-Dinitrophenol	34000.0	UJ	Initial calibration %RSD > 30%.

0050-21DL (P/PCB) All the results were qualified with "z".

Validator: Abbi Abbi Date: 11-22-93

Concurred by: Roy Clarke Date: 11-23-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

ORGANIC DATA VALIDATION SUMMARY REPORT

Release # CRU 3 PPB FM05639 Matrix SOIL Units: Ug/Kg ASL level C

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems).
0050-21 (VOA)	Acetone	870000.0	UJ	Initial and Cont. calib. are outside QC limits.
	Carbon Disulfide	870000.0	UJ	Continuing calibration %D > 25%.
	2-Butanone	870000.0	UJ	Initial and Cont. calib. RRF < .05.
	Carbon Tetrachloride	870000.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	870000.0	UJ	Continuing calibration %D > 25%.
	1,1,2,2-Tetrachloroethane	870000.0	UJ	Continuing calibration %D > 25%.
0050-22 (VOA)	Acetone	12.0	J	Initial and Cont. calib. are outside QC limits.
	Carbon Disulfide	10.0	UJ	Continuing calibration %D > 25%.
	2-Butanone	10.0	UJ	Initial and Cont. calib. RRF < .05.
	Carbon Tetrachloride	10.0	UJ	Continuing calibration %D > 25%.
	2-Hexanone	10.0	UJ	Continuing calibration %D > 25%.
	1,1,2,2-Tetrachloroethane	10.0	UJ	Continuing calibration %D > 25%.
0050-21 (BNA)	2,4-Dinitrophenol	34000.0	UJ	Initial calibration %RSD > 30%.

0050-21DL (P/PCB) All the results were qualified with "z".

0141

Validator: Abbi Abbi Date: 11-22-93

Concurred by: Roy Clarke Date: 11-23-93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* Final Data Validation Qualifiers assigned based upon the relevent factor(s) that were indicated.

SEMCO OU #3 9402 3 08:24

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 5639

ASL level C

Special Comments: (When Necessary - Initial & Date.) CRU3 Pilot Plant Sump -Total Metals

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
005021	Antimony	3.6 mg/Kg	J	The matrix spike recovery was below control limits. The result has been qualified estimated and should be considered biased low.
	Arsenic	7.7 mg/Kg	J	The matrix spike recovery was below control limits. The result has been qualified estimated and should be considered biased low.
	Barium	369 mg/Kg	J	The laboratory duplicate RPD exceeded control limits and the matrix spike recovery was below control limits. The result has been qualified estimated.
	Beryllium	4.7 mg/Kg	J	The laboratory duplicate RPD exceeded control limits and the matrix spike recovery was below control limits. The result has been qualified estimated.
	Cadmium	8.0 mg/Kg	J	The laboratory duplicate RPD exceeded control limits and the matrix spike recovery was below control limits. The result has been qualified estimated.
	Calcium	46100 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.

0142

Validator: Dan Q Benedikt Date: 11/23/93

Concurred by: Date: 11/24/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

4987

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 5639 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
005021	Chromium	75.8 mg/Kg	J	The matrix spike recovery was above control limits. The result has been qualified estimated and should be considered biased high.
	Cobalt	8.0 mg/Kg	UJ	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected and should be considered biased high. The matrix spike recovery was above control limits. The detection limit was further qualified estimated and should additionally be considered biased high.
	Copper	444 mg/Kg	J	The serial dilution %D and duplicate RPD exceeded control limits. The result has been qualified estimated.
	Lead	308 mg/Kg	J	The matrix spike recovery was above control limits. The result has been qualified estimated and should be considered biased high.
	Magnesium	16400 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.

0143

Validator: Dan Q Benedikt Date: 11/22/93

Concurred by: Roy Clark Date: 11/23/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

4987

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 5639 Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)
ASL level C

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
005021	Manganese	697 mg/Kg	J	The laboratory duplicate RPD exceeded control limits. The result has been qualified estimated.
	Nickel	208 mg/Kg	J	The matrix spike recovery was above control limits. The result has been qualified estimated and should be considered biased high.
	Selenium	0.86 mg/Kg	UJ	The analyte was detected in the laboratory blank and the sample level was within the range attributable to contamination. The result has been qualified undetected. The matrix spike recovery was below control limits. The detection limit has been further qualified estimated.
	Silver	6.0 mg/Kg	J	The matrix spike recovery was below control limits. The result has been qualified estimated and should be considered biased low.
	Thallium	0.28 mg/Kg	R	The matrix spike recovery was extremely low. The result has been qualified unusable and should be considered biased extremely low.

Validator: Dan Q Benedikt Date: 11/22/93

Concurred by: [illegible] Date: 11/23/93

Qualifier Codes Entered by: _____ Date: _____

Qualifier Codes Approved by: _____ Date: _____

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 5639

ASL level C

Special Comments: CRU3 Pilot Plant Sump -Total Metals
(When Necessary - Initial & Date.)

(Reported Measurement Units): as indicated below

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
005021	Zinc	97.5 mg/Kg	J	The serial dilution %D and duplicate RPD exceeded control limits. Additionally, the matrix spike recovery was low. The result has been qualified estimated.
	Cyanide	1.9 mg/Kg	J	The matrix spike recovery was high. The result has been qualified estimated and should be considered biased high.

01145

Validator: Dan Q Benedikt Date: 11/22/93

Concurred by: Roy Clark Date: 11/23/93

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

* - Final Data Validation Qualifiers assigned based upon the relevant factor(s) that were indicated.