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TRANSMITTAL OF CLOSURE CERTIFICATION REPORT FOR HAZARDOUS WASTE MANAGEMENT UNIT NUMBER 38 - HYDROFLUORIC ACID TANK CAR

09/29/95

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Hazardous Waste Management Unit No. 38
Closure Certification Report
for the
HF Tank Car

Fernald Environmental Management Project

September 1995

U.S. DEPARTMENT OF ENERGY

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Department of Energy
Fernald Environmental Management Project
P. O. Box 398705
Cincinnati, Ohio 45239-8705
(513) 648-3155

SEP 29 1995

DOE-1562-95

Mr. Donald Schregardus, Director
Ohio Environmental Protection Agency
Post Office Box 1049
1800 Watermark Drive
Columbus, Ohio 43266-1049

Dear Mr. Schregardus:

TRANSMITTAL OF CLOSURE CERTIFICATION REPORT FOR HAZARDOUS WASTE MANAGEMENT UNIT NUMBER 38 - HYDROFLUORIC ACID TANK CAR

Enclosed is the Closure Certification Report for Hazardous Waste Management Unit Number 38 - Hydrofluoric Acid (HF) Tank Car. This report completes the closure schedule per the Closure Plan Information and Data (CPID) package in compliance with the time allowed for closure in OAC 3745-66-13.

Section 3.0, in the enclosed certification report, discusses the wastes generated during closure. These include the filtrate and solids from the filtration of neutralized slurry in Plant 8 and the two decontaminated rail cars. The filtrate was tested and processed through Plant 8. The 99 drums of filtered solids were drummed, sampled, and verified to be non-hazardous. Because they are not Resource Conservation and Recovery Act (RCRA) wastes and they are awaiting final disposition.

Submittal of this Closure Certification Report is the final requirement of the closure plan and documents completion of closure for Hazardous Waste Management Unit (HWMU) Number 38.

If you have any questions, please contact Don Pfister at (513) 648-3170.

Sincerely,

Jack R. Craig
Director

FN:Pfister

Enclosure: As Stated

Recycled and Recyclable

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cc w/enc:

J. A. Saric, U.S. EPA

cc w/o enc:

J. Sattler, DOE-FN
K. R. Kolthoff, FERMCO/52-3

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ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
CPID	Closure Plan Information and Data
CSIP	Conceptual System Implementation Plan
DOE	Department of Energy
FEMP	Fernald Environmental Management Project
FMPC	Feed Materials Production Center
HF	hydrofluoric acid
HWMU	Hazardous Waste Management Unit
IH	Industrial Hygienists
MEF	materials evaluation form
NPDES	National Pollutant Discharge Elimination System
OAC	Ohio Administrative Code
OEPA	Ohio Environmental Protection Agency
PSAP	Project Specific Sampling and Analysis Plan
PVDF	polyvinyldienefluoride
RCRA	Resource Conservation and Recovery Act
SOP	Standard Operating Procedure
USEPA	U.S. Environmental Protection Agency
WQS	Water Quality Standards

1.0 INTRODUCTION

The Fernald Environmental Management Project (FEMP) is a U.S. Department of Energy (DOE) owned facility. The FEMP was formerly operated as the Feed Materials Production Center (FMPC). Facility construction and startup occurred in 1951 and 1952. The FEMP site is located on 1,050 acres in a rural area in Hamilton and Butler Counties, Ohio, approximately 18 miles northwest of Cincinnati. The FEMP production facilities are limited to an approximate 136-acre tract near the center of the site. The villages of Fernald, New Baltimore, Ross, New Haven, and Shandon are all located within a 5-mile radius of the plant.

The former FMPC facility was established to produce high-purity uranium metals and intermediate compounds from uranium ore concentrates or recycled uranium materials for use in government defense programs. A wide variety of chemical and metallurgical processes were used to support the production of uranium metal products. Production operations began in the early 1950s and continued until July 1989 when production ceased.

The HF (hydrofluoric acid) Tank Car, Hazardous Waste Management Unit (HWMU) No. 38, was used in support of the FMPC's chemical and metallurgical process activities and declared a HWMU in June 1991. A *Closure Plan Information and Data* (CPID) document (DOE 1994a) was prepared that described the closure procedure used for the HF Tank Car.

1.1 PURPOSE

This certification report summarizes the activities that were conducted to accomplish clean closure of the HF Tank Car. It completes the requirements for closure under Ohio Administrative Code (OAC) 3745-66-10. The certification report was prepared in accordance with the Ohio Environmental Protection Agency (OEPA) Closure Plan Review Guidance, Interim Final, September 1993 (OEPA Guidance).

1.2 BACKGROUND

The initial draft of the CPID was originally submitted to the OEPA on May 7, 1992. Comments were received and incorporated into subsequent revised CPID drafts submitted on May 28, 1993 and November 10, 1993. Upon successful incorporation of all comments, the final CPID was submitted to OEPA and the U.S. Environmental Protection Agency (USEPA) on July 27, 1994. The closure plan approval by OEPA was received February 14, 1995. The field activities to implement the approved closure plan were begun on June 12, 1995 and were completed on July 31, 1995. Copies of correspondence regarding the CPID are contained in Attachment A.

1.3 UNIT DESCRIPTION

The HF Tank Car, HWMU No. 38, is a rubber-lined carbon steel tank mounted on a railway carriage carrying the identification number OROX17501. The tank car is believed to be more than 40 years old. In June 1991, the HF Tank Car's contents were declared a corrosive hazardous waste (D002), and the HF Tank Car was identified as HWMU No. 38 at the FEMP site. The HWMU boundaries were defined at that time as the perimeter of the actual tank car and the track segment lying beneath it. These boundaries were determined based on process knowledge which established that the tank car had not been moved from its storage location since the HF was placed there in October 1988 and no spills had been reported at the storage location.

The HF Tank Car was sampled on December 2, 1992 and December 8, 1993 and was found to contain hydrofluoric acid with a concentration of 28.7 percent. The total uranium concentration was determined to be 54.7 ppm (DOE 1994b). The HF was characterized according to the FEMP Waste Analysis and Waste Determination Plans. Process knowledge and analytical information used in the characterization were documented in a materials evaluation form (MEF). A revised materials evaluation form (MEF No. 1691R, Rev. 01-04-93) identified the HF stored in Rail Car #OROX17501 as Resource Conservation and Recovery Act (RCRA) Hazardous for corrosivity (EPA Hazardous Waste Code D002). Based on process knowledge, it was determined that the HF was a process waste and not a discarded commercial chemical product under OAC 3745-51-33. There are no records that documented the quantity of HF placed into the HF Tank Car. However, based on the liquid level observed during sampling, the quantity of HF was estimated at approximately 4,400 gallons.

While planning field closure actions, it was determined that the HF Tank Car should be relocated to provide better access for removal of acid wastes and containment for possible leaks or spills. In the northwest corner of the Main Tank Farm area, the rail lines had been extended over a coated secondary containment pit in a secondary containment area for loading and unloading acids from rail cars. This acid rail car loading and unloading area is located approximately 300 feet west of the designated HWMU. In September 1992, an independent rail car inspector reported that the tank car had obsolete components but could be safely moved within the confines of the FEMP rail system. On April 14, 1994, following the requirements in the *Transportation Safety Plan for the HF Tank Car* (Attachment D of the CPID) (DOE 1994a), the HF Tank Car was moved from the HWMU to the specified secondary containment area in the FEMP main tank farm.

The HF Tank Car is approximately 10 feet wide by 36 feet long by 15 feet high and has a liquid storage capacity of approximately 8,000 gallons. The area previously occupied by the rail car constitutes the physical boundary of the HWMU. Prior to its movement, the HF Tank Car sat on an elevated rail siding, track 6, at this location. Figure 1-1 shows the location of the HF Tank Car HWMU, and the subsequent location of the HF Tank Car at the secondary containment pit after it was moved.

In addition to the HF Tank Car (Tank Car No.1), a portable container was identified on the FEMP site that was estimated to contain approximately 750 gallons of HF with a concentration of 10 percent. As a condition of approval of the CPID, it was agreed by DOE and FERMCO that this material would be removed from the dumpster and neutralized after the processing of the contents of the HF Tank Car had been completed. Also, a second RCRA empty railway tank car (Tank Car No. 2) was present on site that was determined to have contained HF prior to being emptied. Based on observations and a video tape made while sampling Tank Car No. 2, the empty rail car contained approximately 22 gallons of residues. Following removal and neutralization of HF residues from the HF Tank Car and the portable container, the residues in Tank Car No. 2 were to be removed and the tank car rinsed until the rinsate pH was found to be greater than 2 and less than 12.5. The HF residues and rinsates from the second rail car were to be processed in the same manner as the HF Tank Car residues and rinsates.

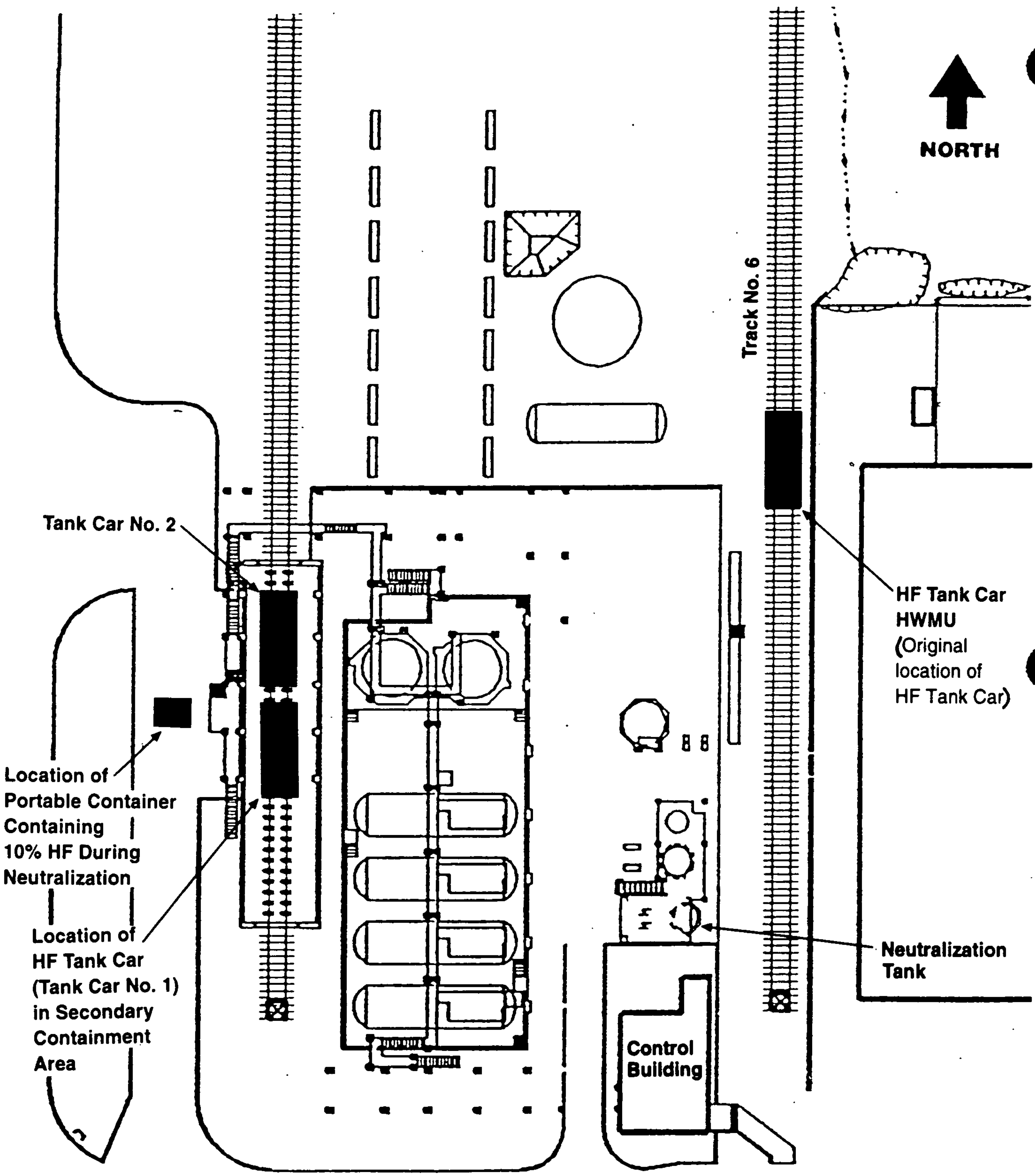

Figure 1-1. Vicinity of HF Tank Car and Secondary Containment Area.

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2.0 SUMMARY OF CLOSURE ACTIONS

The closure activities completed for the HF Tank Car met the following performance standards (OAC 3745-66-11 and 40 Code of Federal Regulations [CFR] 265.111) presented in the CPID:

- Minimize the need for further maintenance by removing all stored materials, and by sampling residual waste materials and soils to determine that all hazardous waste has been removed from the unit. Post-closure maintenance is not required for the unit if no hazardous wastes or unacceptable levels of contamination remain in the unit or unit soils after closure (e.g., "clean" closed).

- Control, minimize, or eliminate to the extent necessary to protect human health and the environment, the escape of hazardous waste, hazardous waste constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the groundwater, surface waters, or to the atmosphere.

- Conduct closure actions according to the approved RCRA CPID.

Clean closure was accomplished by moving the HF Tank Car from the HWMU to a secondary containment area west of the tank farm; sampling the soil under the HWMU; neutralizing the HF from the HF Tank Car; filtering the neutralized slurry and testing the filtrate and filter cake; rinsing (decontaminating) the HF Tank Car and a portable container; and rinsing (decontaminating) the neutralization piping system. This Closure Certification Report documents that these closure actions met the RCRA requirements of the CPID. The closure actions and their completion dates are listed below:

1) 4-14-94 Moved HF Tank Car from the HWMU to the secondary containment area west of the tank farm
2) 6-27-94 Sampled soil from beneath HWMU
3) 7-11-95 Completed neutralization of residues from HF Tank Car (Tank Car No. 1)
4) 7-12-95 Rinsed portable container and neutralized rinsates

5) 7-18-95 Completed rinsing of HF Tank Car (Tank Car No. 1) and neutralization of associated rinsates

6) 7-21-95 Completed rinsing of empty rail car (Tank Car No. 2) neutralization of associated rinsates, and rinsing of neutralization system

7) 7-24-95 Completed filtration of all neutralized slurry from HF and rinsate neutralization

8) 7-31-95 Completed sampling of drummed residues for waste disposal verification

These closure activities, a summary of related closure actions taken, and any deviations from the CPID are described below.

2.1 MOVEMENT OF THE HF TANK CAR FROM HWMU TO THE TANK FARM

The HF Tank Car was moved from the HWMU to the secondary containment area west of the tank farm on April 14, 1994. This satisfied the requirement that HWMUs have secondary containment in case of an accident, incident, or spill.

FERMCO employees who worked in the production area were given the afternoon off to minimize the number of personnel in the immediate area. The tank car was moved at about 13:30 hours. Inspections of the railroad tracks and the HF Tank Car were performed by FERMCO prior to the movement of the HF Tank Car and documented on the HF Tank Car inspection checklist, as required in the *Transportation Safety Plan for the HF Tank Car* that was included in the CPID.

Control zones for contamination and contamination reduction were established around the tank car. The Emergency Response Team and the FERMCO Fire Department were standing by in the event that an unplanned event occurred. The actual tank car movement required a total of 3 hours and 30 minutes to complete. No spills, leaks, accidents, or incidents were observed or reported during or prior to initiation of the tank car relocation. The *Transportation Safety Plan for the HF Tank Car* was observed and followed during the movement of the tank car.

2.2 SOIL SAMPLING

Sampling of the soils beneath the former location of the HF Tank began after the tank was relocated to the main tank farm. This task was completed on June 27, 1994. The sampling was performed in accordance with the CPID Sampling and Analysis Plan and the FEMP Project Specific Sampling and Analysis Plan (PSAP).

As required by the sampling plan, the HWMU area was divided into 12 grids measuring approximately 4 feet square. The individual samples were taken at the approximate grid center and the sample depths were begun at the interface between the rail bed (18-inch-thick pea gravel) and the underlying clay soils. Three composite samples were taken from each location, representing the 0 to 6, 6 to 18, and 18 to 30 inch depth zones. In total, 36 samples total plus duplicates were collected. Throughout the sampling events, standard site sampling protocols were employed (see certification log, pages 1 through 12). Analyses of the samples for pH found soil pH to be within the expected range for soils of this type. The absence of soils with a lowered pH indicated that soil remediation for pH was not required.

The soil sampling was completed prior to the submittal of the final version of the CPID in July 1994. A summary of the soil sampling results were included in the CPID as Table 3.

2.3 NEUTRALIZATION OF THE HYDROFLUORIC ACID (HF)

The neutralization process took place at the FEMP tank storage area by modifying a previously built and unused HF acid neutralization tank with a 7-foot diameter and a shell height of 5 feet, giving it a nominal capacity of approximately 1,440 gallons. The operational concept of the neutralization system using this tank has been described in the *Conceptual System Implementation Plan* (CSIP) document (DOE 1994c). According to the CSIP, the HF would be neutralized in discrete batches by adding HF at a controlled addition rate to a previously prepared neutralization slurry consisting of water, hydrated lime, and calcium carbonate. The pH in the neutralization tank would be monitored using two pH instruments interlocked to the HF metering pump and an activated valve on the suction side of the pump. When the pH decreased to a value less than the preset operating limits, the power would be interrupted, shutting off the pump and valve and stopping the addition of HF to the neutralization tank. Additional process control of HF addition would also be provided by dual level and temperature instruments. When neutralization was complete, the neutralized slurry would be placed into two portable containers and transferred to Plant 8. There, the neutralized slurry was to be removed from the containers and placed into a tank from which it would be removed and filtered in a large rotary drum vacuum filter. The design details of the neutralization system were presented in the HF Neutralization System Installation Specifications and Requirements (FERMCO 1994).

This system was to be used to neutralize HF from the HF Tank Car with a concentration of 28.7 wt. percent. In addition, the OEPA required that the system also be used to neutralize a quantity of HF contained within a portable container that had an HF concentration estimated at 10 wt. percent. The different HF concentrations between these two streams necessitated the use of different neutralization batch compositions for each.

2.3.1 Neutralization of the HF Tank Car Contents

A total of 34 neutralization batches were required to neutralize the contents of the HF Tank Car. Calculations in the CSIP described a neutralization slurry batch with a volume of 1,150 gallons which was to be obtained using 968 gallons of water, 625 pounds of hydrated lime, and 268 pounds of calcium carbonate. A total quantity of 143 gallons of 28.7 percent HF was to be added to this batch to produce a final neutralization slurry batch of 1,150 gallons.

These numbers were adjusted somewhat in the field to allow the addition of even numbers of 50-pound bags of lime and calcium carbonate. As a result, the batch sheet for the initial batch called for the use of six 50-pound bags of calcium carbonate (300 pounds) and thirteen 50-pound bags of lime (650 pounds). Table 2-1 summarizes the quantities of reagents used for each neutralization batch. Calculations indicated that this slightly greater quantity of neutralization reagents was capable of neutralizing approximately 152 gallons of 28.7 percent HF.

The first neutralization batch was processed on June 12, 1995. Initially, difficulties were encountered with pumping the HF due to an obstruction or air leakage in the tank car dip tube. A 1 inch kynar insert tube was prepared by FERMCO personnel and inserted into the larger dip tube, which solved the problem. HF flow was then established and the HF transfer proceeded as expected by design at approximately a 1.8-

Table 2-1. Summary of Neutralization Tank Data

Batch No.	Date	Batch Ending Time	Water Addition (gallons)	CaCO3 Addition (lbs)	Lime Addition (lbs)	Estimated [1/] IIF Volume Neutralized (gallons)	Ending pH	Final Temp. (oF)	Estimated [2/] Slurry Vol. Transferred to Plant 8 (gallons)	Estimated Slurry Mass Transferred to Plant 8 (lbs)	Recorded [3/] Slurry Vol. Received at Plant 8 (gallons)
IIF Tank Car Acid											
1	12-Jun-95	20:04	1,013	300	650	114	11.0	132	1,100	9,680	1,130
2	14-Jun-95	16:36	968	300	650	154	7.7	128	1,200	10,560	1,170
3	15-Jun-95	10:30	968	300	650	156	8.8	124	1,200	10,560	1,360
4	15-Jun-95	14:51	968	300	650	150	7.9	126	1,200	10,560	1,170
5	16-Jun-95	9:54	968	300	650	133	8.1	119	1,200	10,560	1,170
6	16-Jun-95	14:55	968	300	650	152	8.1	127	1,200	10,560	1,230
7	19-Jun-95	13:02	968	300	650	170	7.8	134	1,200	10,560	1,200
8	19-Jun-95	16:44	968	300	650	154	8.1	131	1,200	10,560	1,320
9	20-Jun-95	7:40	968	300	650	152	8.3	125	1,200	10,560	1,100
10	20-Jun-95	11:24	900	300	650	150	8.1	128	1,132	10,560	1,230
11	20-Jun-95	14:31	900	300	650	140	7.9	125	1,132	9,940	1,210
12	21-Jun-95	8:18	900	300	650	154	8.2	126	1,132	9,940	1,040
13	21-Jun-95	13:15	900	300	650	168	8.3	136	1,132	9,940	1,100
14	22-Jun-95	11:06	900	300	650	163	7.4	134	1,132	9,940	1,040
15	22-Jun-95	14:31	900	300	650	152	7.7	130	1,132	9,940	1,100
16	23-Jun-95	7:51	900	300	650	161	7.7	127	1,132	9,940	1,130
17	23-Jun-95	10:58	900	300	650	161	7.5	128	1,132	9,940	1,110
18	23-Jun-95	14:15	900	300	650	145	8.1	125	1,132	9,940	1,200
19	26-Jun-95	8:11	900	300	650	175	8.2	138	1,132	9,940	1,040
20	26-Jun-95	11:29	900	300	650	161	7.6	130	1,132	9,960	1,080
21	26-Jun-95	15:58	900	300	650	163	7.8	130	1,132	9,960	990
22	27-Jun-95	7:56	900	300	650	161	7.6	129	1,132	9,960	820
23	27-Jun-95	11:18	900	300	650	163	8.7	128	1,132	9,960	1,010
24	27-Jun-95	16:26	900	300	650	166	8.0	132	1,132	9,960	1,000
25	28-Jun-95	7:37	900	300	650	161	8.2	128	1,132	9,960	1,065
26	28-Jun-95	10:43	900	300	650	166	8.2	125	1,132	9,960	1,070
27	29-Jun-95	10:43	900	300	650	168	7.4	128	1,132	9,960	1,040
28	29-Jun-95	14:31	900	300	650	175	7.7	129	1,132	9,960	1,030
29	30-Jun-95	8:43	900	300	650	168	8.2	128	1,132	9,960	1,070
30	30-Jun-95	11:53	900	300	650	173	8.1	129	1,132	9,960	960
31	30-Jun-95	15:04	900	300	650	175	8.0	130	1,132	9,960	1,050
32	3-Jul-95	7:52	900	300	650	170	8.2	122	1,132	9,960	960
33	3-Jul-95	11:27	900	300	650	205	8.6	133	1,132	9,960	1,030
34	6-Jul-95	13:32	900	300	650	150	10.4	123	1,132	9,960	1,230
Subtotals			31,257	10,200	22,100	5,427			39,000	343,580	37,455

Table 2-1. Summary of Neutralization Tank Data

Batch No.	Date	Batch Ending Time	Water Addition (gallons)	CaCO3 Addition (lbs)	Lime Addition (lbs)	Estimated [1/] HF Volume Neutralized (gallons)	Ending pH	Final Temp. (oF)	Estimated [2/] Slurry Vol. Transferred to Plant 8 (gallons)	Estimated Slurry Mass Transferred to Plant 8 (lbs)	Recorded [3/] Slurry Vol. Received at Plant 8 (gallons)
Portable Container Acid											
35	7-Jul-95	9:18	700	200	500	287	9.0	118	1,032	9,080	840
36	7-Jul-95	15:33	700	200	500	356	9.0	122	1,032	9,080	1,290
37	10-Jul-95	7:35	700	200	500	85	11.5	89	918	8,074	900
Subtotals			2,100	600	1,500	729			2,982	26,234	3,030
Portable Container Rinsate											
38	12-Jul-95	15:44	600	16	50		11.6	79	900	7,470	790
HF Tank Car Rinsate											
39	14-Jul-95	6:48	600	16	50		12.1	84	1,200	9,960	1,270
40	14-Jul-95	14:17	600	16	50		11.5	81	1,200	10,560	1,240
41	17-Jul-95	13:49	600	15	50		11.5	81	1,050	9,240	1,060
Subtotals			1,800	47	150	0			3,450	29,760	3,570
Tank Car No. 2 Rinsate											
42	20-Jul-95	6:57	600	15	50		10.2	78	1,200	10,560	1,185
43	21-Jul-95	10:30	600	15	50		11.9	70	1,008	8,800	1,750
Subtotals			1,200	30	100	0			2,208	19,360	2,935
TOTALS			36,957	10,893	23,900	6,156			48,540	426,404	47,780

Notes:
1/ HF volume neutralized was estimated by multiplying the estimated pumping rate by the pump operating time.
2/ The estimated slurry volume is a typical volume and not based on specific measurements of each batch.
3/ The recorded slurry volume was determined by the Plant 8 operator by recording the receiving tank level before and after the transfer.

gallon per minute flow rate. HF neutralization was terminated when one of the pH control instruments incorrectly indicated a low pH, shut off the HF metering pump, and actuated an alarm. Because the pH instruments provided process safety control, FEMP procedures required repair of the malfunctioning pH instrument before processing could continue. The final pH for the batch was field analyzed at 11.00.

After transferring the slurry to transfer dumpsters, a tank inspection indicated a buildup of solids within the dip tubes surrounding the instrument probes which was suspected of providing inaccurate readings. The dip tubes were modified with additional circulatory openings to alleviate the problem. The instruments were recalibrated by the FEMP instrument technicians at this time, as well as periodically throughout the neutralization process.

During the startup procedure for the second batch (prior to any HF transfer for this batch), the pump operators observed that an HF drip leak had developed on the output line sight glasses on the metering pump which contained components that were apparently not HF resistant. After flushing the HF piping with water (which was then collected in the drainage collection drum), the sight glasses were removed and replaced with straight polyvinyldienefluoride (PVDF) pipe. Due to the passive drainage configuration of the HF piping design, the maximum amount of HF that could have leaked was limited to the HF present in a portion of the piping near the pump. This maximum quantity was calculated to be approximately 0.6 gallon. Based on the size of the drip pattern beneath the leak, however, the actual amount of the leak was estimated by FERMCO to be approximately 4 ounces. The spill was confined primarily to the steel pump platform constructed on top of the tank car.

After these repairs, the second neutralization batch was completed without further problems on June 14, 1995 with a final pH reading of 7.67. The flow rate of HF through the repaired line was estimated to be 2.3 gallons per minute; this flowrate was used to estimate the gallons of HF transferred for each batch.

After 9 additional neutralization batches, it was evident to FERMCO operational personnel that a narrow 10- to 15-gallon margin (approximately 0.5 inch of slurry level) existed between the volume required for the desired pH and the neutralization tank's high-level shutdown setpoint. To increase the freeboard at the end of a batch, the water volume added for a batch was reduced from 968 gallons to 900 gallons for the remaining batches. The remaining neutralization batches were completed without incident. The final endpoint batch pH readings ranged from a low of 7.36 to a high of 8.55 on all but the last batch (number 34) because the final volume of HF removed from the tank car only reduced the neutralization slurry pH to 10.44.

A visual inspection of the car's interior indicated the HF Tank Car was empty with a very small 1 to 2-gallon heel. The total quantity of HF transferred from the HF Tank Car was estimated by multiplying the transfer time by the estimated pumping flowrate. Using this approach, the total volume of HF neutralized is estimated at 5,427 gallons and is summarized in Table 2-1.

2.3.2 Neutralization of the Portable Container Contents

Following completion of neutralization of the HF Tank Car contents, the neutralization tank system was used to neutralize the HF contained within the portable container. The concentration of HF in the portable container was estimated at 10 percent. The calculated batch quantities were 700 gallons of water, 500 pounds of lime, and 200 pounds of calcium carbonate. The dumpster was positioned within a temporarily constructed containment system to the west and as close to Tank Car No. 1 and the HF transfer system as possible. The suction piping to the existing neutralization tank HF metering pump was modified to make a hard pipe connection to the portable container. The first batch was completed on July 7, 1995. A total of 3 batches (numbers 35, 36, and 37) were required to complete the neutralization of the HF in the portable container. These 3 batches proceeded without incident. The final endpoint pH readings were 8.98, 8.98, and 11.45, respectively. The total quantity of 10 wt. percent HF neutralized was estimated at 729 gallons. Table 2-1 contains summarized information about these batches.

2.3.3 Neutralization of the Decontamination Rinsate

The rinsate produced from the decontamination of the HF Tank Car, the portable container, and Tank Car No. 2 was transferred to the neutralization tank and neutralized. The decontamination rinsing is described in Sections 2.5 and 2.6. A total of 6 batches were used to neutralize all of the rinsate. The reagents added to the neutralization tank for neutralization of the rinsate were 600 gallons of water, 1/3 bag of calcium carbonate (17 pounds), and 1 bag of lime (50 pounds). These quantities allowed the neutralization of approximately 600 gallons of rinsate per batch. The pH of the six slurry batches used to neutralize rinsates ranged from 10.15 to 12.1 as the acid concentrations in the rinsates decreased.

2.4 FILTRATION OF THE NEUTRALIZED SLURRY

As required by the CPID, the neutralized slurry generated by the neutralization process was transferred to the FEMP Plant 8 waste water treatment facility after the completion of each batch. Upon delivery to this facility, the valve alignment to Tank D-102 was performed and verified, and the slurry offloaded with a 3-inch double-diaphragm pump. Tank D-102 was used as a dedicated 6,600-gallon capacity agitated storage tank for the HF neutralized slurry. Except when receiving neutralized HF slurry or engaging in the filtering process, the tank's inlets and outlets were locked to prevent accidental transfer to or from another tank or process.

When a sufficient volume of neutralized slurry had been accumulated in Tank D-102, a valve alignment to the "Large Eimco" rotary drum vacuum filter was performed and verified, and the slurry was pumped through the filter system. The filtrate was collected in filtrate tank 28A and the filtered solids were collected in 55-gallon metal open-top drums. In accordance with the approved CPID, the filtrate was sampled and analyzed for uranium, pH, and total fluoride to confirm that discharge to the waste water treatment system would not result in a violation of the FEMP effluent limit or area Water Quality Standards (WQS). Because the current FEMP NPDES does not limit fluoride concentrations, a limit was established to prevent the FEMP effluent from exceeding the area WQS of 2 mg/L fluoride. The acceptable limit for discharge of the filtrate to the FEMP general sump was set at 32.2 mg/L, based on previous NPDES limits at a location downstream from the biodenitrification system (4605). The previous monthly average limitation of 1.1 Kg/day equated to a filtrate fluoride concentration of 32.2 mg/L, based on a maximum filtration rate of 9,000 gallons of neutralized slurry per day. Using the current FEMP waste water flow measurements at the Parshall Flume, it was calculated that this would limit the fluoride concentration to 0.012 μg/L or less in the final outfall. The filtered solids generated had the appearance and consistency of a moist light gray paste. The filled drums of filtered solids were closed and stored on the east pad of Plant 8 for later transfer to the FEMP drummed waste storage. Filtration of the neutralized slurry and drumming of filtered solids was completed on July 24, 1995. All of the drums had been transferred and sampled by

July 31, 1995. A summary of operational data collected during the filtering activities at Plant 8 is presented in Table 2-2. Log sheets and other data from the filtration activities are available for review in the FEMP operating record.

2.5 RINSING (DECONTAMINATION) OF THE HF TANK CAR

After the HF had been removed, the HF Tank Car was rinsed with a "Chemdet Fury 600 Tank Washer" rotating water jet system. The head of the tank washer had two 8-mm nozzles that rotated in a manner that contacted all of the interior surfaces of the tank car after an operating time of approximately 4 minutes. The tank washer was suspended down into the tank car through an opening on top of the car and clamped securely in place. A fire hydrant supplied the rinsate water. The pressure of the water to the spray head was controlled with a pressure regulator as shown in Figure 2-1.

Calculations showed that a pressure of 70 psig at the outlet of the regulator produced a rinsate flowrate of approximately 40 gallons per minute at the tank washer jets. Figure 2-2 shows the calculated flow versus pressure relationship for the tank car rinsing system. The calculations and other data for the rinsing equipment are contained in Attachment C. Rinses of the HF Tank Car were performed for 5 minutes each.

A total of four 5-minute rinses were completed and the pH of the rinsate was field checked. The pH was found to be approximately 3. Additional rinses were performed at a duration of only 1 minute, as it was believed that numerous short rinses with complete removal of the heel would remove the acidic residues more effectively than a relatively few long rinses. A total of 14 rinses were ultimately performed on the HF Tank Car, providing 46.5 minutes of total rinse time using 1,721 gallons of water. The pH remained at a value slightly greater than 3 after the last of these rinses.

It appeared that the pH of rinsate would continue to remain in this range regardless of the number of rinses, possibly due to the acidifying effects of the deteriorated and decomposing rubber liner in the tank car interior. The CPID required that the rinsate have a pH greater than 2.0 and less than 12.5. FERMCO had set an internal goal of achieving a rinsate with a pH greater than 4 to reduce worker exposure during subsequent dismantling of the HF Tank Car. When it became apparent that a reasonable number of rinses would not raise the pH to 4, FERMCO industrial hygienists (IH) were requested to evaluate the potential exposures. Based on the IH review, it was determined that handling during dismantling can be safely conducted using standard

Table 2-2. Summary of Plant 8 Filtration Data

Neutralization Batch No.	Date	Neutralized Slurry: Volume Received (gallons)	Neutralized Slurry: Estimated [1/] Inventory in Tank D-102 (gallons)	Neutralized Slurry: Volume Filtered (gallons)	Filtrate: Filtrate Collected in Tank 28A (gallons)	Filtrate: Filtrate Recycled [2/] (gallons)	Filtrate: Filtrate Discharged (gallons)	Filtrate Field Analytical Results: Uranium Field Screening Test (Dimple) [3/] (mg/l)	Filtrate Field Analytical Results: Fluoride (mg/l)	Filtrate Field Analytical Results: pH	Filtered Solids: Filtered Solids Drums	Filtered Solids: Filtered Solids lbs (net)
28.7% HF from HF Tank Car												
			0									
1	13-Jun-95	1,130	1,130									
2	14-Jun-95	1,170	2,300									
3	15-Jun-95	1,360	3,660									
4	15-Jun-95	1,170	4,830									
	16-Jun-95		1,580	3,250	2,795			Pass	1.9	10.79	10	5,012
5	16-Jun-95	1,170	2,750									
	16-Jun-95		2,750				2,795					
6	16-Jun-95	1,230	3,980									
	17-Jun-95		1,650	2,330	2,150				>2.0		5	2,798
	17-Jun-95		3,800			2,150						
	19-Jun-95		2,360	1,440	1,548			Pass	>2.0		2	1,006
	19-Jun-95		3,908			1,548						
	19-Jun-95		1,609	2,299	2,021				>2.0			
7	19-Jun-95	1,200	2,809									
	19-Jun-95		4,830			2,021						
8	19-Jun-95	1,320	6,150									
	19-Jun-95		1,650	4,500	3,440			Pass	>2.0	10.93	9	4,604
9	20-Jun-95	1,100	2,750									
10	20-Jun-95	1,230	3,980									
	20-Jun-95		3,980				3,440		11			
11	20-Jun-95	1,210	5,190									
	21-Jun-95		1,650	3,540	3,096						6	3,044
12	21-Jun-95	1,040	2,690									
13	21-Jun-95	1,100	3,790									
	22-Jun-95		3,790				3,096			7.85		
	22-Jun-95		1,710	2,080	1,978						5	2,969
14	22-Jun-95	1,040	2,750									
15	22-Jun-95	1,100	3,850									
	22-Jun-95		2,470	1,380	989						7	4,195
16	23-Jun-95	1,130	3,600									
17	23-Jun-95	1,110	4,710									
18	23-Jun-95	1,200	5,910									
	23-Jun-95		4,890	1,020	602						2	1,131
	24-Jun-95		2,180	2,710	1,978						5	2,991
19	26-Jun-95	1,040	3,220					Pass	1.7	7.85		
20	26-Jun-95	1,080	4,300									
	26-Jun-95		4,300				5,547					

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Table 2-2. Summary of Plant 8 Filtration Data

Neutralization Batch No.	Date	Neutralized Slurry: Volume Received (gallons)	Estimated [1/] Inventory in Tank D-102 (gallons)	Volume Filtered (gallons)	Filtrate: Filtrate Collected in Tank 28A (gallons)	Filtrate Recycled [2/] (gallons)	Filtrate Discharged (gallons)	Filtrate Field Analytical Results: Uranium Field Screening Test (Dimple) [3/] (mg/l)	Fluoride (mg/l)	pH	Filtered Solids: Filtered Solids Drums	Filtered Solids lbs (net)
21	26-Jun-95	990	5,290									
	26-Jun-95		2,910	2,380	1,892						5	2,878
	27-Jun-95		1,570	1,340	1,290						7	4,296
22	27-Jun-95	820	2,390									
23	27-Jun-95	1,010	3,400									
24	27-Jun-95	1,000	4,400									
25	28-Jun-95	1,065	5,465									
	28-Jun-95		2,270	3,195	2,150						7	4,141
26	28-Jun-95	1,070	3,340									
	28-Jun-95		3,340				5,332	Pass	28.7	8.89		
	29-Jun-95		1,570	1,770	1,935						5	2,750
27	29-Jun-95	1,040	2,610									
28	29-Jun-95	1,030	3,640									
	30-Jun-95		1,570	2,070	1,333			Pass	18.2	9.00	4	1,942
29	30-Jun-95	1,070	2,640									
30	30-Jun-95	960	3,600									
31	30-Jun-95	1,050	4,650									
	30-Jun-95		4,650				3,268					
32	3-Jul-95	960	5,610									
33	3-Jul-95	1,030	6,640									
	3-Jul-95		3,600	3,040	2,990							
	3-Jul-95		1,590	2,010	1,052			Pass	26.5	7.93	13	8,109
	5-Jul-95		1,590				4,042					
34	6-Jul-95	1,230	2,820									
Subtotal		**37,455**					**27,520**				**92**	**51,866**
10% HF from Portable Container												
35	7-Jul-95	840	3,660									
36	7-Jul-95	1,290	4,950									
37	10-Jul-95	900	5,850									
	11-Jul-95		3,420	2,430	2,193						5	3,113
	11-Jul-95		0	3,420	2,666						11	5,673
	12-Jul-95		0				4,859	Pass	4	10.52		
Subtotal		**3,030**					**4,859**				**16**	**8,786**

Table 2-2. Summary of Plant 8 Filtration Data

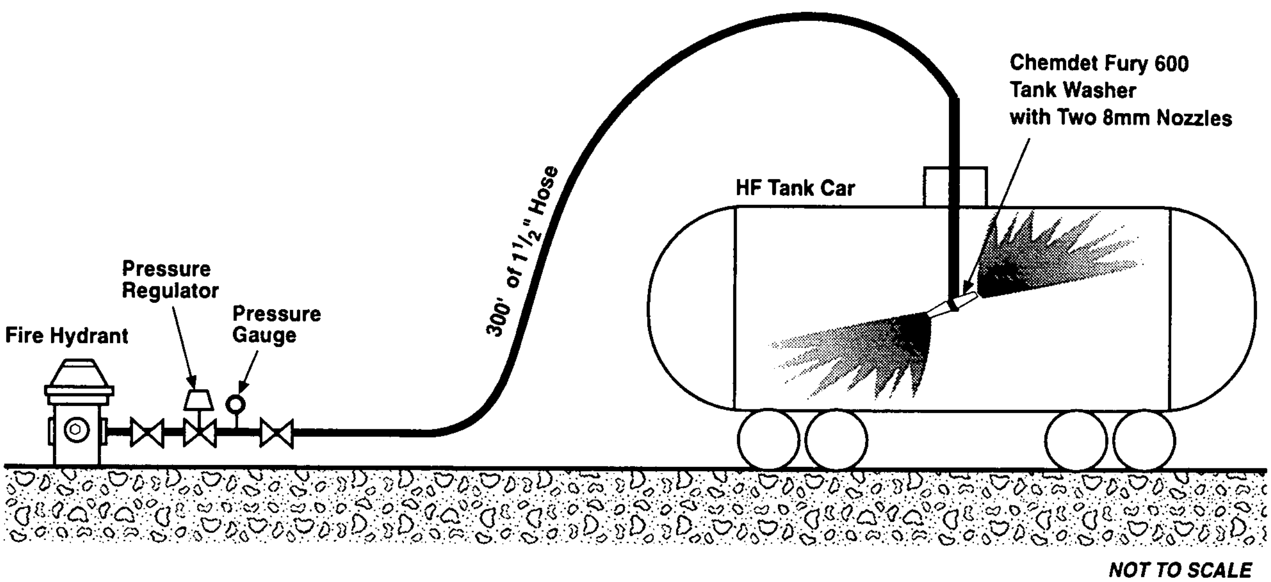
		Neutralized Slurry			Filtrate			Filtrate Field Analytical Results			Filtered Solids	
Neutralization Batch No.	Date	Volume Received (gallons)	Estimated [1/] Inventory in Tank D-102 (gallons)	Volume Filtered (gallons)	Filtrate Collected in Tank 28A (gallons)	Filtrate Recycled [2/] (gallons)	Filtrate Discharged (gallons)	Uranium Field Screening Test (Dimple) [3/] (mg/l)	Fluoride (mg/l)	pH	Filtered Solids Drums	Filtered Solids lbs (net)
Rinsate												
			0									
38	13-Jul-95	790	790									
39	14-Jul-95	1,270	2,060									
40	14-Jul-95	1,240	3,300									
41	18-Jul-95	1,060	4,360									
42	20-Jul-95	1,185	5,545									
	22-Jul-95		0	5,545	4,988		4,988	Pass	0.25	11.47	3	1,320
43	24-Jul-95	1,750	0	1,750	1,677		1,677	Pass	0.4	11.24	1	340
Subtotal		**7,295**					**6,665**				**4**	**1,660**
Total		**47,780**					**39,044**				**112**	**62,312**

NOTES:

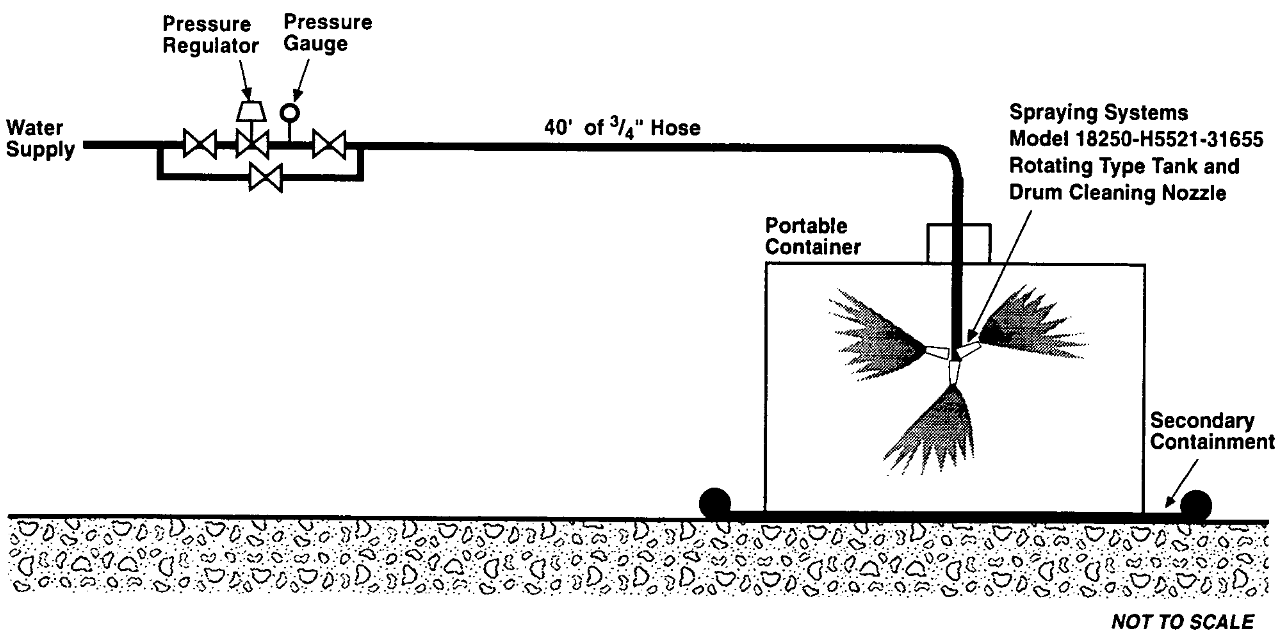
1/ Estimated inventory levels were determined based on quantities added and removed. Actual inventory measurements are listed where available.

2/ Filtrate was recycled and re-filtered due to Fl concentration greater than the Plant 8 treatment objective.

3/ A "Pass" indicates uranium concentration is acceptable for release from Plant 8 based on the dimple test.
The dimple test is a colorimetric test using potasium ferrocyanide in acetic acid to which the sample is added and the color change noted.



HF tank car rinsing system.



Portable container rinsing system.

Figure 2-1. Schematic Diagrams of Rinsing Systems

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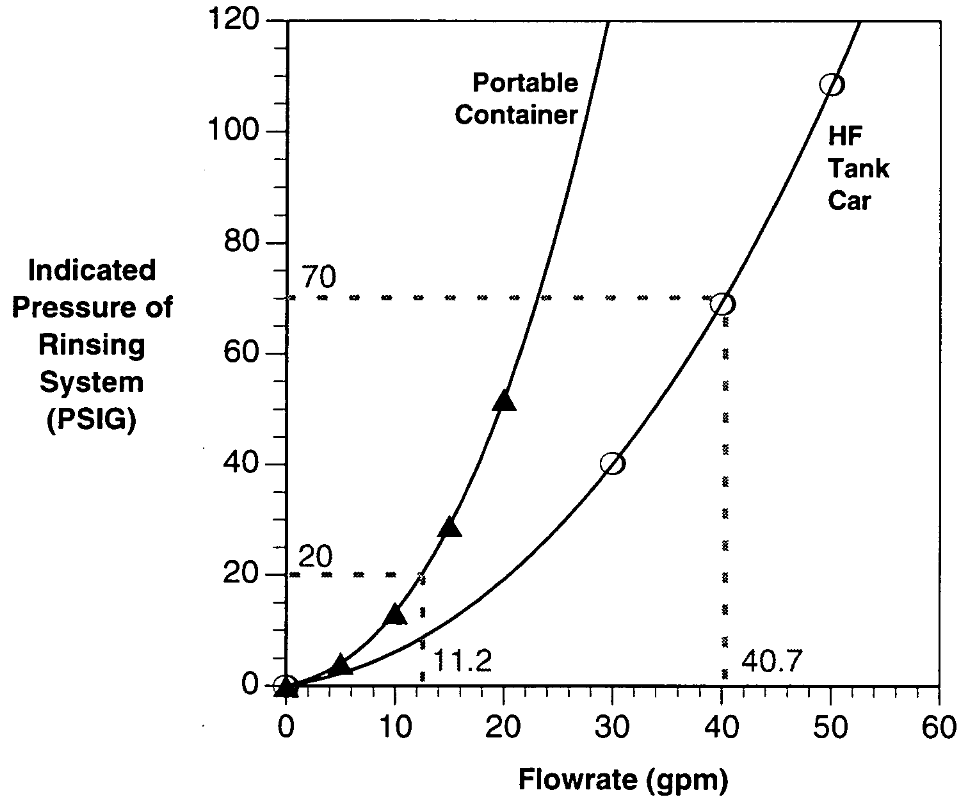

Figure 2-2. Estimated Flowrate Versus Indicated Pressure for Decontamination Rinsing Systems

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worker protection practices when the HF contamination is 0.4 percent or less. Since a pH 3.0 rinsate contains only 0.002 percent HF, no additional decontamination was required. Rinsate samples were collected and sent to the FEMP laboratory to be analyzed for pH. Copies of the analytical results are contained in Attachment B and the results are included in Table 2-3.

After each rinse, the rinsate was transferred to the neutralization tank using the metering pump system. A summary of the rinses performed on the HF Tank Car are contained in Table 2-3.

Although not required for RCRA closure, a second empty rail car, Tank Car No. 2, was rinsed using the same equipment and following the procedure used for the HF Tank Car. A total of 13 rinses were performed on Tank Car No. 2, providing 41 minutes of total rinse time using 1,435 gallons of water.

2.6 RINSING OF THE PORTABLE CONTAINER

The portable container was rinsed using a smaller rotating head manufactured by Spraying Systems. Details of the rinsing system used for the portable container are shown in Figure 2-1; calculations and manufacturer's literature are contained in Attachment H. The flowrate was estimated to be approximately 11 gallons per minute at an indicated gauge pressure of approximately 20 psig. A total of five 3-minute rinses were performed on the portable container. A summary of the rinses performed on the portable container are presented in Table 2-3.

The pH of the rinsate at the completion of the final rinse was verified by laboratory analysis to be 4.7. Suspended solids were visible in the rinsate and a radiological screening found that they exhibited significant radioactivity. The nature and source of the radioactive solids is unknown. During all field closure activities, the portable container was managed as a radiologically controlled area and was marked with magenta and yellow signs and rope. A Radiological Work Permit was required for all workers approaching the portable container.

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Table 2-3. Summary of Rinsate Data.

Rinse No.	Date	Time	Pressure psig	Rinse Duration mins.	Estimated Volume gallons	Neutralization Batch No.	Rinsate Field pH	Rinsate Lab pH
Portable Container								
1	12-Jul-95	11:02	20	3	30	38	--	--
2	12-Jul-95	11:19	20	3	30	38	--	--
3	12-Jul-95	13:52	20	3	30	38	--	--
4	12-Jul-95	14:09	20	3	30	38	--	--
5	12-Jul-95	14:28	20	3	30	38	7	5.52 / 4.64
Subtotal				15	150			
HF Tank Car								
1	13-Jul-95	14:20	70	5	200	39	--	--
2	13-Jul-95	16:04	70	5	200	39	--	--
3	13-Jul-95	17:18	70	5	200	39	3.1	--
4	14-Jul-95	8:05	70	5	200	40	3	--
5	14-Jul-95	9:16	70	1	40	40	--	--
6	14-Jul-95	9:33	70	0.5	20	40	--	--
7	14-Jul-95	9:45	70	5	200	40	3.98	--
8	14-Jul-95	11:13	70	5	200	40	3.8	--
9	14-Jul-95	13:36	70	1	40	40	--	--
10	14-Jul-95	13:59	70	1	40	40	3.77	--
11	17-Jul-95	6:24	25	2	40	41	--	--
12	17-Jul-95	6:54	30	2	48	41	3.08	--
13	17-Jul-95	8:08	30	2	48	41	3.35	--
14	17-Jul-95	12:14	55	7	245	41	3.25	3.77 / 3.71
Subtotal				46.5	1721			
Tank Car No.2								
1	19-Jul-95	7:26	55	2	70	42	--	--
2	19-Jul-95	11:07	55	1	35	42	--	--
3	19-Jul-95	11:52	55	1	35	42	--	--
4	19-Jul-95	12:40	55	5	175	42	3.2	2.42 / 2.41 [1/]
5	20-Jul-95	4:53	55	1	35	42	3.27	--
6	20-Jul-95	5:59	55	1	35	42	3.04	--
7	21-Jul-95	6:15	55	1	35	43	--	--
8	21-Jul-95	6:41	55	1	35	43	--	--
9	21-Jul-95	7:16	55	1	35	43	2.85	--
10	21-Jul-95	7:35	55	2	70	43	3.22	--
11	21-Jul-95	8:06	55	1	35	43	3.54	--
12	21-Jul-95	8:33	55	6	210	43	3.02	--
13	21-Jul-95	9:45	55	18	630	43	4.16	3.95 / 3.83
Subtotal				41	1435			
Neutralizing System								
1	21-Jul-95	13:45	20	13	156	43	--	2.54 / 2.65

NOTE:
1/ Fluoride measurements were 763 / 759 mg/l, respectively, and normalities were 0.04 N / 0.04 N, respectively, for the two samples.

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2.7 RINSING (DECONTAMINATION) OF THE NEUTRALIZATION SYSTEM PIPING

The neutralization system rinse was completed on July 21, 1995. An in-place rinse was conducted to clean the HF piping and metering pump used to transfer HF and rinsates to the neutralization tank. A water hose was connected to a flushing connection on the suction side of the pump. The HF metering pump and transfer lines were rinsed for approximately 13 minutes with an estimated 156 gallons of water. A final rinsate sample was collected from the HF transfer line by disconnecting the flanged connection directly on top of the neutralization tank. The pH of the final rinsate was verified by laboratory analysis to be 2.54. Since the pH of the neutralized slurries were all 8 and above, the pH of the neutralization tank did not require testing.

After rinsing, the HF metering pump and transfer lines were blown down with air to remove any residual rinsate. The remaining neutralized slurry was pumped to the portable slurry transfer tanks. Then the tank was hosed out with water and a double diaphragm air-actuated pump was used to remove the final heel of slurry and water from the bottom of the neutralization tank. The tank bottoms were added to the final batch (Batch No. 43) in the portable slurry transfer tanks and transferred to Plant 8 for filtration.

3.0 MATERIALS AND WASTES GENERATED FROM THE CLOSURE AND DISPOSITION OF WASTE STREAMS

Three waste streams were generated from this closure which were managed and handled in accordance with FEMP Standard Operating Procedures (SOPs). The waste streams were 1) scrap metal from dismantlement of the HF Tank Car, 2) filtrate, and 3) filtered solids. The filtrate was collected and discharged from Plant 8 under the existing WWTS Criteria and FEMP National Pollutant Discharge Elimination System (NPDES) permit which includes monitoring for pH, fluoride, and uranium parameters. No violations of FEMP discharge limits were encountered during discharge of the filtrate.

The HF Tank Car was successfully rinsed according to the requirements of the CPID and can be considered a RCRA clean container. The intended disposition of this waste stream is to dismantle the tank car and recycle the metal, pending the identification of a suitable off-site location for recycling.

The portable container, which was rinsed, was confirmed by laboratory analysis to be RCRA clean. However, this container exhibited radiological contamination that will require radiological decontamination and management as a low-level waste if it is to be disposed of. Table 3-1 contains a summary of the radiological analysis of the portable container rinsate. It is anticipated that the portable tank will be reused on site to handle other radioactivity-contaminated liquids before it is removed from service for final disposition.

The filtered solids waste stream is discussed below.

3.1 RCRA DETERMINATION OF GENERATED WASTE STREAMS

Pursuant to the requirements of the CPID, the filtered solids were sampled on July 31, 1995 (as described in Section 2.4 to meet the requirements of the CPID). The analytical results and custody records are provided in Attachment B. The results indicate that the wastes do not exceed the RCRA hazardous waste characteristics identified in the approved CPID. FERMCO is using the data to finalize the waste characterization and verify Nevada Test Site waste acceptance criteria for low level waste disposal. The analytical results of the sampling are summarized in Table 3-2.

Table 3-1. Summary of Analytical Results for Portable Container Rinsate

Constituent	Units	Sample No. DR-1	Sample No. DR-1D
FERMCO Sample ID No.		200166504	200166505
Radiological Analysis			
Total Alpha	pCi/g	390	1,400
Total Beta	pCi/g	360	1,300
Total Thorium	mg/l	1.0	2.8
Total Uranium	g/l	0.82	2.01
Uranium 235	wt%	0.8458	0.897
pH		5.52	4.64

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Table 3-2. Summary of Analytical Results for Filtered Solids (Page 1 of 2)

Constituent	TCLP Limits	FERMCO ID. No.	Sample No. 95-1003-1	FERMCO ID. No.	Sample No. 95-1003-2	FERMCO ID. No.	Sample No. 95-1003-3
TCLP Metals	(mg/l)		(mg/l)		(mg/l)		(mg/l)
Arsenic	5.0	200170233	0.010 U	200170236	0.010 U	200170239	0.010 U
Barium	100.0	200170233	0.231	200170236	0.221	200170239	0.515
Cadmium	1.0	200170233	0.010	200170236	0.012	200170239	0.005 U
Chromium	5.0	200170233	0.010 U	200170236	0.027	200170239	0.010 U
Lead	5.0	200170233	0.021 U	200170236	0.087	200170239	0.021 U
Mercury	0.2	200170233	0.0002 U	200170236	0.0002 U	200170239	0.0002 U
Selenium	1.0	200170233	0.010	200170236	0.017	200170239	0.015
Silver	5.0	200170233	0.010 U	200170236	0.019	200170239	0.010 U
Physical Properties							
Moisture Content (wt. %)	n/a	200170234	51.82	200170237	52.66	200170240	49.16
Free Liquids (pass/fail) (US EPA Paint Filter Test)	n/a	200170234	pass	200170237	pass	200170240	pass
Radiological Analysis							
Total Uranium, ppm	n/a	200170234	110	200170237	120	200170240	80
Uranium 235, wt. % of U	n/a	200170235	0.653	200170238	0.651	200170241	0.780

n/a = not applicable

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Table 3-2. Summary of Analytical Results for Filtered Solids (Page 2 of 2)

Constituent	TCLP Limits	FERMCO ID. No.	Sample No. 95-1003-4	FERMCO ID. No.	Sample No. 95-1003-5	FERMCO ID. No.	Sample No. 95-1003-6
TCLP Metals	(mg/l)		(mg/l)		(mg/l)		(mg/l)
Arsenic	5.0	200170242	0.010 U	200170245	0.010 U	200170248	0.010 U
Barium	100.0	200170242	0.554	200170245	0.200 U	200170248	0.200 U
Cadmium	1.0	200170242	0.005 U	200170245	0.005 U	200170248	0.005 U
Chromium	5.0	200170242	0.010	200170245	0.010 U	200170248	0.010
Lead	5.0	200170242	0.032	200170245	0.021 U	200170248	0.021 U
Mercury	0.2	200170242	0.0002 U	200170245	0.0002 U	200170248	0.0002
Selenium	1.0	200170242	0.015	200170245	0.010 U	200170248	0.010 U
Silver	5.0	200170242	0.010 U	200170245	0.010 U	200170248	0.010 U
Physical Properties							
Moisture Content (wt. %)	n/a	200170243	49.18	200170246	46.10	200170249	45.49
Free Liquids (pass/fail) (US EPA Paint Filter Test)	n/a	200170243	pass	200170246	pass	200170249	pass
Radiological Analysis							
Total Uranium, ppm	n/a	200170243	80	200170246	46	200170249	210
Uranium 235, wt. % of U	n/a	200170244	0.828	200170247	0.710	200170250	0.803

n/a = not applicable

The interim management of the recycled/reused materials and waste streams generated by this closure action will be in accordance with FEMP low level waste management practices. Because the interim management and final disposition of these wastes are beyond the scope of the approved CPID, further documentation is not included in the Closure Certification Report.

3.2 HWMU SOILS

As described in Section 3.3.2 of the CPID (DOE 1994a), soil samples were collected from the soil underlying the HF Tank Car HWMU (previous location of the tank car). The soil samples were submitted to the FEMP analytical laboratory to be analyzed for pH.

The "clean" soil standard for RCRA closure is a pH greater than 4.7 and less than 9.0 (as discussed in Section 3.1.1 of the CPID). As reported in the CPID, the analytical results of the soil sampling show a pH measurement between 6.27 and 8.11. Therefore, the "clean" soil standard for pH has been confirmed and no soil remediation for pH was required. Low concentrations of radiological contamination were also detected in some of the sampled locations as reported in the CPID.

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4.0 CERTIFICATION STATEMENTS

The following pages are the FEMP closure certification statements (following the format in OAC 3745-50-42 (D)) and a Professional Engineer's (P.E.) certification statement documenting that HWMU No. 38, the HF Tank Car, was closed in accordance with the approved closure plan as required under OAC 3745-66-15.

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INDEPENDENT ENGINEER'S CERTIFICATION STATEMENT

I hereby certify that the HF Tank Car Hazardous Waste Management Unit No. 38 at DOE's Fernald Environmental Management Project has been closed in accordance with the specifications in the CPID, as revised in July 1994. Closure activities were initiated and completed based upon the CPID as modified based upon the OEPA approval of the CPID dated February 6, 1995. Copies of the correspondence concerning this matter are included in Attachment A. As noted in Section 3.1, storage and final disposal of the solid waste streams generated by this closure action are not included in this Closure Certification Report.

Additional characterization by the generator of all of the closure waste streams described in Section 3 will be required prior to final disposal of these wastes to meet the applicable waste acceptance criteria and land disposal restrictions of the final disposal site.

David T. Johnson, P.E.
Ohio Registration No. 58114
Foster Wheeler Environmental Corporation

STATE OF OHIO
DAVID T. JOHNSON
58114
REGISTERED
PROFESSIONAL ENGINEER

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CERTIFICATION OF OWNER AND OPERATOR

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

[signature]
U.S. Department of Energy, Fernald Office
Owner and Operator

9/29/95
Date Signed

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CERTIFICATION OF CO-OPERATOR

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

C. G. Little for Don Ofte, President
Fernald Environmental Restoration Management Corporation, Co-Operator

9/28/95
Date Signed

000042

5.0 REFERENCES

DOE. 1994a. Closure Plan Information and Data for the HF Tank Car, Revision 2 (Resubmittal). Department of Energy, Fernald, Ohio. July 1994.

DOE. 1994b. HF Tank Car Hazardous Waste Management Unit Report on Bench-Scale Treatability Testing of HF Tank Car Wastes, Final Draft. Department of Energy, Fernald, Ohio. July 1994.

DOE. 1994c. Conceptual System Implementation Plan for HF Tank Car Closure, Final. Department of Energy, Fernald, Ohio. November 1994.

FERMCO. 1994. HF Tank Car Closure Project HF Neutralization System Installation Specifications and Requirements. Fernald Environmental Restoration Management Corporation, Fernald, Ohio. December 5, 1994.

7222

ATTACHMENT A

CORRESPONDENCE

000045

OhioEPA
State of Ohio Environmental Protection Agency

P.O. Box 1049, 1800 WaterMark Dr.
Columbus, Ohio 43266-0149
(614) 644-3020
FAX (614) 644-2329

7222

I-14-C

George V. Voinovich
Governor

Donald R. Schregardus
Director

CLOSURE PLAN APPROVAL

CERTIFIED MAIL

February 6, 1995

RE: CLOSURE PLAN
U.S. Department of Energy
Fernald Environmental
Management Project
OH6890008976

John S - what does this mean schedule wise? JC

Mr. J. Phil Hamric
Site Manager
Fernald Office
U.S. DOE-FEMP
P.O. Box 398705
Cincinnati, Ohio 45239-8705

Dear Mr. Hamric:

On May 7, 1992, U.S. DOE-FEMP submitted to Ohio EPA a closure plan for the Hydrofluoric Acid (HF) Tank Car and Area, Hazardous Waste Management Unit Number 38, located at 7400 Willey Road, Fernald, Ohio. Revisions to the closure plan were received on June 1, 1993, July 28, 1994, November 10, 1994 and December 21, 1994. The closure plan was submitted pursuant to Rule 3745-66-12 of the Ohio Administrative Code (OAC) in order to demonstrate that U.S. DOE-FEMP's proposal for closure complies with the requirements of OAC Rules 3745-66-11 and 3745-66-12.

The public was given the opportunity to submit written comments regarding the closure plan of U.S. DOE-FEMP in accordance with OAC Rule 3745-66-12. No comments were received by Ohio EPA in this matter.

Based upon review of U.S. DOE-FEMP's submittal and subsequent revisions, I conclude that the closure plan for the hazardous waste facility at 7400 Willey Road, Fernald, Ohio, as modified herein, meets the performance standard contained in OAC 3745-66-11 and complies with the pertinent parts of OAC Rule 3745-66-12.

I certify this to be a true and accurate copy of the official document as filed in the records of the Ohio Environmental Protection Agency.

By: Mary Cavin Date 2-8-95

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The closure plan submitted to Ohio EPA on May 7, 1992 and revised on June 1, 1993, July 23, 1994, November 10, 1994 and December 21, 1994 by U.S. DOE-FEMP is hereby approved with the following modification:

1. U.S. DOE-FEMP shall implement the neutralization and decontamination steps as outlined in the HF Tank Car closure plan for the 500 gallon portable container. The closure certification for the HF Tank Car shall also address the 500 gallon portable container.

Please be advised that approval of this closure plan does not release U.S. DOE-FEMP from any responsibilities as required under the Hazardous and Solid Waste Amendments of 1984 regarding corrective actions for all releases of hazardous waste or constituents from any solid waste management unit, regardless of the time at which waste was placed in the unit.

Notwithstanding compliance with the terms of the closure plan, the Director may, on the basis of any information that there is or has been a release of hazardous waste, hazardous constituents, or hazardous substances into the environment, issue an order pursuant to Section 3734.20 et seq of the Revised Code or Chapters 3734 or 6111 of the Revised Code requiring corrective action or such other response as deemed necessary; or initiate appropriate action; or seek any appropriate legal or equitable remedies to abate pollution or contamination or to protect public health or safety or the environment.

Nothing here shall waive the right of the Director to take action beyond the terms of the closure plan pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. § 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986, Pub. L. 99-499 ("CERCLA") or to take any other action pursuant to applicable Federal or State law, including but not limited to the right to issue a permit with terms and conditions requiring corrective action pursuant to Chapters 3734 or 6111 of the Revised Code; the right to seek injunctive relief, monetary penalties and punitive damages; to undertake any removal, remedial, and/or response action relating to the facility, and to seek recovery for any costs incurred by the Director in undertaking such actions.

I certify this to be a true and accurate copy of the official document as filed in the records of the Ohio Environmental Protection Agency.

By: Mary Cavin Date 2-8-95

000047

Mr. Hamric
U.S. DOE-FEMP
Page Three

You are notified that this action of the Director is final and may be appealed to the Environmental Board of Review pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. It must be filed with the Environmental Board of Review within thirty (30) days after notice of the Director's action.

A copy of the appeal must be served on the Director of the Ohio Environmental Protection Agency within three (3) days of filing with the Board. An appeal may be filed with the Environmental Board of Review at the following address: Environmental Board of Review, 236 East Town Street, Room 300, Columbus, Ohio 43266-0557.

When closure is completed, the Ohio Administrative Code Rule 3745-66-15 requires the owner or operator of a facility to submit to the Director of the Ohio EPA certification by the owner or operator and an independent, registered professional engineer that the facility has been closed in accordance with the approved closure plan. The certification by the owner or operator shall include the statement found in OAC 3745-50-42(D). These certifications should be submitted to: Ohio Environmental Protection Agency, Division of Hazardous Waste Management, Attention: Thomas Crepeau, Data Management Section, P.O. Box 163669, Columbus, Ohio 43216-3669.

Sincerely,

Donald R. Schregardus
Director

DRS/

cc: Thomas Crepeau, OEPA, DHWM Central File
Montee Suleiman, OEPA, DHWM
Harriet Croke, Ohio Permit Section, USEPA, Region V
Mark Metcalf, OEPA, Southwest District Office

I certify this to be a true and accurate copy of the official document as filed in the records of the Ohio Environmental Protection Agency.

By: Marie Cassin Date 3-8-95

U.S. DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

FERMCO CONTRACT
DE-AC24-920H21972

RECORD OF TELEPHONE CONVERSATION TC:CRU3:94-0017

FROM: Mark Metcalf **DATE:** December 20, 1994

LOCATION: Ohio EPA Southwest District Office, Solid & Hazardous Waste Div.

TO: John M. Lippitt, MS76 JML **LOCATION:** Fernald

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR REVIEW AND APPROVAL OF HF TANK CAR CLOSURE PLAN INFORMATION AND DATA (CPID)

DISTRIBUTION:

Todd Clark, MS53-2
Steve Beckman, MS65-2
Lew Goidell, MS53-2
Ken Kolthoff, MS76
Karen Wintz, MS76
John Sattler, MS45
Wally Quaider, MS45
Tom Walsh, MS65-2

Mark Metcalf from the Ohio EPA Southwest District Office is reviewing the HF Tank Car CPID and called to request the following:

1) Additional information to support the assertion that the introduction of the HF near the bottom of the neutralization tank would control and prevent HF venting of HF vapors.

2) Confirmation that we had reviewed the air permitting requirements for the system.

In response, I indicated I would fax him the calculations from Appendix A of the Conceptual System Implementation Plan concerning CO_2 and HF gas generation during the neutralization process. This includes mass transfer coefficient and scrubbing times for HF (see Attachment 1).

I told Mark that we had reviewed the air permitting issues and concluded that an air permit would not be required (see Attachment 2).

Mark indicated that the information I am sending should be sufficient. After he has reviewed the additional information and is assured that HF vapors will not be vented, Mark indicated he would approve the CPID. The schedule in the CPID indicates all field work will be completed within 180 days of the OEPA approval. Assuming approval of the CPID in early January 1995, this would require completion of all field work by early July 1995.

JML:JWE:nlr

Attachments: 2
c: CRU3 Project Files
CRU3 EE RCRA Files

000048

ATTACHMENT 1: FAX COVER SHEET FOR CALCULATIONS REQUESTED

000051

Fernald Environmental
FERMCO
Restoration Management Corporation

FERMCO
P. O. Box 538704
Cincinnati, OH 45253-8704

FACSIMILE LEAD SHEET

No. of Pages: 1
Including Lead Sheet

DATE: December 21, 1994

TO: Mr. Mark Metcalf

COMPANY NAME: Ohio Environmental Protection Agency

LOCATION: Southwest District Office (Dayton), Division of Solid and Hazardous Waste

FAX NO. TO BE CALLED: 513-285-6249 **TELEPHONE NO.:** 513-285-6083

FROM: John M. Lippitt **TELEPHONE NO.:** (513) 738-9405

PROJECT NAME: FERNALD ENVIRONMENTAL MGMT **CONTRACT NO.:** DE-AC24-92OH21972

MESSAGE

SUBJECT: **FERNALD ENVIRONMENTAL MANAGEMENT PROJECT, AIR EMISSIONS FROM HF NEUTRALIZATION TANK DURING CLOSURE OF THE HF TANK CAR HWMU# 38**

Per our telephone conversation yesterday, I am sending you the attached 10 pages of calculations (pages 16 of 24 through 24 of 24) from the Conceptual System Implementation Plan for the HF Tank Car Closure (FERMCO, November, 1994). These calculations were made to evaluate CO_2 and hydrofluoric acid (HF) vapor generation during neutralization of the HF Tank Car contents. The calculations indicate that HF emissions would not occur.

In regard to your question concerning air permits, our Regulatory Permitting group has reviewed the process and calculations. Based on their review and evaluation, the system meets the criteria for a de minimis source under OAC 3745-15-05. The applicable de minimis source threshold for uncontrolled particulate emissions is 10 lb\day. The HF neutralization system would generate an uncontrolled particulate emission of 8.93 lbs\day (0.0893 lbs\day controlled), assuming a 1% maximum loss from the combined lime and calcium carbonate addition as a particulate and a dust collector efficiency of 99%. The de minimis source threshold for HF of 2.0 lbs\day would not be exceeded even using a worst case assumption that 1% HF by weight would be unmixed and vented as vapor. Since the HF Neutralization System qualifies as a de minimis source, the FEMP is not required to submit a Permit to Install or Permit to Operate an air pollution source for this project.

JML
Attachment

Fernald Environmental

FERMCO

Restoration Management Corporation

FERMCO
P. O. Box 538704
Cincinnati, OH 45253-8704

FACSIMILE LEAD SHEET

(Continued)

c:
T. Clark, MS53-2
S. Beckman, MS65-2
L. Goidell, MS53-2
K. Kolthoff, MS76
K. Wintz, MS76
J. Sattler, MS45
W. Quaider, MS45
T. Walsh, MS65-2

CRU3 Project Files
CRU3 EE RCRA Files

File Record Storage Copy 106.4.

EBASCO

BY DTJ DATE 6/13/94 2941 4200-0000-0500 SHEET 16 OF 24
CHKD. BY [illegible] DATE 9-12-94 OFS NO. DEPT. NO.
CLIENT FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
PROJECT HF TANK CAR
SUBJECT

CO_2 EXHAUST GAS FLOWRATE

FROM MATERIAL BALANCE, CO_2 MASS = 3030 LBS
H_2O EXHAUST MASS = 100 LBS

$H_2O + CO_2$ DENSITY @ 60F ≅ .12 LB/FT³

$$\text{VOLUME} = \frac{3030 + 100}{.12\ \text{LB/FT}^3} = 26{,}100\ \text{FT}^3$$

UNDER NORMAL CONDITIONS, THE HF ADDITION TIME WOULD BE 84 MINUTES PER BATCH

$$\text{FLOWRATE} - \frac{26{,}100\ \text{FT}^3}{(84)(31\ \text{BATCHES})} \approx 10\ \text{CFM}$$

FOR WORST CASE CONDITION, ASSUME HF ADDITION RATE IS 4X FASTER AND ADDITION TIME IS 84/4 = 21 MINUTES

$$\text{VOL. FLOW RATE} = \frac{25{,}250}{(21)(31)} = 40\ \text{CFM}$$

THE TANK SHOULD BE VENTED TO THE ATMOSPHERE WITH A VENT DIAMETER SUFFICIENT TO PREVENT A PRESSURE BUILD-UP.

(FROM CRANE p3-20) $\Delta P_{100} = \dfrac{.000336\, f W^2}{d^5 \rho}$

$f = .015$

$W = \dfrac{3130\ \text{LB}}{\left(\frac{21}{60}\right)(31)} = 288\ \text{LB/HR}$

$d = 6$ INCHES (EXISTING VENT)

$\rho = .12\ \text{LB/FT}^3$

$$\Delta P_{100} = \frac{(.000336)(.015)(288)^2}{(6)^5(.12)} = 4.5 \times 10^{-?}\ \text{PSI}$$

000054

BY DTJ DATE 6/13/94 OFS NO. 2940.4200-000 DEPT. NO.

CHKD. BY [illegible] DATE 9-12-94

CLIENT FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

PROJECT HF TANK CAR

SUBJECT

THE VENT LENGTH WILL PROBABLY BE 20' LONG OR LESS SO $\Delta P = \frac{4.5 \times 10^{-5}}{(100/20)} = 9 \times 10^{-5}$ psi

$\therefore$ 6" VENT OK

FINAL DESIGN OF TANK SYSTEM SHOULD INCLUDE AN EVALUATION OF VENT LENGTH, AIR DISPERSION, ETCETERA. THIS IS OUTSIDE OF THE SCOPE OF THE CONCEPTUAL DESIGN.

EBASCO SERVICES INCORPORATED

BY DTJ DATE 7/12/94 2941.4200 0000.0800 SHEET 18 OF 24

CKD. BY RJP DATE 9-12-94 OFS NO. DEPT. NO.

CLIENT FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

PROJECT HF TANK CAR

SUBJECT

ESTIMATE ABSORPTION OF HF FROM GASES IN NEUTRALIZATION TANK

ASSUME GAS DENSITY = CO_2 DENSITY = .12 LB/FT^3 = 1.92 KG/M^3
HF CONC. = 28.7%
TEMP = 41°C
HF FLOW = 1.7 GPM

$$CO_2 \text{ EVOLVED} = \left(\frac{3030 \text{ LB}}{4400 \text{ GAL}}\right)\left(\frac{1.7 \text{ GAL}}{\text{MIN}}\right) = 1.17 \text{ LB/MIN}$$

$$\frac{1.17 \text{ LB/MIN}}{.12 \text{ LB/FT}^3} = 9.75 \text{ FT}^3\text{/MIN} = .0046 \text{ M}^3\text{/SEC}$$

CO_2 WILL FORM AS GAS BUBBLES IN AGITATED NEUTRALIZATION TANK. HF VAPOR WILL TRANSFER FROM LIQUID TO CO_2 BUBBLES. FOR CONSERVATIVE ASSUMPTION, ASSUME HF WILL INITIALLY BE PRESENT IN CO_2 BUBBLES AT EQUILIBRIUM PARTIAL PRESSURE AND WILL THEN TRANSFER TO THE LIQUID FROM THE GAS BUBBLES AS THEY RISE THROUGH THE TANK. ASSUME BUBBLES WILL RISE A TOTAL DISTANCE OF 3 FEET (.92 m) THROUGH THE TANK

FROM LITERATURE: IND. ENG CHEM VOL 41 PP 1504-1508 (1949) (SEE NOMOGRAPH ATTACHED)

HF PARTIAL PRESSURE = 4 MM HG AT HF CONC = 28.7% AND TEMP = 41°C

EBASCO SERVICES INCORPORATED

BY DTJ DATE 7/13/94 SHEET 19 OF 24

CHKD. BY [illegible] DATE 9-12-94 OFS NO. 2.4.4 42... DEPT. NO.

CLIENT FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

PROJECT HF TANK CAR

SUBJECT

INTERFACIAL AREA

$$a_0 = 1.44\left[\left(\frac{P_G}{V_L}\right)^{0.4}\left(\frac{\rho_L}{\sigma^3 g_c}\right)^{0.2}\right]\left(\frac{V_G}{V_T}\right)^{1/2}$$

(EQN 6.21 TREYBAL 3RD EDITION)

NOTE: THIS EQUATION IS BASED ON A FLAT-BLADED TURBINE

P_G = IMPELLER POWER = 1.5 HP = 666 $\frac{N-m}{SEC}$

V_L = CONTENTS VOLUME = 1015 GAL = 3.84 m^3

V_T = BUBBLE ASCENDING VELOCITY m/SEC

$$a_0 = 1.44\left[\left(\frac{666}{3.84}\right)^{0.4}\left(\frac{1054}{(.072)^3(1)}\right)^{0.2}\right]\left(\frac{.0013}{V_T}\right)^{1/2}$$

$$a_0 = \frac{7.96}{V_T^{1/2}}$$

MEAN BUBBLE DIAMETER $= d_p = K\left[\left(\frac{V_L}{P_G}\right)^{0.4}\left(\frac{\sigma^3 g_c}{\rho_L}\right)^{0.2}\right]\Phi_G^{m}\left(\frac{\mu_g}{\mu_L}\right)^{0.25}$

EQN 6.23 TREYBAL 3RD ED

K = 2.25 , m = 0.4 FOR ELECTROLYTES

$$d_p = (2.25)\left[\left(\frac{3.84}{666}\right)^{0.4}\left(\frac{(.072)^3(1)}{1054}\right)^{0.2}\right]\Phi_G^{0.4}\left(\frac{.000015}{.03}\right)^{0.25}$$

WHERE μ_L = SOLUTION VISCOSITY = 30 cp = .03 $\frac{KG}{M-SEC}$

μ_G = CO_2 GAS VISCOSITY = .015 cp = .000015 $\frac{KG}{m-SEC}$

(PERRYS P 3-211 5TH ED)

000057

d_p = .0022 $\Phi_G^{0.4}$ WHERE Φ_G = GAS HOLDUP DIMENSIONLESS

EBASCO SERVICES INCORPORATED

BY DTJ DATE 7/13/94 2440 42... SHEET 20 OF 24
CHKD. BY ... DATE 4-12-94 OFS NO. DEPT. NO.
CLIENT FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
PROJECT HF TANK CAR
SUBJECT

FOR GAS DISPERSION, IMPELLER SPEED DETERMINED BY:

$$N = \left(1.22 + 1.25 \frac{T}{d_i}\right)\left(\sigma g g_c / \rho_L\right)^{0.25}\left(\frac{1}{d_i}\right)$$

(EQN 6.18 TREYBAL, 3RD ED "MASS TRANSFER OPERATIONS")

NOTE: THIS EQUATION IS BASED ON A FLAT-BLADED TURBINE

T = TANK DIAMETER = 7 FT = 2.15 m
d_i = IMPELLER DIAMETER = 25 IN = .64 m
σ = SURFACE TENSION = .072 N/m^2
g = GRAVITATIONAL ACCEL = 9.81 m/sec^2
g_c = CONVERSION FACTOR = 1 $KG\text{-}m/N\text{-}SEC^2$
ρ_L = LIQUID DENSITY = 1054 KG/M^3

$$N = \left(1.22 + 1.25\left(\frac{2.15}{.64}\right)\right)\left(\frac{(.072)(9.81)(1)}{1054}\right)^{0.25}\left(\frac{1}{.64}\right) = 1.36\ R/SEC$$

$$= 82\ RPM$$

THIS SUGGESTS THAT IMPELLER SPEED OF 82 RPM WILL PROVIDE EFFECTIVE BUBBLE DISPERSION

SUPERFICIAL GAS VELOCITY, V_G =

$$V_G = \frac{.0046\ M^3/SEC}{(\pi(2.15)^2/4)} = .0013\ m/SEC$$

IMPELLER POWER WITH GAS = P_G

$$P_G = P\left(.62 - 1.85\left(\frac{Q_G}{N d_i^3}\right)\right) = 666\ \frac{N-m}{SEC}$$

P = TOTAL POWER = 1.5 HP = 1118 $\frac{N-m}{SEC}$

Q_G = GAS FLOW = .0046 m^3/sec

FROM EQN 6-9 TREYBAL, 3RD ED

$$a = \frac{6\,\phi_G}{d_p}$$

SUBSTITUTING FOR a & d_p FROM ABOVE GIVES

$$\frac{7.96}{V_T^{1/2}} = \frac{6\,\phi_G}{.0022\,\phi_G^{0.4}} = 2727\,\phi_G^{0.6}$$

USE TRIAL & ERROR SOLUTION USING STOKES LAW TO CONFIRM CHOICE OF V_T

REARRANGE ABOVE TO GET

$$\phi_G = \frac{5.96 \times 10^{-5}}{V_T^{\,0.833}}$$

FOR $d_p < .7\,mm$, $V_T = \dfrac{g\,d_p^2\,\Delta\rho}{18\,\mu_L}$

$$\Delta\rho = \rho_L - \rho_G = 1054\,\frac{kg}{m^3} - 1.92\,\frac{kg}{m^3} = 1052\,\frac{kg}{m^3}$$

FROM TRIAL & ERROR, $V_T = .002246\ m/sec$

$$\therefore \phi_G = \frac{5.96 \times 10^{-5}}{(.002246)^{0.833}} = .00958$$

BY DTJ DATE 7/13/94 Z140.420.0000.0500 OFS NO. DEPT. NO.

CHKD. BY [illegible] DATE 9-12-94

CLIENT FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

PROJECT [illegible] TANK CA[illegible]

SUBJECT

$d_p = .0022(.00958)^{0.4} = .00034\ m = .34\ mm$ (OK SINCE < .7 mm)

$V_T = \frac{(9.81)(.00034)^2(1052)}{(18)(.03)} = .00221\ m/SEC$

CALCULATED $V_T \cong .00224$, THEREFORE TRIAL & ERROR SOLUTION IS OK

ESTIMATE MASS TRANSFER COEFFICIENT

$Sh_L = 2.0 + .31\, R_A^{1/3}$ = SHERWOOD NUMBER
EQN 6.25 TREYBAL 3RD ED.

THIS IS BASED ON ASSUMPTION THAT MASS TRANSFER RESISTANCE IS ENTIRELY IN LIQUID PHASE. THIS IS AN ACCEPTED ASSUMPTION

R_A = RAYLEIGH NUMBER = $\frac{d_p^3 \Delta\rho g}{D_L \mu_L}$

D_L = DIFFUSIVITY FOR CO_2 IN WATER = $1.77 \times 10^{-9}\ m^2/SEC$ @ 20°C (TREYBAL p36)

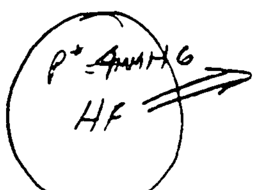
$R_A = \frac{(.00034)^3(1052)(9.81)}{(1.77 \times 10^{-9})(.03)} = 7640$

$Sh_L = \frac{F_L d_p}{c D_L} = 2.0 + .31(7640)^{1/3} = 8.11$

$$F_L = \frac{(Sh_L)(c)D_L}{d_p} = \text{MASS TRANSFER COEFFICIENT}$$

$$c = \text{LIQUID MOLAR DENSITY} = \frac{1000\ KG/M^3}{18\ KG/KMOLE} = 55\ \frac{KMOLE}{M^3}$$

$$F_L = \frac{(8.11)(55)(1.77\times10^{-9})}{(.00034)} = .0023\ KMOLE/m^2\text{-SEC}$$



ASSUME HF CONCENTRATION IN TANK LIQUID $\cong 0 = X_{AL}$

EQUILIBRIUM HF LIQUID CONCENTRATION AT VAPOR PARTIAL PRESSURE OF 4 mm HG IS 29 WT %

$\therefore$ INTERFACE HF MOLE FRACTION $= .29\left(\frac{18}{20}\right) = .26 = X_{Ai}$

$$FLUX = N_A = F_L \ln\left(\frac{1-X_{AL}}{1-X_{Ai}}\right)$$

$$= .0023 \ln\left(\frac{1-0}{1-.26}\right) = .00069\ KMOLE/m^2\text{-SEC}$$

ASSUME RESIDENCE TIME FOR A BUBBLE IS $= \frac{.92\ m}{V_T} = \frac{.92}{.0022} = 419\ SEC$

FLUX AREA PER BUBBLE $= \pi d_p^2 = \pi(.00034\ m)^2 = 3.63\times10^{-7} m^2$

EBASCO

BY OTJ DATE 7/13/94 SHEET 24 OF 24

CHKD. BY NP DATE 9-12-94 OFS NO. 2496-42.. DEPT. NO.

CLIENT FERNALD ENVIRONMENTAL MGMT PROJECT

PROJECT HF TANK CAR

SUBJECT

HF CONTAINED IN BUBBLE IS

$$= \frac{1.92 \frac{KG}{m^3}}{\left(44 \frac{KG}{KMOLE}\right)} \left(\frac{4 \text{ mmHG}}{760 \text{ mmHG}}\right)\left(\tfrac{1}{6}\pi d_p^3\right)$$

$$= \left(\frac{1.92}{44}\right)\left(\frac{4}{760}\right)\left(\frac{\pi (.00034)^3}{6}\right) = 4.73 \times 10^{-15} \text{ KMOLE}$$

FLUX FROM ONE BUBBLE $= \left(.00069 \frac{KMOLE}{m^2-SEC}\right)\left(3.63 \times 10^{-7} m^2\right) = 2.5 \times 10^{-10}$ KMOLE/SEC

TIME TO STRIP BUBBLE OF HF $= \frac{4.73 \times 10^{-15} \text{ KMOLE}}{2.5 \times 10^{-10} \text{ KMOLE/SEC}} = 1.9 \times 10^{-5}$ SECS

SINCE RESIDENCE TIME IS MUCH GREATER THAN STRIPPING TIME BUBBLES WILL BE FREE OF HF WHEN THEY BROACH THE SURFACE AND LEAVE THE TANK

EBASCO

BY DTJ DATE 9/9/94 SHEET 24A OF 24

CHKD. BY AJ DATE 9-12-94 OFS NO. 2940.420-CCC-C500 DEPT. NO.

CLIENT FERNALD ENVIRONMENTAL MGMT PROJECT

PROJECT HF TANK CAR

SUBJECT

REFERENCES

No.	REFERENCE	PAGES WHERE CITED
1.	DOE, 1994. "HF TANK CAR HAZARDOUS WASTE MANAGEMENT UNIT REPORT ON BENCH-SCALE TREATABILITY TESTING OF HF TANK CAR WASTES."	2
2.	DWG NO. HW8813D. HAMILTON TANKS "1400 GALLON VERTICAL NEUTRALIZATION TANK NO. T-19X-4000." FEB 8, 1988.	7
3.	PERRY'S "CHEMICAL ENGINEER'S HANDBOOK." 5TH EDITION. McGRAW-HILL. 1973	9, 19
4.	CRANE TECHNICAL PAPER NO. 410. "FLOW OF FLUIDS THROUGH VALVES, FITTINGS, AND PIPE."	12, 16
5.	LANGE, N.A. "HANDBOOK OF CHEMISTRY" 10TH EDITION. McGRAW-HILL. 1961.	15
6.	IND. ENG. CHEMISTRY, VOL 41, PP 1504-1508 1949. MUNTER, P.A. AND KOSSATZ, F.A.	18
7.	TREYBAL, R.E. "MASS TRANSFER OPERATIONS," 3RD EDITION. McGRAW-HILL. 1980.	19, 20, 22

ATTACHMENT 2: MEMO ON REGULATORY REQUIREMENTS FOR THE HF TANK CAR CLOSURE

Fernald Environmental

FERMCO

Restoration Management Corporation

INTEROFFICE MEMORANDUM

To:	John Lippitt	Date:	September 14, 1994
Location:	MS 76	Reference:	None.
From:	Steve Beckman SVB 9/14	FERMCO #:	M:RP(RTS):94-0155
Location:	MS 65-2	Client:	DOE DE-AC05-920R21972
Extension:	6502	Subject:	REGULATORY REQUIREMENTS FOR THE HF TANK CAR CLOSURE

c: File Record Storage Copy 106.4.11.3
RCRA Operating Record
RTS Files
Ken Alkema
Lew Goidell
Frank Johnston
Barry Ko
Mike Strimbu
Tom Walsh

The HF tank car project has been evaluated for RCRA and other relevant regulatory requirements. The proposed plan of neutralizing HF in a permanent tank; transferring the resulting neutralized slurry to Plant 8 for filtration; packaging the filter cake; and discharging the filtrate to the FEMP WWTS has been evaluated for the following air pollution, water pollution, and RCRA issues.

RCRA:

Under RCRA, the tank where the HF will be neutralized has been determined to be an elementary neutralization unit because the unit is used for neutralizing wastes that are hazardous only because they exhibit the corrosivity characteristic (40 CFR 261.22, OAC 3745-51-22), and the unit meets the definition of a tank or tank system. Elementary neutralization units are exempt from RCRA management standards and hazardous waste treatment permitting. For corrosive wastes (D002) 40 CFR 268.42, Table 2 specifies deactivation as the treatment technology for acid and alkaline subcategories identified as corrosive. Deactivation - or removing the hazardous characteristic of ignitibility, corrosivity, and/or reactivity - is being achieved through the proposed treatment process. Deactivation followed by the discharge of the filtrate through a NPDES

Fernald Environmental

FERMCO

Restoration Management Corporation

INTEROFFICE MEMORANDUM

Air:

Emissions estimates for particulate emissions (PM_{10}) and HF were performed for the neutralization process. These estimates indicate the neutralization tank meets the criteria for a deminimis source pursuant to OAC 3745-15-05. As such no air PTI's or PTO's are required for this action.

The estimate for PM_{10} included an assumption of a 1% maximum loss from the combined lime and calcium carbonate addition as particulate and a dust collector efficiency of 99%. (Lime and calcium carbonate usage was taken from the design basis). The resultant uncontrolled emission rate of 8.93 lb/day (0.0893 lb/day controlled) is below the 10 lb/day threshold for a deminimis source.

The design basis estimated that the HF would be completely neutralized. The emission estimate assumed that 1% HF by weight would be unmixed and vented as vapor. Based on the mole fraction of HF in the vapor an estimate of 2.0 lb HF/day is emitted which also meets the threshold for a deminimis source.

FLJ

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Fernald Environmental Management Project
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NOV 0 3 1994

DOE-0145-95

Mr. Mark Metcalf
Hazardous and Solid Waste Division
Ohio Environmental Protection Agency
401 East Fifth Street
Dayton, Ohio 45402-2911

Dear Mr. Metcalf,

RESPONSES TO TELEPHONE CONVERSATION CONCERNING THE HYDROFLUORIC ACID TANK CAR CLOSURE PLAN INFORMATION AND DATA AND PROPOSED HYDROFLUORIC ACID NEUTRALIZATION SYSTEM

This letter is in response to your telephone conversation on October 18, 1994, with Mr. John Lippitt, Fernald Environmental Restoration Management Corporation (FERMCO) Project Manager for the Hydrofluoric Acid (HF) Tank Car Closure. In your conversation, you requested additional information to facilitate your review and approval of the revised Closure Plan Information and Data (CPID) submitted in July, 1994. The following enclosures have been prepared in response to your request:

Enclosure 1: A review of controls and requirements for operating the HF Neutralizations System to be used for elementary neutralization of the HF wastes being stored in the HF Tank Car.

Enclosure 2: Regulatory discussions supporting why fluoride is not a constituent of concern for evaluating contamination and declaring clean closure of soils associated with the HF Tank Car Hazardous Waste Management Unit (HWMU).

Enclosure 3: A copy of the July 27, 1994, letter submitting the revised CPID and addressing other HF residues in a portable tank (dumpster) and a "Resource Conservation and Recovery Act, 1976 (RCRA) empty" rail car currently located in the same secondary containment area as the HF Tank Car.

If you have any questions or need additional information, please contact Mr. John Sattler at (513) 648-3145.

Sincerely,

Wally Quaider

W. J. Quaider
Acting Associate Director
Office of Safety & Assessment

FN:Sattler

000067

Enclosures: As Stated

cc w/enc:

J. Reising, DOE-FN
J. Lippitt, FERMCO
J. Theising, FERMCO
M. Yates, FERMCO
Operating Record, FERMCO
Closure Files, FERMCO

ENCLOSURE 1: OVERVIEW OF HF NEUTRALIZATION SYSTEM OPERATING REQUIREMENTS

OVERVIEW OF HF NEUTRALIZATION SYSTEM OPERATING REQUIREMENTS

The following is an overview of the operational controls specified in the final design and the anticipated operating conditions for system start up. The anticipated control settings are based on bench-scale testing. The final control settings used will be based on information obtained during system testing and start up.

The tank to be used for neutralization is a previously unused tank in the Tank Farm Area north of Plant 4. The tank is a 1,400 gallon carbon steel tank with a rubber liner that was designed and installed in 1989 for HF neutralization as part of a Tank Farm Upgrade Project. The tank was constructed with three baffles, each 8 inches in width and spaced at 120-degree intervals in the tank. The tank is equipped with an agitator constructed with two sets of 25-inch diameter axial-flow turbine blades capable of rotating at a speed of 84 revolutions per minute (rpm). An electric variable speed drive is being installed to vary the agitator speed from 20 to 84 rpm while maintaining an output torque sufficient to turn the agitator. The existing 1.5 HP motor meets the calculated requirements for agitating the neutralized slurry at the maximum speed of 84 rpm. The tank lid is bolted to the top of the tank and is constructed in 2 sections. There are 13 openings on the tank including an overflow line, a bottom discharge\recirculation line, a 12 inch by 12 inch inspection opening and 11 flanged nozzles on the lid of the tank to be used for venting, lime\calcium carbonate feed inlet, the agitator shaft, and installation of control instrument sensors. The tank has sheet metal and fiberglass insulation jacketing.

Prior to using the system, the sheet metal and fiberglass jacketing on top of the tank will be removed to allow inspections and access into the neutralization tank. The tank will be inspected to verify the integrity of the baffles and liner. The acid inlet line will be extended to approximately 12 inches above the tank bottom. An elbow will be installed on the discharge piping to extend the discharge pipe inlet from its current 8 inches on center from the bottom of the tank to within 2 inches of the bottom. The motor will be tested and the agitator configuration of the neutralization tank will be inspected and verified. All piping and connections not required for the neutralization will be removed or blanked to prevent undesired flow and to create a piping system isolated from all other existing FEMP piping systems. Testing of the tank and piping systems will be done in accordance with DOE and FEMP standards and will be described in detail in the start up/testing procedures.

The HF transfer system being installed consists of a Teflon diaphragm metering pump with a Kynar liner for use with HF solutions, Kynar connecting piping to and from the metering pump, and existing Teflon-lined (PTFE) carbon steel transfer piping leading to the neutralization tank. The metering pump will be set to transfer the HF to the neutralization tank at a rate of 1.7 gpm. A rotameter will be installed in the HF transfer line to monitor the HF flow rate to the neutralization tank. The pump pressure regulator will be set for a maximum 50 psi. If the pressure exceeds 50 psi, an internal pressure relief valve will be activated to recirculate the HF to the suction side of the pump. The internal recirculation prevents excessive pressure in the HF transfer system without atmospheric releases of HF.

Prior to use, all necessary piping modifications will be made to isolate the transfer lines and the lines will be connected to the HF metering pump. New Kynar piping will be used to connect the metering pump inlet to the existing Teflon-lined HF Tank Car off-loading pipe connection. New Kynar piping will also be used to connect the metering pump discharge to the existing PTFE transfer piping. The PTFE transfer piping was installed during the 1989 Tank Farm Upgrade. The existing PTFE piping to the neutralization tank will be modified to provide isolated direct piping from the HF Tank Car to the neutralization tank. Acid-indicating flange and fitting covers will be installed to allow immediate leak detection to minimize potential HF releases and exposures. The transfer system piping will be hydrostatically tested to 75 psi after the HF transfer system installation has been completed, but prior to start up. This is 150% of the maximum design pressure of the transfer system using the metering pump with the operating control set at 50 psi. The metering pump will be tested to verify pressure and flow rate settings.

The potable water feed to the neutralization tank is regulated by a batch controller that is interlocked with an actuated solenoid valve. The actuated valve will shut off the water feed when 968 gallons of water have been introduced to the neutralization tank. The water feed line is also equipped with a backflow prevention device.

Instruments will be installed on the tank to monitor pH, temperature, level, and pressure. These instruments will be equipped with switches and transmitters interlocked to the HF transfer metering pump and an actuated solenoid valve on the suction side of the pump to control the transfer of HF from the HF Tank Car to the neutralization tank. The HF transfer pump and actuated valve on the transfer line cannot operate or will be shut off when the instrument measurements are beyond the operating ranges. An alarm will also sound if the temperature. pH or liquid level in the neutralization tank exceeds preset limits. Redundant instrumentation will be provided to monitor and control the neutralization tank pH, temperature, and liquid level. A strip chart recorder will be installed to provide a constant readout of system conditions. The pH will be monitored between 0 and 14, temperature between 6°F and 200°F, tank level between 0 and 100 percent, and pressure between 0 and 60 inches of water.

The liquid level monitoring instrument on the tank will be equipped with a low and high level switch. The low level switch is interlocked to both the lime\carbonate bag slitter and dry powder feed system and to the HF transfer pump and actuated valve. This prevents the addition of lime and carbonate and HF when there is no water in the neutralization tank. The low level switch will be set at approximately 2 feet from the bottom of the tank (or one half the batch depth of four feet). The high level switch is interlocked to both the HF transfer and water feed systems to prevent tank overflow through excessive addition of HF or water. Under normal operations, a 12 inch freeboard will be maintained in the neutralization tank. The tank overflow line will be modified to overflow if the liquid level reaches within 2 inches of the top of the tank. The high level switch will be set at approximately 6 inches from the top of the tank. The overflow line will be extended just under the surface of a shallow lime solution contained in the bottom of a 55 gallon drum.

The pH instrument will be calibrated to prevent HF addition when the pH measurement falls below 6. In addition, if the pH falls below 5, an alarm will sound to alert the operator to potential low acid conditions. After the HF flow is stopped, the slurry will be agitated for 15 minutes and the HF feed pump and valve will be restarted by the operator if the pH rises above 6. The cycle will be repeated until the pH remains between 5 and 6 for fifteen minutes after the last addition of HF.

The high temperature switch will stop the addition of HF if the internal temperature of the tank contents exceed 140°F. The maximum temperature allowed for the rubber tank lining is 200°F (based on information provided by the manufacturer). In bench-scale testing under simulated adiabatic conditions, the temperature of the neutralization mixture reached a maximum of 106°F when the starting temperature of the water was 68°F.

The pressure instrument is provided as a safety back up in the unlikely event that the tank vent and overflow become clogged. Carbon dioxide gas will be released from the tank during the neutralization of the HF. The release rate of carbon dioxide is estimated to be 10 cfm at an HF addition rate of 1.7 gpm. A process vent will be installed on the tank to prevent the occurrence of positive pressure in the tank during operation. A ventilation stack with a length of 20 feet and a diameter of 6 inches will not allow the pressure to rise more than 0.1 inches of water above atmospheric pressure when the carbon dioxide release rate is four times this rate or 40 cfm. The outlet of the vent will be located to disperse the carbon dioxide gas in such a way as to prevent the creation of an oxygen-deficient pocket of air that might be hazardous to exposed personnel.

To prevent the venting of possible HF vapors, the HF will be added through a dip tube into the tank that will terminate at a distance of 12 inches above the tank bottom. The HF leaving the dip tube will be mixed and neutralized with the tank contents before volatilization of the HF can occur. The design of the HF feed was based on an evaluation of the potential for carbon dioxide bubbles formed during the neutralization reaction to provide a transport mechanism for HF vapors from the tank. An evaluation was done on the rate at which HF vapor present in the bubbles might leave the bubbles and be neutralized prior to the bubbles reaching the surface of the tank contents and leaving the tank. The evaluation showed that the CO_2 bubbles would be relatively small due to the mechanical agitation present in the tank and that they would rise through the tank contents relatively slowly due to the significant viscosity of the tank contents. Any HF vapor contained within a bubble would be immediately transported out of the bubble and neutralized when the bubble was exposed to unreacted calcium and lime slurry. Therefore, the carbon dioxide gas leaving the neutralization tank would be effectively scrubbed by the tank contents and would be essentially free of HF vapor as long as the acid condition in the neutralization slurry are controlled as described above.

During the 1989 Tank Farm Upgrade Project, a lime addition system was also constructed over the top of the neutralization tank which includes a bag slitter, dust collector, and lime feeder. The lime and calcium carbonate will be delivered to the feeder in 60- or 100-pound sacks that will be manually fed into the bag slitter. The bag contents will be fed into the lime storage hopper and then into the neutralization tank at a rate determined by the speed of the lime feed screw. A total of 268 pounds of calcium carbonate and 625 pounds of lime will be used for a typical neutralization batch. At an assumed bulk density of these solids of 40 pounds per cubic foot, the solids will need to be added at a minimum addition rate of 0.40 cfm to add all of the solids in 1 hour or less.

Prior to use, a new lime feed screw and cylinder will be installed to provide solids addition at the rate of 0.40 cfm. There is currently a variable speed control for the lime feed screw that is controlled by a programmable logic controller. This system will be revised to eliminate the controller and convert the lime feed screw to a manually controlled variable-speed operation. This will assist in optimizing the addition of neutralization solids and reducing the neutralization batch time as much as possible. The dust collector system installed on the lime addition system will be energized and tested. Filter bags and other system components will be replaced or repaired as required to restore operation of the dust collection unit.

After neutralization, the non-hazardous, reacted slurry will be pumped into portable tanks and transferred to Plant 8 for filtration. Up to five 1,150 gallon batches of neutralized slurry will be accumulated in an agitated holding tank in Plant 8. The slurry will be segregated and filtered separately to minimize the mass loading of fluoride to the FEMP waste water treatment system (WWTS). Based on bench-scale test results, the filtered solids will be non-RCRA hazardous low-level radioactive wastes and the filtrate will be suitable for discharge to the FEMP WWTS general sump. The filtered solids and filtrate will be tested to confirm disposal requirements before final disposition.

The HF Neutralization System will be operated by certified Hazardous Waste System Operators. Operator training and certification will be conducted in accordance with DOE and FERMCO training requirements. When in operation, a Certified Operator will be assigned to each subsystem (i.e., the lime\calcium carbonate feed system, the neutralization tank system and slurry transfer slurry system, and the HF transfer system). A field supervisor will monitor conditions and provide an interface for coordination with FEMP field support services and the Project Manager and Design Engineers.

Operations will not be conducted when weather conditions present unacceptable risks to personal safety and health (e.g., excessive ice build up on elevated walkways to access the HF Tank Car) or temperatures exceed operating ranges of equipment (e.g., metering pump recommended operating range is from 35° to 125°F). The system start up and operating procedures will identify weather conditions that will prevent processing. However, if weather conditions deteriorate after processing has been initiated and freezing is a concern, the slurry will be removed from the neutralization tank before the end of the work shift.

ENCLOSURE 2: REGULATORY BASIS FOR NOT INCLUDING FLUORIDE AS A CONSTITUENT OF CONCERN IN THE CLOSURE PLAN INFORMATION AND DATA

REGULATORY BASIS FOR NOT INCLUDING FLUORIDE AS A CONSTITUENT OF CONCERN IN THE REVISED HF TANK CAR CLOSURE PLAN INFORMATION AND DATA SUBMITTED IN JULY 1994

Additional information was requested to explain why fluoride was not a constituent of concern (COC) for the HF Tank Car soils. This seemed to be inconsistent with using fluoride as a COC was for rinseates during closure of the Drummed HF Residue and Associated Storage Areas Inside Plant 4 (HWMU No. 6).

Fluoride was not included as a constituent of concern in the July 1994 revision to the HF Tank Car CPID because the HF managed in the HWMU is not a listed hazardous waste and fluoride is not listed as a hazardous constituent in OAC 3745-51-11 (40 CFR 261 Appendix VIII). The basic difference between the HF Tank Car and HWMU No. 6 inside Plant 4 is the hazardous waste listing criteria in OAC 3745-51-33 (40 CFR 261), as it applies to the wastes involved. The wastes managed in HWMU No. 6 were wastes from the clean out of an anhydrous hydrofluoric acid product tank and were declared to be a listed RCRA waste (U134) based on OAC 3745-33(C) (40 CFR 261.33(c)). Accordingly, the CPID for HWMU No. 6 included evaluation of fluoride as a decomposition product of a listed waste. The HF in the HF Tank Car is a recovered production process residues and, under OAC 3745-51-33(G) (40 CFR 261.33(d)), it is not a listed hazardous waste and fluoride from the HF in the HF Tank Car is not a decomposition product from a listed waste.

The requirements for RCRA Corrective Action were also reviewed to verify that fluoride should not be a constituent of concern for closure of the HF Tank Car. It was determined that Corrective Actions for fluoride are not required for closure of the HF Tank Car, based on the information provided in pages 16-18 of the September 1, 1993, Ohio EPA Interim Final Closure Plan Review Guidance for RCRA Facilities (OEPA Closure Guidance). This determination was based on these two findings:

1. Since the wastes in the HF Tank Car are not listed hazardous wastes and do not contain hazardous constituents, the only continuing concern is the potential release of corrosive hazardous waste (D002) from the HF Tank Car. Therefore, pH is a sufficient indicator parameter to assess the impact and need for remediation of contamination in soils within the HF Tank Car HWMU.

   Section 2.9, Paragraph 1, Corrective Action/DERR Referral for General Contamination of the OEPA Closure Guidance, "requires owners/operators to identify, investigate, and remediate, if necessary, releases of hazardous waste or hazardous waste constituents...." Fluoride is not a constituent of concern and the use of pH testing is sufficient because:

   a. Based on laboratory analysis, the HF in the tank car was determined to be hazardous only for RCRA corrosivity (D002).

   b. The HF in the tank car is a recovered from a processed material. In accordance with OAC 3745-51-33(G) (40 CFR 261.33(d)), a manufacturing process waste is not subject to the RCRA listing unless it is identified under K-series or F-series hazardous waste code listings. HF is not listed as a hazardous constituent in 40 CFR 261 Appendix VII which identifies the basis for the K- or F-series hazardous waste listings.

c. Fluoride is not a hazardous constituent listed in OAC 3745-51-11 (40 CFR 261 Appendix VIII) and it is not listed as a hazardous constituent in the Ground Water Monitoring List in the Appendix to OAC 3745-54-98 (40 CFR 264 Appendix IX).

d. Fluoride is not included in Table 302.4 - List of Hazardous Substances and Reportable Quantities in 40 CFR Part 302.

2. There is no evidence, or reason to suspect, that there have been any releases of HF from the HF Tank Car after the residues became subject to regulation as a corrosive hazardous waste. In addition, there are other sources of fluoride that make it unsuitable for evaluating impacts of potential releases from the HF Tank Car.

Paragraph 3 of Section 2.9, in the OEPA Closure Guidance states, "To prove that soil contamination is from a source different from the RCRA Unit being closed, the owner/operator, at a minimum, must a) identify an alternative source(s) of contamination, b) document no release(s) from the unit, and c) include arguments for one of the following possibilities: (i) contamination is ubiquitous; (ii) no statistical difference in the soil; or, (iii) mass balance analysis." Accordingly, the following arguments have been provided.

a. *Alternate Sources* - Fluoride in the soil may have originated from the following sources:

i) De minimis losses resulting from reuse/resale activities during production that were not regulated under RCRA;
ii) Emission blow down from Plant 4 hydrofluorination production processes;
iii) Activities at the site prior to RCRA enactment;
iv) CERCLA regulated contamination sources; and.
v) Naturally occurring sources, such as calcium fluoride and sodium fluoride.

b. *Document No Releases* - In October 1988, the HF in the HF Tank was returned from a prospective buyer and placed into storage pending reuse or resale. The HF has not been removed from the HF Tank Car since the speculative accumulation limit was exceeded and it became regulated as a hazardous waste for corrosivity (D002). There are no spills event reports indicating that there have been any releases from the HF Tank Car. In addition, ultrasound tests and visual inspections were conducted in March\April of 1994. The test and inspections confirmed the integrity of the tank and found no evidence of leaks or spills from the HF Tank Car.

c. *i) Ubiquitous Contamination* - It is reasonable to assume that the cumulative impact from airborne contaminants over 30 plus years of operation has resulted in widespread dispersion of fluoride contamination in the Tank Farm Area soils. The original design used a common drainage collection system for the rail lines and HF Tank

Car and Anhydrous Hydrofluoric Acid (AHF) and HF process storage tanks located within the Tank Farm Area. During periods of heavy precipitation, contamination from de minimums material handling losses during production would have dispersed fluoride contamination through the Tank Farm Area soils. In addition, the Tank Farm Area is located across 2nd Street, approximately 300 feet North of Plant 4. Hydrofluorination process operations were conducted in Plant 4 during uranium production.

ii) No Statistical Differences - The soils sampling and pH analyses conducted in June 1994, support the assertion that no HF has been released from the HF Tank Car. No statistical difference have been identified during the soil pH analysis between the soil underlying the unit and nearby soils.

ENCLOSURE 3: JULY 27, 1994 TRANSMITTAL LETTER FOR THE HF TANK CAR CPID

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ENV. ENG. SDS DEPT

Department of Energy
Fernald Environmental Management Project
P. O. Box 398705
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AUG 9 2 45 AM '94

JUL 27 1994

DOE-2152-94

Mr. Thomas Crepeau
Data Management Section
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, Ohio 43266-0149

Dear Mr. Crepeau:

TRANSMITTAL OF REVISED RESPONSES TO COMMENTS AND REVISED CLOSURE PLAN INFORMATION AND DATA FOR THE HYDROFLUORIC ACID TANK CAR

References: 1) Letter, D. R. Schregardus to R. J. Hansen, "Notice of Deficiency," subject Closure Plan U.S. Department of Energy - Fernald Environmental Management Project, dated October 4, 1993

2) Letter, DOE-0278-94, J. P. Hamric to T. Crepeau, "Transmittal of Response to Comments and Revised Closure Plan Information and Data for the Hydrofluoric Acid Tank Car," dated November 10, 1993

3) Letter, M. W. Metcalf to W. J. Quaider, "HF Tank Car Closure Plan Extension Request," dated May 2, 1994

Enclosed are revised responses to the October 4, 1993, Notice of Deficiency (NOD) comments and a copy of the revised Closure Plan Information and Data (CPID) for the Hydrofluoric Acid (HF) Tank Car, Hazardous Waste Management Unit No. 38, at the Fernald Environmental Management Project (FEMP). The revised comment responses and CPID document have been prepared to replace the previous CPID Revision 2, originally submitted to the Ohio Environmental Protection Agency (OEPA) on November 10, 1993.

In addition to revising the CPID in response to the NOD comments, a limited number of other changes have been incorporated in the CPID to reflect activities and refinements that have occurred since November 1993. The CPID has been revised to reflect the April 14, 1994, movement of the HF Tank to the Main Tank Farm secondary containment area. Analysis of soil samples underneath the HF Tank Car were completed in June 1994, in accordance with the CPID, and the analytical results, along with the statement that further soil remediation activities should not be necessary, has been incorporated into the document. In addition, based upon safety considerations and information obtained from the bench scale test completed on May 18, 1994, the HF Tank Car neutralization solution spray flush has been replaced by a water spray flush. Accordingly, because use of a water spray flush will not precipitate solids, the discussion that a remote camera will be used to look for solids inside the tank car has been struck from the CPID. Lastly, as discussed in Section 3.4 of the CPID, the HF neutralization system will be maintained in operating condition for use in support of Safe Shutdown under Removal Action 12.

Presently, there are two containers of HF material being evaluated under Safe Shutdown, Removal Action 12, to determine if the contents will require treatment by the HF neutralization system. These containers are a 500 gallon portable tank (dumpster) containing an estimated 400 gallons of suspected HF residues, and a second tank car that has been declared "empty", but may contain a small amount of HF residue. Both containers have been relocated to the Main Tank Farm secondary containment area with the HF Tank Car. Sampling and analysis of the residues will be completed in August 1994.

If you have any questions regarding this resubmittal of the HF Tank Car CPID, please contact John Sattler at (513) 648-3145.

Sincerely,

Wally Quaider

Walter J. Quaider
Acting Associate Director
Safety, Operations and
Technical Support

FN:Sattler

Enclosure: As Stated

cc w/enc:

M. Metcalf, OEPA-Dayton
J. A. Saric, USEPA Region V
K. A. Chaney EM-423, QO

cc w/o enc:

M. McDermontt, DOJ
J. Van Kley, Ohio AGO
K. L. Alkema, FERMCO/65-2
P. F. Clay, FERMCO/52-2
D. L. Howe, FERMCO/30 RCRA Operating Record
D. Ofte, FERMCO/1
N. L. Redmon, FERMCO/76 RCRA Closure Files
J. W. Thiesing, FERMCO/2

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JUL 27 1994

DOE-2152-94

Mr. Thomas Crepeau
Data Management Section
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, Ohio 43266-0149

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If you have any questions regarding this resubmittal of the HF Tank Car CPID, please contact John Sattler at (513) 648-3145.

Sincerely,

Wally Quaider

Walter J. Quaider
Acting Associate Director
Safety, Operations and
Technical Support

FN:Sattler

Enclosure: As Stated

cc w/enc:

M. Metcalf, OEPA-Dayton
J. A. Saric, USEPA Region V
K. A. Chaney EM-423, QO

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M. McDermontt, DOJ
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N. L. Redmon, FERMCO/76 RCRA Closure Files
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DOE-0278-94

Tom Crepeau
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P. O. Box 1049
1800 WaterMark Drive
Columbus, Ohio 43266-0149

TRANSMITTAL OF RESPONSE TO COMMENTS AND REVISED CLOSURE PLAN INFORMATION AND DATA FOR THE HYDROFLUORIC ACID TANK CAR

Reference: Letter, Donald R. Schregardus to Raymond J. Hansen, "Notice of Deficiency", RE: Closure Plan, U.S. Department of Energy - Fernald Environmental Management Project, dated October 4, 1993.

Enclosed are responses to specific Notice of Deficiency comments and a copy of the modified Closure Plan Information and Data (CPID) for the Hydrofluoric Acid (HF) Tank Car, Hazardous Waste Management Unit No. 38 at the Fernald Environmental Management Project (FEMP). The CPID document Revision 2 was prepared to replace the previous CPID Revision 1 document submitted to the Ohio Environmental Protection Agency (OEPA) on May 28, 1993.

Specific comment 3 requests results from the bench scale testing necessary to safely achieve the required neutralization. The bench scale testing is not as yet completed. When finished, DOE will provide those results in the form of a modified section for inclusion in the CPID. The current schedule is to complete this testing in December 1993 and a modified section to the CPID will be provided as soon as possible thereafter, but no later than January 15, 1994.

Also discussed with the staff at the Southwest District Office during the October 27, 1993 bi-monthly technical interchange meeting, DOE will provide an amended CPID to OEPA if an alternative other than lime slurry elemental neutralization will be used to achieve the desired results. At this time, the lime slurry neutralization option is anticipated to be the best process.

Sincerely,

J. Phil Hamric
Manager

010005
SD-EES-C38-CPI-100
000083
11-10-93

FN:Sattler

OhioEPA
State of Ohio Environmental Protection Agency

P.O. Box 1049, 1800 WaterMark Dr.
Columbus, Ohio 43266-0149
(614) 644-3020
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C38
H-00106
ENV. ENG. SDS DEPT
OCT 8 12 34 PM '93

George V. Voinovich
Governor
Donald R. Schregardus
Director

NOTICE OF DEFICIENCY

CERTIFIED MAIL

October 4, 1993

RECORD COPY

RE: CLOSURE PLAN
U.S DEPARTMENT OF ENERGY-
FERNALD ENVIRONMENTAL
MANAGEMENT PROJECT
OH6 890 008 976
05-31-0681

Mr. Raymond J. Hansen
Acting Manager
Fernald Office
U.S. DOE-FEMP
P.O. Box 398705
Cincinnati, Ohio 45239-8705

CONTROL NO.: 010005
DOC. NO.: SD-EES-C38-NOD-10084
REVISION: –
SUPERSEDES: –
ISSUE DATE: 10-4-93
REVISION DATE: –

Dear Mr. Hansen:

On May 7, 1992, Ohio EPA received from the U.S. Department of Energy-Fernald Environmental Management Project a closure plan for Hazardous Waste Management Unit #38 (HF Tank Car), an unpermitted storage unit located at 7400 Willey Road, Fernald, Ohio. Per a December 9, 1992, Notice of Deficiency (NOD), a revision to the closure plan was received on June 2, 1993.

This closure plan was submitted pursuant to Rule 3745-66-12 of the Ohio Administrative Code (OAC) in order to demonstrate that the U.S. Department of Energy-Fernald Environmental Management Project's proposal for closure complies with the requirements of OAC Rules 3745-66-11 and 3745-66-12.

The public was given the opportunity to submit written comments regarding the closure plan in accordance with OAC Rule(s) 3745-66-12. The public comment period extended from November 23, 1992 through December 25, 1992. No public comments were received by Ohio EPA.

Pursuant to OAC Rule 3745-66-12(D)(4), I am providing you with a statement of deficiencies in the plan, outlined in Attachment A.

000084

Mr. Raymond J. Hansen
U.S. DOE-FEMP
Page Two

Please take notice that OAC Rule 3745-66-12 requires that a modified closure plan addressing the deficiencies enumerated in Attachment A be submitted to the Director of the Ohio EPA for approval within thirty (30) days of the receipt of this letter.

The modified closure plan shall be in accordance with the following editorial protocol or convention:

1. Old language is over-struck, but not obliterated.

2. New language is capitalized.

3. Page headers should indicate date of submission.

4. If significant changes are necessary, pages should be re-numbered, table of contents revised, and complete sections provided as required.

The modified closure plan should be submitted to: Ohio Environmental Protection Agency, Division of Hazardous Waste Management, Attention: Tom Crepeau, Data Management Section, P.O. Box 1049, Columbus, Ohio 43266-0149. A copy should also be sent to: Robin Fisher, Ohio EPA, Southwest District Office, 40 South Main Street, 5th Floor, Dayton, Ohio 45402.

Upon review of the resubmitted plan, I will prepare and issue a final action approving or modifying such plan. If you wish to arrange a meeting to discuss your responses to this Notice of Deficiency, please contact Robin Fisher at (513) 285-6357.

Sincerely,

Donald R. Schregardus
Director

DRS/rgf

cc: Tom Crepeau, OEPA, DHWM Central File
Randy Meyer, OEPA, DHWM
Section Chief, Ohio Permit Section, USEPA, Region V
Robin Fisher, OEPA, Southwest District Office

ATTACHMENT A

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
HYDROGEN FLUORIDE (HF) TANK CAR

OH6 890 008 976

General Comment:

The closure plan was reviewed based upon the use of elementary neutralization (lime slurry) as the chosen neutralization process; however, the submittal letter that accompanied the closure plan indicates that three alternative methods for neutralizing the hydrofluoric acid are still under consideration. If the bench scale tests indicate that an alternate neutralization agent should be used, the U.S. DOE-FEMP must submit an amended plan to the Ohio EPA. Changes within the amended plan would be subject to additional comment by the Agency.

Specific Comments:

1. Section 3.2, Page 9 - The closure plan fails to provide detailed information regarding the transportation of the tank car to the secondary containment area. The following information must be provided in accordance with OAC 3745-66-12(B)(3):

   a) Detailed procedures for moving the tank car.
   b) Precautions taken to avoids leaks or spills.
   c) Safety equipment available in case of a leak or spill.

2. Section 3.1.1, Page 9 - The closure plan indicates that the clean levels for soil will be 2.0 to 12.5. Please revise the closure plan to indicate that the clean level for soils will be 4.7 to 9.0 as per the Closure Plan Review Guidance Document (page 33). This information must be provided in accordance with OAC 3745-66-12(B)(4).

3. Section 3.2, Page 10 - The closure plan fails to provide the bench scale test results that confirm that the proposed design will safely achieve the required neutralization. Please amend the closure plan to include a copy of the appropriate bench scale test results. This information must be provided in accordance with OAC 3745-66-12(B)(3).

4. Section 3.2, Page 12, Number 7 - The closure plan states that the filter cake will be tested to determine if it fails TCLP for metals; however, the plan does not indicate how it will be managed if the results of the TCLP exceed the regulatory limits. Please amend the closure plan to include provisions for dealing with the filter cake if it is determined to be a hazardous waste. This information must be provided in accordance with OAC 3745-66-12(B)(4).

5. Sampling and Analysis Plan, Section 2.5, Page A-7 - The closure plan describes the methods for decontamination of sampling and decontamination equipment but fails to indicate that the equipment used in the neutralization process (ie. Reactor A and B, ancillary equipment, etc.) will also be decontaminated when neutralization is completed. Revise the closure plan to indicate that the equipment used in the neutralization process will be decontaminated in a manner consistent with Section 2.5 of the Sampling and Analysis Plan. This information must be provided in accordance with OAC 3745-66-12(B)(4).

END OF CLOSURE COMMENTS

Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
Cincinnati, Ohio 45239-8705
(513) 738-6357

MAY 28 1993
DOE-2094-93

Mr. Tom Crepeau, Manager
Ohio Environmental Protection Agency
Division of Hazardous Waste Management
Data Management Section
P.O. Box 1049
1800 WaterMark Drive
Columbus, Ohio 43266-0149

Dear Mr. Crepeau:

TRANSMITTAL OF REVISED CLOSURE PLAN INFORMATION AND DATA FOR THE HYDROFLUORIC ACID TANK CAR, HAZARDOUS WASTE MANAGEMENT UNIT NO. 38 (HWMU NO. 38)

References: 1. Letter, DOE-0831-93, James J. Fiore to Tom Crepeau, "Hydrofluoric Acid Tank Car Closure Plan Information and Data Notice of Deficiencies," dated January 13, 1993.

2. Letter, Donald R. Schregardus to W. D. Adams, OH6 890 008 976, 05-31-0681, RE: Closure Plan, U.S. Department of Energy - Fernald Environmental Management Project, dated December 9, 1992.

Enclosed is a copy of the modified Closure Plan Information and Data (CPID) for the Hydrofluoric Acid (HF) Tank Car, Hazardous Waste Management Unit No. 38 (HWMU No. 38) at the Fernald Environmental Management Project (FEMP). The CPID document was prepared to replace the previous CPID submitted to the Ohio Environmental Protection Agency (OEPA) on May 7, 1992.

The DOE response (Reference 1) to the OEPA Notice of Deficiency (NOD) (Reference 2) stipulated that a revised CPID would be submitted pending the investigation of on-site and off-site treatment options. The off-site treatment option has been eliminated based on discussions with commercial vendors. Four on-site treatment options are currently being investigated. Bench scale testing and analyses are being developed to determine which on-site treatment option will be selected. The four neutralization processes undergoing bench scale testing and analyses include:

1. Lime Slurry - Elementary Neutralization

2. Activated Alumina/Ion Exchange Neutralization

000088

cc w/o encl:

R. Meyer, OEPA-Columbus
R. Fisher, OEPA-Dayton
H. O'Connell, OEPA-Dayton
M. McDermontt, DOJ
J. Van Kley, Ohio AGO
N. C. Kaufman, FERMCO/1
K. L. Alkema, FERMCO/65-2
P. F. Clay, FERMCO/19
J. T. Curtis, FERMCO/8
J. W. Theising, FERMCO/19
Administrative Record

ENCLOSURE

NEUTRALIZATION METHODS TO BE EVALUATED BY BENCH SCALE TESTING

The FEMP is developing bench scale tests to evaluate and identify which of four (4) suggested methods can safely achieve the required neutralization and generates the least volume of waste. The four neutralization processes undergoing bench scale testing and analyses include:

1. Lime Slurry - Elementary Neutralization (Figure 1)
2. Activated Alumina/Ion Exchange Neutralization (Figure 2)
3. Soda Ash Addition Neutralization (Figure 3)
4. Nitric Acid Addition/Lime Slurry Neutralization (Figure 4)

The information to be collected for each of the options includes:

- Rate of heat build up and gas or steam evolution.
- Effectiveness of fluoride removal as calcium fluoride, sodium fluoride or aluminum fluoride salts.
- Sizing and equipment requirements for the alternative methods being evaluated.
- Ratio of neutralizing agent to additions of DHF solution and the respective input rates.
- Estimated time required to complete neutralization of the full 4,400 gallons of DHF.
- Characterization of solid and liquid wastes, to be determined by sampling and analyses of filtered solids and wastewater effluent. Analyses will be used to characterize Ph changes and fluoride concentrations during the process.
- The final effluent and solid residues will be sampled and analyzed to characterize concentrations of RCRA TCLP metals, total uranium and soluble fluoride to confirm options for disposition of wastes generated during DHF neutralization.

The following pages provide a brief narrative of the options being evaluated.

fluorides and Ph.

10) If the filtrate meets NPDES and local water quality discharge criteria, it will then be discharged to the general sump for eventual disposal, through the biodenitrification facility (BDN), to the Great Miami River.

11) The filter cake, pending analysis, will be disposed at the Nevada Test Site (NTS) as a low level radioactive waste (LLW).

OPTION 2: NEUTRALIZATION/ION EXCHANGE USING ACTIVATED ALUMINA (Figure 2)

1) The following formula describes the reaction of activated alumina (AA) with hydrofluoric acid:

$$Al_2O_3 + 6HF - 2AlF_3 + 3H_2O$$

2) The DHF will be pumped through a tank of activated alumina which will adsorb and react with the acid to "give-up" an oxygen ion in exchange for a fluoride ion.

3) The spent AA will be dried or run through a filter press, drummed and sampled. At this time it is anticipated that the resulting dried cake would be disposed of as a non-RCRA low level radioactive waste.

OPTION 3: NEUTRALIZATION/SOLIDIFICATION WITH SODA ASH (Figure 3)

1) The following formula describes the reaction of hydrofluoric acid with soda ash:

$$2HF + Na_2CO_3 - 2NaF + CO_2 \uparrow + H_2O$$

2) The DHF will be pumped into a tank containing a paste-like slurry of soda ash and recirculated in a closed loop via an in-line mixer until the pH approaches 7.

3) The neutralized slurry paste will be pumped into a drum containing a heal of dry soda ash and covered with a dry soda ash layer. Once dried (i.e., no free liquids as demonstrated by the paint filter test) the drums will be shipped to the NTS for LLW disposal.

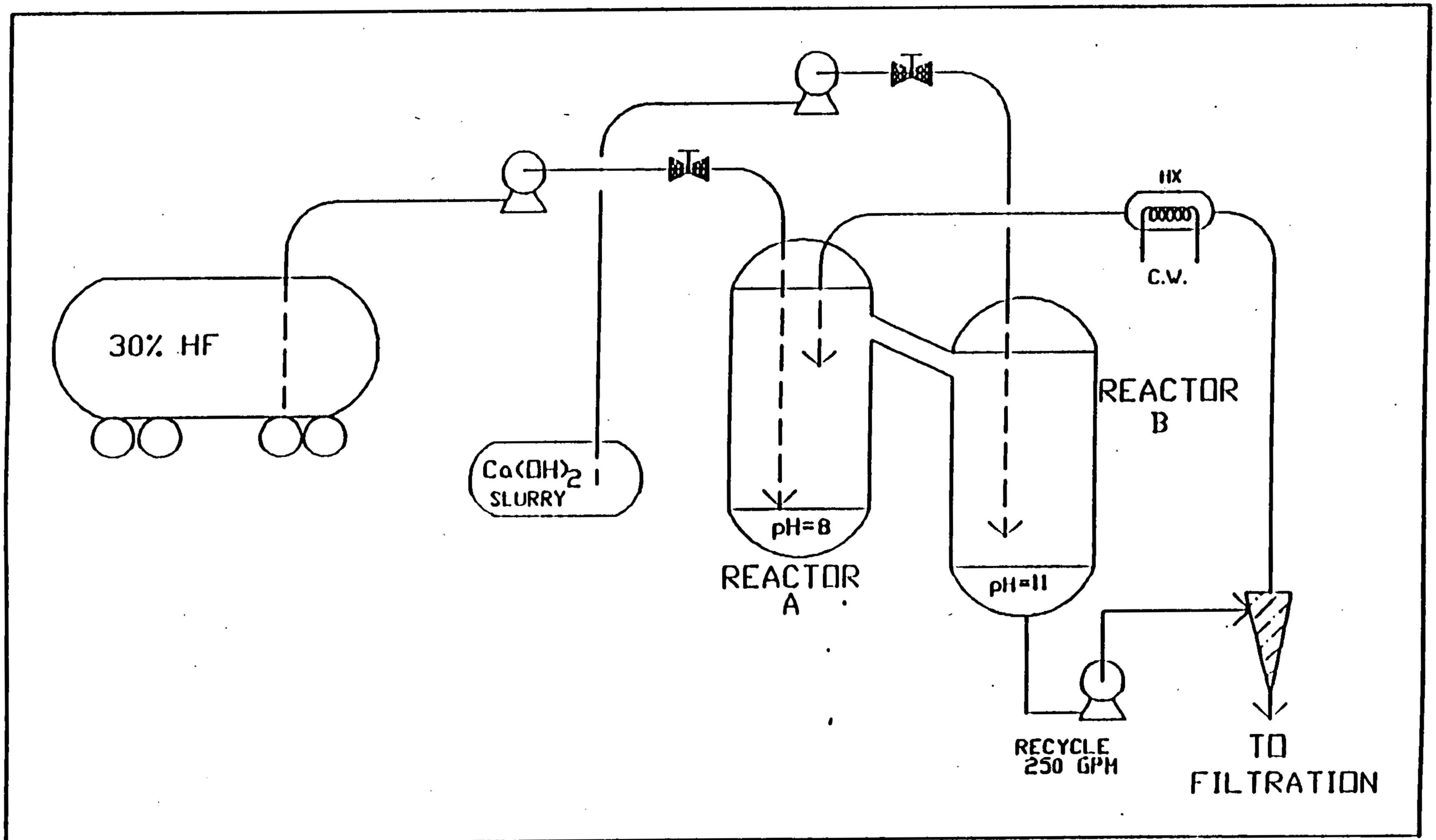
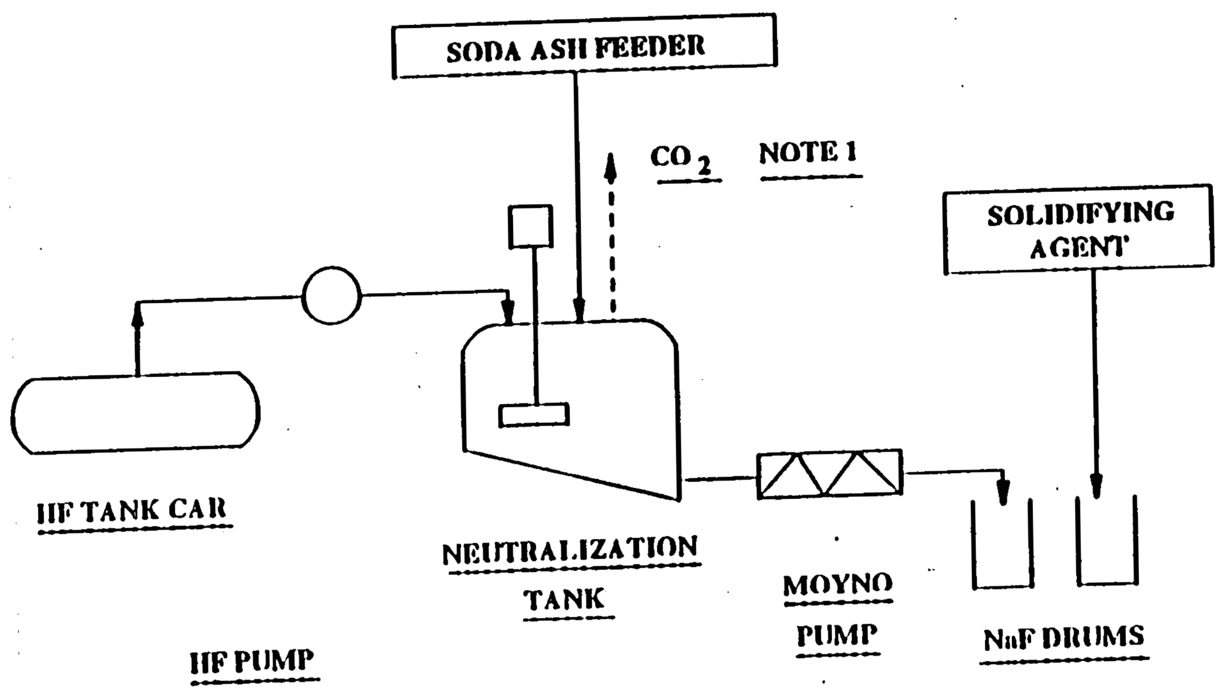


FIGURE 1: Lime Slurry - Elementary Neutralization

TANK CAR HF - NEUTRALIZATION FLOWSHEET



NOTE:
1 - Filter to be provided, as required.

FIGURE 3: Soda Ash Addition Neutralization

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000093

Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
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(513) 738-6357

ENV. ENG. SDS DEPT

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JAN 1 3 1993
DOE-0831-93

c38

Ohio Environmental Protection Agency
Division of Hazardous Waste Management
Data Management Section
P.O. Box 1049
Columbus, Ohio 43266-0149

RECORD COPY

HYDROFLUORIC ACID TANK CAR CLOSURE PLAN INFORMATION AND DATA NOTICE OF DEFICIENCIES

Reference: Letter, OEPA to U.S. DOE-FN, Donald R. Schregardus to W. D. Adams, OH6 890 008 976, 05-31-0681, December 9, 1992.

Dear Mr. Crepeau:

This letter is in response to the Notice of Deficiencies (NOD) for the Hydrofluoric Acid (HF) Tank Car Closure Plan Information and Data that were identified in the above referenced letter. Also enclosed is a copy of a lab sheet from analysis of a sample of the wastes in the HF Tank Car from December, 1992.

On December 23, 1992, Mr. John Sattler, DOE-FN called Mr. Phil Harris (OEPA Division of Solid and Hazardous Waste Management, Southwest District Office) to discuss the need to delay submittal of revised closure plan information and data (CPID). A delay was requested because of the possibility of significant changes in the closure procedure. After the original CPID was submitted in May 1992, the Fernald Environmental Management Project (FEMP) contacted a commercial vendor to evaluate the option of off-site disposition of the Dilute Hydrofluoric Acid (DHF) waste and the tank car. The FEMP is currently awaiting the proposal and details of waste disposition from the vendor. The FEMP is also developing the necessary detailed procedures for on-site neutralization and decontamination. Once the two alternatives have been evaluated and the preferred option is selected, a revised CPID will be prepared to incorporate the necessary changes. It will be sent to you at that time. Mr. Harris suggested this approach. He also recommended that the FEMP include responses to the NOD within the thirty day deadline.

The following comments and responses will be incorporated as appropriate in the revised CIPD. OEPA comments are in Italics followed by the FEMP response.

CONTROL 010005
SD-EES-C38-/101
1-13-93

Ohio EPA General Comment:

The closure plan indicated that pH is the only contaminant of concern. DOE-FEMP must provide additional justification for the use of this single analyte as a means of ensuring clean closure. Specifically, OEPA requires further information regarding characterization of the contents of the tank car through either process knowledge or analytical methods.

FEMP RESPONSE:

Prior to 1989, dilute hydrofluoric acid (DHF) was generated from the hydrogen fluoride recovery systems attached to the production process in Plant 4 which reduced UO_3 to UF_4 and, in the late 1980's, a process in the Pilot Plant for reduction of UF_6 to UF_4. The Plant 4 production process involved dissociated ammonium (hydrogen and nitrogen) and anhydrous hydrofluoric acid (AHF) gas. The Pilot Plant process used dissociated ammonium.

Based on previous sampling and analysis and process knowledge, the DHF currently in the Tank Car has been characterized as a RCRA corrosive hazardous waste (Waste Number D002). Samples of the DHF in the tank car were collected in December 1992 and analyzed for the eight metals regulated based on RCRA Toxicity Characteristic Leaching Procedure (TCLP). Sample analyses from December 1992 confirmed that the DHF in the tank car is not hazardous for RCRA TCLP metals (see attached copy of the December 1992 lab report). Since no organics were used in the process, testing for organic contamination was not required.

The period of operation discussed in the closure plan information and data included production uses prior to the storage of hazardous wastes in the Tank Car. During production, the HF tank car was used for storage of DHF used in the production process or sold to off-site buyers. The basis for the HWMU determination was storage of unusable DHF wastes that have been stored in the tank since October 1988. In June 1991, the HF tank car was declared a HWMU in the RCRA Part A permit application, Revision 11 as HWMU No. 38. The boundaries were based on the fact that the tank car has not been moved since wastes were placed in the tank car in October 1988.

Ohio EPA Specific Comments:

1. *Section 2.1, Page 5 - The closure plan describes the present location of the tank car and indicates its period of operation was approximately 15 years. Since the unit is mobile, provide information verifying that the tank car was always located at the same position on the track or indicate the boundaries of the hazardous waste management unit based upon its past movement(s). this information must be provided in accordance with OAC 3745-66-11.*

FEMP RESPONSE:

The period of operation discussed in the closure plan information and data included production uses prior to the storage of hazardous wastes in the Tank Car. Prior to October 1988, the HF Tank Car was used to batch shipments of DHF which were sold. Standing contracts were maintained for the sale of DHF. After the DHF was tested, approved, and sold the DHF was transferred to tank trucks for off-site transport. In October 1988, the DHF, currently in the tank car, was returned from a prospective buyer and placed in storage. Since that time, the DHF in the tank car has exceeded regulatory limits for speculative accumulation and ninety-day storage. As a result, the DHF has been declared a corrosive hazardous waste. In June 1991, the HF Tank Car was declared to be a hazardous waste management unit. The boundaries were based on the fact that the tank car has not been moved since the DHF wastes were placed in the tank car in October 1988.

2. *Section 2.2, Page 5 - Expand this section to provide justification that D002 is the only hazardous waste constituent of concern in the waste (refer to general comment). The plan does not indicate that an appropriate characterization for this waste stream has been done per DOE-FEMP's Waste Analysis Plan procedures. Enclosure A (Sampling and Analysis Plan) and other sections may require modification based upon DOE-FEMP's response to this comment. this information must be provided in accordance with OAC 3745-66-12(B)(1).*

FEMP RESPONSE:

The information discussed in response to the general comment is being incorporated into a revised Materials Evaluation Form (MEF) in accordance with the approved Waste Analyses and Waste Determination Plans.

3. *Section 3.2, Page 8, Item 2 - Following the neutralization process the resultant waste would be non-hazardous based upon the characterization of corrosivity; however, this section should identify the method of disposal. If DOE-FEMP intends to discharge the neutralized waste to the facility waste water treatment system, OEPA requests that this operation be conducted with an awareness of the facility NPDES permit limitation for pH. this disposal option is also dependent upon DOE-FEMP's response to comment #2.*

FEMP RESPONSE:

The FEMP agrees with the comment. Two alternatives are being considered: 1) on-site neutralization and treatment/disposal of non-hazardous waste water in the FEMP waste water treatment system and disposal of the precipitate as a non-RCRA low level radioactive waste and 2) neutralization and disposal at permitted/licensed, off-site, commercial treatment, storage and disposal facilities. If the final neutralization is conducted on-site, a review and any necessary testing of waste waters will be conducted to comply with the NPDES requirements. This is consistent with the statement referenced from the closure plan information and data in Item 2 (above). The statement says, "...the resulting non-hazardous wastes will be handled in accordance with approved procedures and in compliance with all applicable regulations and DOE Orders."

4. *Section 3.2, Page 8, Item 3 - The plan does not describe the procedures which will be used to remove the hazardous waste inventory from the tank car. Expand this section to describe the methods of waste removal (i.e. pumping operations) and identify equipment needed for this operation. the plan should include a detailed drawing of the tank car to include dimensions, other construction details and appurtenant structures. This information must be provided in accordance with OAC 3745-66-12(B)(3).*

FEMP RESPONSE:

The procedures which will be used to remove the hazardous waste inventory from the tank car, neutralize the wastes and clean the tank car will depend upon the alternative selected. The previous site standard operating procedure (SSOP) for removing DHF from the HF Tank Car is being reviewed and revised to ensure compliance with current requirements for removal of the hazardous waste. In addition, the necessary equipment, drawings, construction details and appurtenant structures will be identified in the revised closure plan information and data.

5. *Section 3.2, Page 8, Item 2 - The plan does not detail the methods and procedures to be used for neutralizing the waste. Please expand this description should include equipment, material and personnel needed, procedures to prevent hazards associated with recreation from improper neutralization and the type of vessel that will be utilized for the procedure. This information must be provided in accordance with OAC 3745-66-12(B)(3).*

FEMP RESPONSE:

See response to comment number 3. The specific equipment, material, personnel and procedures to prevent hazards associated with reactions from improper neutralization will be specified in the revised closure plan information and data.

6. *Section 3.2, Page 8, Item 3, Page 9, Item 6 - Identify the procedure that will be used for flushing the walls and bottom of the tank car and for rinsing the interior of the tank car (i.e. power rinse, etc.). This information must be provided in accordance with OAC 3745-66-12(B)(3) &(4).*

FEMP RESPONSE:

See response to comment number 3.

7. *Section 3.2, Page 9, Item 4 - Please describe the procedure that will be used to mechanically agitate the sludge remaining in the bottom of the tank car. This information must be provided in accordance with OAC 3745-66-12(B)(3)&(4).*

FEMP RESPONSE:

See response to comment number 3.

8. *Section 3.2, Page 9, Item 4 - Please identify the caustic material that will be used in the neutralization process and provide an example of the calculations used for pH adjustment. Also, please indicate whether initial bench-scale testing will be utilized to screen for possible reactions during the procedure. This information must be provided in accordance with OAC 3745-66-12(B)(3)&(4).*

FEMP RESPONSE:

See responses to comments number 3,4 and 5.

A bench-scale test for on-site neutralization has been conducted using a 2-stage process involving the reaction of nitric acid and calcium oxide to form calcium nitrate which is then reacted with the dilute hydrofluoric acid to precipitate calcium fluoride. Analyses of the aqueous and solid components are currently being conducted. A final neutralization procedure will be developed based upon a review of the analytical results and a technical review and safety assessment of the full-scale procedure based upon the bench-scale test procedures.

9. *Section 3.3.2, Page 10 - The soil sample locations do not take into consideration the chance that HF could have contaminated an area outside of the boundaries of the tank. Please expand the soil sampling to account for the area surrounding the tank car which would be subject to spills or leaks during routine loading or unloading operations. This information must be provided in accordance with OAC 3745-66-11.*

FEMP RESPONSE:

The soil samples referenced in the closure plan will be taken when the tank car is emptied and removed from the tracks to provide characterization of the soil contamination within the HWMU boundaries. In addition, the HF Tank Car is contiguous with the much larger HWMU identified as the Tank Farm Sump (identified as HWMU No. 11 in the June 1991 Part a Permit Application). During production, the tank farm was used for storage of hydrofluoric acids used in the Plant 4 process. Since there is no distinction between potential contamination from the Tank Farm Sump and the HF Tank Car, adjacent soils outside of the immediate HF Tank Car boundaries will be addressed in the clean-up/ closure of the Tank Farm Sump.

10. *Section 5.0, Page 15 - The closure schedule submitted includes a one hundred eighty day time period needed for "internal activities" before closure can begin. OAC 3745-66-13(B) states that the owner or operator shall complete partial and final closure activities in accordance with the approved closure plan within one hundred eighty days from approval. DOE-FEMP must remove the extra time period from the closure schedule or supply justification for the extension. The Ohio EPA would not normally consider internal administrative activities sufficient cause for an extension.*

FEMP RESPONSE:

The schedule provided was intended to represent an achievable schedule given the constraints placed on contractors at a DOE facility. The "internal administrative activities" referenced in the closure schedule are binding federal statutory and regulatory requirements for contractors at U.S. DOE facilities. As indicated in Section 5.0 of the closure plan information and data, it is expected that most of these requirements can be accomplished concurrently with the Ohio EPA review. However several items, such as contracting outside services, finalization of health and safety requirements, and project-specific employee training, cannot be completed until the final requirements are specified.

The revised CPID will include a schedule that shows closure activities to be completed within one hundred eighty days after approval, or an extended schedule along with a justification for the extension.

11\. *Section 4.1, Page A-13 - The first paragraph of this section describes the equipment decontamination process and includes the methods for determining if the cleaning process was effective. The last sentence of this paragraph is unclear. Please revise or explain the meaning of this statement. This information must be provided in accordance with OAC 3745-66-12(b)(4).*

FEMP RESPONSE:

The paragraph will be changed as follows (new wording is capitalized and old wording is struck out):

To prevent cross-contamination between samples and locations, only clean or decontaminated sampling equipment will be used. SAMPLING OF DECONTAMINATION RINSEATE WILL BE CONDUCTED TO CONFIRM EFFECTIVENESS AND IDENTIFY POSSIBLE CROSS-CONTAMINATION OF SAMPLES COLLECTED. AT A MINIMUM, ONE (1) SAMPLE OF FINAL SAMPLING EQUIPMENT DECONTAMINATION RINSEATE WILL BE COLLECTED FOR EACH DAY SAMPLING IS CONDUCTED OR FOR EVERY TWENTY SAMPLES COLLECTED PER SAMPLING EVENT, WHICHEVER IS GREATER. THE FINAL RINSEATE SAMPLES WILL BE ANALYZED FOR pH BY THE DESIGNATED ANALYTICAL LABORATORY USING SW-846 METHOD 9040. THE FOLLOWING PROCEDURE WILL BE USED TO COLLECT THE FINAL RINSEATE SAMPLES: ~~When sampling equipment is decontaminated following collection of a sample, a sample of the final rinseate will be collected and analyzed for pH by the FEMP analytical laboratory using SW-846 Method 9040. These samples will confirm that decontamination was effective. One (1) sample of final sampling equipment decontaminate rinseate will be collected for every twenty samples collected per sampling event, using the following procedure:~~

12\. *Section 4.1, Page A-14 - The last paragraph of the Field QA/QC Procedures section should indicate that a duplicate sample will be collected for each sampling event or once for every twenty samples collected. This information must be provided in accordance with OAC 3745-66-12(B)(4).*

FEMP RESPONSE:

In preparation of the sampling plan, it was assumed that less than twenty samples for each media being sampled would be collected during any given sampling event. The referenced frequency of sample duplicates is requirement of the FEMP Sitewide CERCLA Quality Assurance Project Plan (SCQ). The FEMP has already committed to following the SCQ in Section 1.0 INTRODUCTION of the sampling and analysis plan. To avoid confusion, the paragraph will be changed as follows (new wording is capitalized and old wording is struck out):

To evaluate the impact of field sampling activities on analytical precision (i.e., repeatability of results), field duplicate samples will be collected. One (1) duplicate sample of the decontamination verification rinseate will be collected for each sampling event OR FOR EACH TWENTY SAMPLES COLLECTED, WHICHEVER IS GREATER. ~~, and~~ One (1) duplicate sample of the soil underlying the unit will be collected for each sampling event OR FOR EACH TWENTY SAMPLES COLLECTED, WHICHEVER IS GREATER. If requested, additional duplicate samples will be collected for QC confirmation by an independent laboratory.

If you or your staff have any questions, please contact John M. Sattler at FTS/Commercial 513-738-8672.

Sincerely,

James J. Fiore
Acting Manager

FN:Sattler

Enclosure: As Stated

cc w/encl:

K. A. Hayes, EM-424 TREV
J. A. Saric, USEPA-Region V
P. Harris, OEPA-Dayton
R. Meyer, OEPA-Columbus
G. E. Mitchell, OEPA-Dayton
H. O'Connell, OEPA-Dayton
P. D. Pardi, OEPA-Dayton
AR Coordinator, FERMCO

cc w/o encl:

M. Mc Dermontt, DOJ
J. Van Kley, Ohio AGO
N. C. Kaufman, FERMCO/1
J. W. Thiesing, FERMCO/2
D. P. Dubois, FERMCO/65-2
P. F. Clay, FERMCO/19

Westinghouse Materials Co of Ohio
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 921203-069 Project: 0020 0001 Customer Sample ID: UHF-1
Customer: F&C. & WAREHOUSE Requisition Number: 2227
Date Sampled: 2-DEC-1992 Date Sample Received: 3-DEC-1992
Sampled By: D. ZAHNER Date Sample Completed: 10-DEC-1992
Material Description: HF RAILCAR DISPOSITION Charge Number: SGC00

Activ. Number	Procedure No.	Analysis	Result	Units	Data Entered By	QA File Number	Date Completed
[illegible]5620	1055	As - GFAA AnL INORG	1311	ug/L	LA WALLER	92WF134/FA164	8-DEC-19
[illegible]	1059	Hg - CVAA AnL INORG	<0.2	ug/L	JE REILMAN	92VW051MA 018	8-DEC-19
[illegible]6020	1060	Pb - GFAA AnL INORG	3.2	ug/L	MJ HARPER	92WF134/FB224	7-DEC-19
[illegible]6120	1061	Se - GFAA AnL INORG	<5.0	ug/L	MJ HARPER	92WF134/FB223	7-DEC-19
904320	9043	Ag - ICP AnL INORG	94.5	ug/L	GJ KUNZE	92WP171/P2217	8-DEC-19
	9043	Ba - ICP AnL INORG	13622	ug/L	GJ KUNZE	92WP171/P2217	8-DEC-19
	9043	Cd - ICP AnL INORG	26.5	ug/L	GJ KUNZE	92WP171/P2216	7-D[illegible]
	9043	Cr - ICP AnL INORG	690.1	ug/L	GJ KUNZE	92WP171/P2216	7-[illegible]

Westinghouse Materials Co of Ohio
Analytical Chemistry Department
Results of Analyses

AnaLIS ID: 921203-070 Project: 0020 0001 Customer Sample ID: UHF-2
Customer: F&C. & WAREHOUSE Requisition Number: 2227
Date Sampled: 2-DEC-1992 Date Sample Received: 3-DEC-1992
Sampled By: D. ZAHNER Date Sample Completed: 8-DEC-1992
Material Description: HF RAILCAR DISPOSITION Charge Number: SGC00

Activ. Number	Procedure No.	Analysis	Result	Units	Data Entered By	QA File Number	Date Complete
300220	3002	U - BrPADAP AnL	63	ppm	FL MILLER	BRENNAN	7-DEC-1
305920	3059	Total Th - Color. AnL	<45	ppm	JJ STOECKEL	MILLER/JJS	7-D[illegible]

000102

OhioEPA

State of Ohio Environmental Protection Agency

Southwest District Office
40 South Main Street
Dayton, Ohio 45402-2086
(513) 285-6357
FAX (513) 285-6404

George V. Voinovich
Governor

NORMA FOR RCRA FILE HF TANK CAR ENV. ENG SDS DEPT

G-2119 7222

DEC 30 11 39 AM '92

December 9, 1992

CERTIFIED MAIL

NOTICE OF DEFICIENCY

Mr. W.D. Adams
Acting Manager
Fernald Office
U.S. DOE-FEMP
P.O. Box 398705
Cincinnati, Ohio 45239-8705

RECORD COPY

RE: CLOSURE PLAN
U.S. DEPARTMENT OF ENERGY-FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
OH6 890 008 976
05-31-0681

Dear Mr. Adams:

On May 7, 1992 Ohio EPA received from U.S. Department of Energy-Fernald Environmental Management Project a closure plan for a tank car (hydrogen fluoride) used for storage of hazardous waste.

This closure plan was submitted pursuant to Rule 3745-66-12 of the Ohio Administrative Code (OAC) in order to demonstrate that U.S. Department of Energy-Fernald Environmental Management Project's proposal for closure complies with the requirements of OAC Rules 3745-66-11 and 3745-66-12.

The public will be given the opportunity to submit written comments regarding the plan in accordance with OAC Rule(s) 3745-66-12 and OAC 3745-66-18. The public comment period will extend from November 23, 1992 through December 25, 1992. Public comments will be considered by Ohio EPA.

Pursuant to OAC Rule(s) 3745-66-12(D)(4), I am providing you with a statement of deficiencies in the plan, as outlined within the attachment. Please take notice that OAC Rule 3745-66-12 requires that a modified closure plan addressing the deficiencies enumerated in the attachment be submitted to the Director for approval within thirty (30) days of your receipt of this letter.

000103

CONTROL NO.: 010002
SD NO.: SD-EES-C38-NOD-1001
REVISION: –
SUPERSEDES: –
ISSUE DATE: 12-9-92
REVISION DATE: –

The closure plan shall be modified in accordance with the following editorial protocal:

1. Old language is overstruck.
2. New language is capitalized.
3. Page headers should indicate date of submission.
4. If significant changes are necessary, pages should be renumbered, table of contents revised, and complete sections provided as required.

The modified closure plan should be submitted to: Ohio Environmental Protection Agency, Division of Hazardous Waste Management, ATTN: Mr. Tom Crepeau, Manager, Data Management Section, P.O. Box 1049, Columbus, Ohio 43266-0149. An additional copy should also be forwarded to: Ohio Environmental Protection Agency, SWDO, ATTN: Group Leader, DHWM, 40 South Main Street, Dayton, Ohio 45402.

Upon review of the re-submitted plan, I will prepare and issue a final action approving or modifying such plan. If you wish to arrange a meeting to discuss your responses to this Notice of Deficiency, please contact Harold O'Connell at (513) 285-6357.

Sincerely,

Donald R. Schregardus
Director

cc: Tom Crepeau, DHWM, Central File, Ohio EPA
Randy Meyer, CO, Ohio EPA
Harold O'Connell, SWDO, Ohio EPA

ATTACHMENT

DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
HYDROGEN FLUORIDE (HF) TANK CAR

OH6 890 008 976

General Comment:

The closure plan indicates that pH is the only contaminant of concern. DOE-FEMP must provide additional justification for the use of this single analyte as a means of ensuring clean closure. Specifically, Ohio EPA requires further information regarding characterization of the contents of the tank car through either process knowledge or analytical methods.

Specific Comments:

1. Section 2.1, Page 5 - The closure plan describes the present location of the tank car and indicates its period of operation was approximately 15 years. Since the unit is mobile, provide information verifying that the tank car was always located at the same position on the track or indicate the boundaries of the hazardous waste management unit based upon its past movement(s). This information must be provided in accordance with OAC 3745-66-11.

2. Section 2.2, Page 5 - Expand this section to provide justification that D002 is the only hazardous waste constituent of concern in the waste (refer to general comment). The plan does not indicate that an appropriate characterization for this waste stream has been done per DOE-FEMP's Waste Analysis Plan procedures. Attachment A (Sampling and Analysis Plan) and other sections may require modification based upon DOE-FEMP's response to this comment. This information must be provided in accordance with OAC 3745-66-12(B)(1).

3. Section 3.2, Page 8, Item 2 - Following the neutralization process the resultant waste would be non-hazardous based upon the characteristic of corrosivity; however, this section should identify the method of disposal. If DOE-FEMP intends to discharge the neutralized waste to the facility waste water treatment system, Ohio EPA requests that this operation be conducted with an awareness of the facility NPDES permit limitation for pH. This disposal option is also dependent upon DOE-FEMP's response to comment #2.

4. Section 3.2, Page 8, Item 2 - The plan does not describe the procedures which will be used to remove the hazardous waste inventory from the tank car. Expand this section to describe the methods for waste removal (ie. pumping operations) and identify equipment needed for this operation. The plan should include a detailed drawing of the tank car to include dimensions, other construction details and appurtenant structures. This information must be provided in accordance with OAC 3745-66-12(B)(3).

5. Section 3.2, Page 8, Item 2 - The plan does not detail the methods and procedures to be used for neutralizing the waste. Please expand this section to provide a more complete description of this process. The description should include equipment, material and personnel needed, procedures to prevent hazards associated with reactions from improper neutralization and the type of vessel that will be utilized for the procedure. This information must be provided in accordance with OAC 3745-66-12(B)(3).

6. Section 3.2, Page 8, Item 3, Page 9, Item 6 - Identify the procedures to be used for flushing the walls and bottom of the tank car and for rinsing the interior of the tank car (ie. power rinse, etc.). This information must be provided in accordance with OAC 3745-66-12(B)(3)(4).

7. Section 3.2, Page 9, Item 4 - Please describe the procedure that will be used to mechanically agitate the sludge remaining in the bottom of the tank car. This information must be provided in accordance with OAC 3745-66-12(B)(3)&(4).

8. Section 3.2, Page 9, Item 4 - Please identify the caustic material that will be used in the neutralization process and provide an example of the calculations used for pH adjustment. Also, please indicate whether initial bench scale testing will be utilized to screen for possible reactions during the procedure. This information must be provided in accordance with OAC 3745-66-12(B)(3)&(4).

9. Section 3.3.2, Page 10 - The soil sample locations do not take into consideration the chance that HF could have contaminated an area outside of the boundaries of the tank. Please expand the soil sampling to account for the area surrounding the tank car which would be subject to spills or leaks during routine loading or unloading operations. This information must be provided in accordance with OAC 3745-66-11.

10. Section 5.0, Page 15 - The closure schedule submitted includes an one hundred eighty day time period needed for "internal activities" before closure can begin. OAC 3745-66-13(B) states that the owner or operator shall complete partial and final closure activities in accordance with the approved closure plan within one hundred eighty days after approval. DOE-FEMP must remove the extra time period from the closure schedule or supply justification for the extension. The Ohio EPA would not normally consider internal administrative activities sufficient cause for an extension.

11. Section 4.1, Page A-13 - The first paragraph of this section describes the equipment decontamination process and includes the methods for determining if the cleaning process was effective. The last sentence of this paragraph is unclear. Please revise or explain the meaning of this statement. This information must be provided in accordance with OAC 3745-66-12(B)(4).

12. Section 4.1, Page A-14 - The last paragraph of the Field QA/QC Procedures section should indicate that a duplicate sample will be collected for each sampling event or once for every twenty samples collected. This information must be provided in accordance with OAC 3745-66-12(B)(4).

COPY - AL
RICK
DON
ROBERT
JOHN
RCRA FILES

ENV. ENG. SDS DEPT

MAY 13 2 24 PM '92

Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
Cincinnati, Ohio 45239-8705
(513) 738-6357

MAY 07 1992

DOE-1519-92

RECORD COPY

Donald R. Schregardus, Director
Ohio Environmental Protection Agency
P. O. Box 1049
1800 WaterMark Drive
Columbus, Ohio 43266-1049

Dear Mr. Schregardus:

TRANSMITTAL OF CLOSURE PLAN INFORMATION AND DATA FOR THE HYDROGEN FLUORIDE (HF) TANK CAR

Enclosed is a copy of the Closure Plan Information and Data for the HF Tank Car Hazardous Waste Management Unit (HWMU) at the DOE Fernald Environmental Management Project (FEMP), in Fernald, Ohio. This document is submitted to fulfill the requirements of Section II of the Proposed Amended Consent Decree (PACD) between the State of Ohio and Department of Energy (DOE), et. al. (CIVIL NO. C-1-86-0217). In Section II, paragraph 3.12 of the PACD, DOE is required to submit a schedule that identifies projected activities for newly identified HWMUs. The schedule, which sets forth timetables for the submittal of closure plans, was submitted to the Ohio Environmental Protection Agency (Ohio EPA) on August 27, 1991. This Closure Plan Information and Data for the HF Tank Car satisfies one of the commitments in the schedule for submittal of a closure plan to close the unit.

This Closure Plan Information and Data provides for clean closure under the Resource Conservation and Recovery Act (RCRA), and does not expect remedial response activities to be required for the unit. In the event that soil sampling detects contamination from RCRA hazardous waste constituents, revised closure plan information and data, along with a revised schedule, will be submitted to the Ohio EPA. Any remediation required at the unit will be integrated with response or remedial activities scheduled under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) at the FEMP site.

Ohio EPA approval of the enclosed document is requested. If there are any questions regarding this closure plan information and data, please contact David Rast at (513) 738-6322.

Sincerely,

R.E. Tiller

R. E. Tiller
Manager

FN:Rast **000108**

Enclosure: As Stated

CONTROL NO.: 010002
SD NO.: SD-EES-C38-CPT-1000
REVISION: —
SUPERSEDES: —
ISSUE DATE: 5-7-92
REVISION DATE: —

cc w/enc.:

J. A. Saric, USEPA-V, 5HRE-8J
G. E. Mitchell, OEPA-Dayton
P. D. Pardi, OEPA-Dayton
AR Coordinator, WEMCO

cc w/o enc.:

L. S. Farmer, WEMCO
V. A. Franklin, WEMCO
K. C. Gessendorf, WEMCO
J. E. Harmon, WEMCO
J. P. Hopper, WEMCO
V. L. Murray, WEMCO
M. W. Salisbury, WEMCO
E. D. Savage, WEMCO
R. S. Shirley, WEMCO
K. A. Solomon, WEMCO

ATTACHMENT B

LABORATORY ANALYTICAL RESULTS

DATE 02-AUG-95 SUMMARY REPORT
TIME 09:37:18

SE NUMBER : 1000007571
CT NAME : HF TANK CAR

LAB	SAMPLE ID	USER SAMPLE ID	SAMPLE POINT	SUFFIX	COMPONENT	RESULT	UNITS	LQ	DATE SAMPLED	DATE TASK PERFORMED	ASL
INORGANICS-EPM	200167390	014551/TNK-1	TANK CAR 1		PH	3.77	pH Un		14-JUL-95	14-JUL-95	B
INORGANICS-EPM	200167391	014550/TNK-1D	TANK CAR 1		PH	3.71	pH Un		14-JUL-95	14-JUL-95	B

****

Your Selection Criteria Was:
Release Number: % Component: % Submission ID: % Project Name: HF TANK CAR
From Received Date: % Display Text? N

000112

Form Number: SPL-95-1997

FEMP
RSO ANALYTICAL

SITE-WIDE ANALYSIS REQUEST/CUSTODY RECORD

Page 1 of 1

PROJECT: UF TANK CAR RINSE

☐ PLAN NO.: NA OR ☐ PROJECT NO.: NA

PROJECT MANAGER/ENGINEER: JOHN LIPPITT

SAMPLER: John Miller PHONE: 4458

CHARGE NUMBER: 3B54 ✓ LOT MARKING CODE: 2022031

SAMPLER SIGNATURE(S): John Miller

SEND RESULTS TO: DON LUKEN 52-3

FOR SAMPLE RELATED PROBLEMS, CONTACT:

ORGANIZATION: CRU3

NAME: MIKE HEINEN PHONE: 4047

SAMPLER REMARKS:

*NOTE - Expedited TOT for pH.

1000007571

CHECK FOR: ☐ S R LAB ☐ BIO LAB ☐ WTP LAB

SAMPLE SOURCE, DESCRIPTION/IDENTIFICATION, ANALYSIS REGIMEN

ITEM NO.	SAMPLE NUMBER	CUSTOMER NUMBER	SAMPLE POINT	MATRIX CODE	COLLECTED DATE	COLLECTED TIME	CONTAINER/ VOLUME	COMPOSITE	GRAB	NO. OF CONTAINERS	ANALYTES CODE - (UNITS CODE): 435 P00 2000	REMARKS
1	~~200167390~~ 014551	TNK-1	TANK CAR 1	M300	7/14/95	1130	4 OZ.		✓	1	✓	
2	~~200167391~~ 014550	TNK-1D	TANK CAR 1	M300	7/14/95	1130	4 oz.		✓	1	✓	
3												
4												
5												
6												
7												
8												
9												
10												

1000026542

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
PROCESS ALL	John Miller	[signature]	7-14-95	1210

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME

NO.	DISTRIBUTION OF COPIES
1	LABORATORY
2	REQUESTER
3	SAMPLER

FS-F-3361 (REV. 3/

[illegible]ASE NUMBER : 1000007549
[illegible]CT NAME : SPL

LAB	SAMPLE ID	USER SAMPLE ID	SAMPLE POINT	SUFFIX	COMPONENT	RESULT	UNITS	LQ	DATE SAMPLED	DATE TASK PERFORMED	ASL
RADIOCHEMICAL	200166504	DR-1	TNK 1		ALPHA	390	pCi/g		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166504	DR-1	TNK 1		ALPHA-LBC	YES	YES/N		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166504	DR-1	TNK 1		ALPHA-LCE	11	2 sig		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166504	DR-1	TNK 1		ALPHA-LMDC	0.88	pCi/g		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166504	DR-1	TNK 1		ALPHA-LTPU	79	2 sig		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166504	DR-1	TNK 1		BETA	360	pCi/g		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166504	DR-1	TNK 1		BETA-LBC	YES	YES/N		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166504	DR-1	TNK 1		BETA-LCE	8	2 sig		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166504	DR-1	TNK 1		BETA-LMDC	1.4	pCi/g		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166504	DR-1	TNK 1		BETA-LTPU	72	2 sig		12-JUL-95	25-JUL-95	B
INORGANICS-EPM	200166504	DR-1	TNK 1		PH	5.52	pH Un		12-JUL-95	12-JUL-95	B
INORGANICS-EPM	200166504	DR-1	TNK 1		THORIUM	1.0	mg/L		12-JUL-95	25-JUL-95	B
INORGANICS-EPM	200166504	DR-1	TNK 1		URANIUM	0.82	g/L		12-JUL-95	16-JUL-95	B
MASS SPECTROSCO	200166504	DR-1	TNK 1		URANIUM 235	0.8458	APPRO		12-JUL-95	14-JUL-95	B
MASS SPECTROSCO	200166504	DR-1	TNK 1		URANIUM 235-LBC		YES/N		12-JUL-95	14-JUL-95	B
MASS SPECTROSCO	200166504	DR-1	TNK 1		URANIUM 235-LCE		2 sig		12-JUL-95	14-JUL-95	B
MASS SPECTROSCO	200166504	DR-1	TNK 1		URANIUM 235-LMD		APPRO		12-JUL-95	14-JUL-95	B
MASS SPECTROSCO	200166504	DR-1	TNK 1		URANIUM 235-LTP		2 sig		12-JUL-95	14-JUL-95	B
RADIOCHEMICAL	200166505	DR-1D	TNK 1		ALPHA	1400	pCi/g		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166505	DR-1D	TNK 1		ALPHA-LBC	YES	YES/N		12-JUL-95	25-JUL-95	B
[illegible]OCHEMICAL	200166505	DR-1D	TNK 1		ALPHA-LCE	20	2 sig		12-JUL-95	25-JUL-95	B
[illegible]OCHEMICAL	200166505	DR-1D	TNK 1		ALPHA-LMDC	0.83	pCi/g		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166505	DR-1D	TNK 1		ALPHA-LTPU	270	2 sig		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166505	DR-1D	TNK 1		BETA	1300	pCi/g		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166505	DR-1D	TNK 1		BETA-LBC	YES	YES/N		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166505	DR-1D	TNK 1		BETA-LCE	15	2 sig		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166505	DR-1D	TNK 1		BETA-LMDC	1.4	pCi/g		12-JUL-95	25-JUL-95	B
RADIOCHEMICAL	200166505	DR-1D	TNK 1		BETA-LTPU	250	2 sig		12-JUL-95	25-JUL-95	B
INORGANICS-EPM	200166505	DR-1D	TNK 1		PH	4.64	pH Un		12-JUL-95	12-JUL-95	B
INORGANICS-EPM	200166505	DR-1D	TNK 1		THORIUM	2.8	mg/L		12-JUL-95	25-JUL-95	B
INORGANICS-EPM	200166505	DR-1D	TNK 1		URANIUM	2.01	g/L		12-JUL-95	16-JUL-95	B
MASS SPECTROSCO	200166505	DR-1D	TNK 1		URANIUM 235	0.897	APPRO		12-JUL-95	14-JUL-95	B
MASS SPECTROSCO	200166505	DR-1D	TNK 1		URANIUM 235-LBC		YES/N		12-JUL-95	14-JUL-95	B
MASS SPECTROSCO	200166505	DR-1D	TNK 1		URANIUM 235-LCE		2 sig		12-JUL-95	14-JUL-95	B
MASS SPECTROSCO	200166505	DR-1D	TNK 1		URANIUM 235-LMD		APPRO		12-JUL-95	14-JUL-95	B
MASS SPECTROSCO	200166505	DR-1D	TNK 1		URANIUM 235-LTP		2 sig		12-JUL-95	14-JUL-95	B

36 RECORDS PRINTED

END OF REPORT

****

Your Selection Criteria Was:
Release Number: 1000007549 Component: % Submission ID: % Project Name: %
From Received Date: % Display Text? N

Form Number: SPL-95-1963

Page 1 of 1

FEMP
RSO - ANALYTICAL

SITE-WIDE ANALYSIS REQUEST/CUSTODY RECORD

00011

PROJECT: 4E ~~TANK CAR~~ Dumpster RINSE SAMPLING

☐ PLAN NO.: OR ☐ PROJECT NO.:

PROJECT MANAGER/ENGINEER: John Lippitt

SAMPLER: Charles Abrams PHONE: x 4458

CHARGE NUMBER: 3BSU4 LOT MARKING CODE: n/a

SAMPLER SIGNATURE(S): Charles Abrams

SEND RESULTS TO: DON LUKEN MS 52-3

FOR SAMPLE RELATED PROBLEMS, CONTACT:
ORGANIZATION:
NAME: Mike Heimen PHONE: 4047

SAMPLER REMARKS: LUUD 7549

*Gross α, β, Tot. U, Tot Th added due to unexpected counts on rinse. U-235 Approx weight.

CHECK FOR: ☐ S R LAB ☐ BIO LAB ☐ WTP LAB

SAMPLE SOURCE, DESCRIPTION/IDENTIFICATION, ANALYSIS REGIMEN

ITEM NO.		CUSTOMER NUMBER	SAMPLE POINT	MATRIX CODE	COLLECTED DATE	COLLECTED TIME	CONTAINER/ VOLUME	COMPOSITE	GRAB	NO. OF CONTAINERS	U-235 P00 2000	U-11 P00 2441/2445	LOZ P?? 2442	LOBL P00 2002	LO2 P00 2027									REMARKS
1		DR-1	TNK1	M300	7/12/95	1500	4 oz.		✓	1	✓	✓	✓	✓	✓									Expedited TOT pH
2		DR-1D	TNK1	M300	7/12/95	1508	4 oz.		✓	1	✓	✓	✓	✓	✓									DUPLICATE, Expedited TOT pH
3		NOTHING BELOW THIS LINE																						
4																								
5																								
6																								
7																								
8																								
9																								
10																								

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
	Charles Abrams	[illegible]	7-12-95	1500
	John M. Lippitt	[illegible]	7-12-95	1525
	[illegible]	Michael Moy	7-12-95	1531

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME

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1	LABORATORY
2	REQUESTER
3	SAMPLER

FS-F-3361 (REV. 3/25/...)

DATE 02-AUG-95 SUMMARY REPORT PAGE 3
TIME 09:37:18

CASE NUMBER : 1000007645
ECT NAME : HF TANK CAR

LAB	SAMPLE ID	USER SAMPLE ID	SAMPLE POINT	SUFFIX	COMPONENT	RESULT	UNITS	LQ	DATE SAMPLED	DATE TASK PERFORMED	ASL
INORGANICS-EPM	200168353	TNK-3	TANK CAR 2		FLUORIDE	763	mg/L		20-JUL-95	26-JUL-95	B
INORGANICS-EPM	200168353	TNK-3	TANK CAR 2		HYDROGEN IONS	0.04	N		20-JUL-95	26-JUL-95	B
INORGANICS-EPM	200168353	TNK-3	TANK CAR 2		PH	2.42	pH Un		20-JUL-95	20-JUL-95	B
INORGANICS-EPM	200168354	TNK-3D	TANK CAR 2		FLUORIDE	759	mg/L		20-JUL-95	26-JUL-95	B
INORGANICS-EPM	200168354	TNK-3D	TANK CAR 2		HYDROGEN IONS	0.04	N		20-JUL-95	26-JUL-95	B
INORGANICS-EPM	200168354	TNK-3D	TANK CAR 2		PH	2.41	pH Un		20-JUL-95	20-JUL-95	B

****

Your Selection Criteria Was:
Release Number: % Component: % Submission ID: % Project Name: HF TANK CAR
From Received Date: % Display Text? N

FEMP

RSO - ANALYTICAL

SITE-WIDE ANALYSIS REQUEST/CUSTODY RECORD

Form Number: SPL - 95 - 2064

Page 1 of 1

000116

PROJECT: HF TANK CAR RINSEATE SAMPLING

☐ PLAN NO.: OR ☐ PROJECT NO.:

PROJECT MANAGER/ENGINEER: JOHN LIPPITT

SAMPLER: John Miller PHONE: 4448

CHARGE NUMBER: 3BSU4 LOT MARKING CODE:

SAMPLER SIGNATURE(S): John Miller

SEND RESULTS TO: DON LUKEN, MIKE HEINEN MS52-3

FOR SAMPLE RELATED PROBLEMS, CONTACT:

ORGANIZATION: CRU 3

NAME: Mike Heinen PHONE: 4047

SAMPLER REMARKS:

10000007645

1063 = Normality

CHECK FOR: ☐ S R LAB ☐ BIO LAB ☐ WTP LAB

SAMPLE SOURCE, DESCRIPTION/IDENTIFICATION, ANALYSIS REGIMEN

ITEM NO.	SAMPLE NUMBER	CUSTOMER NUMBER	SAMPLE POINT	MATRIX CODE	COLLECTED DATE	COLLECTED TIME	CONTAINER/VOLUME	COMPOSITE	GRAB	NO. OF CONTAINERS	402 1017 (P00)	1063 (P00)	U35 2000 (P00)											REMARKS
1	20016835B 013367	TNK-1	Tank Car 2	M300	7/20/95	0730	4 oz.		✓	1	✓	✓	✓											Expedite TOT on pH
2	20016835A 013368	TNK-2D	Tank Car 2	M300	7/20/95	0730	4 oz.		✓	1	✓	✓	✓											
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME	ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
2-2	John Miller	D. Earley	7-20-95	0855					

NO.	DISTRIBUTION OF COPIES
1	LABORATORY
2	REQUESTER
3	SAMPLER

FS-F-3361 (REV :

000116

7222

ASE NUMBER : 1000007680
ECT NAME : HF TANK CAR

LAB	SAMPLE ID	USER SAMPLE ID	SAMPLE POINT	SUFFIX	COMPONENT	RESULT	UNITS	LQ	DATE SAMPLED	DATE TASK PERFORMED	ASL
INORGANICS-EPM	200168822	013366/TNK-4	TANK CAR 2		PH	3.95	pH Un		21-JUL-95	21-JUL-95	B
INORGANICS-EPM	200168823	013367/TNK-4D	TANK CAR 2		PH	3.83	pH Un		21-JUL-95	21-JUL-95	B
INORGANICS-EPM	200168824	013364/TNK-1	HF TRANSFER LI		PH	2.54	pH Un		21-JUL-95	21-JUL-95	B
INORGANICS-EPM	200168825	013365/TNK-1D	HF TRANSFER LI		PH	2.65	pH Un		21-JUL-95	21-JUL-95	B

18 RECORDS PRINTED

END OF REPORT

****

Your Selection Criteria Was:
Release Number: % Component: % Submission ID: % Project Name: HF TANK CAR
From Received Date: % Display Text? N

000118

FEMP
RSO - ANALYTICAL
SITE-WIDE ANALYSIS REQUEST/CUSTODY RECORD

Form No.: SPL - 95 - 2083

Page 1 of 1

PROJECT: HF TANKCAR RINSEATE SAMPLING

☐ PROJECT NO.: OR ☐ PROJECT NO.:

PROJECT MANAGER/ENGINEER: JOHN LIPPITT

SAMPLER: DOUG QUESTA PHONE: 2145 8

CHARGE NUMBER: 3BS44 LOT MARKING CODE:

SAMPLER SIGNATURE(S): Doug Questa

SEND RESULTS TO: DON AIKEN, MIKE HEINEN MS 52-3

FOR SAMPLE RELATED PROBLEMS, CONTACT:

ORGANIZATION: CRU 3

NAME: MIKE HEINEN PHONE: 4047

SAMPLER REMARKS:

7680
Release 10000~~2083~~ 07/21/95
ASLB

CHECK FOR: ☐ S R LAB ☐ BIO LAB ☐ WTP LAB

SAMPLE SOURCE, DESCRIPTION/IDENTIFICATION, ANALYSIS REGIMEN

ITEM NO.	SAMPLE NUMBER	CUSTOMER NUMBER	SAMPLE POINT	MATRIX CODE	COLLECTED DATE	COLLECTED TIME	CONTAINER/VOLUME	COMPOSITE	GRAB	NO. OF CONTAINERS	ANALYTES CODE - (UNITS CODE) 435 2000	REMARKS
1	~~20016882~~ ~~013366~~	013366 TNK-4	TANKCAR 2	M300	7-21-95	0950	4 oz.		✓	1	✓	Expedited TOT on pH
2	20016882 ~~013367~~	013367 TNK-4D	TANKCAR 2	M300	7-21-95	0950	4 oz		✓	1	✓	
3												
4												
5												
6												
7												
8												
9												
10												

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
013366	Doug Questa	Mike Heinen	7-21-95	
013367	Doug Questa	Mike Heinen	7-21-95	
1+2	Mike Heinen	Jenny Vance	07/21/95	1015

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME

NO.	DISTRIBUTION OF COPIES
1	LABORATORY
2	REQUESTER
3	SAMPLER

FS-F-3361 (REV. 3

10000 2083

F[illegible]
RSO - ANALYTICAL

SITE-WIDE ANALYSIS REQUEST/CUSTODY RECORD

Form Number: SPL - [illegible] - 2093

Page 1 of 1

PROJECT: HF TANK CAR RINSEATE SAMPLING

☐ **PLAN NO.:** N/A **OR** ☐ **PROJECT NO.:** N/A

PROJECT MANAGER/ENGINEER: John M. Lippitt

SAMPLER: Doug Questa **PHONE:** 4458

CHARGE NUMBER: 3BSU5 **LOT MARKING CODE:** N/A

SAMPLER SIGNATURE(S): Douglas A Questa

SEND RESULTS TO: Don Lukken, John Lippitt MS52-3

Rel # 1-00007680

FOR SAMPLE RELATED PROBLEMS, CONTACT:

ORGANIZATION: CRU3

NAME: JOHN LIPPITT **PHONE:** (920-3129) X 4052

SAMPLER REMARKS:

CHECK FOR: ☒ S R LAB ☐ BIO LAB ☐ WTP LAB

SAMPLE SOURCE, DESCRIPTION/IDENTIFICATION, ANALYSIS REGIMEN

ITEM NO.	SAMPLE NUMBER	CUSTOMER NUMBER	SAMPLE POINT	MATRIX CODE	COLLECTED DATE	COLLECTED TIME	CONTAINER/ VOLUME	COMPOSITE	GRAB	NO. OF CONTAINERS	ANALYTES CODE - (UNITS CODE): 200 U35 LAB	REMARKS
1	~~200168824~~ 013364	N-TNK-1	HF Transfer line	M300	7/21/95	14:05	4 oz		✓	1	✓	
2	~~200168825~~ 013365	N-TNK-1	HF Transfer line	M300	7/21/95	14:05	4 oz		✓	1	✓	
3												
4												
5												
6												
7												
8												
9												
10												

10000 268803

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
2 [illegible]	Doug Questa	John M. Lippitt	7/21/95	14:30
	John Lippitt	M. McConnell	7/21/95	14:53

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME

NO.	DISTRIBUTION OF COPIES
1	LABORATORY
2	REQUESTER
3	SAMPLER

000119

7222

FS-F-33[illegible] (REV. 3/25/93)

RELEASE NUMBER : 1000007806
PROJECT NAME : 95-1003 HF TANK CAR NEUTRALIZATION

LAB	SAMPLE ID	USER SAMPLE ID	SAMPLE POINT	SUFFIX	COMPONENT	RESULT	UNITS	LQ	DATE SAMPLED	DATE TASK PERFORMED	ASL
INORGANICS-AA/I	200170233	95-1003-1	W300955/W050-8		ARSENIC	0.010	mg/L	U	31-JUL-95	07-AUG-95	B
INORGANICS-AA/I	200170233	95-1003-1	W300955/W050-8		BARIUM	0.231	mg/L		31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170233	95-1003-1	W300955/W050-8		CADMIUM	0.010	mg/L		31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170233	95-1003-1	W300955/W050-8		CHROMIUM	0.010	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170233	95-1003-1	W300955/W050-8		LEAD	0.021	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170233	95-1003-1	W300955/W050-8		MERCURY	.0002	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170233	95-1003-1	W300955/W050-8		SELENIUM	0.010	mg/L		31-JUL-95	09-AUG-95	B
INORGANICS-AA/I	200170233	95-1003-1	W300955/W050-8		SILVER	0.010	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-EPM	200170234	95-1003-1	W300955/W050-8		LIQUIDS	ABSENT	PRESE		31-JUL-95	23-AUG-95	B
INORGANICS-EPM	200170234	95-1003-1	W300955/W050-8		MOISTURE	51.82	wt %		31-JUL-95	15-AUG-95	B
INORGANICS-EPM	200170234	95-1003-1	W300955/W050-8		URANIUM	110	ppm		31-JUL-95	08-AUG-95	B
MASS SPECTROSCO	200170235	95-1003-1	W300955/W050-8		URANIUM 235	0.653	WT %		31-JUL-95	18-AUG-95	B
MASS SPECTROSCO	200170235	95-1003-1	W300955/W050-8		URANIUM 235-LBC	YES	YES/N		31-JUL-95	18-AUG-95	B
MASS SPECTROSCO	200170235	95-1003-1	W300955/W050-8		URANIUM 235-LCE		2 sig		31-JUL-95	18-AUG-95	B
MASS SPECTROSCO	200170235	95-1003-1	W300955/W050-8		URANIUM 235-LMD		pCi/m		31-JUL-95	18-AUG-95	B
MASS SPECTROSCO	200170235	95-1003-1	W300955/W050-8		URANIUM 235-LTP		2 sig		31-JUL-95	18-AUG-95	B
INORGANICS-AA/I	200170236	95-1003-2	W300955/W050-8		ARSENIC	0.010	mg/L	U	31-JUL-95	07-AUG-95	B
INORGANICS-AA/I	200170236	95-1003-2	W300955/W050-8		BARIUM	0.221	mg/L		31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170236	95-1003-2	W300955/W050-8		CADMIUM	0.012	mg/L		31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170236	95-1003-2	W300955/W050-8		CHROMIUM	0.027	mg/L		31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170236	95-1003-2	W300955/W050-8		LEAD	0.087	mg/L		31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170236	95-1003-2	W300955/W050-8		MERCURY	.0002	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170236	95-1003-2	W300955/W050-8		SELENIUM	0.017	mg/L		31-JUL-95	09-AUG-95	B
INORGANICS-AA/I	200170236	95-1003-2	W300955/W050-8		SILVER	0.019	mg/L		31-JUL-95	08-AUG-95	B
INORGANICS-EPM	200170237	95-1003-2	W300955/W050-8		LIQUIDS	ABSENT	PRESE		31-JUL-95	23-AUG-95	B
INORGANICS-EPM	200170237	95-1003-2	W300955/W050-8		MOISTURE	52.66	wt %		31-JUL-95	15-AUG-95	B
INORGANICS-EPM	200170237	95-1003-2	W300955/W050-8		URANIUM	120	ppm		31-JUL-95	08-AUG-95	B
MASS SPECTROSCO	200170238	95-1003-2	W300955/W050-8		URANIUM 235	0.651	WT %		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170238	95-1003-2	W300955/W050-8		URANIUM 235-LBC		YES/N		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170238	95-1003-2	W300955/W050-8		URANIUM 235-LCE		2 sig		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170238	95-1003-2	W300955/W050-8		URANIUM 235-LMD		WT %		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170238	95-1003-2	W300955/W050-8		URANIUM 235-LTP		2 sig		31-JUL-95	15-AUG-95	B
INORGANICS-AA/I	200170239	95-1003-3	W300965/W050-8		ARSENIC	0.010	mg/L	U	31-JUL-95	07-AUG-95	B
INORGANICS-AA/I	200170239	95-1003-3	W300965/W050-8		BARIUM	0.515	mg/L		31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170239	95-1003-3	W300965/W050-8		CADMIUM	0.005	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170239	95-1003-3	W300965/W050-8		CHROMIUM	0.010	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170239	95-1003-3	W300965/W050-8		LEAD	0.021	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170239	95-1003-3	W300965/W050-8		MERCURY	.0002	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170239	95-1003-3	W300965/W050-8		SELENIUM	0.015	mg/L		31-JUL-95	09-AUG-95	B
INORGANICS-AA/I	200170239	95-1003-3	W300965/W050-8		SILVER	0.010	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-EPM	200170240	95-1003-3	W300965/W050-8		LIQUIDS	ABSENT	PRESE		31-JUL-95	23-AUG-95	B
INORGANICS-EPM	200170240	95-1003-3	W300965/W050-8		MOISTURE	49.16	wt %		31-JUL-95	15-AUG-95	B
INORGANICS-EPM	200170240	95-1003-3	W300965/W050-8		URANIUM	80	ppm		31-JUL-95	08-AUG-95	B
MASS SPECTROSCO	200170241	95-1003-3	W300965/W050-8		URANIUM 235	0.780	WT %		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170241	95-1003-3	W300965/W050-8		URANIUM 235-LBC		YES/N		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170241	95-1003-3	W300965/W050-8		URANIUM 235-LCE		2 sig		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170241	95-1003-3	W300965/W050-8		URANIUM 235-LMD		WT %		31-JUL-95	15-AUG-95	B

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Your Selection Criteria
Release Number: 1000007806 Component: % Submission ID: % Project Name: %
From Received Date: % Display Text? N

RELEASE NUMBER : 1000007806
PROJECT NAME : 95-1003 HF TANK CAR NEUTRALIZATION

LAB	SAMPLE ID	USER SAMPLE ID	SAMPLE POINT	SUFFIX	COMPONENT	RESULT	UNITS	LQ	DATE SAMPLED	DATE TASK PERFORMED	ASL
MASS SPECTROSCO	200170241	95-1003-3	W300965/W050-8		URANIUM 235-LTP		2 sig		31-JUL-95	15-AUG-95	B
INORGANICS-AA/I	200170242	95-1003-4	W301063/W050-8		ARSENIC	0.010	mg/L	U	31-JUL-95	07-AUG-95	B
INORGANICS-AA/I	200170242	95-1003-4	W301063/W050-8		BARIUM	0.554	mg/L		31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170242	95-1003-4	W301063/W050-8		CADMIUM	0.005	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170242	95-1003-4	W301063/W050-8		CHROMIUM	0.010	mg/L		31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170242	95-1003-4	W301063/W050-8		LEAD	0.032	mg/L		31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170242	95-1003-4	W301063/W050-8		MERCURY	.0002	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170242	95-1003-4	W301063/W050-8		SELENIUM	0.015	mg/L		31-JUL-95	09-AUG-95	B
INORGANICS-AA/I	200170242	95-1003-4	W301063/W050-8		SILVER	0.010	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-EPM	200170243	95-1003-4	W301063/W050-8		LIQUIDS	ABSENT	PRESE		31-JUL-95	23-AUG-95	B
INORGANICS-EPM	200170243	95-1003-4	W301063/W050-8		MOISTURE	49.18	wt %		31-JUL-95	15-AUG-95	B
INORGANICS-EPM	200170243	95-1003-4	W301063/W050-8		URANIUM	80	ppm		31-JUL-95	08-AUG-95	B
MASS SPECTROSCO	200170244	95-1003-4	W301063/W050-8		URANIUM 235	0.828	WT %		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170244	95-1003-4	W301063/W050-8		URANIUM 235-LBC		YES/N		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170244	95-1003-4	W301063/W050-8		URANIUM 235-LCE		2 sig		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170244	95-1003-4	W301063/W050-8		URANIUM 235-LMD		WT %		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170244	95-1003-4	W301063/W050-8		URANIUM 235-LTP		2 sig		31-JUL-95	15-AUG-95	B
INORGANICS-AA/I	200170245	95-1003-5	W301207/W050-8		ARSENIC	0.010	mg/L	U	31-JUL-95	07-AUG-95	B
INORGANICS-AA/I	200170245	95-1003-5	W301207/W050-8		BARIUM	0.200	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170245	95-1003-5	W301207/W050-8		CADMIUM	0.005	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170245	95-1003-5	W301207/W050-8		CHROMIUM	0.010	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170245	95-1003-5	W301207/W050-8		LEAD	0.021	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170245	95-1003-5	W301207/W050-8		MERCURY	.0002	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170245	95-1003-5	W301207/W050-8		SELENIUM	0.010	mg/L	U	31-JUL-95	09-AUG-95	B
INORGANICS-AA/I	200170245	95-1003-5	W301207/W050-8		SILVER	0.010	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-EPM	200170246	95-1003-5	W301207/W050-8		LIQUIDS	ABSENT	PRESE		31-JUL-95	23-AUG-95	B
INORGANICS-EPM	200170246	95-1003-5	W301207/W050-8		MOISTURE	46.10	wt %		31-JUL-95	05-AUG-95	B
INORGANICS-EPM	200170246	95-1003-5	W301207/W050-8		URANIUM	46	ppm		31-JUL-95	08-AUG-95	B
MASS SPECTROSCO	200170247	95-1003-5	W301207/W050-8		URANIUM 235	0.710	WT %		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170247	95-1003-5	W301207/W050-8		URANIUM 235-LBC		YES/N		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170247	95-1003-5	W301207/W050-8		URANIUM 235-LCE		2 sig		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170247	95-1003-5	W301207/W050-8		URANIUM 235-LMD		WT %		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170247	95-1003-5	W301207/W050-8		URANIUM 235-LTP		2 sig		31-JUL-95	15-AUG-95	B
INORGANICS-AA/I	200170248	95-1003-6	W301220/W050-8		ARSENIC	0.010	mg/L	U	31-JUL-95	07-AUG-95	B
INORGANICS-AA/I	200170248	95-1003-6	W301220/W050-8		BARIUM	0.200	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170248	95-1003-6	W301220/W050-8		CADMIUM	0.005	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170248	95-1003-6	W301220/W050-8		CHROMIUM	0.010	mg/L		31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170248	95-1003-6	W301220/W050-8		LEAD	0.021	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170248	95-1003-6	W301220/W050-8		MERCURY	.0002	mg/L		31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170248	95-1003-6	W301220/W050-8		SELENIUM	0.010	mg/L	U	31-JUL-95	09-AUG-95	B
INORGANICS-AA/I	200170248	95-1003-6	W301220/W050-8		SILVER	0.010	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-EPM	200170249	95-1003-6	W301220/W050-8		LIQUIDS	ABSENT	PRESE		31-JUL-95	23-AUG-95	B
INORGANICS-EPM	200170249	95-1003-6	W301220/W050-8		MOISTURE	45.49	wt %		31-JUL-95	15-AUG-95	B
INORGANICS-EPM	200170249	95-1003-6	W301220/W050-8		URANIUM	210	ppm		31-JUL-95	08-AUG-95	B
MASS SPECTROSCO	200170250	95-1003-6	W301220/W050-8		URANIUM 235	0.803	WT %		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170250	95-1003-6	W301220/W050-8		URANIUM 235-LBC		YES/N		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170250	95-1003-6	W301220/W050-8		URANIUM 235-LCE		2 sig		31-JUL-95	15-AUG-95	B

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Your Selection Criteria Was:
Release Number: 1000007806 Component: % Submission ID: % Project Name: ~
From Received Date: % Display Text? N

RELEASE NUMBER : 1000007806
PROJECT NAME : 95-1003 HF TANK CAR NEUTRALIZATION

LAB	SAMPLE ID	USER SAMPLE ID	SAMPLE POINT	SUFFIX	COMPONENT	RESULT	UNITS	LQ	DATE SAMPLED	DATE TASK PERFORMED	ASL
MASS SPECTROSCO	200170250	95-1003-6	W301220/W050-8		URANIUM 235-LMD		WT %		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170250	95-1003-6	W301220/W050-8		URANIUM 235-LTP		2 sig		31-JUL-95	15-AUG-95	B
INORGANICS-AA/I	200170251	95-1003-ER	95-1003 EQUIPM		ARSENIC	0.010	mg/L	U	31-JUL-95	07-AUG-95	B
INORGANICS-AA/I	200170251	95-1003-ER	95-1003 EQUIPM		BARIUM	0.200	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170251	95-1003-ER	95-1003 EQUIPM		CADMIUM	0.005	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170251	95-1003-ER	95-1003 EQUIPM		CHROMIUM	0.010	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170251	95-1003-ER	95-1003 EQUIPM		LEAD	0.021	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170251	95-1003-ER	95-1003 EQUIPM		MERCURY	.0002	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170251	95-1003-ER	95-1003 EQUIPM		SELENIUM	0.037	mg/L		31-JUL-95	09-AUG-95	B
INORGANICS-AA/I	200170251	95-1003-ER	95-1003 EQUIPM		SILVER	0.010	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-EPM	200170252	95-1003-ER	95-1003 EQUIPM		URANIUM	0.2	mg/L		31-JUL-95	02-AUG-95	B
MASS SPECTROSCO	200170253	95-1003-ER	95-1003 EQUIPM		URANIUM 235	ND	WT %		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170253	95-1003-ER	95-1003 EQUIPM		URANIUM 235-LBC		YES/N		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170253	95-1003-ER	95-1003 EQUIPM		URANIUM 235-LCE		2 sig		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170253	95-1003-ER	95-1003 EQUIPM		URANIUM 235-LMD		WT %		31-JUL-95	15-AUG-95	B
MASS SPECTROSCO	200170253	95-1003-ER	95-1003 EQUIPM		URANIUM 235-LTP		2 sig		31-JUL-95	15-AUG-95	B
INORGANICS-AA/I	200170254	95-1003-FB	95-1003 FIELD		ARSENIC	0.010	mg/L	U	31-JUL-95	07-AUG-95	B
INORGANICS-AA/I	200170254	95-1003-FB	95-1003 FIELD		BARIUM	0.200	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170254	95-1003-FB	95-1003 FIELD		CADMIUM	0.005	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170254	95-1003-FB	95-1003 FIELD		CHROMIUM	0.010	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170254	95-1003-FB	95-1003 FIELD		LEAD	0.021	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170254	95-1003-FB	95-1003 FIELD		MERCURY	.0002	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-AA/I	200170254	95-1003-FB	95-1003 FIELD		SELENIUM	0.010	mg/L	U	31-JUL-95	09-AUG-95	B
INORGANICS-AA/I	200170254	95-1003-FB	95-1003 FIELD		SILVER	0.010	mg/L	U	31-JUL-95	08-AUG-95	B
INORGANICS-EPM	200170255	95-1003-FB	95-1003 FIELD		URANIUM	0.1	mg/L	U	31-JUL-95	02-AUG-95	B
MASS SPECTROSCO	200170256	95-1003-FB	95-1003 FIELD		URANIUM 235	0.725	WT %		31-JUL-95	18-AUG-95	B
MASS SPECTROSCO	200170256	95-1003-FB	95-1003 FIELD		URANIUM 235-LBC	YES	YES/N		31-JUL-95	18-AUG-95	B
MASS SPECTROSCO	200170256	95-1003-FB	95-1003 FIELD		URANIUM 235-LCE		2 sig		31-JUL-95	18-AUG-95	B
MASS SPECTROSCO	200170256	95-1003-FB	95-1003 FIELD		URANIUM 235-LMD		WT %		31-JUL-95	18-AUG-95	B
MASS SPECTROSCO	200170256	95-1003-FB	95-1003 FIELD		URANIUM 235-LTP		2 sig		31-JUL-95	18-AUG-95	B

124 RECORDS PRINTED

END OF REPORT

000122

****

Your Selection Criteria Was:
Release Number: 1000007806 Component: % Submission ID: % Project Name: %
From Received Date: % Display Text? N

FORM F-3808

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 1-7806
3BSU4
ASL B
(Reported Measurement Units): µg/L

Special Comments: (When Necessary - Initial & Date.) Note: All sample numbers begin with "200...".
UNH Tank Car Neutralization Plan 95-1003

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
170233	Barium	231	U	The result was qualified undetected due to laboratory blank contamination, and should be considered biased high.
	Chromium	8.7	U	The result was qualified undetected due to laboratory blank contamination, and should be considered biased high.
	Mercury	0.03	U	The result was qualified undetected due to field blank contamination, and should be considered biased high.
	Selenium	6.4	UJ	The result was qualified undetected due to field blank contamination. The undetected result was further qualified estimated due to low matrix and analytical spike recoveries.
	Silver	5.0	J	The result was qualified estimated due to a low matrix spike recovery, and should be considered baised low.
170236	Barium	221	U	The result was qualified undetected due to laboratory blank contamination, and should be considered biased high.
	Mercury	0.02	U	The result was qualified undetected due to field blank contamination, and should be considered biased high.
	Selenium	4.8	UJ	The result was qualified undetected due to field blank contamination. The undetected result was further qualified estimated due to low matrix and analytical spike recoveries.

Validator: [signature] (James P. Cross) Date: 8/30/95

Concurred by: [signature] Date: 8/30/95

QC Check of Subcontractor Submissions by: [initials] Date:

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

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

FORM FS-F-3808

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

000124

Release # 1-7806
3BSU4
ASL B
(Reported Measurement Units): µg/L

Special Comments: (When Necessary - Initial & Date.) Note: All sample numbers begin with "200...".
UNH Tank Car Neutralization Plan 95-1003

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
170236	Silver	18.9	J	The result was qualified estimated due to a low matrix spike recovery, and should be considered baised low.
170239	Barium	515	U	The result was qualified undetected due to laboratory blank contamination, and should be considered biased high.
	Chromium	8.3	U	The result was qualified undetected due to laboratory blank contamination, and should be considered biased high.
	Mercury	0.03	U	The result was qualified undetected due to field blank contamination, and should be considered biased high.
	Selenium	4.9	UJ	The result was qualified undetected due to field blank contamination. The undetected result was further qualified estimated due to low matrix and analytical spike recoveries.
	Silver	5.9	J	The result was qualified estimated due to a low matrix spike recovery, and should be considered baised low.
170242	Barium	554	U	The result was qualified undetected due to laboratory blank contamination, and should be considered biased high.
	Chromium	10.3	U	The result was qualified undetected due to laboratory blank contamination, and should be considered biased high.

Validator: [signature] (James P. Cross) Date: 8/30/95

Concurred by: [signature] Date: 8/30/95

QC Check of Subcontractor Submissions by: ____ Date: ____

Qualifier Codes Entered by: ____ Date: ____

Qualifier Codes Approved by: ____ Date: ____

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

FORM [redacted]-3808

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 1-7806
3BSU4
ASL B
(Reported Measurement Units): µg/L

Special Comments: (When Necessary - Initial & Date.) Note: All sample numbers begin with "200...".
UNH Tank Car Neutralization Plan 95-1003

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
170242	Mercury	0.03	U	The result was qualified undetected due to field blank contamination, and should be considered biased high.
	Selenium	4.5	UJ	The result was qualified undetected due to field blank contamination. The undetected result was further qualified estimated due to a low matrix recovery.
	Silver	5.9	J	The result was qualified estimated due to a low matrix spike recovery, and should be considered baised low.
170245	Barium	152	U	The result was qualified undetected due to laboratory blank contamination, and should be considered biased high.
	Chromium	7.8	U	The result was qualified undetected due to laboratory blank contamination, and should be considered biased high.
	Mercury	0.04	U	The result was qualified undetected due to field blank contamination, and should be considered biased high.
	Selenium	4.9	UJ	The result was qualified undetected due to field blank contamination. The undetected result was further qualified estimated due to a low matrix recovery.
	Silver	6.3	J	The result was qualified estimated due to a low matrix spike recovery, and should be considered baised low.

Validator: (James P. Cross) Date: 8/30/95

Concurred by: Date: 8/30/95

QC Check of Subcontractor Submissions by: Date:

Qualifier Codes Entered by: Date:

Qualifier Codes Approved by: Date:

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

000125

000126

FORM FS-F-3808

INORGANIC/CONVENTIONAL DATA VALIDATION SUMMARY REPORT

Release # 1-7806
3BSU4
ASL B
(Reported Measurement Units): μg/L

Special Comments: (When Necessary - Initial & Date.) Note: All sample numbers begin with "200...".
UNH Tank Car Neutralization Plan 95-1003

Sample #(s)	Analyte(s)	Final Results	DV Qual*	Qualifier Logic (Deficiencies, SOW problems, etc.)
170248	Barium	187	U	The result was qualified undetected due to laboratory blank contamination, and should be considered biased high.
	Chromium	10.4	U	The result was qualified undetected due to laboratory blank contamination, and should be considered biased high.
	Mercury	0.20	U	The result was qualified undetected due to field blank contamination, and should be considered biased high.
	Selenium	6.7	UJ	The result was qualified undetected due to field blank contamination. The undetected result was further qualified estimated due to a low matrix recovery.
	Silver	6.5	J	The result was qualified estimated due to a low matrix spike recovery, and should be considered baised low.
170251	Mercury	0.04	U	The result was qualified undetected due to laboratory blank contamination, and should be considered biased high.
170254	Mercury	0.03	U	The result was qualified undetected due to laboratory blank contamination, and should be considered biased high.

Validator: _______________ (James P. Cross) Date: 8/30/95

Concurred by: _______________ Date: 8/31/95

QC Check of Subcontractor Submissions by: n/a Date: ______

Qualifier Codes Entered by: _______________ Date: ______

Qualifier Codes Approved by: _______________ Date: ______

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

7222

FERMCO
Fernald Environmental Restoration Management Corporation

INTEROFFICE MEMORANDUM

To:	ADM Release file	Date:	August 18, 1995
Location:	Fernald	Reference:	N/A
From:	Amy Meyer, MS35	FERMCO #:	M:ETS(ALS):95-0494
Location:	Fernald	Client:	DOE DE-AC24-92OR21972
Extension:	648-5423	Subject:	SDG# 4-0039

c: File Record Storage Copy 106.4.14.11
Mike Rolfes, MS35 (2x attachments)
Ervin O'Bryan, MS35

On July 31, 1995, the AA-ICP laboratory received the following samples for analysis. The analysis was completed on August 9, 1995.

Release #	Customer #	AA-ICP #	ANALYSIS
1000007809	95-1003-1	200170233	8 RCRA METALS
1000007809	95-1003-2	200170236	8 RCRA METALS
1000007809	95-1003-3	200170239	8 RCRA METALS
1000007809	95-1003-4	200170242	8 RCRA METALS
1000007809	95-1003-5	200170245	8 RCRA METALS
1000007809	95-1003-6	200170248	8 RCRA METALS
1000007809	95-1003-ER	200170251	8 RCRA METALS
1000007809	95-1003-FB	200170254	8 RCRA METALS

This package completes all of the metals samples for release 1000007809.

The analyses requested for these samples were ASL B TCLP Metals. The samples are of known and documented quality. The SCQ methods and criteria used are as follows:

- criterion 9 - Metals by GFAA (SW-846 7000 series methods, used for Selenium and Arsenic analysis,

- criterion 11 - Metals by ICP-AES (SW-0846 Method 6010A, used for Barium, Cadmium, Lead, Silver and Chromium analysis, and

- criterion 12 - (Cold Vapor: SW-846 method 7470A [liquid] or 7471A [solid]), used for Mercury analysis.

FS-F-3934 (11/28/94)

Fernald Environmental

FERMCO

Restoration Management Corporation

INTEROFFICE MEMORANDUM

Criterion 9-Metals by GFAA allows for 80-120 % recoveries for ICV, CCV, and LCS. Criterion 11-Metals by ICP-AES allows LCS recoveries to fall within the 80-120% range as well. QC (matrix spikes, lab duplicates, serial dilutions...) was performed on a sample from each release.

Although the sample analysis was requested at ASL B and the referenced methods were used, the customer requested that the data be reported on CLP forms. These forms are supplied, and the appropriate CLP qualifier flags, if any, have been applied, based on the SCQ QC criteria.

Specific QC problems/issues are noted below.

All samples are flagged with "N" qualifier for Arsenic and Silver, which indicates that the spiked sample recovery is not within the control limits. A post spike was performed.

Except for the above mentioned deficiencies, all other QC results were within acceptable limits as defined by the SCQ for ASL B analyses.

If you have any questions, please contact me.

AJM:meh
Attachment

WF-95-155

[redacted]

WP-95-142

FMPC
WATER DIGESTION LOG

7222

Date 8-4-95

Date ______

Analyst Prep. John T. Gillespie

Analyst Prep. ______

Samples transferred by (init/date/time) ______

Samples received by (init/date/time) MGK 8/7/95 8:00

		Sample #	Initial - WP	DUP - WP	SPK - WP	Final - WP	Initial - WF	DUP - WF	SPK - WF	Final - WF	Comments
		PB-WP 95142	100			100					
		LCS-WP 95142	100			100					
		PB-WF 95155					100			100	
		LCS-WF 95155					100			100	
1.		2-170233	100	100	100	100	100	100	100	100	
2.		2-170236	|			|	|				
3.		2-170239	|								
4.		2-170242	|			|				|	
5.		2-170245	|			|				|	
6.		2-170248	|			|					
7.		2-170251	|			|					
8.		2-170254	✓			✓	✓			✓	
9.	(#2)	EPCLP95041	100			100	100			100	
10.											
11.											
12.											
13.											
14											
15.											
16.											
17.											
18.											
19											
20.											

1 PB, LCS/20
1 DUP, SPK/20/each sample
Delivery group

W = Water
PB = Prep Blank
P = ICP
LCS = Laboratory Control Sample
F = Furnace

LCS & Spike Used 1ml GFAA163-95-0?
Additional Comments 1ml 6-99AS

000129

AIO SPIKE CONC. (ug/L)

PARAMETER	GFAA	ICP
	10.0	50.0
	40.0	2000.0
		2000.0
		50.0
	10.0	200.0
	1.0	
	20.0	500.0
	20.0	2000.0

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: FERMCO Contract: ____

Lab Code: ____ Case No.: ____ SAS No.: ____ SDG No.:4-0039

SOW No.: ILM02.1

EPA Sample No.	Lab Sample ID
2-170233	2-170233
2-170233	2-170233D
2-170233	2-170233S
2-170236	2-170236
2-170239	2-170239
2-170239	2-170239L
2-170242	2-170242
2-170245	2-170245
2-170248	2-170248
2-170251	2-170251
2-170254	2-170254
2-170254	2-170254L

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: ____ Name: ____

Date: ____ Title: ____

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

2-170233

ab Name: FERMCO Contract:

ab Code: Case No.: SAS No.: SDG No.: 4-0039

atrix (soil/water): WATER Lab Sample ID: 2-170233

evel (low/med): LOW Date Received: 07/31/95

Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	1.0	U	N	F
7440-39-3	Barium	231			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	10.2			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	8.7	B		P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	20.5	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.03	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	10.8			F
7440-22-4	Silver	5.0	B	N	P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

7222

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

2-170236

ıme: EERMCO Contract:

ɔde: Case No.: SAS No.: SDG No.: 4-0039

x (soil/water): WATER Lab Sample ID: 2-170236

(low/med): LOW__ Date Received: 07/31/95

.ids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	1.0	U	N	F
7440-39-3	Barium	221			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	11.7			P
7440-70-2	Calcium				NR
7440-47-3	Chromium	27.0			P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	86.8			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.02	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	16.6			F
7440-22-4	Silver	18.9		N	P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

ɔlor Before: Clarity Before: Texture:

ɔlor After: Clarity After: Artifacts:

omments:

FORM I - IN ILM02.1

000133

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

2-170239

Lab Name: FERMCO Contract: ___

Lab Code: ___ Case No.: ___ SAS No.: ___ SDG No.: 4-0039

Matrix (soil/water): WATER Lab Sample ID: 2-170239

Level (low/med): LOW Date Received: 07/31/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	1.0	U	N	F
7440-39-3	Barium	515			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	3.4	B		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	8.3	B		P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	20.5	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.03	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	15.3			F
7440-22-4	Silver	5.9	B	N	P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: ___ Clarity Before: ___ Texture: ___

Color After: ___ Clarity After: ___ Artifacts: ___

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

2-170242

b Name: FERMCO Contract:

b Code: Case No.: SAS No.: SDG No.: 4-0039

trix (soil/water): WATER Lab Sample ID: 2-170242

vel (low/med): LOW Date Received: 07/31/95

Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	1.0	U	N	F
7440-39-3	Barium	554			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	1.5	B		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	10.3			P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	32.3			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.03	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	15.3			F
7440-22-4	Silver	5.9	B	N	P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

olor Before: Clarity Before: Texture:

olor After: Clarity After: Artifacts:

omments:

FORM I - IN ILM02.1

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

2-170245

Name: EERMCO Contract: ______

Code: ______ Case No.: ______ SAS No.: ______ SDG No.: 4-0039

ix (soil/water): WATER Lab Sample ID: 2-170245

el (low/med): LOW__ Date Received: 07/31/95

olids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	1.0	U	N	F
7440-39-3	Barium	152	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	1.3	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	7.8	B		P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	20.5	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.04	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.6	U		F
7440-22-4	Silver	6.3	B	N	P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

olor Before: ______ Clarity Before: ______ Texture: ______

olor After: ______ Clarity After: ______ Artifacts: ______

omments:

7222

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

2-170248

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 4-0039

Matrix (soil/water): WATER Lab Sample ID: 2-170248

Level (low/med): LOW Date Received: 07/31/95

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	1.0	U	N	F
7440-39-3	Barium	187	B		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	1.3	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	10.4			P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	20.5	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.20			CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium	2.6	U		F
7440-22-4	Silver	6.5	B	N	P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

2-170251

ɔ Name: FERMCO Contract:

ɒ Code: Case No.: SAS No.: SDG No.: 4-0039

trix (soil/water) WATER Lab Sample ID: 2-170251

vel (low/med): LOW Date Received: 07/31/95

Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	1.0	U	N	F
7440-39-3	Barium	6.1	U		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	1.3	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	2.4	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	20.5	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.04	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver	3.8	U	N	P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

2-170254

Jame: BERMCO Contract:

:ode: Case No.: SAS No.: SDG No.: 4-0039

ix (soil/water): WATER Lab Sample ID: 2-170254

l (low/med): LOW Date Received: 07/31/95

›lids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic	1.0	U	N	F
7440-39-3	Barium	6.1	U		P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	1.3	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium	2.4	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper				NR
7439-89-6	Iron				NR
7439-92-1	Lead	20.5	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.03	B		CV
7440-02-0	Nickel				NR
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver	3.8	U	N	P
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc				NR
	Cyanide				NR

:olor Before: Clarity Before: Texture:

:olor After: Clarity After: Artifacts:

Comments:

FORM I - IN ILM02.1

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: FERMCO Contract: ____________

Lab Code: ______ Case No.: ______ SAS No.: ______ SDG No.: 4-0039

Initial Calibration Source: SPEX

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum									NR
Antimony									NR
Arsenic	40.0	40.14	100.4	40.0	39.48	98.7	37.96	94.9	F
Barium	2000.0	1948.00	97.4	2000.0	1980.00	99.0	1958.00	97.9	P
Beryllium									NR
Cadmium	50.0	54.70	109.4	50.0	55.60	111.2	52.60	105.2	P
Calcium									NR
Chromium	100.0	103.70	103.7	100.0	106.20	106.2	103.40	103.4	P
Cobalt									NR
Copper									[illegible]
Iron									NR
Lead	250.0	255.70	102.3	250.0	247.80	99.1	253.80	101.5	P
Magnesium									NR
Manganese									NR
Mercury	2.5	2.51	100.4	2.5	2.47	98.8	2.46	98.4	CV
Nickel									NR
Potassium									NR
Selenium	40.0	38.20	95.5	40.0	39.00	97.5	45.80	114.5	F
Silver	100.0	101.90	101.9	100.0	98.20	98.2	101.60	101.6	P
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

7222

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 4-0039

Initial Calibration Source: SPEX

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	%R(1)	Found	%R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				40.0	38.69	96.7	35.95	89.9	F
Barium				2000.0	1981.00	99.0	1984.00	99.2	P
Beryllium									NR
Cadmium				50.0	50.20	100.4	50.20	100.4	P
Calcium									NR
Chromium				100.0	103.90	103.9	101.90	101.9	P
Cobalt									NR
Copper									NR
Iron									NR
Lead				250.0	259.60	103.8	267.00	106.8	P
Magnesium									NR
Manganese									NR
Mercury				2.5	2.38	95.2			CV
Nickel									NR
Potassium									NR
Selenium				40.0	37.70	94.2	39.00	97.5	F
Silver				100.0	94.90	94.9	97.40	97.4	P
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: FERMCO Contract: ____

Lab Code: ____ Case No.: ____ SAS No.: ____ SDG No.: 4-0039

Initial Calibration Source: SPEX

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	%R(1)	Continuing Calibration True	Continuing Calibration Found	%R(1)	Found	%R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				40.0	39.93	99.8	39.76	99.4	F
Barium				2000.0	2031.00	101.6	2040.00	102.0	P
Beryllium									NR
Cadmium				50.0	47.40	94.8	49.60	99.2	P
Calcium									NR
Chromium				100.0	101.00	101.0	103.10	103.1	[illegible]
Cobalt									[illegible]
Copper									NR
Iron									NR
Lead				250.0	237.10	94.8	269.10	107.6	P
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium				40.0	36.60	91.5	36.30	90.8	F
Silver				100.0	102.00	102.0	97.70	97.7	P
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

7222

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: FERMCO Contract: ____________

Lab Code: _______ Case No.: _______ SAS No.: _______ SDG No.: 4-0039

Initial Calibration Source: SPEX

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				40.0	40.72	101.8	38.82	97.0	F
Barium	2000.0	1937.00	96.8	2000.0	1980.00	99.0	2001.00	100.0	P
Beryllium									NR
Cadmium	50.0	51.40	102.8	50.0	52.00	104.0	53.20	106.4	P
Calcium									NR
Chromium	100.0	105.00	105.0	100.0	104.90	104.9	104.30	104.3	P
Cobalt									NR
Copper									NR
Iron									NR
Lead	250.0	261.40	104.6	250.0	258.40	103.4	263.10	105.2	P
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver	100.0	100.90	100.9	100.0	99.90	99.9	99.10	99.1	P
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: FERMCO Contract: ______

Lab Code: ______ Case No.: ______ SAS No.: ______ SDG No.: 4-0039

Initial Calibration Source: SPEX

Continuing Calibration Source: SPEX

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum									NR
Antimony									NR
Arsenic				40.0	38.02	95.0			F
Barium				2000.0	1955.00	97.8	2002.00	100.1	P
Beryllium									NR
Cadmium				50.0	51.00	102.0	55.10	110.2	P
Calcium									NR
Chromium				100.0	102.30	102.3	106.30	106.3	P
Cobalt									NR
Copper									NR
Iron									NR
Lead				250.0	273.30	109.3	275.40	110.2	P
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver				100.0	96.90	96.9	99.50	99.5	P
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

ab Name: FERMCO____________ Contract: ________

ab Code: ______ Case No.: ______ SAS No.: ______ SDG No.: 4-0039

nitial Calibration Source: SPEX________

ontinuing Calibration Source: SPEX________

Concentration Units: ug/L

Analyte	Initial Calibration True	Found	%R(1)	Continuing Calibration True	Found	%R(1)	Found	%R(1)	M
Aluminum									NR
Antimony									NR
Arsenic									NR
Barium				2000.0	1991.00	99.6	2045.00	102.2	P
Beryllium									NR
Cadmium				50.0	54.80	109.6	56.70	113.4	P
Calcium									NR
Chromium				100.0	104.40	104.4	105.70	105.7	P
Cobalt									NR
Copper									NR
Iron									NR
Lead				250.0	256.10	102.4	265.40	106.2	P
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver				100.0	97.80	97.8	98.60	98.6	P
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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2B
CRDL STANDARD FOR AA AND ICP

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 4-0039

AA CRDL Standard Source: SPEX

ICP CRDL Standard Source: SPEX

Concentration Units: ug/L

Analyte	CRDL Standard for AA True	CRDL Standard for AA Found	CRDL Standard for AA %R	CRDL Standard for ICP True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony								
Arsenic	10.0	9.01	90.1					
Barium								
Beryllium								
Cadmium				10.0	11.10	111.0	9.40	94.0
Calcium								
Chromium				20.0	21.80	109.0	19.30	96.5
Cobalt								
Copper								
Iron								
Lead				56.0	77.10	137.7	47.80	85.4
Magnesium								
Manganese								
Mercury	0.5	0.46	92.0					
Nickel								
Potassium								
Selenium	5.0	4.90	98.0					
Silver				20.0	18.90	94.5	17.00	85.0
Sodium								
Thallium								
Vanadium								
Zinc								

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2B
CRDL STANDARD FOR AA AND ICP

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 4-0039

AA CRDL Standard Source: SPEX

ICP CRDL Standard Source: SPEX

Concentration Units: ug/L

Analyte	CRDL Standard for AA True	Found	%R	CRDL Standard for ICP True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium				10.0	9.00	90.0	10.90	109.0
Calcium								
Chromium				20.0	20.50	102.5	22.30	111.5
Cobalt								
Copper								
Iron								
Lead				56.0	63.70	113.8	82.30	147.0
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver				20.0	20.30	101.5	16.70	83.5
Sodium								
Thallium								
Vanadium								
Zinc								

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3
BLANKS

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 4-0039

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic	1.7	B	1.2	B	1.4	B	1.4	B	1.720	B	F
Barium	6.1	U	6.1	U	6.1	U	6.1	U	6.100	U	P
Beryllium											NR
Cadmium	1.3	U	1.3	U	1.3	U	1.3	U	-1.700	B	P
Calcium											NR
Chromium	2.4	U	2.4	U	2.4	U	2.4	U	2.400	U	P
Cobalt											NR
Copper											NR
Iron											NR
Lead	20.5	U	20.5	U	20.5	U	20.5	U	20.500	U	P
Magnesium											NR
Manganese											NR
Mercury	0.0	U	0.0	U	0.0	U	0.0	U	0.029	B	CV
Nickel											NR
Potassium											NR
Selenium	1.3	U	1.3	U	1.3	U	1.3	U	1.300	U	F
Silver	3.8	U	-4.3	B	3.8	U	3.8	U	3.800	U	P
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

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3
BLANKS

Lab Name: FERMCO   Contract:

Lab Code: Case No.:   SAS No.:   SDG No.: 4-0039

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic			1.0	B	1.0	U	1.0	U	1.140	B	F
Barium			6.1	U	6.1	U	6.1	U	505.700		P
Beryllium											NR
Cadmium			1.3	U	-1.3	B	1.3	U	1.300	U	P
Calcium											NR
Chromium			2.4	U	2.4	U	2.4	U	2.400	U	P
Cobalt											NR
Copper											NR
Iron											NR
Lead			20.5	U	20.5	U	20.5	U	20.500	U	P
Magnesium											NR
Manganese											NR
Mercury									0.031	B	CV
Nickel											NR
Potassium											NR
Selenium			1.3	U	1.3	U	2.4	B	1.300	U	F
Silver			3.8	U	3.8	U	3.8	U	3.800	U	P
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

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3
BLANKS

Lab Name: FERMCO   Contract:

ab Code: Case No.:   SAS No.:   SDG No.: 4-0039

reparation Blank Matrix (soil/water):

reparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic			1.0	U	-1.0	B	1.0	U			F
Barium	6.1	U	6.1	U	6.1	U	6.1	U			P
Beryllium											NR
Cadmium	1.3	U	1.3	U	1.3	U	1.3	U			P
Calcium											NR
Chromium	2.4	U	2.4	U	2.4	U	2.4	U			P
Cobalt											NR
Copper											NR
Iron											NR
Lead	20.5	U	20.5	U	20.5	U	20.5	U			P
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium											NR
Silver	3.8	U	3.8	U	3.8	U	3.8	U			P
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

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3
BLANKS

Lab Name: FERMCO   Contract: ______

Lab Code: ______   Case No.: ______   SAS No.: ______   SDG No.: 4-0039

Preparation Blank Matrix (soil/water): ______

Preparation Blank Concentration Units (ug/L or mg/kg): ______

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic											NR
Barium			6.1	U	6.1	U	6.1	U			P
Beryllium											NR
Cadmium			1.3	U	1.3	U	1.3	U			P
Calcium											NR
Chromium			2.8	B	2.4	U	2.4	U			P
Cobalt											NR
Copper											NR
Iron											NR
Lead			20.5	U	20.5	U	20.5	U			P
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium											NR
Silver			3.8	U	-4.8	B	3.8	U			P
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

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4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: FERMCO ____________ Contract: ____________

Lab Code: ______ Case No.: ______ SAS No: ______ SDG No.: 4-0039

ICP ID Number: ICP2 ______ ICS Source: SPEX ______

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum								
Antimony								
Arsenic								
Barium		500		462.4	92.5		473.7	94.7
Beryllium								
Cadmium		1000		967.3	96.7		896.8	89.7
Calcium								
Chromium		500		505.1	101.0		484.9	97.0
Cobalt								
Copper								
Iron								
Lead		1000		1025.0	102.5		989.7	99.0
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver		1000		980.4	98.0		955.9	95.6
Sodium								
Thallium								
Vanadium								
Zinc								

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4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No: SDG No.: 4-0039

ICP ID Number: ICP2 ICS Source: SPEX

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum								
Antimony								
Arsenic								
Barium		500		473.6	94.7		485.3	97.1
Beryllium								
Cadmium		1000		981.2	98.1		972.5	97.2
Calcium								
Chromium		500		514.5	102.9		490.7	98.1
Cobalt								
Copper								
Iron								
Lead		1000		1068.0	106.8		1111.0	111.1
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver		1000		1017.0	101.7		1006.0	100.6
Sodium								
Thallium								
Vanadium								
Zinc								

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

2-170233S

Lab Name: FERMCO Contract: ____

Lab Code: ____ Case No.: ____ SAS No.: ____ SDG No.: 4-0039

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony									NR
Arsenic	75-125	29.9600		1.0000	U	40.00	74.9	N	F
Barium	75-125	2160.0000		230.9000		2000.00	96.5		P
Beryllium									NR
Cadmium	75-125	56.7000		10.2000		50.00	93.0		P
Calcium									NR
Chromium	75-125	182.4000		8.7000	B	200.00	86.8		P
Cobalt									NR
Copper									NR
Iron									NR
Lead	75-125	417.9000		20.5000	U	500.00	83.6		P
Magnesium									NR
Manganese									NR
Mercury	75-125	0.9160		0.0290	B	1.00	88.7		CV
Nickel									NR
Potassium									NR
Selenium	75-125	31.6000		10.8000		20.00	104.0		F
Silver	75-125	37.1000		5.0000	B	50.00	64.2	N	P
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

Comments:

U.S. EPA - CLP

5B
POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

2-170233PS

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 4-0039

Matrix (soil/water) : WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Added (SA)	%R	Q	M
Aluminum									NR
Antimony									NR
Arsenic		25.59		1.00	U	40.0	64.0		F
Barium		2154.00		230.90		2000.0	96.2		P
Beryllium									NR
Cadmium		54.00		10.20		50.0	87.6		P
Calcium									NR
Chromium		175.60		8.70	B	200.0	83.4		P
Cobalt									NR
Copper									NR
Iron									NR
Lead		401.20		20.50	U	500.0	80.2		P
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium		24.65		10.80		20.0	69.2		F
Silver		35.30		5.00	B	50.0	60.6		P
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

Comments:

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

2-170233D

Lab Name: FERMCO Contract: ____

Lab Code: ____ Case No.: ____ SAS No.: ____ SDG No.: 4-0039

Matrix (soil/water): WATER Level (low/med): _LOW__

% Solids for Sample: __0.0 % Solids for Duplicate: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								NR
Antimony								NR
Arsenic		1.0000	U	1.0000	U			F
Barium	200.0	230.9000		228.4000		1.1		P
Beryllium								NR
Cadmium	5.0	10.2000		8.4000		19.4		P
Calcium								NR
Chromium		8.7000	B	9.6000	B	9.8		P
Cobalt								NR
Copper								NR
Iron								NR
Lead		20.5000	U	20.5000	U			P
Magnesium								NR
Manganese								NR
Mercury		0.0290	B	0.0200	U	200.0		CV
Nickel								NR
Potassium								NR
Selenium	5.0	10.8000		14.6000		29.9		F
Silver		5.0000	B	6.4000	B	24.6		P
Sodium								NR
Thallium								NR
Vanadium								NR
Zinc								NR
Cyanide								NR

7222

7

LABORATORY CONTROL SAMPLE

ab Name: FERMCO Contract:

ab Code: Case No.: SAS No.: SDG No.: 4-0039

olid LCS Source:

queous LCS Source: SPEX

Analyte	Aqueous (ug/L) True	Aqueous (ug/L) Found	Aqueous (ug/L) %R	Solid (mg/kg) True	Solid (mg/kg) Found	C	Limits		%R
Aluminum									
Antimony									
Arsenic									
Barium	2000.0	1975.00	98.8						
Beryllium									
Cadmium	50.0	52.00	104.0						
Calcium									
Chromium	200.0	204.10	102.0						
obalt									
opper									
Iron									
Lead	500.0	510.70	102.1						
Magnesium									
Manganese									
Mercury	1.0	0.98	97.8						
Nickel									
Potassium									
Selenium									
Silver	50.0	43.70	87.4						
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

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7

LABORATORY CONTROL SAMPLE

ab Name: FERMCO Contract:

ab Code: Case No.: SAS No.: SDG No.: 4-0039

olid LCS Source:

queous LCS Source: SPEX

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum									
Antimony									
Arsenic	40.0	35.72	89.3						
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium	20.0	20.40	102.0						
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

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8
STANDARD ADDITION RESULTS

Name: FERMCO ____________________ Contract: __________

Code: _______ Case No.: _______ SAS No.: _______ SDG No.: 4-0039

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q

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9
ICP SERIAL DILUTION

EPA SAMPLE NO.

2-170239L

Name: FERMCO Contract:

Code: Case No.: SAS No.: SDG No.: 4-0039

:ix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum							NR
Antimony							NR
Arsenic							NR
Barium	515.40		533.00	B	3.4		P
Beryllium							NR
Cadmium	3.40	B	6.50	U	100.0		P
Calcium							NR
Chromium	8.30	B	18.00	B	116.9		P
Cobalt							NR
Copper							NR
Iron							NR
Lead	20.50	U	102.50	U			P
Magnesium							NR
Manganese							NR
Mercury							NR
Nickel							NR
Potassium							NR
Selenium							NR
Silver	5.90	B	19.00	U	100.0		P
Sodium							NR
Thallium							NR
Vanadium							NR
Zinc							NR

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9
ICP SERIAL DILUTION

EPA SAMPLE NO.

2-170254L

ne: FERMCO Contract:

de: Case No.: SAS No.: SDG No.: 4-0039

: (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum							NR
Antimony							NR
Arsenic							NR
Barium	6.10	U	30.50	U			P
Beryllium							NR
Cadmium	1.30	U	6.50	U			P
Calcium							NR
Chromium	2.40	U	12.00	U			P
Cobalt							NR
Copper							NR
Iron							NR
Lead	20.50	U	102.50	U			P
Magnesium							NR
Manganese							NR
Mercury							NR
Nickel							NR
Potassium							NR
Selenium							NR
Silver	3.80	U	19.00	U			P
Sodium							NR
Thallium							NR
Vanadium							NR
Zinc							NR

000161

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10

Instrument Detection Limits (Quarterly)

Lab Name: FERMCO Contract: ____

Lab Code: ____ Case No.: ____ SAS No.: ____ SDG No.: 4-0039

ICP ID Number: ICP2 Date: 07/21/95

Flame AA ID Number : ____

Furnace AA ID Number : ____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium	455.40		200	6.1	P
Beryllium			5		NR
Cadmium	214.44		5	1.3	P
Calcium			5000		NR
Chromium	267.72		10	2.4	P
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead	220.35		3	20.5	P
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver	327.07		10	3.8	P
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:

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7222

10

Instrument Detection Limits (Quarterly)

:ame: FERMCO Contract:

:ode: Case No.: SAS No.: SDG No.: 4-0039

ID Number: Date: 07/21/95

e AA ID Number :

.ace AA ID Number : 5100A

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic	193.70	BZ	10	1.0	F
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

omments:

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10

Instrument Detection Limits (Quarterly)

Lab Name: FERMCO____________________ Contract: ____________

Lab Code: _______ Case No.: _______ SAS No.: _______ SDG No.: 4-0039

ICP ID Number: ______________ Date: 07/21/95

Flame AA ID Number : ______________

Furnace AA ID Number : 5100C________

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium	196.00	BZ	5	1.3	F
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:

000164

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10
Instrument Detection Limits (Quarterly)

ab Name: FERMCO Contract:

ab Code: Case No.: SAS No.: SDG No.: 4-0039

CP ID Number: Date: 07/21/95

'lame AA ID Number : MA2

'urnace AA ID Number :

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury	254.00		0.2	0.0	CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:

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11A

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Name: EERMCO Contract:

Code: Case No.: SAS No.: SDG No.: 4-0039

ID Number: ICP2 Date: 06/09/94

Analyte	Wave-length (nm)	Al	Ca	Fe	Mg	
luminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	
ntimony	206.83	0.0000000	0.0000000	0.0000000	0.0000000	
rsenic						
Barium	455.40	0.0000000	0.0000000	0.0000000	0.0000000	
Beryllium	234.86	0.0000000	0.0000000	0.0000000	0.0000000	
Cadmium	214.44	0.0000000	0.0000000	0.0000000	0.0000000	
Calcium	317.93	0.0000000	0.0000000	0.0000510	-0.0000600	
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	
Iron	259.94	0.0000000	0.0000000	0.0000000	0.0000000	
Lead	220.35	0.0000000	0.0000000	0.0000000	0.0000000	
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	
Manganese	257.61	0.0000000	0.0000000	0.0000480	0.0000000	
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	
Selenium						
Silver	327.07	0.0000000	0.0000000	0.0000020	0.0000000	
Sodium	589.59	0.0000000	0.0000000	0.0000000	0.0000000	
Thallium						
Vanadium	310.23	0.0000000	0.0000000	0.0000000	-0.0000200	
Zinc	213.86	0.0000000	0.0000000	0.0000590	0.0000400	

Interelement Correction Factors for:

Comments:

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12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No.: SDG No.: 4-0039

ICP ID Number: ICP2 Date: 07/21/95

Analyte	Integ. Time (sec.)	Concentration (ug/L)	M
Aluminum	3.00	500000.0	P
Antimony	3.00	100000.0	P
Arsenic			NR
Barium	3.00	20000.0	P
Beryllium	3.00	90000.0	P
Cadmium	3.00	100000.0	P
Calcium	3.00	500000.0	P
Chromium	3.00	100000.0	P
Cobalt	3.00	100000.0	P
Copper	3.00	100000.0	P
Iron	3.00	200000.0	P
Lead	3.00	100000.0	P
Magnesium	3.00	500000.0	P
Manganese	3.00	100000.0	P
Mercury			NR
Nickel	3.00	100000.0	P
Potassium	3.00	100000.0	P
Selenium			NR
Silver	3.00	100000.0	P
Sodium	3.00	100000.0	P
Thallium			NR
Vanadium	3.00	100000.0	P
Zinc	3.00	100000.0	P

Comments:

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13
PREPARATION LOG

b Name: FERMCO Contract: ___________

b Code: _______ Case No.: ________ SAS No.: _______ SDG No.:4-0039

thod: P_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
-170233	08/04/95		100
170233D	08/04/95		100
170233S	08/04/95		100
-170236	08/04/95		100
-170239	08/04/95		100
-170242	08/04/95		100
-170245	08/04/95		100
-170248	08/04/95		100
-170251	08/04/95		100
-170254	08/04/95		100
EB	08/04/95		100
LCSW	08/04/95		100
PBW	08/04/95		100

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13
PREPARATION LOG

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No.: SDG No.:4-0039

Method: F

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
-170233	08/04/95		100
170233D	08/04/95		100
170233S	08/04/95		100
-170236	08/04/95		100
-170239	08/04/95		100
-170242	08/04/95		100
-170245	08/04/95		100
-170248	08/04/95		100
-170251	08/04/95		100
-170254	08/04/95		100
ALCSW	08/04/95		100
EB	08/04/95		100
PBW	08/04/95		100

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13
PREPARATION LOG

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No.: SDG No.:4-0039

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
-170233	08/08/95		100
170233D	08/08/95		100
170233S	08/08/95		100
-170236	08/08/95		100
-170239	08/08/95		100
-170242	08/08/95		100
-170245	08/08/95		100
-170248	08/08/95		100
-170251	08/08/95		100
-170254	08/08/95		100
EB	08/08/95		100
LCSW	08/08/95		100
PBW	08/08/95		100

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14
ANALYSIS RUN LOG

Name: FERMCO Contract:

Code: Case No.: SAS No.: SDG No.:4-0039

rument ID Number: ICP2 Method: P_

t Date: 08/08/95 End Date: 08/08/95

EPA Sample No.	D/F	Time	% R	AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
TD1REP1	1.00	0751					X		X		X				X							X					
TD1REP2	1.00	0753					X		X		X				X							X					
TD1REP3	1.00	0754					X		X		X				X							X					
TD2REP1	1.00	0759					X		X		X				X							X					
TD2REP2	1.00	0800					X		X		X				X							X					
TD2REP3	1.00	0802					X		X		X				X							X					
CV	1.00	0810					X		X		X				X							X					
CB	1.00	0814					X		X		X				X							X					
RI	1.00	0819							X		X				X							X					
CSA	1.00	0823																									
CSAB	1.00	0828					X		X		X				X							X					
ZZZ	1.00	0839																									
ZZZZZ	1.00	0843																									
ZZZZZ	1.00	0848																									
ZZZZZ	1.00	0852																									
ZZZZZ	1.00	0857																									
ZZZZZZ	1.00	0902																									
ZZZZZZ	1.00	0906																									
CCV	1.00	0918					X		X		X				X							X					
CCB	1.00	0923					X		X		X				X							X					
CCV	1.00	0943					X		X		X				X							X					
CCB	1.00	0948					X		X		X				X							X					
ZZZZZZ	1.00	0952																									
ZZZZZZ	1.00	0957																									
ZZZZZZ	1.00	1002																									
ZZZZZZ	1.00	1006																									
ZZZZZZ	1.00	1011																									
ZZZZZZ	1.00	1015																									
ZZZZZZ	1.00	1020																									
ZZZZZZ	1.00	1025																									
ZZZZZZ	1.00	1029																									
ZZZZZZ	1.00	1034																									

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14
ANALYSIS RUN LOG

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No.: SDG No.:4-0039

Instrument ID Number: ICP2 Method: P_

Start Date: 08/08/95 End Date: 08/08/95

EPA Sample No.	D/F	Time	% R	AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCV	1.00	1047					X		X		X				X							X					
CCB	1.00	1053					X		X		X				X							X					
ZZZZZZ	1.00	1058																									
ZZZZZZ	1.00	1103																									
PBW	1.00	1107					X		X		X				X							X					
EB	1.00	1112					X		X		X				X							X					
LCSW	1.00	1117					X		X		X				X							X					
2-170233	1.00	1121					X		X		X				X							X					
-170233D	1.00	1126					X		X		X				X							X					
-170233S	1.00	1130																									
2-170236	1.00	1135					X		X		X				X							X					
2-170239	1.00	1140					X		X		X				X							X					
CCV	1.00	1147					X		X		X				X							X					
CCB	1.00	1152					X		X		X				X							X					
-170233S	1.00	1157					X		X		X				X							X					
2-170242	1.00	1203																									
2-170245	1.00	1208					X		X		X				X							X					
2-170248	1.00	1213					X		X		X				X							X					
2-170251	1.00	1217					X		X		X				X							X					
2-170254	1.00	1222					X		X		X				X							X					
-170254L	1.00	1227					X		X		X				X							X					
170233PS	1.00	1232					X		X		X				X							X					
2-170242	1.00	1237					X		X		X				X							X					
CCV	1.00	1243					X		X		X				X							X					
CCB	1.00	1247					X		X		X				X							X					
ICSAB	1.00	1252					X		X		X				X							X					
ICSA	1.00	1257																									
CRI	1.00	1301							X		X				X							X					
CCV	1.00	1306					X		X		X				X							X					
CCB	1.00	1310					X		X		X				X							X					

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ANALYSIS RUN LOG

b Name: FERMCO______________ Contract: ________

.b Code: ______ Case No.: ______ SAS No.: ______ SDG No.: 4-0039

ıstrument ID Number: ICP2________ Method: P_

:art Date: 08/14/95 End Date: 08/14/95

EPA Sample No.	D/F	Time	% R	AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
STD1REP1	1.00	0858					X		X		X				X							X					
STD1REP2	1.00	0900					X		X		X				X							X					
STD1REP3	1.00	0901					X		X		X				X							X					
STD2REP1	1.00	0906					X		X		X				X							X					
STD2REP2	1.00	0907					X		X		X				X							X					
STD2REP3	1.00	0909					X		X		X				X							X					
STD2REP3	1.00	0920					X		X		X				X							X					
ICV	1.00	0926					X		X		X				X							X					
ICB	1.00	0931					X		X		X				X							X					
C[illegible]	1.00	0936							X		X				X							X					
[illegible]	1.00	0940																									
ICSAB	1.00	0945					X		X		X				X							X					
ZZZZZZ	1.00	0952																									
ZZZZZZ	1.00	0957																									
-170239L	1.00	1001					X		X		X				X							X					
ZZZZZZ	1.00	1006																									
ZZZZZZ	1.00	1011																									
ZZZZZZ	1.00	1015																									
ZZZZZZ	1.00	1020																									
CCV	1.00	1027					X		X		X				X							X					
CCB	1.00	1032					X		X		X				X							X					
ZZZZZZ	1.00	1036																									
ZZZZZZ	1.00	1041																									
ZZZZZZ	1.00	1046																									
ZZZZZZ	1.00	1050																									
ZZZZZZ	1.00	1055																									
ZZZZZZ	1.00	1100																									
ZZZZZZ	1.00	1104																									
ZZZZZZ	1.00	1109																									
ZZZZZZ	1.00	1114																									
ZZZZZZ	1.00	1118																									
CCV	1.00	1126					X		X		X				X							X					

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No.: SDG No.:4-0039

Instrument ID Number: ICP2 Method: P

Start Date: 08/14/95 End Date: 08/14/95

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1131					X		X		X				X							X					
ZZZZZZ	1.00	1138																									
ZZZZZZ	1.00	1143																									
ZZZZZZ	1.00	1149																									
ZZZZZZ	1.00	1154																									
ZZZZZZ	1.00	1158																									
ZZZZZZ	1.00	1203																									
ZZZZZZ	1.00	1208																									
ZZZZZZ	1.00	1212																									
ZZZZZZ	1.00	1217																									
ZZZZZZ	1.00	1221																									
CCV	1.00	1226					X		X		X				X							X					
CCB	1.00	1231					X		X		X				X							X					
ZZZZZZ	1.00	1236																									
ZZZZZZ	1.00	1240																									
ZZZZZZ	1.00	1245																									
ZZZZZZ	1.00	1250																									
ZZZZZZ	1.00	1254																									
ZZZZZZ	1.00	1259																									
ZZZZZZ	1.00	1304																									
ZZZZZZ	1.00	1308																									
CCV	1.00	1316					X		X		X				X							X					
CCB	1.00	1321					X		X		X				X							X					
ZZZZZZ	1.00	1328																									
ZZZZZZ	1.00	1332																									
ZZZZZZ	1.00	1337																									
ZZZZZZ	1.00	1341																									
ZZZZZZ	1.00	1346																									
ZZZZZZ	1.00	1351																									
ZZZZZZ	1.00	1355																									
ZZZZZZ	1.00	1400																									
ZZZZZZ	1.00	1405																									

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: FERMCO | Contract:

Lab Code: | Case No.: | SAS No.: | SDG No.:4-0039

Instrument ID Number: ICP2 | Method: P_

Start Date: 08/14/95 | End Date: 08/14/95

EPA Sample No.	D/F	Time	% R	AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1409																									
CCV	1.00	1414					X		X		X				X							X					
CCB	1.00	1419					X		X		X				X							X					
ICSAB	1.00	1423					X		X		X				X							X					
ICSA	1.00	1428																									
CRI	1.00	1432							X		X				X							X					
CCV	1.00	1437					X		X		X				X							X					
CCB	1.00	1442					X		X		X				X							X					

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14
ANALYSIS RUN LOG

Lab Name: FERMCO Contract: ____

Lab Code: ____ Case No.: ____ SAS No.: ____ SDG No.:4-0039

Instrument ID Number: 5100A Method: F_

Start Date: 08/07/95 End Date: 08/07/95

EPA Sample No.	D/F	Time	% R	AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	0824																									
ZZZZZZ	1.00	0827																									
ZZZZZZ	1.00	0841																									
STANDARD	1.00	0847				X																					
STANDARD	1.00	0852				X																					
STANDARD	1.00	0858				X																					
STANDARD	1.00	0903				X																					
ICV	1.00	0921				X																					
ICB	1.00	0927				X																					
CRA	1.00	0932				X																					
CRAA	1.00	0938	104.6			X																					
ZZZZZZ	1.00	0944																									
ZZZZZZA	1.00	0949	129.1																								
ZZZZZZ	1.00	0955																									
ZZZZZZA	1.00	1001	113.9																								
ZZZZZZ	1.00	1006																									
ZZZZZZA	1.00	1012	111.9																								
ZZZZZZ	1.00	1018																									
ZZZZZZA	1.00	1023	105.3																								
CCV	1.00	1029				X																					
CCB	1.00	1035				X																					
ZZZZZZ	1.00	1040																									
ZZZZZZA	1.00	1046	108.0																								
ZZZZZZ	1.00	1052																									
ZZZZZZA	1.00	1058	118.5																								
ZZZZZZ	1.00	1103																									
ZZZZZZA	1.00	1109	103.7																								
ZZZZZZ	1.00	1115																									
ZZZZZZA	1.00	1120	110.6																								
ZZZZZZ	1.00	1126																									
ZZZZZZA	1.00	1132	104.7																								
CCV	1.00	1137				X																					

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14
ANALYSIS RUN LOG

Lab Name: FERMCO Contract: ____

Lab Code: ____ Case No.: ____ SAS No.: ____ SDG No.: 4-0039

Instrument ID Number: 5100A Method: F

Start Date: 08/07/95 End Date: 08/07/95

EPA Sample No.	D/F	Time	% R	AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1143				X																					
ZZZZZZ	1.00	1149																									
ZZZZZZA	1.00	1155	113.5																								
ZZZZZZ	1.00	1200																									
ZZZZZZA	1.00	1206	113.2																								
ALCSW	1.00	1212																									
ALCSWA	1.00	1218	118.6																								
PBW	1.00	1224				X																					
PBWA	1.00	1230	107.8			X																					
F	1.00	1235				X																					
E	1.00	1241	111.2			X																					
CCV	1.00	1247				X																					
CCB	1.00	1252				X																					
2-170233	1.00	1258																									
-170233A	1.00	1304	112.1																								
-170233D	1.00	1309																									
170233DA	1.00	1315	102.4																								
-170233S	1.00	1321																									
170233SA	1.00	1327	106.5																								
2-170236	1.00	1333																									
-170236A	1.00	1338	103.6																								
2-170239	1.00	1344																									
-170239A	1.00	1350	102.3																								
CCV	1.00	1355				X																					
CCB	1.00	1401				X																					
ZZZZZZ	1.00	1407																									
ZZZZZZ	1.00	1412																									
CCV	1.00	1418				X																					
CCB	1.00	1424				X																					
CCV	1.00	1441				X																					
CCB	1.00	1447				X																					
2-170233	1.00	1452				X																					

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: FERMCO

Contract: ____

Lab Code: ____ Case No.: ____ SAS No.: ____ SDG No.: 4-0039

Instrument ID Number: 5100A Method: F

Start Date: 08/07/95 End Date: 08/07/95

EPA Sample No.	D/F	Time	% R	Analytes AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
-170233A	1.00	1458	110.8			X																					
-170233D	1.00	1503				X																					
170233DA	1.00	1509	117.8			X																					
-170233S	1.00	1515				X																					
170233SA	1.00	1521	130.8			X																					
2-170236	1.00	1526				X																					
-170236A	1.00	1532	105.6			X																					
2-170239	1.00	1538				X																					
-170239A	1.00	1543	103.0			X																					
CCV	1.00	1549				X																					
CCB	1.00	1554				X																					
2-170242	1.00	1600				X																					
-170242A	1.00	1606	102.0			X																					
2-170245	1.00	1612				X																					
-170245A	1.00	1617	106.5			X																					
2-170248	1.00	1623				X																					
-170248A	1.00	1629	105.7			X																					
2-170251	1.00	1634				X																					
-170251A	1.00	1640	103.6			X																					
2-170254	1.00	1646				X																					
-170254A	1.00	1652	97.0			X																					
CCV	1.00	1657				X																					
CCB	1.00	1703				X																					
ZZZZZZ	2.00	1709																									
ZZZZZZA	2.00	1715	116.7																								
ALCSW	2.00	1720				X																					
ALCSWA	2.00	1726	112.0			X																					
170233PS	1.00	1732				X																					
70233PSA	1.00	1738	123.1			X																					
ZZZZZZ	1.00	1743																									
ZZZZZZA	1.00	1749	115.6																								
ZZZZZZ	1.00	1755																									

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: FERMCO

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 4-0039

Instrument ID Number: 5100A

Method: F

Start Date: 08/07/95

End Date: 08/07/95

EPA Sample No.	D/F	Time	% R	AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZA	1.00	1801	101.5																								
CCV	1.00	1806				X																					
CCB	1.00	1812				X																					

FORM XIV - IN

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14
ANALYSIS RUN LOG

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No.: SDG No.:4-0039

Instrument ID Number: 5100C Method: F

Start Date: 08/09/95 End Date: 08/09/95

EPA Sample No.	D/F	Time	% R	AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	0904																									
ZZZZZZ	1.00	0910																									
ZZZZZZ	1.00	0916																									
STANDARD	1.00	0922																				X						
STANDARD	1.00	0928																				X						
STANDARD	1.00	0934																				X						
STANDARD	1.00	0940																				X						
ICV	1.00	0949																				X						
ICB	1.00	0955																				X						
CRA	1.00	1001																				X						
CRAA	1.00	1007	88.0																			X						
ALCSW	1.00	1013																				X						
ALCSWA	1.00	1019	87.0																			X						
PBW	1.00	1025																				X						
PBWA	1.00	1031	99.0																			X						
EB	1.00	1038																				X						
EBA	1.00	1044	109.0																			X						
ZZZZZZ	1.00	1050																									
ZZZZZZA	1.00	1056	88.0																								
CCV	1.00	1102																				X						
CCB	1.00	1108																				X						
2-170233	2.00	1114																									
-170233A	2.00	1120	115.0																								
-170233D	2.00	1126																									
170233DA	2.00	1133	109.0																								
-170233S	2.00	1139																									
170233SA	2.00	1145	112.5																								
170233PS	2.00	1151																									
70233PSA	2.00	1157	102.5																								
2-170236	2.00	1203																									
-170236A	2.00	1209	105.5																								
CCV	1.00	1215																				X						

000180

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: FERMCO Contract:

Lab Code: Case No.: SAS No.: SDG No.:4-0039

Instrument ID Number: 5100C Method: F_

Start Date: 08/09/95 End Date: 08/09/95

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1221																			X						
ZZZZZZ	1.00	1227																									
ZZZZZZ	1.00	1233																									
CCV	1.00	1239																			X						
CCB	1.00	1245																			X						
2-170233	2.00	1251																			X						
-170233A	2.00	1257	103.0																		X						
-170233D	2.00	1303																			X						
170233DA	2.00	1310	88.0																		X						
[illegible]0233S	2.00	1316																			X						
[illegible]233SA	2.00	1322	92.5																		X						
170233PS	2.00	1328																			X						
70233PSA	2.00	1334	91.5																		X						
2-170236	2.00	1340																			X						
-170236A	2.00	1346	87.5																		X						
CCV	1.00	1352																			X						
CCB	1.00	1358																			X						
2-170239	2.00	1404																			X						
-170239A	2.00	1411	97.0																		X						
2-170242	2.00	1417																			X						
-170242A	2.00	1423	89.0																		X						
2-170245	2.00	1429																			X						
-170245A	2.00	1435	100.0																		X						
2-170248	2.00	1441																			X						
-170248A	2.00	1447	85.0																		X						
ZZZZZZ	2.00	1453																									
ZZZZZZA	2.00	1459	105.0																								
CCV	1.00	1505																			X						
CCB	1.00	1511																			X						
ZZZZZZ	2.00	1517																									
ZZZZZZA	2.00	1524	91.0																								
ZZZZZZ	1.00	1530																									

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14
ANALYSIS RUN LOG

Lab Name: FERMCO Contract: ____________

Lab Code: _______ Case No.: _______ SAS No.: _______ SDG No.:4-0039

Instrument ID Number: 5100C Method: F_

Start Date: 08/09/95 End Date: 08/09/95

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZA	1.00	1536	83.0																								
ZZZZZZ	1.00	1542																									
ZZZZZZA	1.00	1548	57.0																								
ZZZZZZ	1.00	1554																									
ZZZZZZA	1.00	1600	73.0																								
ZZZZZZ	2.00	1606																									
ZZZZZZA	2.00	1613	67.5																								
CCV	1.00	1619																			X						
CCB	1.00	1625																			X						

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14
ANALYSIS RUN LOG

Lab Name: FERMCO

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 4-0039

Instrument ID Number: MA2

Method: CV

Start Date: 08/08/95

End Date: 08/08/95

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
STD1REP1	1.00	0915																X									
STD1REP2	1.00	0917																X									
STD1REP3	1.00	0919																X									
STD2REP1	1.00	0921																X									
STD2REP2	1.00	0924																X									
STD2REP3	1.00	0926																X									
STD3REP1	1.00	0929																X									
STD3REP2	1.00	0931																X									
STD3REP3	1.00	0934																X									
STD4REP1	1.00	0936																X									
STD4REP2	1.00	0939																X									
STD4REP3	1.00	0941																X									
STD5REP1	1.00	0944																X									
STD5REP2	1.00	0947																X									
STD5REP3	1.00	0949																X									
ICV	1.00	0953																X									
ICB	1.00	0955																X									
PBW	1.00	1003																X									
LCSW	1.00	1005																X									
CRA	1.00	1007																X									
ZZZZZZ	1.00	1010																									
ZZZZZZ	1.00	1012																									
ZZZZZZ	1.00	1014																									
ZZZZZZ	1.00	1016																									
ZZZZZZ	1.00	1018																									
ZZZZZZ	1.00	1020																									
ZZZZZZ	1.00	1023																									
CCV	1.00	1025																X									
CCB	1.00	1028																X									
ZZZZZZ	1.00	1030																									
ZZZZZZ	1.00	1032																									
ZZZZZZ	1.00	1034																									

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14
ANALYSIS RUN LOG

.ab Name: FERMCO

.ab Code: ______ Case No.: ______

nstrument ID Number: MA2

tart Date: 08/08/95

Contract: ______

SAS No.: ______ SDG No.:4-0039

Method: CV

End Date: 08/08/95

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1037																									
ZZZZZZ	1.00	1040																									
2-170233	1.00	1042																X									
-170233D	1.00	1044																X									
-170233S	1.00	1046																X									
2-170236	1.00	1048																X									
2-170239	1.00	1050																X									
CCV	1.00	1054																X									
CCB	1.00	1056																X									
2-170242	1.00	1058																X									
2-170245	1.00	1100																X									
2-170248	1.00	1103																X									
ZZZZZZ	1.00	1105																									
2-170251	1.00	1107																X									
2-170254	1.00	1109																X									
EB	1.00	1111																X									
CCV	1.00	1135																X									
CCB	1.00	1138																X									

Form Number: SPL - [illegible] - 2210

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FL[illegible]
RSO - ANALYTICAL

SITE-WIDE ANALYSIS REQUEST/CUSTODY RECORD

PROJECT: HF TANK CAR NEUTRALIZATION	**FOR SAMPLE RELATED PROBLEMS, CONTACT:**
☒ **PLAN NO.:** 95-1003 **OR** ☐ **PROJECT NO.:** NA	**ORGANIZATION:** WSS
PROJECT MANAGER/ENGINEER: JOHN LIPPERT	**NAME:** CAMILA **PHONE:** 5676
SAMPLER: RANDY ROUR 9281, TIM LOFTON 956 **PHONE:**	**SAMPLER REMARKS:** DUP
CHARGE NUMBER: 3BSU4 **LOT MARKING CODE:** W050-817-PC01-0001P6 INV300955, W050-817-PC01-CCU 16 INV W300465	
SAMPLER SIGNATURE(S): [signature]	DUP 95-1003-2 = LAB Q C
SEND RESULTS TO: CHRISTA NALLS 5673	[illegible]

CHECK FOR: ☒ S R LAB ☐ BIO LAB ☐ WTP LAB

SAMPLE SOURCE, DESCRIPTION/IDENTIFICATION, ANALYSIS REGIMEN

ITEM NO.	SAMPLE NUMBER	CUSTOMER NUMBER	SAMPLE POINT	MATRIX CODE	COLLECTED DATE	COLLECTED TIME	CONTAINER/VOLUME	COMPOSITE	GRAB	NO. OF CONTAINERS	1461-PCI	2442-OCC	4455-2053-POO	1088-POO	3637-PCC									REMARKS
1	[illegible]70233	95-1003-1	PLT6/L2	M324	7-31-95	745	8oz GL		✓	1	✓													T-Table INV 300955 T-2
2	[illegible]70234	95-1003-1	PLT6/L2	M324	7-31-95	745	8oz GL		✓	1		✓	✓	✓										T-17,16
3	[illegible]70235	95-1003-1	PLT6/L2	M324	7-31-95	745	8oz		✓	1					✓									T-17
4	[illegible]70236	95-1003-2	PLT6/L2	M324	7-31-95	800	8oz GL		✓	1	✓													INV 300955 T-L DUP
5	[illegible]70237	95-1003-2	PLT6/L2	M324	7-31-95	800	8oz GL		✓	1		✓	✓	✓										T-17,16
6	[illegible]70238	95-1003-2	PLT6/L2	M324	7-31-95	800	8oz GL		✓	1					✓									T-17
7	[illegible]70239	95-1003-3	PLT6/L2	M324	7-31-95	830	8oz GL		✓	1	✓													INV 300465 T-2
8	[illegible]70240	95-1003-3	PLT6/L2	M324	7-31-95	830	8oz GL		✓	1		✓	✓	✓										T-17,16
9	[illegible]70241	95-1003-3	PLT6/L2	M324	7-31-95	830	8oz GL		✓	1					✓									T-17
10	Nothing Taken this Line																							

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME	ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
1-9 LAB	[signature]	[signature]	7-31-95	1411					
ALL [illegible]	[signature]	[signature]	[illegible]	[illegible]					

000185

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2	REQUESTER
3	SAMPLER

Form Number: 12-95-2216

FEMP

RSO - ANALYTICAL

SITE-WIDE ANALYSIS REQUEST/CUSTODY RECORD

PROJECT: UF TANK CAR NEUTRALIZATION

☑ PLAN NO.: 95-1003 OR ☐ PROJECT NO.: NA

PROJECT MANAGER/ENGINEER: John Lippert

SAMPLER: Randy Rohr 9[illegible] / Tim Lofton 95[illegible]

PHONE:

CHARGE NUMBER: 3BSU4

LOT MARKING CODE: W038-917-P[illegible]-00[illegible]55 INV 301063 / W[illegible]-317-P[illegible]-00[illegible]7 INV 301207 / W[illegible]-817-P[illegible]-002[illegible] INV 301220

SAMPLER SIGNATURE(S): [signature]

SEND RESULTS TO: CHRISTA WALLS 5[illegible]73

FOR SAMPLE RELATED PROBLEMS, CONTACT:

ORGANIZATION: WSS

NAME: CAMILA

PHONE: 5676

SAMPLER REMARKS:

11xxc07806

CHECK FOR: ☑ S R LAB ☐ BIO LAB ☐ WTP LAB

SAMPLE SOURCE, DESCRIPTION/IDENTIFICATION, ANALYSIS REGIMEN

ITEM NO.	SAMPLE NUMBER	CUSTOMER NUMBER	SAMPLE POINT	MATRIX CODE	COLLECTED DATE	COLLECTED TIME	CONTAINER/VOLUME	COMPOSITE	GRAB	NO. OF CONTAINERS	2401-P01	2042-P0C	2053-P00	1052-P00	2057-P0C	REMARKS
																T = Table
1	[illegible]170242	95-1003-4	NLT6/L2	M324	7-31-95	845	8oz GL		✓	1	✓					INV 301063 T2
2	[illegible]170243	95-1003-4	NLT6/L2	M324	7-31-95	845	8oz GL		✓	1		✓	✓	✓		T 17,16
3	[illegible]170244	95-1003-4	PLT6/L2	M324	7-31-95	845	8oz GL		✓	1					✓	T 17
4	[illegible]170245	95-1003-5	PLT6/L2	M324	7-31-95	915	8oz GL		✓	1	✓					INV 301207 T2
5	[illegible]170246	95-1003-5	PLT6/L2	M324	7-31-95	915	8oz GL		✓	1		✓	–	✓		T 17,16
6	[illegible]170247	95-1003-5	PLT6/L2	M324	7-31-95	915	8oz GL		✓	1					✓	T 17
7	[illegible]170248	95-1003-6	PLT6/L2	M324	7-31-95	945	8oz GL		✓	1	✓					INV 301220 T2
8	[illegible]170249	95-1003-6	PLT6/L2	M324	7-31-95	945	8oz GL		✓	1		✓	✓	–		T 17,16
9	[illegible]170250	95-1003-6	PLT6/L2	M324	7-31-95	945	8oz GL		✓	1					✓	T 17
10			Nothing below this line													

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
1-9 LAB	[signature]	[signature]	7-31-95	1400
[illegible]	Sally Sh[illegible]	[signature]	[illegible]	1530

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME

NO.	DISTRIBUTION OF COPIES
1	LABORATORY
2	REQUESTER
3	SAMPLER

FE...
RSO - ANALYTICAL

Form Number: R - 1 - 2211

SITE-WIDE ANALYSIS REQUEST/CUSTODY RECORD

PROJECT: HF TANK CAR NeutRAlizATION

☒ PLAN NO.: 95-1003 **OR ☐ PROJECT NO.:** NA

PROJECT MANAGER/ENGINEER: John LipHART

SAMPLER: RANDY ROHR 3281 / TIM LOFTON 956 **PHONE:**

CHARGE NUMBER: 3BSU4 **LOT MARKING CODE:** EQUIPMENT RINSATE FIELD BLANK

SAMPLER SIGNATURE(S): [signature]

SEND RESULTS TO: CHRISTA WALLS 5673

FOR SAMPLE RELATED PROBLEMS, CONTACT:
ORGANIZATION: IUSS
NAME: Camilla **PHONE:** 5676

SAMPLER REMARKS: [signature]

CHECK FOR: ☒ S R LAB ☐ BIO LAB ☐ WTP LAB

SAMPLE SOURCE, DESCRIPTION/IDENTIFICATION, ANALYSIS REGIMEN

ITEM NO.	SAMPLE NUMBER	CUSTOMER NUMBER	SAMPLE POINT	MATRIX CODE	COLLECTED DATE	COLLECTED TIME	CONTAINER/ VOLUME	COMPOSITE	GRAB	NO. OF CONTAINERS	3447-P13 UC2	2442-P11 UC2	2027-P11 UH1	REMARKS T= Table
1	00170061	95-1003-LK	PKT6/LZ	M325	7-31-95	1000	L PH		✓	1	✓			T-3 .150
2	00170252	95-1003 EK	PKT6/LZ	M325	7-31-95	1010	8oz GL			1		✓		T-17 .150
3	00170253	95-1003 LK	PKT6/LZ	M325	7-31-95	1001	32oz GL		✓	1			✓	T-17 .150
4	00170254	95-1003 FL	PKT6/LZ	M325	7-31-95	1015	PH		✓	1	✓			T-3 .150
5	00170255	95-1003 FB	PKT6/LZ	M325	7-31-95	1015	8oz GL		✓	1		✓		T-17 .150
6	00170256	95-1003 FB	PKT6/LZ	M325	7-31-95	1015	8oz GL		✓	1			✓	T-17 .150
7	Nothing below this line													
8														
9														
10														

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME
1-6 LAB	[signature]	Jerry [signature]	7-31-95	1400
	[signature]			

ITEM/REASON	RELINQUISHED BY	RECEIVED BY	DATE	TIME

NO.	DISTRIBUTION OF COPIES
1	LABORATORY
2	REQUESTER
3	SAMPLER

FS-F-3361 (REV. 3/25/93)

000187

7222

ATTACHMENT C

DECONTAMINATION RINSATE SYSTEM DATA

FOSTER WHEELER ENVIRONMENTAL CORPORATION

BY JEFF T. DATE ________ SHEET 1 OF 2

CHKD. BY [illegible] DATE 8/3/95 OFS NO. ________ DEPT. NO. BG

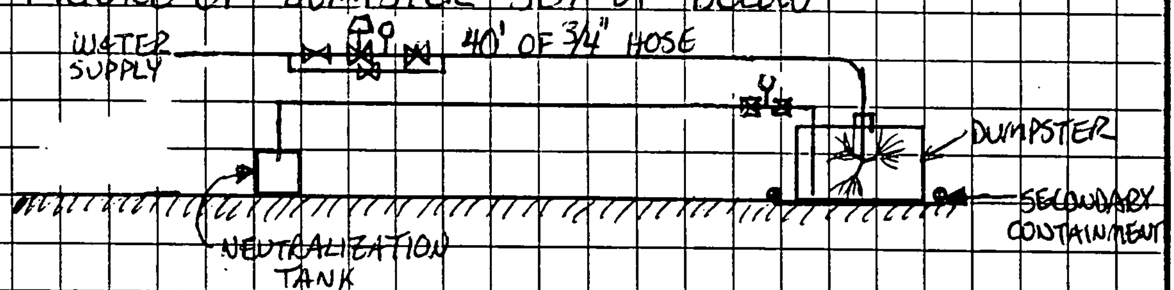
CLIENT FERMCO - FERNALD, OHIO

PROJECT H.F. TANK CAR CERTIFICATION REPORT

SUBJECT CALCULATIONS FOR DUMPSTER FLOW THROUGH RINSE NOZZLE

PURPOSE: • TO CALCULATE THE HF ~~TANK~~ JET DUMPSTER RINSATE FLOW THROUGH THE CLEANING NOZZLE

GIVEN: • NOZZLE WASHER PERFORMANCE SPECIFICATIONS (ATTACHED)
• FLOW OF WATER THROUGH SCHEDULE 40 STEEL PIPE (ATTACHED)
• 40 FT OF 3/4" PIPE
• FIGURE OF DUMPSTER SET-UP BELOW



FIND: • PRESSURE LOSS THROUGH 40 FT OF 3/4" PIPE
• FLOW RATE OF NOZZLES AT PREDETERMINED PRESSURES

METHOD: • ASSUMING CERTAIN FLOW RATES LISTED BELOW, THE PRESSURE DROPS (ΔP) OF 40 FT OF 3/4" PIPE WERE CALCULATED USING THE FLOW OF WATER THROUGH SCHEDULE 40 STEEL PIPE TABLE

FLOW (gpm)	ΔP_{100} (PSI)	ΔP_{40} (PSI)*
0	0	0
5	2.75	1.10
10	9.99	3.99
15	21.60	8.64
20	37.80	15.10

$* \Delta P_{40} = 0.4 \Delta P_{100}$

• USING THE NOZZLE WASHER PERFORMANCE SPECIFICATIONS ATTACHED AND THE ABOVE DATA, A GRAPH WAS CONSTRUCTED SHOWING FLOWS RELATIVE TO [illegible]

FWENC 581/2-95

FOSTER WHEELER ENVIRONMENTAL CORPORATION

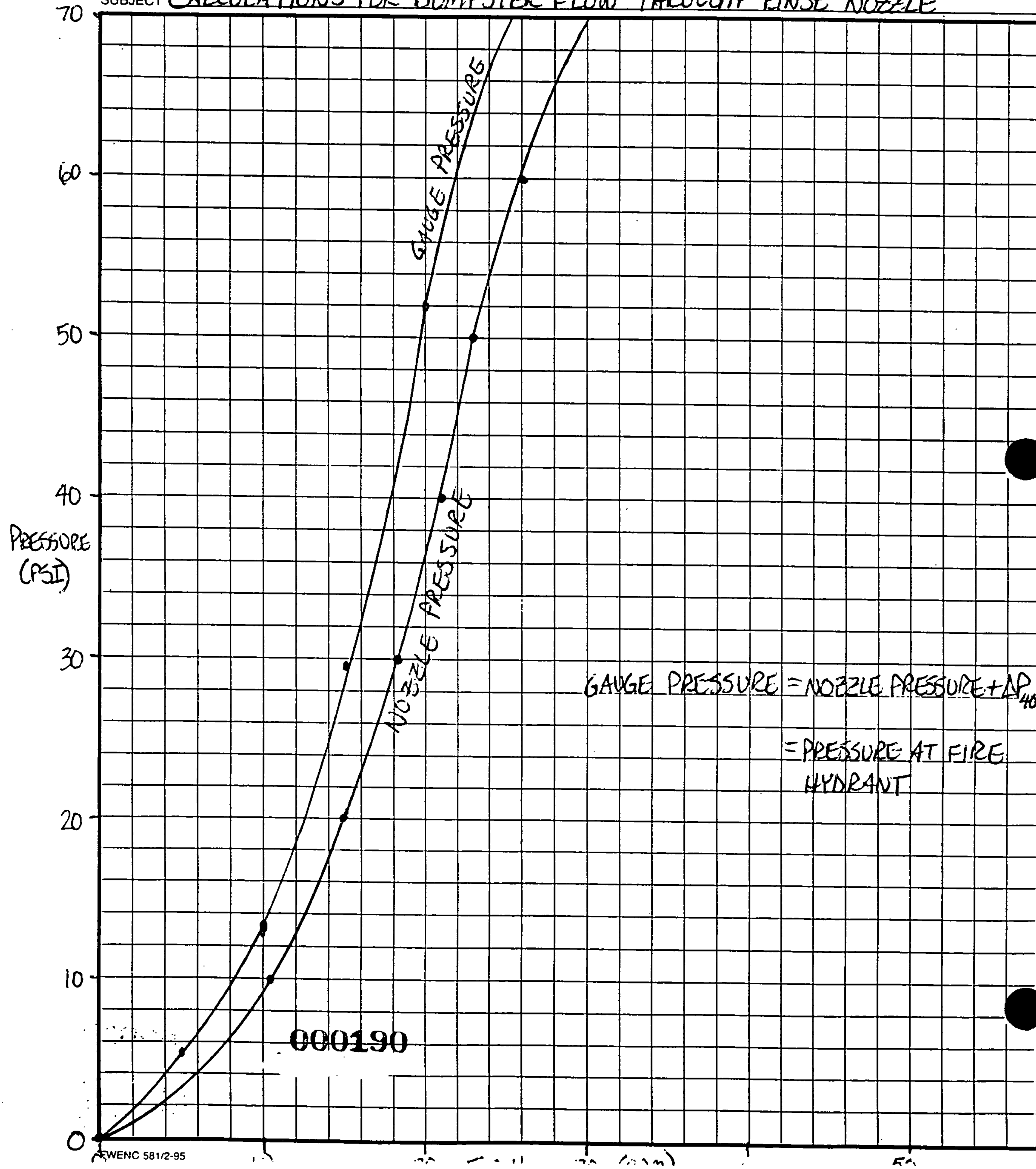
BY JEFF T. DATE 7/31/95 SHEET 2 OF 2

CHKD. BY SPR DATE 8/3/95 OFS NO. ______ DEPT. NO. BE

CLIENT FERMCO - FERNALD, OHIO

PROJECT H.F. TANK CAR CERTIFICATION REPORT

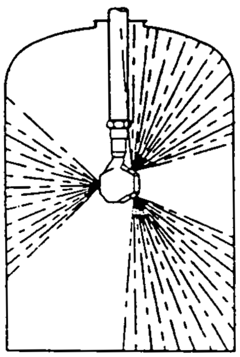
SUBJECT CALCULATIONS FOR DUMPSTER FLOW THROUGH RINSE NOZZLE



000190

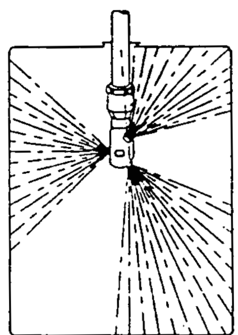
ROTATING TYPE
TANK & DRUM
CLEANING NOZZLE

18250



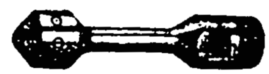
COMPACT
ROTATING TYPE
DRUM
CLEANING NOZZLE

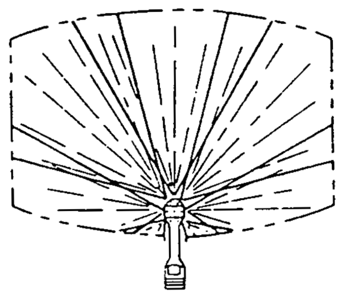
21400



KEG
WASHING NOZZLES

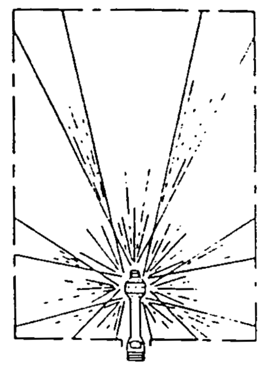
15498





DRUM
WASHING NOZZLES

3150



DESIGN FEATURES

The 21400 and 18250 rotating type nozzles provide effective internal scrubbing of small tanks and drums.

Both the 21400 and the 18250 feature three high impact flat sprays mounted in a rotating spray head which is driven by the flow of the cleaning liquid. These orifices are precisely positioned to provide complete orbital coverage of all interior surfaces.

Bearings and races on both models are constructed of hardened stainless steel for maximum wear life, or 316 stainless steel for maximum corrosion resistance. High impact scouring is achieved with spray pressures up to 100 psi (7 bar).

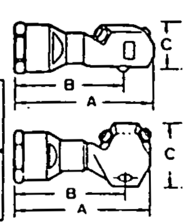
The 21400 compact rotating type drum cleaning nozzle fits through openings just 2¼" (60 mm) in diameter and weighs just 1 lb. (.45 kg), making it perfect for drum and barrel washing. Low capacity flat spray tips are ideal for cleaning small vessels.

The 18250 rotating type tank and drum cleaning nozzle fits through holes just 2⁷⁄₃₂" (60 mm) in diameter and weighs 1.5 lbs. (.68 kg.). Slightly larger orifice capacities are available for effective cleaning of tanks, barrels, and drums.

PERFORMANCE DATA

Nozzle Order No.	CAPACITY (gallons per minute)					
	10 psi	20 psi	30 psi	40 psi	50 psi	60 psi
21400-HSS10-316SS	5	7.1	8.7	10	11.2	12.2
21400-HSS18-316SS	9	12.7	15.6	18	20	22
18250-HSS21-316SS	10.5	14 8	18.2	21	23	26
18250-HSS45-316SS	23	32	39	45	50	55

DIMENSIONS & WEIGHTS



Nozzle No.	Pipe Conn. NPT (F)	A	B	C	Hex.	Net Weight
21400—	¾"	5"	4⅛"	1²¹⁄₃₂"	1¾"	1 lb.
18250—	¾"	4¹³⁄₁₆"	3¹⁵⁄₁₆"	2³⁄₁₆" Diam.	1¾"	1 5 lb.

DESIGN FEATURES

The 15498 and 3150 keg and drum washing nozzles are specially designed for the efficient cleaning of smaller vessels.

Both models offer a choice of 15 or 21 full cone spray tips which spray all interior surfaces at pressures up to 150 psi (10 bar).

The type 15498 is designed to pass through a standard keg bung, and to fit on automatic keg washers. The maximum spray head diameter is 1⅜" (35 mm) with a ⅝" (16 mm) neck which allows for drainage while washing. Stainless steel construction provides maximum corrosion resistance.

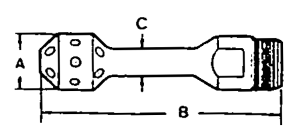
The type 3150 is available in brass or stainless steel. It features a maximum spray head diameter of 1⅝" (41 mm) with a ¾" (19 mm) neck to allow drainage during washing.

PERFORMANCE DATA

Nozzle Order No.	CAPACITY (gallons per minute)							
	10 psi	20 psi	30 psi	40 psi	60 psi	80 psi	100 psi	150 psi
15498-15-SS	–	–	–	–	5.5	6.3	7 0	8.5
15498-21-SS	–	–	–	–	7.7	8.7	9.6	11 7
3150-15	5.2	7.3	8.7	9 9	12.1	13.8	15.3	19 0
3150-21	7.0	9.8	11 7	13.3	16.2	18.5	20.6	25.6

DIMENSIONS & WEIGHTS

Based on largest/heaviest version of each type



Nozzle No.	Pipe Conn, NPT (M)	A Diam.	B	C Diam.	Net Weight
15498—	1"	1⅜"	6⅛"	⅝"	1⅛ lb.
3150—	1"	1¹¹⁄₁₆"	6⁹⁄₁₆"	¼"	[illegible]

G3
SPECIAL PURPOSE NOZZLES

Flow of Water Through Schedule 40 Steel Pipe

Discharge		Pressure Drop per 100 feet and Velocity in Schedule 40 Pipe for Water at 60 F.															
Gallons per Minute	Cubic Ft. per Second	Velocity Feet per Second	Press. Drop Lbs. per Sq. In.	Velocity Feet per Second	Press. Drop Lbs. per Sq. In.	Velocity Feet per Second	Press. Drop Lbs. per Sq. In.	Velocity Feet per Second	Press. Drop Lbs. per Sq. In.	Velocity Feet per Second	Press. Drop Lbs. per Sq. In.	Velocity Feet per Second	Press. Drop Lbs. per Sq. In.	Velocity Feet per Second	Press. Drop Lbs. per Sq. In.	Velocity Feet per Second	Press. Drop Lbs. per Sq. In.
		1/8"		1/4"		3/8"		1/2"									
.2	0.000446	1.13	1.86	0.616	0.359												
.3	0.000668	1.69	4.22	0.924	0.903	0.504	0.159	0.317	0.061								
										3/4"							
.4	0.000891	2.26	6.98	1.23	1.61	0.672	0.345	0.422	0.086								
.5	0.00111	2.82	10.5	1.54	2.39	0.840	0.539	0.528	0.167	0.301	0.033						
.6	0.00134	3.39	14.7	1.85	3.29	1.01	0.751	0.633	0.240	0.361	0.041						
.8	0.00178	4.52	25.0	2.40	5.44	1.34	1.25	0.844	0.408	0.481	0.102						
												1"		1 1/4"		1 1/2"	
1	0.00223	5.65	37.2	3.08	8.28	1.68	1.85	1.06	0.600	0.602	0.155	0.371	0.048				
2	0.00446	11.29	134.4	6.16	30.1	3.36	6.58	2.11	2.10	1.20	0.526	0.743	0.164	0.429	0.044		
3	0.00668			9.25	64.1	5.04	13.9	3.17	4.33	1.81	1.09	1.114	0.336	0.644	0.090	0.473	0.043
4	0.00891			12.33	111.2	6.72	23.9	4.22	7.42	2.41	1.83	1.49	0.565	0.858	0.150	0.610	0.071
		2"															
5	0.01114					8.40	36.7	5.28	11.2	3.01	2.75	1.86	0.835	1.073	0.223	0.788	0.104
				2 1/2"													
6	0.01337	0.574	0.044			10.08	51.9	6.31	15.8	3.61	3.84	2.23	1.17	1.29	0.309	0.946	0.145
8	0.01782	0.765	0.073			13.44	91.1	8.45	27.7	4.81	6.60	2.97	1.99	1.72	0.518	1.26	0.241
10	0.02228	0.956	0.108	0.670	0.046			10.56	42.4	6.02	9.99	3.71	2.99	2.15	0.774	1.58	0.361
						3"											
15	0.03342	1.43	0.224	1.01	0.094					9.03	21.6	5.57	6.36	3.22	1.63	2.37	0.755
								3 1/2"									
20	0.04456	1.91	0.375	1.34	0.158	0.868	0.056			12.03	37.8	7.43	10.9	4.29	2.78	3.16	1.28
										4"							
25	0.05570	2.39	0.561	1.68	0.234	1.09	0.083	0.812	0.041			9.28	16.7	5.37	4.22	3.94	1.93
30	0.06684	2.87	0.786	2.01	0.327	1.30	0.114	0.974	0.056			11.14	23.8	6.44	5.92	4.73	2.72
35	0.07798	3.35	1.05	2.35	0.436	1.52	0.151	1.14	0.071	0.882	0.041	12.99	32.2	7.51	7.90	5.52	3.64
40	0.08912	3.83	1.35	2.68	0.556	1.74	0.192	1.30	0.095	1.01	0.052	14.85	41.5	8.59	10.24	6.30	4.65
45	0.1003	4.30	1.67	3.02	0.668	1.95	0.239	1.46	0.117	1.13	0.064			9.67	12.80	7.09	5.85
												5"					
50	0.1114	4.78	2.03	3.35	0.839	2.17	0.288	1.62	0.142	1.26	0.076			10.74	15.66	7.88	7.15
60	0.1337	5.74	2.87	4.02	1.18	2.60	0.406	1.95	0.204	1.51	0.107			12.89	22.2	9.47	10.21
70	0.1560	6.70	3.84	4.69	1.59	3.04	0.540	2.27	0.261	1.76	0.143	1.12	0.047			11.05	13.71
80	0.1782	7.65	4.97	5.36	2.03	3.47	0.687	2.60	0.334	2.02	0.180	1.28	0.060			12.62	17.59
														6"			
90	0.2005	8.60	6.20	6.03	2.53	3.91	0.861	2.92	0.416	2.27	0.224	1.44	0.074			14.20	22.0
100	0.2228	9.56	7.59	6.70	3.09	4.34	1.05	3.25	0.509	2.52	0.272	1.60	0.090	1.11	0.036	15.78	26.9
125	0.2785	11.97	11.76	8.38	4.71	5.43	1.61	4.06	0.769	3.15	0.415	2.01	0.135	1.39	0.055	19.72	41.4
150	0.3342	14.36	16.70	10.05	6.69	6.51	2.24	4.87	1.08	3.78	0.580	2.41	0.190	1.67	0.077		
175	0.3899	16.75	22.3	11.73	8.97	7.60	3.00	5.68	1.44	4.41	0.774	2.81	0.253	1.94	0.102		
																8"	
200	0.4456	19.14	28.8	13.42	11.68	8.68	3.87	6.49	1.85	5.04	0.985	3.21	0.323	2.22	0.130		
225	0.5013	...	...	15.09	14.63	9.77	4.83	7.30	2.32	5.67	1.23	3.61	0.401	2.50	0.162	1.44	0.043
250	0.557	...	...	...	...	10.85	5.93	8.12	2.84	6.30	1.46	4.01	0.495	2.78	0.195	1.60	0.051
275	0.6127	...	...	...	...	11.94	7.14	8.93	3.40	6.93	1.79	4.41	0.583	3.05	0.234	1.76	0.061
300	0.6684	...	...	...	...	13.00	8.36	9.74	4.02	7.56	2.11	4.81	0.683	3.33	0.275	1.92	0.072
325	0.7241	...	...	...	...	14.12	9.89	10.53	4.09	8.19	2.47	5.21	0.797	3.61	0.320	2.08	0.083
350	0.7798			...	...	...	...	11.36	5.41	8.82	2.84	5.62	0.919	3.89	0.367	2.24	0.095
375	0.8355			...	...	...	...	12.17	6.18	9.45	3.25	6.02	1.05	4.16	0.416	2.40	0.108
400	0.8912			...	...	...	...	12.98	7.03	10.08	3.68	6.42	1.19	4.44	0.471	2.56	0.121
425	0.9469			...	...	...	...	13.80	7.89	10.71	4.12	6.82	1.33	4.72	0.529	2.73	0.136
		10"															
450	1.003			...	...	...	...	14.61	8.80	11.34	4.60	7.22	1.48	5.00	0.590	2.89	0.151
475	1.059	1.93	0.054			...	...	...	...	11.97	5.12	7.62	1.64	5.27	0.653	3.04	0.166
500	1.114	2.03	0.059			...	...	...	...	12.60	5.65	8.02	1.81	5.55	0.720	3.21	0.182
550	1.225	2.24	0.071			...	...	...	...	13.85	6.79	8.82	2.17	6.11	0.861	3.53	0.219
600	1.337	2.44	0.083			...	...	...	...	15.12	8.04	9.63	2.55	6.66	1.02	3.85	0.258
				12"													
650	1.448	2.64	0.097			...	...	...	...	...	...	10.43	2.98	7.22	1.18	4.17	0.301
700	1.560	2.85	0.112	2.01	0.047			...	...	...	...	11.23	3.43	7.78	1.35	4.49	0.343
						14"											
750	1.671	3.05	0.127	2.15	0.054			...	...	...	...	12.03	3.92	8.33	1.55	4.81	0.392
800	1.782	3.25	0.143	2.29	0.061			...	...	...	...	12.83	4.43	8.88	1.75	5.13	0.443
850	1.894	3.46	0.160	2.44	0.068	2.02	0.042	...	...	...	...	13.64	5.00	9.44	1.96	5.45	0.497
900	2.005	3.66	0.179	2.58	0.075	2.13	0.047	...	...	...	...	14.44	5.58	9.99	2.18	5.77	0.554
950	2.117	3.86	0.198	2.72	0.083	2.25	0.052			...	...	15.24	6.21	10.55	2.42	6.09	0.613
								16"									
1 000	2.228	4.07	0.218	2.87	0.091	2.37	0.057			...	...	16.04	6.84	11.10	2.68	6.41	0.675
1 100	2.451	4.48	0.260	3.15	0.110	2.61	0.068			...	...	17.65	8.23	12.22	3.22	7.05	0.807
1 200	2.674	4.88	0.306	3.44	0.128	2.85	0.080	2.18	0.042	...	...	...	...	13.33	3.81	7.70	0.948
1 300	2.896	5.29	0.355	3.73	0.150	3.08	0.093	2.36	0.048	...	...	...	...	14.43	4.45	8.33	1.11
1 400	3.119	5.70	0.409	4.01	0.171	3.32	0.107	2.54	0.055					15.55	5.13	8.98	1.28
										18"							
1 500	3.342	6.10	0.466	4.30	0.195	3.56	0.122	2.72	0.063					16.66	5.85	9.62	1.46
1 600	3.565	6.51	0.527	4.59	0.219	3.79	0.138	2.90	0.071					17.77	6.61	10.26	1.65
1 800	4.010	7.32	0.663	5.16	0.276	4.27	0.172	3.27	0.088	2.58	0.050			19.99	8.37	11.54	2.08
2 000	4.456	8.14	0.808	5.73	0.339	4.74	0.209	3.63	0.107	2.87	0.060			22.21	10.3	12.82	2.55
												20"					
2 500	5.570	10.17	1.24	7.17	0.515	5.93	0.321	4.54	0.163	3.59	0.091					16.03	3.94
														24"			
3 000	6.684	12.20	1.76	8.60	0.731	7.11	0.451	5.45	0.232	4.30	0.129	3.46	0.075			19.24	5.59
3 500	7.798	14.24	2.38	10.03	0.982	8.30	0.607	6.35	0.312	5.02	0.173	4.04	0.101			22.44	7.56
4 000	8.912	16.27	3.08	11.47	1.27	9.48	0.787	7.26	0.401	5.74	0.222	4.62	0.129	3.19	0.052	25.65	9.80
4 500	10.03	18.31	3.87	12.90	1.60	10.67	0.990	8.17	0.503	6.46	0.280	5.20	0.162	3.59	0.065	28.87	12.2
5 000	11.14	20.35	4.71	14.33	1.95	11.85	1.21	9.08	0.617	7.17	0.340	5.77	0.199	3.99	0.079	...	...
6 000	13.37	24.41	6.74	17.20	2.77	14.23	1.71	10.89	0.877	8.61	0.483	6.93	0.280	4.79	0.111	...	...
7 000	15.60	28.49	9.11	20.07	3.74	16.60	2.31	12.71	1.18	10.04	0.652	8.08	0.376	5.59	0.150	...	...
8 000	17.82	...	...	22.93	4.84	18.96	2.99	14.52	1.51	11.47	0.839	9.23	0.488	6.38	0.192	...	...
9 000	20.05	...	...	25.79	6.09	21.34	3.76	16.34	1.90	12.91	1.05	10.39	0.608	7.18	0.242	...	...
10 000	22.28	...	...	28.66	7.46	23.71	4.61	18.15	2.34	14.34	1.28	11.54	0.739	7.98	0.294	...	...
12 000	26.74	...	...	34.40	10.7	28.45	6.59	21.79	3.33	17.21	1.83	13.85	1.06	9.58	0.416	...	...
14 000	31.19	...	...	...	...	33.19	8.89	25.42	4.49	20.08	2.45	16.16	1.43	11.17	0.562	...	...
16 000	35.65	...	...	...	...	...	...	29.05	5.83	22.95	3.18	18.47	1.85	12.77	0.723	...	...
18 000	40.10	...	...	...	...	...	...	32.68	7.31	25.82	4.03	20.77	2.32	14.36	0.907	...	...
20 000	44.56	...	...	...	...	...	...	36.31	9.03	28.69	4.93	23.08	2.86	15.96	1.12	...	...

For pipe lengths other than 100 feet, the pressure drop is proportional to the length. Thus, for 50 feet of pipe, the pressure drop is approximately one-half value given in the table . . . for 300 feet, three times the given value, etc.

Velocity is a function of the cross sectional flow area; thus, it is constant for a given flow rate and is independent of pipe length.

For calculations for pipe other than Schedule 40, see explanation on next page.

FOSTER WHEELER ENVIRONMENTAL CORPORATION

BY: JEFF T. DATE 7/31/95 SHEET 1 OF 1

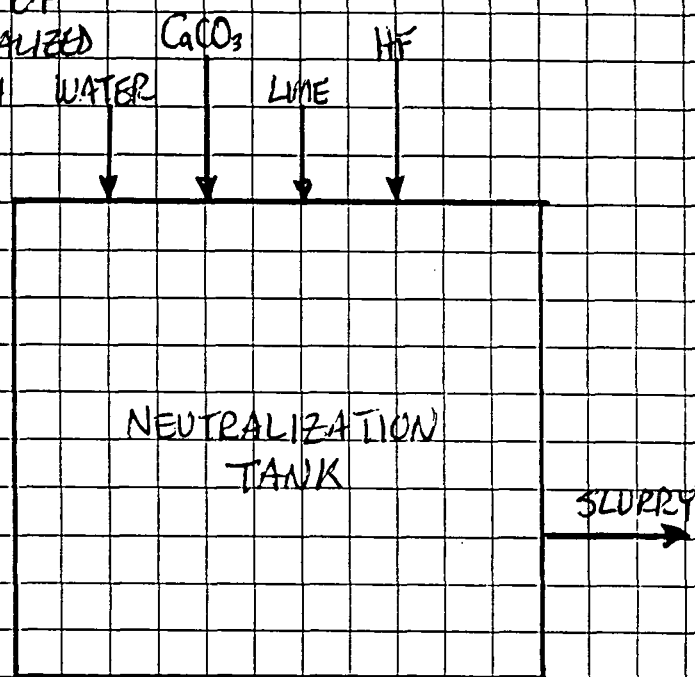
CHKD. BY: DM DATE 8/3/95 OFS NO. ____ DEPT. NO. BE

CLIENT: FERMCO – FERNALD, OHIO

PROJECT: HF TANK CAR P.E. CERTIFICATION REPORT

SUBJECT: CALCULATION TO ESTIMATE HOW MUCH HF WAS NEUTRALIZED EACH BA[TCH]

FIND: GALLONS OF HF NEUTRALIZED EACH BATCH



GIVEN:

$\rho_{H_2O} = 8.305\ \#/GAL$

$\rho_{HF_{28.7}} = 9.02\ \#/GAL$

$\rho_{HF_{10.8}} = 8.60\ \#/GAL$

$\rho_{SLURRY} = 8.80\ \#/GAL$

$(WATER(GAL) \times 8.305\ \#/GAL) + CaCO_3(\#) + LIME(\#) + HF(\#) = SLURRY(\#)$

$$HF_{28.7}(GAL) = \frac{-[WATER(GAL) * (8.305\ \#/GAL) + CaCO_3(\#) + LIME(\#)] + SLURRY(GAL) * (8.8\ \#/GAL)}{9.02\ \#/GAL}$$

$$HF_{10.8}(GAL) = \frac{(SLURRY(GAL) * 8.8\ \#/GAL) - (WATER(GAL) * 8.305\ \#/GAL) - CaCO_3(\#) - LIME(\#)}{8.60\ \#/GAL}$$

KNOW:
- \# OF $CaCO_3$ ADDED TO EACH BATCH
- \# OF LIME ADDED TO EACH BATCH
- GALLONS OF WATER ADDED TO EACH BATCH
- GALLONS OF SLURRY PRODUCED

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[redacted]

FWENC 581/2-95

FOSTER WHEELER ENVIRONMENTAL CORPORATION

BY JEFF T. DATE 7/31/95 SHEET 1 OF 3
CHKD. BY [initials] DATE 8/3/95 OFS NO. DEPT. NO. BE
CLIENT FERMCO - FERNALD, OHIO
PROJECT HF TANK CAR P.E. CERTIFICATION REPORT
SUBJECT CALCULATIONS FOR HF TANK CAR RINSATE FLOW THROUGH CHEMDET 600 NOZZLE

PURPOSE: • TO CALCULATE THE HF TANK CAR RINSATE FLOW THROUGH A CHEMDET CLEANING NOZZLE WITH TWO 8mm NOZZLES (FURY 600 TANK WASHER)

GIVEN: • FURY 600 TANK WASHER PERFORMANCE SPECIFICATIONS (ATTACHED)
• FLOW OF WATER THROUGH SCHEDULE 40 STEEL PIPE (ATTACHED)
• 300 FEET OF 1½" PIPE

FIND: • PRESSURE LOSS THROUGH 300 FT OF 1½" PIPE
• FLOW RATE OF NOZZLES AT PREDETERMINED PRESSURES

METHOD: • ASSUMING CERTAIN FLOW RATES LISTED BELOW, THE PRESSURE DROPS (ΔP) OF 300 FT OF 1½" PIPE WERE CALCULATED USING THE FLOW OF WATER THROUGH SCHEDULE 40 STEEL PIPE TABLE ATTACHED

FLOW	ΔP_{100}	ΔP_{300} *
30 gpm	2.72 PSI	8.16 PSI
40 gpm	4.65 PSI	13.95 PSI
50 gpm	7.15 PSI	21.45 PSI
60 gpm	10.21 PSI	30.63 PSI
70 gpm	13.71 PSI	41.13 PSI

* $\Delta P_{300} = 3 * \Delta P_{100}$

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• USING THE FURY 600 TANK WASHER PERFORMANCE SPECIFICATIONS ATTACHED, AND THE ABOVE DATA, A GRAPH WAS CONSTRUCTED SHOWING FLOWS RELATIVE TO PRESSURES

FOSTER WHEELER ENVIRONMENTAL CORPORATION

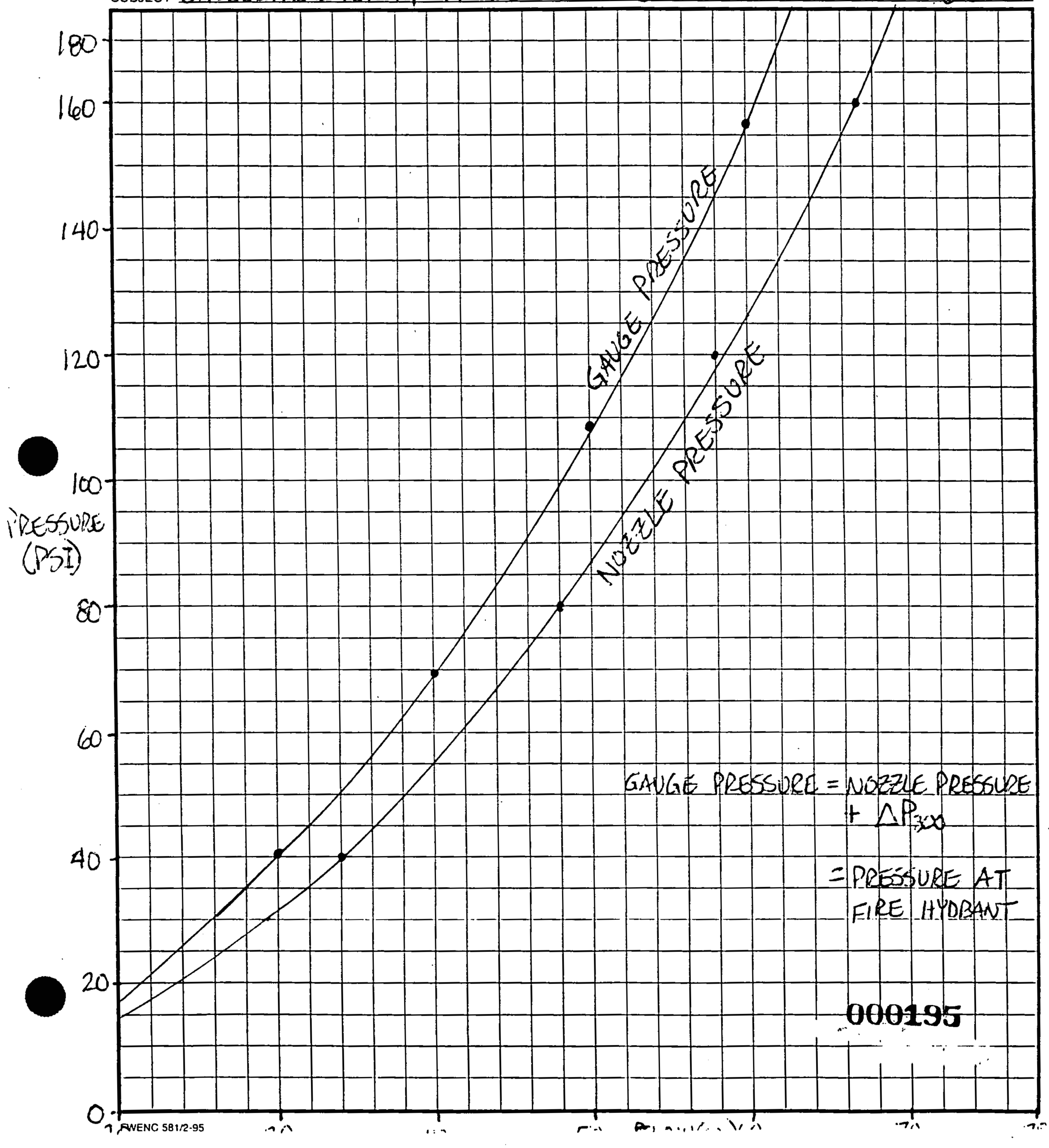
BY Jeff T. DATE 7/31/95 SHEET 2 OF 3

CHKD. BY [illegible] DATE 8/3/95 OFS NO. DEPT. NO. BE

CLIENT FERMCO - FERNALD, OHIO

PROJECT HF TANK CAR P.E. CERTIFICATION REPORT

SUBJECT CALCULATIONS FOR HF TANK CAR RINSATE FLOW THROUGH CHEMDET 600 NOZZLE



FOSTER WHEELER ENVIRONMENTAL CORPORATION

BY JEFF T. DATE 7/31/95 SHEET 3 OF 3

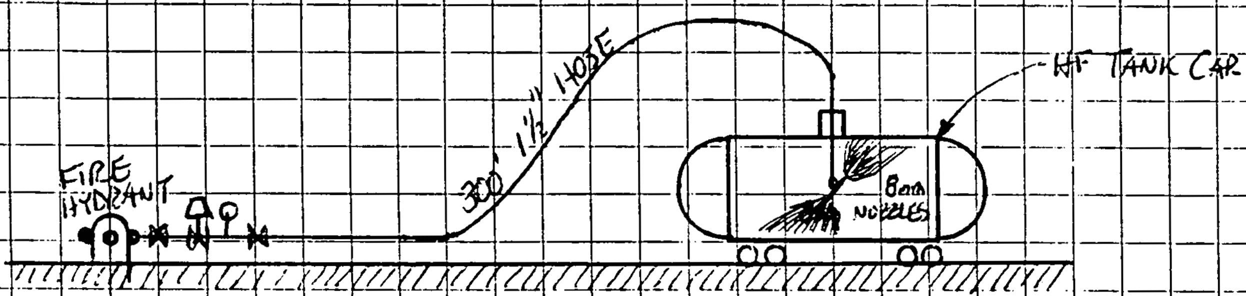
CHKD. BY DFJ DATE 8/3/95 OFS NO. ______ DEPT. NO. BE

CLIENT FERMCO - FERNALD, OHIO

PROJECT HF TANK CAR P.E. CERTIFICATION REPORT

SUBJECT CALCULATIONS FOR HF TANK CAR RINSATE FLOW THROUGH CHEMDET 600 NOZZLE

DIAGRAM OF HF TANK CAR RINSING SYSTEM



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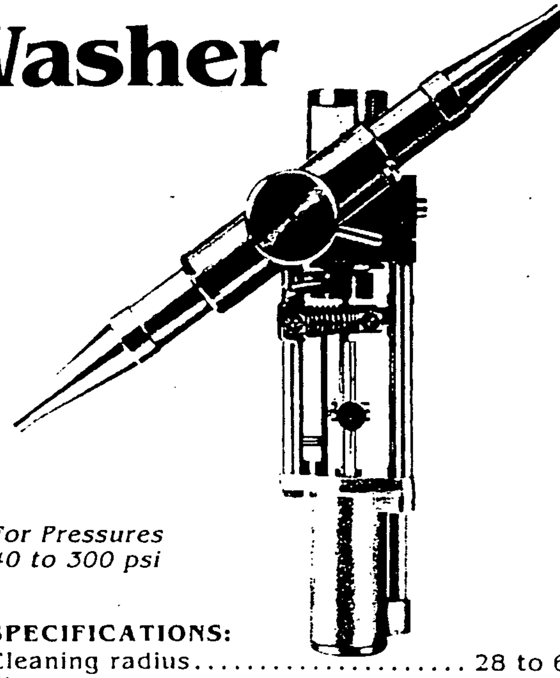
Fury 600 Tank Washer



The **FURY 600 Tankwasher** is the best solution to your most difficult tank cleaning problems. **FURYs** are exceptionally powerful and efficient, yet simple and reliable. Built to clean the most difficult chemical residues from the interiors of tank trucks, tank cars, reactor kettles, process and storage vessels, the **FURY's** unique design also makes it the ideal choice for cleaning food grade tanks.

Constructed of stainless steel, **FURY** Tankwashers will withstand today's aggressive cleaning solutions, yet **FURYs** use absolutely NO OIL OR GREASE... the cleaning fluid is the only lubrication necessary.

The **FURY** is self-powered by the cleaning fluid passing through it. The jet nozzles reciprocate vertically, with an indexed horizontal turning for complete 360° coverage of the vessel interior. Unlike most other tank washers, the **FURY** is not dependent on high internal flow rates and pressures. The **FURY's** speed of operation and cycle time can be fine tuned for maximum cleaning efficiency in minutes, regardless of the flow rate or pressure.

The **FURY** was designed with low maintenance costs in mind. Its steady piston drive eliminates the high speed gears, excessive wear and expensive parts replacement associated with turbine machines. **FURY** tankwashers are simple, reliable and inexpensive to maintain.

Because **FURYs** are lightweight, they can easily be moved from tank to tank or they can be mounted permanently for C.I.P. applications.

KEY FEATURES of the FURY Tankwasher

- Powerful and Efficient
- Simple and Reliable
- Unique Design
- No Oil or Grease Lubrication
- Lightweight
- Low Maintenance Cost
- Self-powered
- Stainless Steel Construction

LOW PRESSURE AND OPEN TOP MODELS ALSO AVAILABLE.

For Pressures 40 to 300 psi

SPECIFICATIONS:

Cleaning radius .... 28 to 66 ft.
Flowrate .... 34 to 194 gpm
Weight .... 22 lb.
Nozzles .... 8, 10 & 12mm
Inlet .... 1 1/2"
Overall length .... 15 3/4"
Operating temperature .... 248° F. max.
Min. opening req'd .... 8" dia.

MATERIALS:

Stainless Steel .... Type 304 & 440C
Teflon .... 25% carbon filled
O-Rings .... Nitrile

PERFORMANCE

Nozzle Size MM	Pressure PSI	Flowrate GPM	Cleaning Radius FEET
2 x 8 MM	40	34	28
	80	48	31
	120	58	33
	160	67	34
	200	75	35
	240	83	35
2 x 10 MM	40	53	34
	80	75	40
	120	88	40
	160	102	38
	200	115	36
	240	120	32
2 x 12 MM	40	76	41
	80	107	55
	120	131	59
	160	152	63
	200	169	65
	240	186	66

Chemdet
Advanced Ideas In Cleaning

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