2174

TREATABILITY STUDY REPORT

Area 1 Phase II

Trap Range Stabilization Project

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1.0 INTRODUCTION

Sevenson Environmental Services, Inc. (Sevenson) presents a Treatability Study Report for the Area 1 Phase II Trap Range Stabilization project at the Fernald Environmental Management Project (FEMP) site in Fernald, Ohio. This report has been prepared in accordance with the requirements of Section 02211 of the technical specifications.

1.1 Goals

The overall goal of this treatability study is to determine the efficacy of Sevenson's MAECTITE® process on the stabilization of lead- and arsenic-impacted soils at the Area 1 Phase II Trap Range site on a bench scale. The goal of the treatability study is to select a treatment mix design that will:

1. Meet or exceed the requirements of the Toxicity Characteristic Leaching Procedure (TCLP) test for lead (5.0 mg/L) and arsenic (5.0 mg/L).
2. Pass the EPA Paint Filter Liquids Test.
3. Minimize volume increase and/or dilution levels of the soils.

This study focuses on identifying the usefulness of MAECTITE® liquid reagent in reducing the leachability of lead from the source sample.

2.0 INITIAL WASTE CHARACTERIZATION

One 5-gallon bucket and one 3-gallon bucket of soils from the Fernald Trap Range site were taken by FDF Sampling Technicians on February 10, 1999. The samples were designated as FERA1P2TRAPTS and FERA1P2TRAPHS, respectively. Sample FERA1P2TRAPTS was a composite sample from sample locations A1P2TRAP-28-1-M, A1P2TRAP-20-1-M, and A1P2TRAP-5S-1-M (as shown on construction drawing G002 of the bid documents), to a depth

of 3 inches. Sample FERA1P2TRAPHS was collected at sample location A1P2TRAP-5S-1-M. Both samples were screened by FDF for alpha, beta, and gamma emissions, and were released for offsite shipment after radioactivity was determined to be at background levels.

Appendix A contains the Chain-of-Custody form and copies of the FEMP Material Unrestricted Releases Forms. Samples were sent by FedEx and were received by the treatability laboratory at Waste Stream Technology, Inc. (WST) on February 11, 1999. Sample FERA1P2TRAPTS weighed 37 lbs. and sample FERA1P2TRAPHS weighed 25 lbs. Both soil samples were very wet, with considerable free liquids present. Soils were silty and clay-like, cohesive, medium to dark brown in appearance, and contained appreciable grass and root mass. Upon receipt, each sample was homogenized thoroughly, sub-sampled, and analyzed for the parameters listed in Table 1.

Table 1
Initial Soil Analytical Methods
Area 1 Phase II Trap Range

Parameter	Method
Soil Digestion	USEPA SW-846 Method 3051
Total Metals (lead, arsenic)	USEPA SW-846 Method 6010
TCLP Extraction	USEPA SW-846 Method 1311
Lead and Arsenic in TCLP Extraction Fluid	USEPA SW-846 Method 6000/7000
pH of soil	USEPA SW-846 Method 9045
Moisture Content	ASTM D-2216
Bulk Density	ASTM D-4254

All quality assurance and quality control data associated with analytical testing, as agreed to in pre-study meetings between FDF and WST, is presented in the laboratory reports contained in the appendices.

2.1 Initial Characterization of FERA1P2TRAPTS

Sample FERA1P2TRAPTS contained 1,590 mg/kg total lead and 15.5 mg/l leachable lead, and 11.0 mg/kg total arsenic and no detectable leachable arsenic. In addition, this soil sample had a pH of 5.32, a density of 1.56 g/ml, and a moisture content of 91.28%. The initial characterization of Sample FERA1P2TRAPTS is summarized in Table 2.

2.2 Initial Characterization of FERA1P2TRAPHS

Sample FERA1P2TRAPHS contained 3,890 mg/kg total lead and 39.6 mg/l leachable lead, and 23.8 mg/kg total arsenic and 0.486 leachable arsenic. In addition, this soil sample had a pH of 5.16, a density of 1.74 g/ml, and a moisture content of 112.98% (calculations based on dry weight can yield moisture contents greater than 100%). The high moisture content is an indication of the high organic content in the near surface soils. The initial characterization of Sample FERA1P2TRAPHS is also summarized in Table 2.

Table 2
Initial Soil Characterization
Area 1 Phase II Trap Range

Analytical Parameter	Sample Designation	
	FERA1P2TRAPHS	FERA1P2TRAPTS
Total Pb	3,890 mg/kg	1,590 mg/kg
TCLP Pb	39.6 mg/l	15.5 mg/l
Total As	23.8 mg/kg	11.0 mg/kg
TCLP As	0.486 mg/l	Not Detected
pH	5.16	5.32
Density	1.74 g/ml	1.56 g/ml
Moisture Content	112.98%	91.28%

Based on the higher levels of contamination, Sample FERA1P2TRAPHS was chosen by Sevenson for use in this treatability study. By testing soils from the location with the highest known lead contamination levels, some conservatism may be built into the mix design.

3.0 TREATABILITY STUDY - PHASE I

The procedures used in the treatability study simulated full scale operations on a bench scale. The results will be used as a basis for scaling up to the planned field implementation.

3.1 Soil Treatments

Preparation of treatability microcosms consisted of removing a 1,000g aliquot from sample container FERA1P2TRAPHS for each treatment mixture evaluated. The soil was then transferred to a polypropylene mixing basin, where water and reagent were added at the designated concentrations. Each microcosm received 15% (w/w) water followed by MAECTITE® liquid reagent at concentrations, by weight, of 0.5%, 1%, 2%, 3%, and 4%. In addition, a control microcosm, containing 15% water, was employed in this study. Microcosms were mixed within the basin by a technician, using a back-and-forth folding motion, until the reagent was incorporated fully into the soil/water admixture and allowed to react at ambient conditions for the pre-established reaction times. Specifically, samples were taken after 1, 3, 7, and 14 days reaction time and analyzed for TCLP lead and arsenic, total lead and arsenic, pH, density, paint filter, and moisture content.

3.2 Observations and Measurements

Addition of MAECTITE® liquid reagent to each microcosm showed no noticeable exothermic reaction or treatment-induced volatile emissions. The water/MAECTITE® liquid reagent was readily incorporated into the soil matrix, and presented no mixing difficulties. Further, the presence of organic material did not effect the homogenization of water and reagent into the soil,

as root mass and soil were easily managed by ordinary mechanical mixing.

The MAECTITE® process is a dehydration process. As expected after reacting overnight, free liquid was gone from the treated microcosms, but was still apparent in the control microcosm. Remediated soil was cohesive and uniform in appearance, and readily formed clumps when compressed in the palm of the hand. No free liquid was exuded when compressed. It should be noted that all of the microcosms dried out during the reaction period, and by Day 14 each appeared desiccated.

MAECTITE® liquid reagent reduced the leachability of lead in all of the treated microcosms for all of the reaction times tested. For example, after a 1 day reaction time, 0.5% reagent reduced the TCLP lead concentration to 7.15 mg/l, compared to 31.6 mg/l for the water control microcosm (Table 3 and Appendix C). 1% MAECTITE® liquid reduced leachable lead to 4.36 mg/l, below the RCRA standard of 5 mg/l. This dose/response effect continued, as increasing the MAECTITE® liquid concentration generally resulted in a corresponding reduction in lead leaching. Specifically, 2% reagent decreased leachable lead to 1.39 mg/l, whereas 3% and 4% MAECTITE® liquid reduced lead in the TCLP extracts to 0.857 mg/l and 0.866 mg/l, respectively. Total lead analysis of each soil sub-sample showed similar results among the microcosms, indicating that the reduction of lead detected in the TCLP extracts was attributed to MAECTITE® liquid treatment, and not due to variable concentrations of total lead found in the different samples.

Increasing MAECTITE® liquid doses correspondingly reduced the soil pH, which ranged from 5.47 in the untreated microcosm, to 2.12 in the soil receiving 4% MAECTITE® liquid. Although the soil remained wet after 1 day, with moisture contents ranging between 65.24% and 86.64%, soil from each of the microcosms passed the paint filter test.

Table 3 Analyses of Treated Soil - 1 Day Reaction Time Area 1 Phase II Trap Range						
Analytical Parameter	**MAECTITE® Dosage - % (w/w)**					
	0%	**0.5%**	**1%**	**2%**	**3%**	**4%**
TCLP Pb	31.6 mg/l	7.15 mg/l	4.36 mg/l	1.39 mg/l	0.857 mg/l	0.866 mg/l
TCLP As	0.319 mg/l	0.258 mg/l	0.294 mg/l	0.279 mg/l	0.438 mg/l	0.343 mg/l
Total Pb	5,140 mg/kg	5,670 mg/kg	4,870 mg/kg	4,790 mg/kg	4,080 mg/kg	17,000 mg/kg
Total As	21.0 mg/kg	25.2 mg/kg	23.3 mg/kg	23.1 mg/kg	22.0 mg/kg	142 mg/kg
pH	5.47	3.45	2.82	2.50	2.22	2.12
Density	1.48 g/ml	1.50 g/ml	1.51 g/ml	1.46 g/ml	1.43 g/ml	1.45 g/ml
Paint Filter	Pass	Pass	Pass	Pass	Pass	Pass
Moisture Content	86.64%	78.71%	65.24%	85.53%	83.30%	86.35%

This general dose/response trend continued after 3 days reaction time. Because of sample variability, there was a measured increase in leachable lead for the control, 0.5%, 1%, and 2% treated microcosms relative to the Day 1 samples. However, there remained a substantial reduction of lead when compared with the control microcosm (Table 4 and Appendix D). Again, reductions were proportional to the dose of MAECTITE® liquid. As in samples taken after Day 1, 1% MAECTITE® liquid was required to achieve the target of <5 mg/l, and 3% MAECTITE® liquid was needed to reduce lead below 1 mg/l. The pH of each of the treated soils began to rise slightly, and soil moisture contents generally began to drop.

Table 4
Analyses of Treated Soil - 3 Day Reaction Time
Area 1 Phase II Trap Range

Analytical Parameter	MAECTITE® Dosage - % (w/w)					
	0%	0.5%	1%	2%	3%	4%
TCLP Pb	64.2 mg/l	31.0 mg/l	4.46 mg/l	1.80 mg/l	0.605 mg/l	0.415 mg/l
TCLP As	0.540 mg/l	0.512 mg/l	0.271 mg/l	0.401 mg/l	0.314 mg/l	0.357 mg/l
Total Pb	4,580 mg/kg	5,520 mg/kg	5,760 mg/kg	4,030 mg/kg	13,400 mg/kg	39,000 mg/kg
Total As	19.7 mg/kg	24.9 mg/kg	28.2 mg/kg	18.5 mg/kg	272 mg/kg	533 mg/kg
pH	5.58	3.79	2.98	2.62	2.45	2.28
Density	1.40 g/ml	1.55 g/ml	1.57 g/ml	1.45 g/ml	1.42 g/ml	1.49 g/ml
Paint Filter	Pass	Pass	Pass	Pass	Pass	Pass
Moisture Content	69.02%	66.92%	89.96%	75.18%	71.18%	71.45%

The general trends observed in the Day 1 and Day 3 reaction soil samples continued through the Day 7 and Day 14 reaction samples (Tables 5 and 6, Appendices E and F). Specifically, soils treated with MAECTITE® liquid contained less leachable lead than the untreated control, 1% MAECTITE® liquid was required to achieve the <5 mg/l standard, and 3% MAECTITE® liquid was necessary to reduce leachable lead below 1 mg/l. Soil pH measurements rose slightly by the Day 7 sample, where values remained fairly stable to Day 14. Treated soils remained more acidic than the untreated control. Finally, soil drying continued to where moisture contents in the Day 14 samples were between 20.75% - 5.60%.

Table 5
Analyses of Treated Soil - 7 Day Reaction Time
Area 1 Phase II Trap Range

Analytical Parameter	MAECTITE® Dosage - % (w/w)					
	0%	0.5%	1%	2%	3%	4%
TCLP Pb	42.9 mg/l	26.9 mg/l	4.35 mg/l	1.05 mg/l	0.943 mg/l	0.187 mg/l
TCLP As	0.518 mg/l	0.660 mg/l	0.370 mg/l	0.309 mg/l	0.567 mg/l	0.262 mg/l
Total Pb	2,930 mg/kg	5,820 mg/kg	5,080 mg/kg	14,200 mg/kg	16,000 mg/kg	5,040 mg/kg
Total As	12.8 mg/kg	27.7 mg/kg	25.6 mg/kg	49.7 mg/kg	132 mg/kg	23.7 mg/kg
pH	5.72	4.05	3.38	2.81	2.53	2.41
Density	1.67 g/ml	1.70 g/ml	1.73 g/ml	1.67 g/ml	1.65 g/ml	1.64 g/ml
Paint Filter	Pass	Pass	Pass	Pass	Pass	Pass
Moisture Content	56.11%	43.27%	43.38%	49.59%	50.95%	54.19%

Table 6
Analyses of Treated Soil - 14 Day Reaction Time
Area 1 Phase II Trap Range

Analytical Parameter	MAECTITE® Dosage - % (w/w)					
	0%	0.5%	1%	2%	3%	4%
TCLP Pb	55.8 mg/l	28.8 mg/l	4.28 mg/l	1.60 mg/l	0.667 mg/l	0.363 mg/l
TCLP As	0.424 mg/l	0.775 mg/l	0.439 mg/l	0.637 mg/l	0.497 mg/l	0.491 mg/l
Total Pb	9,610 mg/kg	5,320 mg/kg	4,650 mg/kg	4,950 mg/kg	5,070 mg/kg	4,410 mg/kg
Total As	68.1 mg.kg	25.8 mg/kg	20.1 mg/kg	22.2 mg/kg	23.0 mg/kg	20.2 mg/kg
pH	5.61	3.98	3.29	2.80	2.44	2.35
Density	1.14 g/ml	1.06 g/ml	1.21 g/ml	1.31 g/ml	1.19 g/ml	1.24 g/ml
Paint Filter	Pass	Pass	Pass	Pass	Pass	Pass
Moisture Content	16.71%	5.60%	6.94%	12.83%	20.75%	19.69%

4.0 TREATABILITY STUDY - PHASE II

4.1 Soil Treatments

Phase II of the treatability testing determined the change in volume as a result of soil remediation. Three treatment samples (15% water + 2%, 3%, or 4% reagent) were implemented in Phase II based on the ability of these treatment designs to meet TCLP objectives and reduce lead mobility. The volume change calculations determined the percentage change in volume as a result of treatment. This volume was measured at the earliest reaction time interval that the mix design achieves acceptable TCLP results. Volumes were recorded at 4 days post-treatment (Day 3 was a Sunday). Volume changes were compared with changes observed in a deionized water control microcosm.

The procedure was performed by measuring the volume 500g of untreated soil occupied within a volumetric cylinder. This was defined as V_1. The selected MAECTITE® liquid doses were applied, mixed and tamped, and allowed to cure for 4 days. The volume measured at Day 4 was thus defined as V_2. The volume change as a result of treatment may be determined as $V_2 - V_1$. The percentage change in volume may be calculated as follows:

$$\% \text{ Volume Change} = (V_2/V_1 \times 100) - 100$$

Where,

(+) value = volume expansion

(-) value = consolidation

4.2 Volume Changes

The results of Phase II experiments are summarized in Table 7, and show that there was consolidation in all of the microcosms tested. Soil treated with 15% water alone consolidated

18.18%, while soil treated with 15% water plus 2% reagent consolidated 21.82%. Soil treated with 15% water plus 3% and 4% MAECTITE® liquid consolidated 1.82% and 7.27%, respectively.

Table 7
Volume Changes Associated with Soil Amendments
Area 1 Phase II Trap Range

Treatment	V_1	V_2	% Consolidation
15% DI Water	275 ml	225 ml	18.18%
15% DI Water + 2% MAECTITE® liquid	275 ml	215 ml	21.82%
15% DI Water + 3% MAECTITE® liquid	275 ml	270 ml	1.82%
15% DI Water + 4% MAECTITE® liquid	275 ml	255 ml	7.27%

5.0 SUMMARY AND CONCLUSIONS

The MAECTITE® chemical treatment process converts leachable lead and other heavy metals to non-leachable mixed mineral forms in the apatite and barite mineral groups. Leachable lead cations react with the MAECTITE® reagents and form compounds that nucleate crystals in hexagonal and twinned orthorhombic (pseudohexagonal) geometries. As a true chemical process, lead in soil is chemically altered. Based on previous studies performed (available upon request), changes in pH will not cause the lead to be leachable.

This treatability study demonstrates that the MAECTITE® liquid reagent can reduce the TCLP mobility of lead in soil samples from the Trap Range site. Specifically, all dosages of

MAECTITE® liquid reagent tested reduced lead leachability, with a minimum of 1% (w/w) reagent required to reduce lead in TCLP extracts to < 5 mg/l, and 3% (w/w) necessary to reduce lead in TCLP extracts to <1 mg/l. Soil remediation was not enhanced by extending the reaction time over one day, as there was not a significant difference in the concentration of lead in TCLP extractions performed after 1, 3, 7, and 14 days (Table 8). Further, all treated soils passed the EPA Paint Filter Liquids Test and any volume increase due to treatment was minimized. In fact, consolidation occurred.

Table 8
Comparison of Total and TCLP Pb Concentrations Over the 14 Day Study
Area 1 Phase II Trap Range

Treatment	Initial	Day 1	Day 3	Day 7	Day 14
Untreated	39.6 mg/l[1] 3,890 mg/kg	31.6 mg/l 5,140 mg/kg	64.2 mg/l 4,580 mg/kg	42.9 mg/l 2,930 mg/kg	55.8 mg/l 9,610 mg/kg
0.5%	-	7.15 mg/l 5,670 mg/kg	31.0 mg/l 5,520 mg/kg	26.9 mg/l 5,820 mg/kg	28.8 mg/l 5,320 mg/kg
1%	-	4.36 mg/l 4,870 mg/kg	4.46 mg/l 5,760 mg/kg	4.35 mg/l 5,080 mg/kg	4.28 mg/l 4,650 mg/kg
2%	-	1.39 mg/l 4,790 mg/kg	1.80 mg/l 4,030 mg/kg	1.05 mg/l 14,200 mg/kg	1.60 mg/l 4,950 mg/kg
3%	-	0.857 mg/l 4,080 mg/kg	0.605 mg/l 13,400 mg/kg	0.943 mg/l 16,000 mg/kg	0.667 mg/l 5,070 mg/kg
4%	-	0.866 mg/l 17,000 mg/kg	0.415 mg/l 39,000 mg/kg	0.187 mg/l 5,040 mg/kg	0.363 mg/l 4,410 mg/kg

1. Due to the similar results of total lead analyses between the "as received" soil and all of the treatability microcosms, the TCLP result from the "as received" soil was considered the baseline concentration for leachable lead in this study.

In addition to TCLP testing, total lead analyses were performed on soil samples from each microcosm and designated reaction time. Results confirmed that lead stabilization was indeed attributed to MAECTITE® liquid treatments, and not variable concentrations of total lead in the samples.

The results of Phase II experiments show that there was consolidation in all of the microcosms tested. The consolidation is most likely a result of some combination of compaction and dehydration. Soil treated with 15% water alone consolidated 18.18%, while soil treated with 2% MAECTITE® liquid reagent consolidated 21.82%. Soils treated with 3% and 4% MAECTITE® liquid reagent consolidated 1.82% and 7.27%, respectively. The lesser amounts of consolidation associated with the higher dosages are most likely a result of the increased volumes of reagent offsetting some of the dehydration/consolidation that occurs. In any case, some consolidation may be expected during full scale treatment.

Treated soil pH values rose slightly until Day 7, and tended to stabilize by Day 14. Based on past experience, the soil pH typically moves toward neutral over time, while the resultant crystalline structure remains stable.

Leachable arsenic was not affected by the treatment process, as values tended to remain consistent in the control and treated microcosms. Some variation due to sample variability was observed. Arsenic did not leach above the RCRA standard of 5 mg/l in either the untreated or treated soils.

The results of treatability testing on the soil sample from the Trap Range indicate that 1% MAECTITE® reduced the leachable lead concentrations to below the RCRA standard of <5 mg/l and 2% MAECTITE® reduced the leachable lead to <2 mg/l. However, Sevenson recommends that 3% MAECTITE® liquid be used during full scale operations. This dosage reduced the leachable lead to <1 mg/l. This recommended concentration is conservative to account for any pockets of high lead that may be encountered in the field and potential loss of MAECTITE® due

to infiltration during field operations. Further, by testing soil from the location with the highest known lead contamination levels, additional conservatism was built into the mix design.

Observations made during this study indicate that on-site treatment should not present any unusual or difficult problems. MAECTITE® liquid, when combined with water, readily mixed and homogenized into the soil. Further, mixing was easily performed with modest effort using a wooden paint stick. Grass and root matter present in the soil samples did not effect the mixing process and did not interfere with the reaction between MAECTITE® liquid and lead in the soil. These observations indicate that, after application, MAECTITE® liquid should easily distribute throughout the Trap Range soils during the full scale stabilization, resulting in a fairly homogenous, stabilized end product with a low probability of treatment failure.

5.1 Field Implementability

The results of this treatability study will be used to scale up to full scale operations. The methods identified in the Full Scale Stabilization Work Plan will follow essentially the same steps as the treatability study:

- Divide remediation area into grids;
- Calculate amount of reagent to be applied to each grid;
- Apply water, as necessary to enhance dispersion of reagent into soils;
- Apply liquid reagent;
- Mix soils;
- Allow treated soils to stabilize; and
- Perform verification sampling and analysis (per Verification of Treatment Sampling Plan).

The amount of reagent to be applied will be calculated in the field for each treatment grid. The calculations will be based on the results of this treatability study, soil volume within the grid, and soil and reagent densities.

Treatment grids will be 2,500 square foot (approximately 50 ft. by 50 ft.) areas adjacent to one another across the site.

Reagent will be added using a percent mass addition rate. The correct amount of reagent to be applied to a grid is determined by multiplying the surface area of the grid by the depth of vertical contamination to calculate the volume of impacted soil to be stabilized in the particular grid. The volume of the soil is then converted to mass by using the density of the soil from the treatability study. Multiplying the mass of the material in the treatment grid by the percentage of reagent required (3%) then provides the mass of treatment chemical to be applied to that grid area.

When using the MAECTITE® liquid reagent, the required mass of the treatment reagent will be pumped from the on-site bulk storage tanker into a graduated 300 gallon poly tank. The Job Superintendent will provide the calculations for the volume of reagent to be metered into the graduated poly tank prior to transferring the liquid from the bulk tanker into the graduated poly tank. The Quality Assurance/Quality Control Representative will confirm the calculations.

Once the correct amount of reagent has been transferred to the graduated poly tank, it will be pumped and applied to the treatment grids via 2-inch-diameter chemical hosing using a double diaphragm pump. The liquid reagent will be evenly distributed across the surface area of the treatment grid.

A controlled application of water may then be added to the treatment grid. The amount of water to be added will be determined by the Job Superintendent based on process knowledge and field experience.

After the reagent and water have been added, mixing will be performed using an excavator fitted with a flat-edged bucket. Mixing may be described a back-and-forth folding motion, which will create a homogeneous mix. Disturbance of soil to below the target treatment depth will be minimized. Proper application and mixing will be checked in the field by pH measurements. A

minimum of five (5) random pH measurements will be taken within each grid at various depths. Consistent pH readings below 3 will indicate that proper application and mixing has occurred.

The treated soils will then be allowed to set overnight to allow stabilization to occur. Stabilization is expected to occur in a matter of hours. Finally, samples will be collected in accordance with the Verification of Treatment Sampling Plan and analyzed at an offsite laboratory.

APPENDIX A

Chain-of-Custody Form and
FEMP Material Unrestricted Releases Forms

CHAIN OF CUSTODY / REQUEST FOR ANALYSIS RECORD

FERMCO
Fernald Environmental Management Corporation

P.O. BOX 538704
CINCINNATI, OH 45253-8704

ORIGINAL MEF NO.: _____

REFERENCE DOCUMENT NO.: CSR - 99 - 0071

CORRESPONDING REFERENCE DOCUMENT NO.: _____

PAGE 1 OF 1

RELEASE NO.: 10000/8561	PROJECT NO.: 20710-RP-0001	FOR SAMPLE RELATED PROBLEMS, ACS CONTACT / PHONE: BILL WESTERMAN X5373	CONTRACT PURCHASE ORDER / TASK ORDER NO.: N/A
PROJECT NAME: LEAD DELINEATION IN THE AIP2 TRAP RANGE JV 2-10-99		REQUIRED REPORT DATE / LAB TAT: 30 days	SAMPLE SHIPMENT DATE: 2-11-99
PROJECT CONTACT / PHONE: MIKE HEINEN X 5442		RECEIVING LAB NAME: WASTE STREAM Technology	SAMPLE SHIPPER (Print): K. Helfferich
CHARGE NO.: 5CSD5	LOT MARKING NO.: N/A	RECEIVING LAB ADDRESS: Buffalo, NY	OFF-SITE LAB CONTACT: James Hyzy

SAMPLING TEAM (Print) & GROUP NAME / PHONE: JOHN VANDINE SMMP X 3992 / Bob Minyes / R. Hy 76951

SAMPLING TEAM (Signature & Badge No.): JR Vandine 5536

ITEM NO.	SAMPLE NUMBER: FACTS ID	SAMPLE NUMBER: CUSTOMER ID / SAMPLE POINT	SAMPLE MATRIX	COMP	GRAB	FILTERED	COLLECTION DATE (99)	COLLECTION TIME	CONTAINER TYPE	CONTAINER VOL. (GAL.)	NO. CONTRS	PRESERVATION	ASL	ANALYSES REQUESTED (If more space is required, use the SPECIAL INSTRUCTIONS block.)	SAMPLE OKAY? (Y/N)* FERMCO	SAMPLE OKAY? (Y/N)* OFF-SITE
RDSP0013	200347694	FERAIP2TRAPTS	S SOIL	X		NO	2/10	1315	*METAL	5	1	NONE	N/A	BENCH - SCALE TESTING	Y	
RDSP0014	200347766	FERAIP2TRAPHS	S SOIL	X		NO	2/10	1330	*METAL	3	1	NONE	N/A	BENCH - SCALE TESTING	Y	
3		END JV 2-10-99														
4																
5																
6																
7																
8																
9																
10																

SPECIAL INSTRUCTIONS: NOT HOMOGENIZED

~~* Poly = container~~
JV 2-10-99

2124

RELINQUISHED: ITEM / REASON	RELINQUISHED BY (Signature) / AFFILIATION	BADGE NO.	DATE	TIME	RECEIVED: RECEIVED BY (Signature) / AFFILIATION	BADGE NO.	DATE	TIME
1-2 LAB	JR Vandine SMMP	[redacted]	2-10-99	1500	[signature] SPL	[redacted]	2-10-99	1500
1-2 to ship	Kathleen Helfferich / SPL	[redacted]	2-11-99	1300	Amy Toth	2	2/12/99	1000
		4				3		
		5				4		
						5		

DISTRIBUTION OF COPIES	WHITE	ON-SITE - RELEASE FILE / OFF-SITE ANALYTICAL LAB - RETURN TO FEMP	YELLOW	ON SITE - DISTRIBUTE AS NEEDED / OFF-SITE ANALYTICAL LAB - RETURN TO FEMP	BLUE	SAMPLING TECH / PROJECT FILE

SHADED AREAS ARE TO BE COMPLETED BY THE SAMPLE RECEIVING GROUP.

* IF "N", THEN COMPLETE APPLICABLE NON-CONFORMANCE PROCEDURE.

FS-F-3361 (09-21-95)

20

63175

FEMP

COVER SHEET

2174

DOCUMENT TYPE ● RSR ○ RWP ○ ASR

SURVEY FOR RWP? ○ YES ● NO

NAME Dawn I Loebker

PAGE 1 OF 3

SIGNED Dawn I Loebker

LOCATION Lab 15A

LOCATION CODE

BADGE # [redacted]

DATE 02/11/99

TIME 08:30

BLDG/GRID# 15A

FLR 1

SURVEY NUMBER 99-02-11-0080

RWP NUMBER -

COMMENTS Soil Sample Shipment Ref# 18561

N/A

REVIEWER Cooper

BADGE [redacted]

SIGNATURE L Cooper 2.11.99

FS-F-4617 (REV. 1 5/30/96)

FE

MATERIAL UNRESTRICTED RELEASE FORM

SURVEY # 99-02-11-80

DATE:	LOCATION:	RCT (PRINT):	SIGNATURE:	BADGE #:
2/11/99	LAB W-26	DAWN I LOEBKER	Dawn I Loebker	[redacted]

MODEL	SERIAL NUMBER	TYPE ALPHA or BETA/GAMMA	CAL DUE DATE	BKGD (CPM)	CF	MDA (DPM)	INST. PERFORMANCE TEST SAT? YES	NO
LB5100	7	α, β, γ	3/99	0.3/1.75	0.297/0.428	4/7	X	N/A
M-3	10359	β, γ	2/99	100	30	3000	X	N/A
	N/A				N/A			

TIME	RCT INITIAL	MATERIAL DESCRIPTION	RELEASE CRITERIA SURF or VOL	DPM//100cm² ALPHA REMOVABLE	ALPHA FIXED + REM	BETA//GAMMA REMOVABLE	BETA//GAMMA FIXED + REM	RELEASE JUSTIFICATION	RECIPIENT	MATERIAL RELEASE EVALUATOR BADGE # and SIGNATURE (1)
0830	DI	200347694 OUTSIDE TOP	SURF	19	N/A	23	<MDCR	RCR 3-3 ATT. A	KAREN HELFFERICH	7431 [signature]
↓	↓	200347694 OUTSIDE BOTTOM	↓	5	↓	5*	↓	↓	↓	↓
↓	↓	200347766 OUTSIDE TOP	↓	5	↓	5*	↓	↓	↓	↓
0830	DI	200347766 OUTSIDE BOTTOM	SURF	-1*	N/A	0*	<MDCR	RCR 3-3 ATT. A	KAREN HELFFERICH	7431 [signature]
			N/A						N/A	

Comments: N/A

	PRINT	SIGNATURE	BADGE #	DATE
REVIEW:	[illegible]	[signature]	[redacted]	2.11.99

(1) Material Release Evaluator approval required in accordance with RP-0009, Radiological Requirements for the Release of Materials at the Fernald Environmental Management Project, if any of the following conditions exist:
a. Material has potential for contamination in areas which are inaccessible for proper survey.
b. Process knowledge is used to support the release decision.
c. Material has potential of contamination beneath any coating applied while the material was in the Controlled Area.
d. Material has potential for volume or in-depth radioactivity within the material matrix.
e. Special case items are being released, such as radioactive consumer products, industrial sources, etc.
f. Material has detectable activity present and the activity is below the contamination limits listed in Attachment A of RP-0009.

2174

THU FEB 11, 1999 08:50:51
GROUP E

2174

SAMPLE NUMBER	COUNT TIME	GROSS ALPHA	GROSS B-g	DPM ALPHA	DPM B-g	TIME COUNTED
11	0.50	3	6	19	23	08:51:24
12	0.50	1	2	5	5	08:52:10
13	0.50	1	2	5	5	08:52:54
14	0.50	0	1	-1	0	08:53:39

OPERATION COMPLETE

OPERATION COMPLETE

FEMP RADIOLOGICAL SURVEY REPORT 3 of 3
SURVEY # 99-2-11-80 DATED 2/11/99

	(Date)	(Signature)
ACT:	Loebber	Loebber
REVIEWER:	Coom	Bloom

63175

FEMP
COVER SHEET

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2174

CUMENT TYPE
- ● RSR
- ○ RWP
- ○ ASR

SURVEY FOR RWP?
- ○ YES
- ● NO

IE MDSCHNEIDER

PAGE 1 OF 2

NED

LOCATION 28F (SKEET RANGE)

[redacted]

LOCATION CODE

DATE 02/10/99

TIME 13:00

BLDG/GRID# 28F

FLR

VEY NUMBER -02-14-0020

RWP NUMBER -

ENTS MURF at Samples
From Skeet Range

REVIEWER DWIGHT D. WERNER

BADGE [redacted]

SIGNATURE

DATE 2/10/99

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FS-F-4617 (REV. 1 5/30/96)

MATERIAL UNRESTRICTED RELEASE FORM

SURVEY # 99-02-14-0020

DATE:	LOCATION:	RCT (PRINT):	SIGNATURE:	BADGE #
2/10/99	SKEET RANGE	MOSCHANSKE		[redacted]

MODEL	SERIAL NUMBER	TYPE ALPHA or BETA/GAMMA	CAL DUE DATE	BKGD (CPM)	CF	MDA (DPM)	INST. PERFORMANCE TEST SAT? YES	NO
3	100667	B γ	6/99	40	4/30	400/3000	✓	

TIME	RCT INITIAL	MATERIAL DESCRIPTION	RELEASE CRITERIA SURF or VOL	DPM//100cm² ALPHA REMOVABLE	ALPHA FIXED + REM	BETA//GAMMA REMOVABLE	BETA//GAMMA FIXED + REM	RELEASE JUSTIFICATION	RECIPIENT	MATERIAL RELEASE EVALUATOR BADGE # and SIGNATURE (1)
1300	[illegible]	5 Gal. Bucket Soil E/S a/S	SURFACE			<MDCR	<MDCR	RP-0009	M. Heinen	2215 [illegible]
1320	[illegible]	3 Gal. Bucket Soil E/S a/S	SURFACE			<MDCR	<MDCR	RP-0009	M. Heinen	

Comments

	PRINT	SIGNATURE	BADGE #	DATE
REVIEW	DWIGHT D. WERNER	[signature]	[redacted]	2/10/99

(1) Material Release Evaluator approval required in accordance with RP-0009, Radiological Requirements for the Release of Materials at the Fernald Environmental Management Project, if any of the following conditions exist:

a. Material has potential for contamination in areas which are inaccessible for proper survey
b. Process knowledge is used to support the release decision.
c. Material has potential of contamination beneath any coating applied while the material was in the Controlled Area
d. Material has potential for volume or in-depth radioactivity within the material matrix
e. Special case items are being released, such as radioactive consumer products, industrial sources, etc
f. Material has detectable activity present and the activity is below the contamination limits listed in Attachment A of RP-0009

15 F 3915 1 REV 2 (01/22/98)

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2124

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APPENDIX B

APPENDIX B

Laboratory Reports for "As Received" Soil

WASTE STREAM TECHNOLOGY, INC.

302 Grote Street
Buffalo, NY 14207
(716) 876-5290

2174

Analytical Data Report

Report Date : 03/23/99
Group Number : 9902-019

Prepared For :
Mr. Steve Sharp
Sevenson Environmental Services, Inc.
9245 Calumet Avenue
Suite 101
Munster, IN 46321

Site : Fernald

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
Initial - HS	WS49620	Soil	02/15/99	02/15/99	15:15
Initial - TS	WS49621	Soil	02/15/99	02/15/99	15:15
Sample Status Upon Receipt : No irregularities.					

Analytical Services

Analytical Parameters	Number of Samples	Turnaround Time
TCLP Lead & Arsenic	2	Standard
Total Lead & Arsenic	2	Standard
pH of TCLP Extract	2	Standard

Report Released By : Daniel W. Voll
Daniel Vollmer, Laboratory QA/QC Officer

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ENVIRONMENTAL LABORATORY ACCREDITATION CERTIFICATION NUMBERS
NYSDOH ELAP #11179 NJDEPE #73977 CDHS ELAP #2189

WASTE STREAM TECHNOLOGY

METHODOLOGIES

2174

The specific methodologies employed in obtaining the analytical data reported are indicated on each of the result forms. The method numbers shown refer to the following U.S. Environmental Protection Agency Reference:

Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020, March 1979, Revised 1983, U.S. Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

Federal Register, 40 CFR Part 136: Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act. Revised July 1992.

Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. Third Edition, Revised December 1996, U.S. EPA SW-846.

Annual Book of ASTM Standards, Volume II. ASTM, 100 Harbor Drive, West Conshohocken, PA 19428-2959.

Standard Methods for the Examination of Water and Wastewater. (18th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

pH of TCLP Leachate

SW846 9040B

2174

Site: Fernald
Date Sampled: 02/15/99
Date Received: 02/15/99

Group Number: 9905-019
Matrix: Soil
Units: pH Units

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS49620	INITIAL - HS	NA	5.01	02/17/99
WS49621	INITIAL - TS	NA	4.99	02/17/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: Fernald
Date Sampled: 02/15/99
Date Received: 02/15/99

Group Number: 9905-019
Units: mg/Kg
Matrix: Soil

WST ID: WS49620
Client ID: INITIAL - HS
Digestion Date: 02/16/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	1.70	23.8	02/17/99	SW-846 6010
Lead by ICP	4.10	3890	02/17/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: Fernald
Date Sampled: 02/15/99
Date Received: 02/15/99

Group Number: 9905-019
Units: mg/Kg
Matrix: Soil

WST ID: WS49621
Client ID: INITIAL - TS
Digestion Date: 02/16/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	1.70	11.0	02/17/99	SW-846 6010
Lead by ICP	4.10	1590	02/17/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: Fernald
Date Sampled: 02/15/99
Date Received: 02/15/99

Group Number: 9905-019
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 02/16/99

WST ID: WS49620
Client ID: INITIAL - HS
Digestion Date: 02/17/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.486	02/17/99	SW-846 6010
Lead by ICP	0.075	39.6	02/17/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: Fernald
Date Sampled: 02/15/99
Date Received: 02/15/99

Group Number: 9905-019
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 02/16/99

WST ID: WS49621
Client ID: INITIAL - TS
Digestion Date: 02/17/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	Not detected	02/17/99	SW-846 6010
Lead by ICP	0.075	15.5	02/17/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Quality Control Analysis Result Reports

- Method Blanks
- Reference Samples
- Duplicate Analysis
- Matrix Spike Analysis
- Post-Digestion Spike Analysis
- Dilution Interference Check Analysis

Waste Stream Technology, Inc.
Metals Method Blank Analysis

2174

Site: Fernald
Date Sampled: NA
Date Received: NA

Group Number: 9905-019
Units: mg/Kg

WST ID MB021699-S1
Client ID: NA
Digestion Date: 02/16/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As soil Method Blank	1.70	Not detected	02/17/99	SW-846 6010
Pb soil Method Blank	4.10	Not detected	02/17/99	SW-846 6010

MB denotes Method Blank
NA denotes Not Applicable

WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc

Total Metals Analysis Result Report

Reference Standard Analysis Summary

2174

Site : Fernald
Group Number: 9905-019

Report Units : % Recovery
Matrix : TCLP Extract

	Lab ID	RF021699-S1		
	Date Digested	2/16/99		
	Date Analyzed	2/17/99		
Analyte	Reference % Recovery QC Limits	% Recovery		Analysis Method
Lead	85 - 115	103		SW-846 6010
Arsenic	85 - 115	102		SW-846 6010

RF denotes Reference Sample.

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: Fernald
Date Sampled: NA
Date Received: NA

Group Number: 9905-019
Units: mg/L
TCLP Extraction Date: 02/16/99

WST ID: MBTC329-T1
Client ID: NA
Digestion Date: 02/17/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As TCLP Method Blank	0.009	Not detected	02/17/99	SW-846 6010
Pb TCLP Method Blank	0.015	Not detected	02/17/99	SW-846 6010

MB denotes Method Blank
NA denotes Not Applicable

WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc

TCLP Metals Analysis Result Report

Reference Standard Analysis Summary

2174

Site : Fernald
Group Number: 9905-019
TCLP Date : 2/16/99

Report Units : % Recovery
Matrix : TCLP Extract

	Lab ID	RFTC329-T1		
	Date Digested	2/17/99		
	Date Analyzed	2/17/99		
Analyte	Reference % Recovery QC Limits	% Recovery		Analysis Method
Lead	85 - 115	98		SW-846 6010
Arsenic	85 - 115	121 #		SW-846 6010

RF denotes Reference Sample.
# denotes outside QC limits.

Waste Stream Technology, Inc.

TCLP Metals Analysis Result Report
Duplicate Sample Analysis Summary

2174

Site : Fernald
Date Sampled : 2/15/99
Date Received : 2/15/99
TCLP Date : 2/16/99

Group Number : 9905-019
Report Units : mg/L
Matrix : TCLP Extract

Lab ID Number	WS49621	WS49621 Dup		
Client ID	Initial-TS	Initial-TS		
Date Digested	2/17/99	2/17/99		
Date Analyzed	2/17/99	2/17/99	**RPD**	**RPD**
Analyte	**Initial Result**	**Duplicate Result**	**(%)**	**QC Limits (%)**
Lead	15.5	15.4	0.5	25
Arsenic	< 0.045	< 0.045	< 0.1	25

Waste Stream Technology, Inc.

TCLP Metals Analysis Result Report

Matrix Spike Analysis Summary

2174

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 2/16/99

Group Number : 9905-019
Report Units : % Recovery

	Lab ID Number	WS49621	
	Client ID	Initial-TS	
	Date Digested	2/17/99	
	Date Analyzed	2/17/99	Analysis
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	75 - 125	NC	SW-846 6010
Arsenic	75 - 125	108	SW-846 6010

NC denotes Not Calculated. Concentration of Lead in unspiked sample greater than 10 times the amount of spike added.

Waste Stream Technology, Inc.

TCLP Metals Analysis Result Report

Post-Digestion Spike Analysis Summary

2174

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 2/16/99

Group Number : 9905-019
Report Units : % Recovery

	Lab ID Number	WS49620	
	Client ID	Initial-HS	
	Date Digested	2/17/99	
	Date Analyzed	2/17/99	Analysis
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	85 - 115	98	SW-846 6010
Arsenic	85 - 115	108	SW-846 6010

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Sample Dilution Interference Check Analysis Summary

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 2/16/99

Group Number : 9905-019
Report Units : % Recovery

Lab ID Number	WS49620
Client ID	Initial-HS
Date Digested	2/17/99
Date Analyzed	2/17/99

Analyte	**Undiluted Result (mg/L)**	**Diluted Result (mg/L)**	**Percent Difference**	**QC Limits (%)**
Lead	39.6	40.7	2.8	10
Arsenic	0.486	0.577	19 #	10

# denotes outside QC limits.

TCLP Extraction Logs and Digestion Logs

PROJECT Fluid Determination Log - TCP

Notebook No.

Continued From Page

Date	Sample ID	Sample wt.	4.0	10.0	7.0	Slope	Temp	pH	HCl 3.5ml	pH 2	Fluid #	initials
2/15/99	WS49419	5.02						10.17	✓	1.96	#1	RD/LS
	422	5.11						10.63	✓	2.09		
	484	5.07						10.40	✓	2.06		
	615	5.00						10.28	✓	2.08		
2/16/99	WS49533	5.21						10.43	✓	2.72	#1	LS
	572	5.19						8.69	✓	2.65		
	573	5.28						8.54	✓	2.04		
	618	5.12						10.62	✓	1.98		
	619	5.22						10.53	✓	3.36		
	620	5.24						6.48	✓	1.92		
	621	5.01						6.32	✓	1.90		
	316	5.06						9.12	✓	2.16		
	446	5.00						8.16	✓	1.94		
2/17/99	49616	5.08	4.01	10.06	6.97	101.0	30.4	10.22	✓	2.00	#1	RD
	716	5.09						10.40	✓	2.07		
	719	5.21						9.88	✓	2.00		
2/18/99	WS49743	5.10						10.18	✓	4.96	#1	LS
	764	5.08						10.43	✓	2.70		
	764	5.13						10.11	✓	2.72		
	522	5.05						5.62	✓	2.12		
	697	5.17						7.45	✓	2.09		
	698	5.08						8.02	✓	1.99		
	699	5.27						8.03	✓	2.02		
	700	5.14						9.31	✓	2.21		
	701	5.24						7.64	✓	2.07		
	702	5.30						5.99	✓	1.95		
	703	5.18						8.01	✓	2.02		
	704	5.01						6.67	✓	2.08		
	705	5.12						7.70	✓	1.92		
	706	5.10						6.77	✓	1.95		
	707	5.03						7.79	✓	1.96		
	708	5.07						7.72	✓	1.98		
2/22/99	WS49777	5.07						9.13	✓	2.48	#1	LS/BB
	851	5.05						9.00	✓	1.92		LS

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Signed Date Signed Date

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PROJECT TCLP Extraction Log

Notebook No.

Continued From Page

Date	Init.	Sample ID	Sample wt.	Part. red	% Solids	Fluid Amt.	Fluid ID 3 TYPE	Time on	Time off	Final pH	Client	Analyst	Comments
2-15-99	LS/RD	WS49589	100.10	None	100%	2L	#1TC328	1700	1000		LCS	70's	
		590	100.13				#1TC328						
		419	100.48							6.04	SAPP	Mets	
		422	100.47							11.81			
		484	100.81							8.37			
		615	100.49							9.96			
2-16-99	LS	WS49533	100.07	None	100%	2L	#1TC329	1600	09[illegible]	9.95	SAPP	Pb, Sb, Cd	
		572	100.85							5-6	GREATLAKES	Mets	
		573	100.43										
		618	50.62			1L				6.48	DOERUN		
		619	50.47							6.59			
		620	100.11			2L				5.01	FERNALD		
		621	100.42							4.99			
		316	100.18			2L				6.7		70's	
		446	100.44			2L				5-6	Barron	70's	
2/17/99	RD	WS49616	100.48 g	None	100%	2L	#1TC332	1540	0900	9.42	SAPP	Mets	
		~~716~~ 715	100.06							9.76			
		718	100.22							8.77			
2/18/99	LS	WS49743	50.40	None	100%	1L	#1TC332	1645	0945	6.70	RODOERUN	Mets	
		744	50.94							6.73			
		764	100.26			2L				8.40	SAPP		
		522	101.01							5-6	ALLEGENY		
		697	100.49								ACRES	Mets/70's	2nd 2L 100.39
		698	100.89										
		699	100.45										
		700	100.36				#1TC335						
		701	100.09										
		702	100.82										
		703	100.65										
		704	100.43										
		705	101.02										
		706	100.47										
		707	100.98										
		708	100.47										

LS

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Signed Date Signed Date Signed Date Signed Date

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Date + Initials	LES #	Sample ID	Sample wt./vol.	Final vol.	Method	Matrix	Sample Spk ID + cont	MDS Lot #	Client	Analysis	Comments			
2-15-99 LS/BB	11	WS49530	45 ml	50 ml	3015	TCLP 6		M29654	SAPP	Pb, Cd, Sb	227.55	279.97	279.97	
2-16-99 LS	1	MBTC 328-T1	45 ml	50 ml	3015	TCLP			SAPP		227.64	279.55	279.55	
	2	RFTC 328-T1				—	0.5 ml Met 1-5-3				228.39	280.67	280.66	
TCLP 2/15	3	WS49419-T1				21					226.81	278.57	278.56	
	4	419BK-T1				—					228.21	279.65	279.65	
	5	419SPK-T1				—	0.5 ml Met 1-5-3				227.97	280.25	280.25	
	6	422-T1				1					227.91	279.55	279.55	
	7	484-T1				2					227.86	279.90	279.90	
	8	615-T1				3					227.91	279.94	279.93	
	9	MBTC 325-T1				—			WASTE RESOURCES	Pb	230.64	282.46	282.44	
	10	RFTC 325-T1				—	0.5 ml Met 1-5-3				228.75	281.14	281.13	
	11	WS49486				4					227.43	279.18	279.16	
	12	49488				5					226.79	278.65	278.65	
2-16-99 LS	1	WS49570	45 ml	50 ml	3015	TCLP 6		M29654	RD 1 TCORP	Pb	227.70	279.63	279.63	* USE MB & RFTC
TCLP 2-15	2	MBTC 314-MP2				MEP					227.53	279.36	279.36	
SPLP 2-15	3	RFTC 314-MP2				—	0.5 ml Met 1-5-3				226.53	278.99	278.97	
	4	WS49402-MP2				—					228.89	280.79	280.76	
	5	MBTC 330-SP1				SPLP			SAPP	Pb, Cd, Sb	227.58	279.34	279.31	
	6	RFTC 330-SP1				—	0.5 ml Met 1-5-3				229.94	282.34	282.25	
	7	WS49419-SP1				18					226.14	278.12	278.09	
	8	419DUP-SP1				—					228.35	279.87	279.85	
	9	419SPK-SP1				—	0.5 ml Met 1-5-3				226.38	278.46	278.44	
	10	422-SP1				1					228.56	280.01	279.97	
	11	484-SP1				2					226.73	278.50	278.49	
	12	615-SP1				3					227.99	279.76	279.71	
2-17-99 LS/BB	1	MBTC 331-SP1	45 ml	50 ml	3015	SPLP		M29654	SAPP	Pb, Cd, Sb	228.13	279.67	279.67	
	2	RFTC 331-SP1				—	0.5 ml Met 1-5-3				227.55	279.86	279.83	
SPLP 2-16	3	WS49533-SP				4					229.13	281.01	280.97	
2-17-99 LS/BB	14	MBTC 329-T1				TCLP					229.42	281.42	281.42	
	25	RFTC 329-T1				—	0.5 ml Met 1-5-3				226.89	279.15	279.13	
	36	WS49533-T1				7					226.14	278.20	278.20	
	47	572				8			GREAT LAKES	TCLP Metals	226.89	279.16	279.15	
	58	573				9					230.38	282.73	282.70	
	69	618				10			RD DEERUN	TCLP, WTS Metals	226.42	278.38	278.38	
	710	619				11					226.23	278.47	278.44	

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Signed Date Signed Date

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Signed Date Signed

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PROJECT

Notebook No.
Continued From Page

Date + Initials	VS #	Sample ID	Sample wt/vol	Final vol.	method	matrix	sample, spike ID + amt	HNU int #	Client	Analysis	Comments		
2-17-99	8H	WS49820	45mL	50mL	3015	TCLP 12		M29494	Kennell	Pb, As	226.79	278.76	278.72
VS/DB	9H	821	↓	↓	↓	13		↓	↓	↓	226.55	278.45	278.44
	10	821 DUP				—					226.31	278.24	278.23
	11	821 SPK				—	0.5mL Met 1-5-3				225.07	280.69	280.68
2-17-99	1	MBC21799-W1	45mL	50mL	3015	H2O			Barron	Pb	227.01	278.83	278.82
VS/BB	2	RFC21799-W1				—	1.0mL Met 1-6-5				230.96	283.62	283.53
	3	WS49683				6					228.05	279.64	279.64
	4	684				7					228.30	280.10	280.06
2-18-99	1	MBC21899-W1	45mL	50mL	3015	H2O		M29494	NIAENV	Cd, Pb, Al, Zn	226.20	278.07	278.05
CS	2	RFC21899-W1				—	1.0mL Met 1-6-5				227.96	280.99	280.95
	3	WS49333				8					227.91	279.50	279.47
	4	334				9					227.63	279.12	279.12
	5	335				10					226.50	278.00	277.98
	6	336				11					226.80	278.91	278.91
	7	337				12					227.57	279.55	279.53
	8	338				13					226.28	277.76	277.77
	9	339				14					229.24	280.87	280.86
	10	340				15				Cd, Tl, Al	227.29	279.16	279.15
	11	443				16			APP	Cu	229.77	281.51	281.50
	12	444				17					226.85	278.43	278.40
2-18-99	1	MBTC332-T1	45mL	50mL	3015	TCLP			SAPP	Pb, Cd, Sb	227.13	278.87	278.82
CS	2	RFTC332-T1				—	0.5mL Met 1-5-3				227.90	280.41	280.39
TCLP 2-17	3	WS49616-T1				1					227.11	278.83	278.77
	4	715-T1				2					227.69	279.59	279.42
	5	718-T1				3					226.71	278.73	278.64
SPLP 2-17	6	MBTC333-SP1				SPLP					228.58	280.30	280.29
	7	RFTC333-SP1				—	0.5mL Met 1-5-3				226.80	279.17	279.13
	8	WS49616-SP1				5					229.48	281.06	281.04
	9	715-SP1				6					226.06	277.49	277.47
	10	718-SP1				7					227.53	279.14	279.09
2-18-99	1	MBTC314-MP3	45mL	50mL	3015	MEP			RDITCORP	Pb	227.86	279.53	279.47
CS	2	RFTC314-MP3				—	0.5mL Met 1-5-3				226.91	279.24	279.24
	3	WS49407-MP3				—					227.64	279.43	279.38
	4	570-MP1				—					228.46	280.24	279.9

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Read and Understood By

Signed Date Signed Date Signed Date Signed Date

Notebook No.
Continued From Page

PROJECT

Read and Understood By

Signed Date Signed

Date + Initials	Vcs #	Sample ID	Sample WT/vol	Final Vol	Method	Matrix	Sample Spike Amt & ID	HNO3 lot #	Client	Analysis	Comments			
2-11-99 LS	1	MBC21199-S2	10ml	50ml	3051	soil		M29054	REACT ENV.	Metals	226.33	240.61	240.54	
	2	RFC21199-S2	↓	↓	↓	—	0.5ml Met 1-5-3	↓	↓	↓	227.90	242.69	242.66	
	3	~~WS49498~~	~~0.52g~~			~~11~~					~~226.79~~	~~241.53~~	~~241.57~~	unnecessary analysis
	4	354	0.50g			12			LOWANDA		229.16	243.91	242.97	
	5	355	0.50g			13			↓		224.49	239.29	238.33	
2-15-99 LS/BA	1	MBC21599-S1	10ml	50ml	3051	soil			GREAT LAKES	RCRA metals	228.75	243.57	243.47	
	2	RFC21599-S1	↓			—	0.5ml Met 1-5-3				227.80	242.79	242.79	
	3	WS49572	0.58g			14					228.45	245.93	245.92	
	4	573	0.50g			15					227.50	242.38	242.17	
2-16-99 LS	1	MBC21699-01	10ml	50ml	3051	soil		M29054	NOCO	As	230.02	244.38	244.38	
	2	RFC21699-01	↓			—	0.11g Met 1-5-3				226.56	241.06	241.05	
	3	WS49594	0.25g			17					226.55	241.11	240.39	
	4	595	0.25g			18					227.44	241.93	241.52	
	5	596	0.25g			19					227.77	242.34	242.27	
	6	596 DUP	0.25g			—					227.11	241.62	240.95	
	7	596 SPK	0.25g			—	0.11g Met 1-5-3				228.66	243.36	243.20	
	8	597	0.25g			1					227.89	242.49	242.34	
	9	598	0.27g			2					228.40	243.00	242.85	
2-16-99 LS	1	MBC21699-S1	10ml	50ml	3051	soil			RD DUERUN	UTS metals	227.12	241.41	241.41	
	2	RFC21699-S1	↓			—	0.5ml Met 1-5-3				227.78	242.64	242.52	
	3	WS49618	0.51g			16					226.68	241.56	241.54	
	4	619	0.52g			17					226.34	241.13	240.05	
	5	620	0.50g			18			RD FERNDALE	Pb, As	225.09	239.96	239.94	
	6	621	0.53g			19			↓	↓	227.70	242.68	242.51	
2-17-99 LS/BA	1	MBC21799-S1	10ml	50ml	3051	soil		M29054	Commuc	As, Be, Pb	226.82	240.96	240.91	
	2	RFC21799-S1	↓			—	0.5ml Met 1-5-3				226.34	241.02	240.99	
	3	WS49682	0.52g			20					227.32	241.99	241.97	
	4	683 DUP ~~587~~ LS	0.50g			—					225.27	243.03	242.93	
	5	683 SPK ~~588~~ LS	0.50g			—	0.5ml Met 1-5-3				226.55	241.79	241.54	
	6	587	0.53			1			HELLERT	Pb, Cr, Cd, Be, As	226.75	241.43	241.42	
	7	588	0.51			2			↓	↓	228.15	242.79	242.78	
2-17-99 LS/BA	1	MBC21799-S2	10ml	50ml	3051	soil			NOCO	Pb	228.57	242.84	242.81	
	2	RFC21799-S2	↓			—	0.5ml Met 1-5-3				227.75	242.43	242.37	
	3	WS49299	0.54g			3					227.61	242.31	239.82	
	4	320	0.53g			4					228.46	243.11	243.03	

Continued on Page

Read and Understood By

Signed T. Ralph Date 3-1-99 Signed Date

Read and Understood By

Signed Date Signed

WASTESTREAM TECHNOLOGY

302 GROTE STREET
BUFFALO, NY 14207
(716) 876-5290

9905 -019

CHAIN OF CUSTODY RECORD

PROJECT NO: 9905

SITE NAME: FERNALD

SAMPLERS (SIGNATURE): CS

SAMPLE NO.	DATE	TIME	COMP	GRAB	MATRIX	SAMPLE LOCATION	SIZE & NO. OF CONTAINERS	Total - Pb, As	TCLP - Pb, As						PRESERVATIVES	REMARKS
	2/15/99	1500		X	Soil	INITIAL - HS	1x4oz	X	X							WS19620
	↓	1505		↓	↓	INITIAL - TS	↓	↓	↓							↓ 621

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
C. Smolkovich	2/15/99 1515	Tracy Colby			
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)

SPECIAL INSTRUCTIONS:

TURNAROUND TIME 24 hrs.

LAB USE: REFRIGERATOR # _____ SHELF # _____ GROUP # _____ DUE DATE _____

2124

APPENDIX C

APPENDIX C

Laboratory Reports for Treated Soil, 1 Day Reaction Time

WASTE STREAM TECHNOLOGY, INC.
302 Grote Street
Buffalo, NY 14207
(716) 876-5290

2174

Analytical Data Report
Report Date : 03/23/99
Group Number : 9902-021

Prepared For :
Mr. Steve Sharp
Sevenson Environmental Services, Inc.
9245 Calumet Avenue
Suite 101
Munster, IN 46321

Site : Fernald

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
0% - D1	WS49905	Soil	02/23/99	02/23/99	09:30
0.5% - D1	WS49906	Soil	02/23/99	02/23/99	09:30
1% - D1	WS49907	Soil	02/23/99	02/23/99	09:30
2% - D1	WS49908	Soil	02/23/99	02/23/99	09:30
3% - D1	WS49909	Soil	02/23/99	02/23/99	09:30
4% - D1	WS49910	Soil	02/23/99	02/23/99	09:30
Sample Status Upon Receipt : No irregularities.					

Analytical Services

Analytical Parameters	Number of Samples	Turnaround Time
TCLP Lead & Arsenic	6	Standard
Total Lead & Arsenic	6	Standard
pH of TCLP Extract	6	Standard

Report Released By : Daniel W. Vollmer
Daniel Vollmer, Laboratory QA/QC Officer

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ENVIRONMENTAL LABORATORY ACCREDITATION CERTIFICATION NUMBERS
NYSDOH ELAP #11179 NJDEPE #73977 CDHS ELAP #2189

WASTE STREAM TECHNOLOGY

METHODOLOGIES

The specific methodologies employed in obtaining the analytical data reported are indicated on each of the result forms. The method numbers shown refer to the following U.S. Environmental Protection Agency Reference:

Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020, March 1979, Revised 1983, U.S. Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

Federal Register, 40 CFR Part 136: Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act. Revised July 1992.

Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. Third Edition, Revised December 1996, U.S. EPA SW-846.

Annual Book of ASTM Standards, Volume II. ASTM, 100 Harbor Drive, West Conshohocken, PA 19428-2959.

Standard Methods for the Examination of Water and Wastewater. (18th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

Waste Stream Technology, Inc.

pH of TCLP Leachate

SW846 9040B

2174

Site: FERNALD
Date Sampled: 02/23/99
Date Received: 02/23/99

Group Number: 9905-021
Matrix: Soil
Units: pH Units

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS49905	0%-D1	NA	5.04	02/24/99
WS49906	0.5%-D1	NA	5.01	02/24/99
WS49907	1%-D1	NA	5.00	02/24/99
WS49908	2%-D1	NA	4.97	02/24/99
WS49909	3%-D1	NA	4.93	02/24/99
WS49910	4%-D1	NA	4.89	02/24/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/23/99
Date Received: 02/23/99

Group Number: 9905-021
Units: mg/Kg
Matrix: Soil

WST ID: WS49905
Client ID: 0%-D1
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	21.0	03/10/99	SW-846 6010
Lead by ICP	20.5	5140	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/23/99
Date Received: 02/23/99

Group Number: 9905-021
Units: mg/Kg
Matrix: Soil

WST ID: WS49906
Client ID: 0.5%-D1
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	25.2	03/10/99	SW-846 6010
Lead by ICP	20.5	5670	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/23/99
Date Received: 02/23/99

Group Number: 9905-021
Units: mg/Kg
Matrix: Soil

WST ID: WS49907
Client ID: 1%-D1
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	23.3	03/10/99	SW-846 6010
Lead by ICP	20.5	4870	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

2174

Metals Analysis Result Report

Site: FERNALD
Date Sampled: 02/23/99
Date Received: 02/23/99

Group Number: 9905-021
Units: mg/Kg
Matrix: Soil

WST ID: WS49908
Client ID: 2%-D1
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	23.1	03/10/99	SW-846 6010
Lead by ICP	20.5	4790	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/23/99
Date Received: 02/23/99

Group Number: 9905-021
Units: mg/Kg
Matrix: Soil

WST ID: WS49909
Client ID: 3%-D1
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	22.0	03/10/99	SW-846 6010
Lead by ICP	20.5	4080	03/10/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/23/99
Date Received: 02/23/99

Group Number: 9905-021
Units: mg/Kg
Matrix: Soil

WST ID: WS49910
Client ID: 4%-D1
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	142	03/10/99	SW-846 6010
Lead by ICP	20.5	17000	03/10/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/23/99
Date Received: 02/23/99

Group Number: 9905-021
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 02/23/99

WST ID: WS49905
Client ID: 0%-D1
Digestion Date: 02/24/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.319	02/24/99	SW-846 6010
Lead by ICP	0.075	31.6	02/24/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/23/99
Date Received: 02/23/99

Group Number: 9905-021
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 02/23/99

WST ID: WS49906
Client ID: 0.5%-D1
Digestion Date: 02/24/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.258	02/24/99	SW-846 6010
Lead by ICP	0.075	7.15	02/24/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/23/99
Date Received: 02/23/99

Group Number: 9905-021
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 02/23/99

WST ID: WS49907
Client ID: 1%-D1
Digestion Date: 02/24/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.294	02/24/99	SW-846 6010
Lead by ICP	0.075	4.36	02/24/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/23/99
Date Received: 02/23/99

Group Number: 9905-021
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 02/23/99

WST ID: WS49908
Client ID: 2%-D1
Digestion Date: 02/24/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.279	02/24/99	SW-846 6010
Lead by ICP	0.075	1.39	02/24/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/23/99
Date Received: 02/23/99

Group Number: 9905-021
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 02/23/99

WST ID: WS49909
Client ID: 3%-D1
Digestion Date: 02/24/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.438	02/24/99	SW-846 6010
Lead by ICP	0.075	0.857	02/24/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/23/99
Date Received: 02/23/99

Group Number: 9905-021
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 02/23/99

WST ID: WS49910
Client ID: 4%-D1
Digestion Date: 02/24/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.343	02/24/99	SW-846 6010
Lead by ICP	0.075	0.866	02/24/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Quality Control Analysis Result Reports

- Method Blanks
- Reference Samples
- Duplicate Analysis
- Matrix Spike Analysis
- Post-Digestion Spike Analysis
- Dilution Interference Check Analysis

Waste Stream Technology, Inc.
Metals Method Blank Analysis

2174

Site: FERNALD
Date Sampled: NA
Date Received: NA

Group Number: 9905-021
Units: mg/Kg

WST ID MB030999-S1
Client ID: NA
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As soil Method Blank	1.70	Not detected	03/10/99	SW-846 6010
Pb soil Method Blank	4.10	Not detected	03/10/99	SW-846 6010

MB denotes Method Blank
NA denotes Not Applicable

WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc

Total Metals Analysis Result Report

Reference Standard Analysis Summary

2174

Site : Fernald
Group Number: 9905-021 & 022

Report Units : % Recovery
Matrix : TCLP Extract

	Lab ID	RF030999-S1		
	Date Digested	3/9/99		
	Date Analyzed	3/10/99		
Analyte	Reference % Recovery QC Limits	% Recovery		Analysis Method
Lead	85 - 115	99		SW-846 6010
Arsenic	85 - 115	98		SW-846 6010

RF denotes Reference Sample.

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: NA
Date Received: NA

Group Number: 9905-021
Units: mg/L
TCLP Extraction Date: 02/23/99

WST ID: MBTC341-T1
Client ID: NA
Digestion Date: 02/24/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As TCLP Method Blank	0.009	Not detected	02/24/99	SW-846 6010
Pb TCLP Method Blank	0.015	Not detected	02/24/99	SW-846 6010

MB denotes Method Blank
NA denotes Not Applicable

WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc.

TCLP Metals Analysis Result Report

Reference Standard Analysis Summary

2174

Site : Fernald
Group Number: 9905-021
TCLP Date : 2/23/99

Report Units : % Recovery
Matrix : TCLP Extract

	Lab ID	RFTC341-T1		
	Date Digested	2/23/99		
	Date Analyzed	2/24/99		
Analyte	Reference % Recovery QC Limits	% Recovery		Analysis Method
Lead	85 - 115	91		SW-846 6010
Arsenic	85 - 115	103		SW-846 6010

RF denotes Reference Sample.

Waste Stream Technology, Inc.

2174

TCLP Metals Analysis Result Report
Duplicate Sample Analysis Summary

Site : Fernald
Date Sampled : 2/23/99
Date Received : 2/23/99
TCLP Date : 2/23/99

Group Number : 9905-021
Report Units : mg/L
Matrix : TCLP Extract

Lab ID Number	WS49908	WS49908 Dup		
Client ID	2%-D1	2%-D1		
Date Digested	2/24/99	2/24/99		
Date Analyzed	2/24/99	2/24/99	**RPD**	**RPD**
Analyte	**Initial Result**	**Duplicate Result**	**(%)**	**QC Limits (%)**
Lead	1.39	1.38	0.7	25
Arsenic	0.279	0.262	6.3	25

Waste Stream Technology, Inc.

2174

TCLP Metals Analysis Result Report

Matrix Spike Analysis Summary

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 2/23/99

Group Number : 9905-021
Report Units : % Recovery

	Lab ID Number	WS49908	
	Client ID	2%-D1	
	Date Digested	2/24/99	
	Date Analyzed	2/24/99	Analysis
Analyte	QC Limits	% Recovery	Method
Lead	75 - 125	110	SW-846 6010
Arsenic	75 - 125	110	SW-846 6010

Waste Stream Technology, Inc.

TCLP Metals Analysis Result Report

Post-Digestion Spike Analysis Summary

- 2174

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 2/23/99

Group Number : 9905-021
Report Units : % Recovery

	Lab ID Number	WS49905	
	Client ID	0%-D1	
	Date Digested	2/24/99	
	Date Analyzed	2/24/99	**Analysis**
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	85 - 115	97	SW-846 6010
Arsenic	85 - 115	105	SW-846 6010

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Sample Dilution Interference Check Analysis Summary

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 2/23/99

Group Number : 9905-021
Report Units : % Recovery

Lab ID Number	WS49905			
Client ID	0%-D1			
Date Digested	2/24/99			
Date Analyzed	2/24/99			
Analyte	**Undiluted Result (mg/L)**	**Diluted Result (mg/L)**	**Percent Difference**	**QC Limits (%)**
Lead	31.6	30.6	3.3	10
Arsenic	0.319	0.334	4.7	10

TCLP Extraction Logs and Digestion Logs

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PROJECT Fluid Determination Log - TCLP

Notebook No. 2174

Continued From Page

Date	Sample ID	Sample wt.	4.0	10.0	7.0	Slope	Temp	pH	HCl 3.5mL	pH 2	Fluid #	Initials
2/23/99	WS49864	5.01						9.30	✓	2.13	#1	LS
	865	5.00						9.44	✓	2.06		
	866	5.17						8.62	✓	1.98		
	867	5.00						4.88	—	—		
2/23/99	WS49905	5.15	101	10.06	6.95	103.0	19.3	6.36	✓	1.96	#1	RD/LS
	906	5.16						3.96	—	—		
	907	5.03						3.52	—	—		
	908	5.20						3.35	—	—		
	909	5.00						3.08	—	—		
	910	5.20						2.98	—	—		
	820	5.08						5.92	✓	2.47		
	821	5.11						6.73	✓	2.26		
	822	5.07						6.60	✓	2.55		
	823	5.00						5.80	✓	2.39		
	824	5.25						5.50	✓	2.03		
	825	5.02						6.81	✓	2.28		
	826	5.05						5.72	✓	2.36		
	827	5.15						6.59	✓	2.31		
	828	5.23						5.96	✓	2.10		
	829	5.04						5.68	✓	2.09		
	830	5.03						6.21	✓	2.09		
2/24/99	WS49867	Fluid determination done on 2/22/99									#1	LS/BB
	868	5.06						8.21	✓	2.02		
2/25/99	WS49961	5.18	4.0	10.07	7.02	101.5	19.3	5.98	✓	1.90	#1	LS
	962	5.10						4.67	—	—		
	963	5.03						3.96	—	—		
	964	5.16						3.36	—	—		
	965	5.05						3.11	—	—		
	966	5.14						2.96	—	—		
3/1/99	WS50036	5.00						6.57	✓	1.95	#1	LS/BB
	037	5.28						5.06	✓	1.94		
	038	5.01						4.17	—	—		
	039	5.00						3.77	—	—		
	040	5.06						3.43	—	—		
	041	5.02						3.42	—	—		

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Signed Date Signed Date

PROJECT TCLP Extraction Log

Notebook No.

Continued From Page

Date	Init.	Sample ID	Sample wt.	Part. Red.	% Solids	Fluid Amt.	Fluid ID Type	Time on	Time off	Final pH	Client	Analysis	Comments
2/22/99	LS/BB	WS49777	100.31	None	100%	2L	#1TC341 339	1400 LS	0830 LS	5-6	BSA	Full TCLP	2nd 2L = 101.06
		851	100.57								Nat. Fuel	Mets	
2/22/99	LS	WS49864	100.64				#1TC339	1600 LS	1000 LS		WATTS	Full TCLP	2nd 2L = 100.13
		865	100.43										2nd 2L = 100.28
		866	100.51										2nd 2L = 100.52
		~~867~~											~~2nd 2L =~~ LS
2/23/99	RD/LS	WS49905	100.72	None	100%	2L	#1TC341 pH 4.89	1555 RD/LS	0915 LS/BB	5.04	RD Formal	Mets	
		906	100.27							5.01			
		907	100.43							5.00			
		908	100.04							4.97			
		909	100.15							4.93			
		910	100.51							4.89			
		830	100.46							5-6	Hid Met	Pb	Burning cinder LS
		831	100.22										
		832	100.38										
		833	100.96										
		834	100.98				#1TC345 pH 4.89						
		835	100.58										
		836	100.16										
		837	100.37										
		838	100.11										
		839	100.56										
		840	100.19										
2/24/99	LS/BB	WS49867	50.64	None	100%	1L	#1TC348	1115 LS/BB	0930	4-5	WATTS	Full TCLP	* Not enough sample for Full
		868	100.88			2L				5-6			2nd 2L = 100.89
2/25/99	LS	WS49961	100.25	None	100%	2L	#1TC349	1600 LS	0900 LS	4.91	Fernald	Mets As, Pb	
		962	100.53							4.94			
		963	100.25							4.91			
		964	100.45							4.86			
		965	100.14							4.81			
		966	100.08							4.76			
3/1/99	LS/BB	WS49946 50036	100.05	None	100%	2L	#1TC348 pH: 4.99	1500 LS/BB	0840 LS	4.96	Fernald	As, Pb	
		037	100.27							4.91			
		038	100.36							4.92			
		039	100.29							4.89			

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PROJECT TCLP Digestion Log

Notebook No.
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Date Initials	vial #	Sample ID	Sample wt/vol	final vol	method	matrix	Sample SPK. ID + Lot	HNO3 Lot #	Client	Analysis	Comments		
2-23-99 LS	1	MBTC339-T1	45ml	50ml	3015	TCLP		M29054	Nat Fuel	TCLP Mets	226.17	278.12	278.02
	2	RFTC339-T1				—	0.5ml Met 1-5-3				226.87	278.98	278.97
	3	WS49851				3					228.12	279.80	279.72
	4	777				4			BSA	Full TCLP	230.73	282.50	282.47
	5	864				5			Watts		228.06	280.04	280.02
	6	865				6					229.67	281.91	281.91
	7	866				7					227.39	279.25	279.23
	8	MBTC338-MPS				MEP			RD ITCORP	Pb	226.66	278.34	278.30
	9	RFTC338-MPS				—	0.5ml Met 1-5-3				227.10	279.48	279.46
	10	WS49402-MPS				—					227.35	279.11	279.11
	11	49570-MP3				—					227.30	279.29	279.25
2-24-99 LS/BB	1	MBTC338-MPL	45ml	50ml	3015	MEP			RD ITCORP	Pb	228.24	280.15	280.14
	2	RFTC338-MPL				—	0.5ml Met 1-5-3				227.44	280.71	280.57
	3	WS49402-MPL				—					228.25	280.50	280.50
	4	49570-MP4				—					225.77	278.10	278.10
SPLP 2/23	5	MBTC344-SP1				SPLP			SAPP	Pb, Cd, Sb	227.54	279.81	279.80
	6	RFTC344-SP1				—	0.5ml Met 1-5-3				228.95	280.85	280.83
	7	WS49534				19					227.16	278.88	278.87
	8	838				20					226.11	277.61	277.60
	9	937				21					227.01	278.61	278.56
	10	937DUP				—					226.07	278.15	278.15
	11	937SPK				—	0.5ml Met 1-5-3				230.18	282.83	282.83
2-24-99 LS/BB	1	MBTC341-T1	45ml	50ml	3015	TCLP			MIDMET	Pb	228.03	280.25	280.25
	2	RFTC341-T1				—	0.5ml Met 1-5-3				229.02	281.23	281.22
	3	WS49820				8					226.93	278.68	278.67
TCLP 2/23	4	821				9					227.45	279.38	279.29
	5	909 ~~833~~ 4/23-24				10				Pb, As	227.74	279.45	279.42
	6	910 ~~833~~ 4/23-24				11					227.17	278.74	278.72
	7	905				12			FERNALD		227.33	279.17	279.16
	8	906				13					229.58	281.34	281.34
	9	907				14					227.50	279.44	279.36
	10	908				15					226.94	278.68	278.64
	11	908DUP				—					227.55	279.08	279.04
	12	908SPK				—	0.5ml Met 1-5-3				227.51	279.70	279.69

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PROJECT

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PROJECT

Soil Digestion Log

Notebook No.

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PROJECT

Notebook No.

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Date + Initials	Res #	Sample ID	Sample Wt/Vol	Final Vol	Method	Matrix	Sample Spike Amt + ID	HBG's lot #	Client	Analysis	Comments		
3-5-99	11	WS49533 SPK	0.52g	50ml	3051	soil	0.5ml Met 1-5-3	M74054	SAPP	Pb, Cd, Sb	228.04	243.56	243.56
LS	12	49534	0.52g	↓	↓	1		↓	↓	↓	226.57	241.51	241.51
3-8-99	1	MBC30899-S1	10ml	50ml	3051	soil			SAPP	Pb, Cd, Sb	228.91	243.26	243.17
LS	2	RFC30899-S1	↓			—	0.5ml Met 1-5-3				226.84	241.71	241.70
	3	WS49616	0.50g			2					225.63	240.45	240.45
	4	617	0.50g			3					227.88	242.63	242.63
	5	716	0.51g			4					228.67	243.48	243.48
	6	717	0.50g			5					228.52	243.32	243.32
	7	719	0.52g			6					227.03	241.82	241.82
	8	720	0.52g			7					226.68	241.50	241.44
	9	765	0.50g			8					227.86	242.64	242.57
	10	766	0.52g			9					227.56	242.39	242.39
	11	838	0.51g			10					226.47	241.35	241.30
	12	839	0.51g			11					228.31	243.16	243.14
3-8-99	1	MBC30899-S2	10ml	50ml	3051	soil			SAPP	Pb, Cd, Sb	228.07	242.27	242.22
LS	2	RFC30899-S2	↓			—	0.5ml Met 1-5-3				227.23	242.13	242.12
	3	WS49912	0.50g			12					228.77	243.51	243.45
	4	889	0.50g			13					227.20	242.00	242.00
	5	890	0.53g			14					227.25	242.04	242.01
	6	938	0.52g			15					227.31	242.22	242.22
	7	939	0.51g			16					225.33	240.18	240.18
	8	953	0.52g			17					227.63	242.49	242.49
	9	954	0.53g			18					228.49	243.43	243.38
	10	982	0.56g			19					227.96	242.91	242.87
	11	982 DUP	0.53g			—					227.67	242.61	242.61
	12	982 SPK	0.54g			—	0.5ml Met 1-5-3				227.34	242.67	242.64
3-8-99	1	MBC30899-S3	10ml	50ml	3051	soil			SAPP	Pb, Cd, Sb	225.53	239.91	239.71
LS	2	RFC30899-S3	↓			—	0.5ml Met 1-5-3				227.44	242.28	242.28
	3	WS49983	0.55g			1					228.15	243.05	243.05
	4	50010	0.50g			2					226.16	241.07	241.02
	5	50011	0.56g			3					227.39	242.30	242.29
3-9-99	1	MBC30999-S1	10ml	50ml	3051	soil		MBC35	Fernald	Pb, As	227.78	242.15	242.10
LS	2	RFC30999-S1	↓			—	0.5ml Met 1-5-3				227.85	242.72	242.72
	3	WS49905	0.55g			4					227.09	242.01	241.98
	4	906	0.51g			5					228.52	243.48	243.37

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PROJECT

Soil Digestion Log

Notebook No.

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PROJECT

Notebook No.

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Date Started	No. #	Sample ID	Sample wt + vol	Final vol	Method	Matrix	Sample spk Cont + Ed.	HRD31 LOT#	Client	Analyses	Comments		
3-9-99 CS	5	WS49907	0.51g	50ml	3051	Soil	6	M13035	Fernald	Pb, As	226.99	241.91	241.90
	6	908	0.56g				7				227.03	241.95	241.91
	7	909	0.51g				8				226.63	241.45	241.43
	8	910	0.51g				9				229.47	244.15	244.10
	9	961	0.54g				10				226.96	241.74	241.76
	10	962	0.51g				11				228.03	242.78	242.61
	11	963	0.54g				12				227.83	242.76	242.73
	12	964	0.56g				13				226.31	241.20	241.17
3-9-99 TR		MBC309991HP1	0.14g	100mL	3050	Hot Plate			NYSDOH	Pb in Oil Wipe	50 ml 1:1 HNO_3	5 ml H_2O	
		RFC309991HP	0.10				1ml Met 1-5-3						
		WS49946	3.24g										
3-10-99 CS	1	MBC31099-01	10ml	50ml	3051	Oil		M13035	NECO	As	227.32	241.56	241.49
	2	RFC31099-01					0.10g Met 1-5-3				227.52	242.08	242.05
	3	WS50279	0.35g				7				227.59	242.13	240.72
	4	280	0.35g				8				228.57	243.09	241.68
	5	281	0.35g				9				227.38	242.07	240.53
	6	282	0.35g				10				229.31	243.92	243.52
	7	283	0.36g				11				230.81	245.80	245.36
3-10-99 CS	1	MBC31099-S1	10ml	50ml	3051	Soil		M13035	Fernald	Pb, As	228.05	242.38	242.36
	2	RFC31099-S1					0.5ml Met 1-5-3				227.16	241.98	241.97
	3	WS49965	0.54g				14				227.42	242.19	242.12
	4	49966	0.56g				15				227.90	242.85	242.84
	5	50036	0.53g				16				228.04	243.00	242.74
	6	50037	0.55g				17				227.27	242.23	242.13
	7	50038	0.52g				18				226.00	241.54	241.46
	8	50039	0.53g				19				227.95	242.77	242.74
	9	50040	0.50g				20				227.10	242.03	242.03
	10	50041	0.54g				21				229.54	244.40	244.27
	11	50041 DUP	0.55g				—				228.10	242.44	242.82
	12	50041 SPK	0.54g				—				228.13	243.56	243.55
3-12-99 CS		MBC31299-HP1	10ml	100ml	3050A	Hot Plate	0.5ml Met 1-5-3		NYSDOH	METS			
		RFC31299-HP1					1.0ml Metals 5						
		WS49943	1.01g										
3-12-99 CS	1	MBC31299-01	10ml	50ml	3051	Oil			NECO	As	230.85	245.30	245.19
	2	RFC31299-01					Continued on Page Met 1-5-3				227.68	242.20	242.17

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Signature

Date

Signature

Date

Signature

Date

Signature

Date

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WASTESTREAM TECHNOLOGY

302 GROTE STREET
BUFFALO, NY 14207
(716) 876-5290

9905-021

CHAIN OF CUSTODY RECORD

PROJECT NO: 9905

SITE NAME: FERNALD

SAMPLERS (SIGNATURE): CS

SAMPLE NO.	DATE	TIME	COMP	GRAB	MATRIX	SAMPLE LOCATION	SIZE & NO. OF CONTAINERS	TCLP-Ba, As						PRESERVATIVES	REMARKS
	2/23/99	8:50		X	Soil	0% - D1	1x4oz	X					WS49	905	* Use 100g for ea.
		8:55				0.5% - D1								906	sample in TCLP*
		9:00				1% - D1								907	
		9:05				2% - D1								908	
		9:10				3% - D1								909	
		9:15				4% - D1								910	

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
C. Smolkovich	2/23/99 9:30	[illegible]			
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)

SPECIAL INSTRUCTIONS:

TURNAROUND TIME 24 hrs.

LAB USE: REFRIGERATOR # _____ SHELF # _____ GROUP # _____ DUE DATE _____

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WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc.
302 Grote Street
Buffalo, NY 14207

2174

ANALYTICAL SERVICES REQUEST FORM

Request Taken By JH Date Requested 3/4/99

Client Rd-Fernald Telephone

Client Contact Steve Sharp / SES MW Fax

Address

Start Date P.O. #

Lab/P.O. #	Number of Samples	Matrix	Analytical Parameters	Turnaround Time (Days)	Quoted Price
WS49905 →	10	Soil	Total Pb, As	5BD	
WS49961 →	66	#18 Total			
WS50036 →	41				

Sample Containers Required?

_____ NO _____ YES (Please Complete Sample Container Request Form)

Special Instructions Due 3/11

Laboratory Use Only: Sample Group # 9905-021, 022, 023

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ACCOUNTING

APPENDIX D

APPENDIX D

Laboratory Reports for Treated Soil, 3 Day Reaction Time

WASTE STREAM TECHNOLOGY, INC.

302 Grote Street
Buffalo, NY 14207
(716) 876-5290

2174

Analytical Data Report
Report Date : 03/23/99
Group Number : 9902-022

Prepared For :
Mr. Steve Sharp
Sevenson Environmental Services, Inc.
9245 Calumet Avenue
Suite 101
Munster, IN 46321

Site : Fernald

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
0% - D3	WS49961	Soil	02/25/99	02/25/99	09:30
0.5% - D3	WS49962	Soil	02/25/99	02/25/99	09:30
1% - D3	WS49963	Soil	02/25/99	02/25/99	09:30
2% - D3	WS49964	Soil	02/25/99	02/25/99	09:30
3% - D3	WS49965	Soil	02/25/99	02/25/99	09:30
4% - D3	WS49966	Soil	02/25/99	02/25/99	09:30
Sample Status Upon Receipt : No irregularities.					

Analytical Services

Analytical Parameters	Number of Samples	Turnaround Time
TCLP Lead & Arsenic	6	Standard
Total Lead & Arsenic	6	Standard
pH of TCLP Extract	6	Standard

Report Released By : Daniel W. Voll
Daniel Vollmer, Laboratory QA/QC Officer

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ENVIRONMENTAL LABORATORY ACCREDITATION CERTIFICATION NUMBERS
NYSDOH ELAP #11179 NJDEPE #73977 CDHS ELAP #2189

WASTE STREAM TECHNOLOGY

METHODOLOGIES

The specific methodologies employed in obtaining the analytical data reported are indicated on each of the result forms. The method numbers shown refer to the following U.S. Environmental Protection Agency Reference:

Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020, March 1979, Revised 1983, U.S. Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

Federal Register, 40 CFR Part 136: Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act. Revised July 1992.

Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. Third Edition, Revised December 1996, U.S. EPA SW-846.

Annual Book of ASTM Standards, Volume II. ASTM, 100 Harbor Drive, West Conshohocken, PA 19428-2959.

Standard Methods for the Examination of Water and Wastewater. (18th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

pH of TCLP Leachate

SW846 9040B

2174

Site: FERNALD
Date Sampled: 02/25/99
Date Received: 02/25/99

Group Number: 9905-022
Matrix: Soil
Units: pH Units

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS49961	0%-D3	NA	4.91	02/26/99
WS49962	0.5%-D3	NA	4.94	02/26/99
WS49963	1%-D3	NA	4.91	02/26/99
WS49964	2%-D3	NA	4.86	02/26/99
WS49965	3%-D3	NA	4.81	02/26/99
WS49966	4%-D3	NA	4.76	02/26/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

- 2174

Site: FERNALD
Date Sampled: 02/25/99
Date Received: 02/25/99

Group Number: 9905-022
Units: mg/Kg
Matrix: Soil

WST ID: WS49961
Client ID: 0%-D3
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	19.7	03/10/99	SW-846 6010
Lead by ICP	20.5	4580	03/10/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/25/99
Date Received: 02/25/99

Group Number: 9905-022
Units: mg/Kg
Matrix: Soil

WST ID: WS49962
Client ID: 0.5%-D3
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	24.9	03/10/99	SW-846 6010
Lead by ICP	20.5	5520	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/25/99
Date Received: 02/25/99

Group Number: 9905-022
Units: mg/Kg
Matrix: Soil

WST ID: WS49963
Client ID: 1%-D3
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	28.2	03/10/99	SW-846 6010
Lead by ICP	20.5	5760	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/25/99
Date Received: 02/25/99

Group Number: 9905-022
Units: mg/Kg
Matrix: Soil

WST ID: WS49964
Client ID: 2%-D3
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	18.5	03/10/99	SW-846 6010
Lead by ICP	20.5	4030	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/25/99
Date Received: 02/25/99

Group Number: 9905-022
Units: mg/Kg
Matrix: Soil

WST ID: WS49965
Client ID: 3%-D3
Digestion Date: 03/10/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	272	03/10/99	SW-846 6010
Lead by ICP	20.5	13400	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/25/99
Date Received: 02/25/99

Group Number: 9905-022
Units: mg/Kg
Matrix: Soil

WST ID: WS49966
Client ID: 4%-D3
Digestion Date: 03/10/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	533	03/10/99	SW-846 6010
Lead by ICP	20.5	39000	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/25/99
Date Received: 02/25/99

Group Number: 9905-022
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 02/25/99

WST ID: WS49961
Client ID: 0%-D3
Digestion Date: 02/26/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.540	02/26/99	SW-846 6010
Lead by ICP	0.075	64.2	02/26/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/25/99
Date Received: 02/25/99

Group Number: 9905-022
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 02/25/99

WST ID: WS49962
Client ID: 0.5%-D3
Digestion Date: 02/26/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.512	02/26/99	SW-846 6010
Lead by ICP	0.075	31.0	02/26/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/25/99
Date Received: 02/25/99

Group Number: 9905-022
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 02/25/99

WST ID: WS49963
Client ID: 1%-D3
Digestion Date: 02/26/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.271	02/26/99	SW-846 6010
Lead by ICP	0.075	4.46	02/26/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/25/99
Date Received: 02/25/99

Group Number: 9905-022
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 02/25/99

WST ID: WS49964
Client ID: 2%-D3
Digestion Date: 02/26/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.401	02/26/99	SW-846 6010
Lead by ICP	0.075	1.80	02/26/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 02/25/99
Date Received: 02/25/99

Group Number: 9905-022
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 02/25/99

WST ID: WS49966
Client ID: 4%-D3
Digestion Date: 02/26/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.357	02/26/99	SW-846 6010
Lead by ICP	0.075	0.415	02/26/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Quality Control Analysis Result Reports

- Method Blanks
- Reference Samples
- Duplicate Analysis
- Matrix Spike Analysis
- Post-Digestion Spike Analysis
- Dilution Interference Check Analysis

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: NA
Date Received: NA

Group Number: 9905-022
Units: mg/L
TCLP Extraction Date: 02/25/99

WST ID: MBTC349-T1
Client ID: NA
Digestion Date: 02/26/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As TCLP Method Blank	0.009	Not detected	02/26/99	SW-846 6010
Pb TCLP Method Blank	0.015	Not detected	02/26/99	SW-846 6010

MB denotes Method Blank
NA denotes Not Applicable

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WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc

TCLP Metals Analysis Result Report

Reference Standard Analysis Summary

2174

Site : Fernald
Group Number: 9905-022
TCLP Date : 2/25/99

Report Units : % Recovery
Matrix : TCLP Extract

	Lab ID	RFTC349-T1		
	Date Digested	2/26/99		
	Date Analyzed	2/26/99		
Analyte	Reference % Recovery QC Limits	% Recovery		Analysis Method
Lead	85 - 115	101		SW-846 6010
Arsenic	85 - 115	110		SW-846 6010

RF denotes Reference Sample.

Waste Stream Technology, Inc.

2174

TCLP Metals Analysis Result Report
Duplicate Sample Analysis Summary

Site : Fernald
Date Sampled : 2/25/99
Date Received : 2/25/99
TCLP Date : 2/25/99

Group Number : 9905-022
Report Units : mg/L
Matrix : TCLP Extract

Lab ID Number	WS49961	WS49961 Dup		
Client ID	0%-D3	0%-D3		
Date Digested	2/26/99	2/26/99		
Date Analyzed	2/26/99	2/26/99	**RPD**	**RPD**
Analyte	**Initial Result**	**Duplicate Result**	**(%)**	**QC Limits (%)**
Lead	64.2	64.9	1.2	25
Arsenic	0.540	0.547	1.3	25

Waste Stream Technology, Inc.

TCLP Metals Analysis Result Report

Matrix Spike Analysis Summary

2174

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 2/25/99

Group Number : 9905-022
Report Units : % Recovery

	Lab ID Number	WS49961	
	Client ID	0%-D3	
	Date Digested	2/26/99	
	Date Analyzed	2/26/99	Analysis
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	75 - 125	NC	SW-846 6010
Arsenic	75 - 125	103	SW-846 6010

NC denotes Not Calculated. Concentration of Lead in the unspiked sample was greater than 10 times the amount of the spike added.

Waste Stream Technology, Inc.

TCLP Metals Analysis Result Report

Post-Digestion Spike Analysis Summary

2174

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 2/25/99

Group Number : 9905-022
Report Units : % Recovery

	Lab ID Number	WS49966	
	Client ID	4%-D3	
	Date Digested	2/26/99	
	Date Analyzed	2/26/99	**Analysis**
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	85 - 115	96	SW-846 6010
Arsenic	85 - 115	92	SW-846 6010

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Sample Dilution Interference Check Analysis Summary

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 2/25/99

Group Number : 9905-022
Report Units : % Recovery

Lab ID Number	WS49966
Client ID	4%-D3
Date Digested	2/26/99
Date Analyzed	2/26/99

Analyte	**Undiluted Result (mg/L)**	**Diluted Result (mg/L)**	**Percent Difference**	**QC Limits (%)**
Lead	0.415	0.430	3.6	10
Arsenic	0.357	0.389	9.0	10

TCLP Extraction Logs and Digestion Logs

PROJECT Fluid Determination Log - TCLP

Notebook No.

Continued From Page

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Date	Sample ID	Sample wt.	4.0	10.0	7.0	Slope	Temp	pH	HCl 3.5mL	pH 2	Fluid #	Initials
2/23/99	WS49864	5.01						9.30	✓	2.13	#1	LS
	865	5.00						9.44	✓	2.06		
	866	5.17						8.62	✓	1.98		
	867	5.00						4.88	—	—		
2/23/99	WS49905	5.15	1.01	10.06	6.95	102.0	19.3	6.36	✓	1.96	#1	RD/LS
	906	5.16						3.96	—	—		
	907	5.03						3.52	—	—		
	908	5.20						3.35	—	—		
	909	5.00						3.08	—	—		
	910	5.20						2.98	—	—		
	820	5.08						5.92	✓	2.47		
	821	5.11						6.73	✓	2.36		
	822	5.07						6.60	✓	2.55		
	823	5.00						5.80	✓	2.39		
	824	5.25						5.50	✓	2.03		
	825	5.02						6.81	✓	2.28		
	826	5.05						5.72	✓	2.36		
	827	5.15						6.59	✓	2.31		
	828	5.23						5.96	✓	2.10		
	829	5.04						5.68	✓	2.09		
	830	5.03						6.21	✓	2.09		
2/24/99	WS49867	Fluid determination done on 2/22/99									#1	LS/BB
	868	5.06						8.21	✓	2.02		
2/25/99	WS49961	5.18	4.0	10.07	7.02	101.5	19.3	5.98	✓	1.90	#1	LS
	962	5.10						4.67	—	—		
	963	5.03						3.96	—	—		
	964	5.16						3.36	—	—		
	965	5.05						3.11	—	—		
	966	5.14						2.96	—	—		
3/1/99	WS50036	5.00						6.57	✓	1.95	#1	LS/BB
	037	5.28						5.06	✓	1.94		
	038	5.01						4.17	—	—		
	039	5.00						3.77	—	—		
	040	5.06						3.43	—	—		
	041	5.02						3.42	—	—		

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PROJECT TCLP Extraction Log

Notebook No.

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Date	Init	Sample ID	Sample wt.	Part. Red.	% Solids	Fluid Amt.	Fluid ID & Type	Time on	Time off	Final pH	Client	Analysis	Comments
2/23/99	LS/BA	WS49777	100.31	None	100%	2L	#1TC341 339	1400 LS	0830 LS	5-6	BSA	Full TCLP	2nd 2L = 101.06
		851	100.71								Nat. Fuel	Mets	
2/23/99	LS	WS49864	100.64				#1TC339	1620 LS	1000 LS		WATTS	Full TCLP	2nd 2L = 100.13
		865	100.43										2nd 2L = 100.38
		866	100.51										2nd 2L = 100.52
		~~867~~											~~2nd 2L =~~ LS
2/23/99	RD/LS	WS49905	100.77	None	100%	2L	#1TC341 pH 4.89	1535 RD/LS	0915 LS/BB	5.04	RD Fernald	Mets	
		906	100.27							5.01			
		907	100.43							5.00			
		908	100.04							4.97			
		909	100.15							4.93			
		910	100.51							4.89			
		820	100.46							5-6	Hid Met	Pb	Barium carbonate LS
		821	100.22										
		822	100.38										
		823	100.96										
		824	100.98				#1TC345 pH 4.89						
		825	100.58										
		826	100.16										
		827	100.37										
		828	100.11										
		829	100.56										
		830	100.19										
2/24/99	LS/BA	WS49867	50.64	None	100%	1L	#1TC348	1415 LS/BA	0930	4-5	WATTS		*Not enough sample for Full
		868	100.88			2L				5-6			2nd 2L = 100.89
2/25/99	LS	WS49961	100.25	None	100%	2L	#1TC349	1600 LS	0900 LS	4.91	Fernald	Full TCLP Mets As, Pb	
		962	100.53							4.94			
		963	100.25							4.91			
		964	100.45							4.86			
		965	100.14							4.81			
		966	100.08							4.76			
3/1/99	LS/BA	WS49~~46~~ 50036	100.65	None	100%	2L	#1TC348 pH: 4.89	1500 LS/BA	0840 LS	4.96	Fernald	As, Pb	
		037	100.27							4.91			
		038	100.36							4.92			
		039	100.29							4.89			

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Signed Date Signed Date

Notebook No.

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PROJECT

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Signed Date Signed

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PROJECT

TCLP Digestion Log

Notebook No.

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PROJECT

Notebook No.

Continued From Page

Date Started	WS #	Sample ID	Sample wt/vol	Final vol	method	Matrix	Sample SPK Information	HNO3 lot #	Client	Analysis	Comments		
2-25-99 LS		RFD22599-HP3	50ml	10ml	206.2	Ht Plte	1.0ml Met 1-6-5	M39654	NCSD#1	Se			
		WS49602	↓	↓	↓	18		↓	↓	↓			
2-25-99 LS	1	MBTC338-MP1	45ml	50ml	3015	MEP			RDITCORP	Pb	225.84	277.98	277.97
	2	WS49402-MP1	↓	↓	↓	—		↓	↓	↓	227.32	279.22	279.20
	3	49570-MP5				—					227.76	279.58	279.45
	4	MBD22599-W1				H2O			SC. JERSEY	Fe, Mn	227.64	279.23	279.20
	5	RFD22599-W1				—	1.0ml Met 1-6-5				226.99	279.78	279.71
	6	WS49967				15					227.76	279.74	279.74
	7	968				16					228.17	280.15	280.14
	8	973				17					231.00	282.64	282.58
2-26-99 LS	1	MBTC349-T1	45ml	50ml	3015	TCLP		M39654	FERNALD	As, Pb	227.89	279.93	279.91
	2	RFTC349-T1				—	0.5ml Met 1-5-3				230.47	282.41	282.89
TCLP 2-27	3	WS49962				1					227.82	279.38	279.32
	4	963				2					228.10	280.10	280.05
	5	964				3					226.70	278.41	278.39
	6	965				4					228.48	280.39	280.34
	7	966				5					231.08	282.97	282.96
	8	961				6					227.58	279.39	279.37
	9	961 DUP				—					227.09	278.80	278.67
	10	961 SPK				—	0.5ml Met 1-5-3				227.92	280.23	280.23
2-26-99 LS	1	MBTC350-SP1	45ml	50ml	3015	SPLP			SAPP	Pb, Cd, Sb Rb,	225.68	277.70	277.54
SPLP 2/25	2	RFTC350-SP1				—	0.5ml Met 1-5-3				227.28	279.99	279.83
	3	WS49981				4					227.86	279.70	279.67
	4	MBD22699-W1				H2O				Pb, Cd, Al	226.84	278.77	278.70
	5	RFD22699-W1				—	1.0ml Met 1-6-5				227.74	280.51	280.38
	6	WS49500				18					227.75	279.61	279.52
3-1-99 LS/DD		MBD30199-HP1	50ml	10ml	206.2	Ht. Plte		M39654	NCSD#1	As	* H2O2 lot # J12949		
		RFC30199-HP1		↓	↓	—	1.0ml Met 1-6-5	↓	↓	↓			
		WS49891				19							
		MBD30199-HP2		50ml	4.1.3H	—				Sb	* HCl lot # M34029		
		RFC30199-HP2		↓	↓	—	1.0ml Met 1-6-5			↓			
		WS49891				—							
		MBC30199-HP3		10ml	270.2	—				Se			
		RFC30199-HP3				—	1.0ml Met 1-6-5						
		WS49891				—							

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Signed Date Signed

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Soil Digestion Log

PROJECT | Notebook No. | PROJECT | Notebook No.

Date Started	Lab #	Sample ID	Sample wt + unit	Final vol	Method	Digestate	Sample spk (mat + std)	HWCS LOT#	Client	Analytes	Comments		
3-9-99 CS	5	WS49907	0.51g	50ml	3051	Soil		M13035	Fernald	Pb, As	226.99	241.91	241.90
	6	908	0.56g			7					227.03	241.95	241.91
	7	909	0.51g			8					226.63	241.45	241.43
	8	910	0.51g			9					229.47	244.15	244.10
	9	961	0.54g			10					226.96	241.79	241.76
	10	962	0.51g			11					228.03	242.78	242.61
	11	963	0.54g			12					227.83	242.76	242.73
	12	964	0.56g			13					226.31	241.20	241.17
3-9-99 TR		MBC30899HP1	0.4g	100ml	3050	Hot Plate			NYSDOH	Pb on Dust Wipe	50ml 1:1 HNO_3		5ml H_2O
		RFC030999HP	0.10				Lab Metals-3						
		WS49046	3.24g										
3-10-99 CS	1	~~MBC31099-C1~~ DV	10ml	50ml	3051	oil		M13035	NECO	As	227.34	241.56	241.49
	2	~~RFC31099-C1~~ 3/24/99				—	0.10g Metals-3				227.52	242.08	242.05
	3	WS50279	0.25g			7					227.59	242.13	240.72
	4	280	0.25g			8					228.57	243.09	241.68
	5	281	0.25g			9					227.38	242.07	240.93
	6	282	0.25g			10					229.31	243.92	243.52
	7	283	0.26g			11					230.81	245.80	245.36
3-10-99 CS	1	MBC31099-S1	10ml	50ml	3051	Soil		M13035	Fernald	Pb, As	228.05	242.38	242.36
	2	RFC31099-S1				—	0.5ml Metals-3				227.16	241.98	241.97
	3	WS49965	0.54g			14					227.42	242.19	242.12
	4	49966	0.56g			15					227.90	242.85	242.84
	5	50036	0.53g			16					228.04	243.00	242.74
	6	50037	0.56g			17					227.27	242.23	242.13
	7	50038	0.52g			18					226.00	241.54	241.46
	8	50039	0.52g			19					227.95	242.77	242.74
	9	50040	0.50g			20					227.16	242.03	242.03
	10	50041	0.54g			21					229.54	244.40	244.27
	11	50041 DUP	0.55g			—					228.16	242.94	242.82
	12	50041 SPK	0.54g			—	0.5ml Metals-3				228.13	243.56	243.55
3-12-99 CS		MBC31299-HP1	10ml	100ml	3050A	Hot Plate			NYSDOH	METS			
		RFC31299-HP1				+	1.0ml Metals-5						
		WS49043	1.01g			—							
3-12-99 CS	1	MBC31299-C1	10ml	50ml	3051	oil			NECO	As	230.55	245.30	245.19
	2	RFC31299-C1				—	0.5ml Metals-3				227.68	242.30	242.17

Signed | Date | Signed | Date | Signed | Date | Signed | Date

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WASTESTREAM TECHNOLOGY

302 GROTE STREET
BUFFALO, NY 14207
(716) 876-5290

9905 - 022

CHAIN OF CUSTODY RECORD

PROJECT NO: 9905

SITE NAME: FERNALD

SAMPLERS (SIGNATURE): CS

SAMPLE NO.	DATE	TIME	COMP	GRAB	MATRIX	SAMPLE LOCATION	SIZE & NO. OF CONTAINERS	TCLP-Pb, As							PRESERVATIVES	REMARKS
	2/25/99	900		X	Soil	0% - D3	1x4oz	X					WS49		961	* Use 100g for analysis
	↓	905		↓	↓	0.5% - D3	↓	↓					↓		962	
		910				1% - D3									963	
		915				2% - D3									964	
		920				3% - D3									965	
	↓	925		↓	↓	4% - D3	↓	↓					↓		966	

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
C Smolovich	2/26/99 930	[illegible]			
RELINQUISHED BY (SIGNATURE)	**DATE/TIME**	**RECEIVED BY (SIGNATURE)**	**RELINQUISHED BY (SIGNATURE)**	**DATE/TIME**	**RECEIVED BY (SIGNATURE)**

SPECIAL INSTRUCTIONS:

TURNAROUND TIME 24 hours

LAB USE: REFRIGERATOR # _____ SHELF # _____ GROUP # _____ DUE DATE _____

WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc.
302 Grote Street
Buffalo, NY 14207

2174

ANALYTICAL SERVICES REQUEST FORM

Request Taken By BH Date Requested 3/4/99

Client Rd-Fernald Telephone

Client Contact Steve Sharp / SES mw Fax

Address

Start Date P.O. #

Lab/P.O. #	Number of Samples	Matrix	Analytical Parameters	Turnaround Time (Days)	Quoted Price
WS49905 →	10	Soil	Total Pb, As	5 BD	
WS49961 →	66	#18 Total			
WS50036 →	41				

Sample Containers Required?

_____ NO _____ YES (Please Complete Sample Container Request Form)

Special Instructions Due 3/11

Laboratory Use Only: Sample Group # 9905-021, 022, 023

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ORIGINAL-LAB

APPENDIX E

Laboratory Reports for Treated Soil, 7 Day Reaction Time

WASTE STREAM TECHNOLOGY, INC.

302 Grote Street
Buffalo, NY 14207
(716) 876-5290

2174

Analytical Data Report
Report Date : 03/23/99
Group Number : 9902-023

Prepared For :
Mr. Steve Sharp
Sevenson Environmental Services, Inc.
9245 Calumet Avenue
Suite 101
Munster, IN 46321

Site : Fernald

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
0% - D7	WS50036	Soil	03/01/99	03/01/99	09:30
0.5% - D7	WS50037	Soil	03/01/99	03/01/99	09:30
1% - D7	WS50038	Soil	03/01/99	03/01/99	09:30
2% - D7	WS50039	Soil	03/01/99	03/01/99	09:30
3% - D7	WS50040	Soil	03/01/99	03/01/99	09:30
4% - D7	WS50041	Soil	03/01/99	03/01/99	09:30
Sample Status Upon Receipt : No irregularities.					

Analytical Services

Analytical Parameters	Number of Samples	Turnaround Time
TCLP Lead & Arsenic	6	Standard
Total Lead & Arsenic	6	Standard
pH of TCLP Extract	6	Standard

Report Released By : Daniel W. Vollmer
Daniel Vollmer, Laboratory QA/QC Officer

ENVIRONMENTAL LABORATORY ACCREDITATION CERTIFICATION NUMBERS 117
NYSDOH ELAP #11179 NJDEPE #73977 CDHS ELAP #2189

WASTE STREAM TECHNOLOGY

METHODOLOGIES

The specific methodologies employed in obtaining the analytical data reported are indicated on each of the result forms. The method numbers shown refer to the following U.S. Environmental Protection Agency Reference:

Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020, March 1979, Revised 1983, U.S. Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

Federal Register, 40 CFR Part 136: Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act. Revised July 1992.

Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. Third Edition, Revised December 1996, U.S. EPA SW-846.

Annual Book of ASTM Standards, Volume II. ASTM, 100 Harbor Drive, West Conshohocken, PA 19428-2959.

Standard Methods for the Examination of Water and Wastewater. (18th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

Waste Stream Technology, Inc.

pH of TCLP Leachate

SW846 9040B

2174

Site: FERNALD
Date Sampled: 03/01/99
Date Received: 03/01/99

Group Number: 9905-023
Matrix: Soil
Units: pH Units

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS50036	0%-D7	NA	4.96	03/02/99
WS50037	0.5%-D7	NA	4.91	03/02/99
WS50038	1%-D7	NA	4.92	03/02/99
WS50039	2%-D7	NA	4.89	03/02/99
WS50040	3%-D7	NA	4.85	03/02/99
WS50041	4%-D7	NA	4.80	03/02/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/01/99
Date Received: 03/01/99

Group Number: 9905-023
Units: mg/Kg
Matrix: Soil

WST ID: WS50036
Client ID: 0%-D7
Digestion Date: 03/10/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	12.8	03/10/99	SW-846 6010
Lead by ICP	20.5	2930	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/01/99
Date Received: 03/01/99

Group Number: 9905-023
Units: mg/Kg
Matrix: Soil

WST ID: WS50037
Client ID: 0.5%-D7
Digestion Date: 03/10/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	27.7	03/10/99	SW-846 6010
Lead by ICP	20.5	5820	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/01/99
Date Received: 03/01/99

Group Number: 9905-023
Units: mg/Kg
Matrix: Soil

WST ID: WS50038
Client ID: 1%-D7
Digestion Date: 03/10/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	25.6	03/10/99	SW-846 6010
Lead by ICP	20.5	5080	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/01/99
Date Received: 03/01/99

Group Number: 9905-023
Units: mg/Kg
Matrix: Soil

WST ID: WS50039
Client ID: 2%-D7
Digestion Date: 03/10/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	49.7	03/10/99	SW-846 6010
Lead by ICP	20.5	14200	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/01/99
Date Received: 03/01/99

Group Number: 9905-023
Units: mg/Kg
Matrix: Soil

WST ID: WS50040
Client ID: 3%-D7
Digestion Date: 03/10/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	132	03/10/99	SW-846 6010
Lead by ICP	20.5	16000	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/01/99
Date Received: 03/01/99

Group Number: 9905-023
Units: mg/Kg
Matrix: Soil

WST ID: WS50041
Client ID: 4%-D7
Digestion Date: 03/10/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	23.7	03/10/99	SW-846 6010
Lead by ICP	20.5	5040	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/01/99
Date Received: 03/01/99

Group Number: 9905-023
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 03/01/99

WST ID: WS50036
Client ID: 0%-D7
Digestion Date: 03/02/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.518	03/02/99	SW-846 6010
Lead by ICP	0.075	42.9	03/02/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

- 2174

Site: FERNALD
Date Sampled: 03/01/99
Date Received: 03/01/99

Group Number: 9905-023
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 03/01/99

WST ID: WS50037
Client ID: 0.5%-D7
Digestion Date: 03/02/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.660	03/02/99	SW-846 6010
Lead by ICP	0.075	26.9	03/02/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/01/99
Date Received: 03/01/99

Group Number: 9905-023
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 03/01/99

WST ID: WS50038
Client ID: 1%-D7
Digestion Date: 03/02/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.370	03/02/99	SW-846 6010
Lead by ICP	0.075	4.35	03/02/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/01/99
Date Received: 03/01/99

Group Number: 9905-023
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 03/01/99

WST ID: WS50039
Client ID: 2%-D7
Digestion Date: 03/02/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.309	03/02/99	SW-846 6010
Lead by ICP	0.075	1.05	03/02/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/01/99
Date Received: 03/01/99

Group Number: 9905-023
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 03/01/99

WST ID: WS50040
Client ID: 3%-D7
Digestion Date: 03/02/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.567	03/02/99	SW-846 6010
Lead by ICP	0.075	0.943	03/02/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/01/99
Date Received: 03/01/99

Group Number: 9905-023
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 03/01/99

WST ID: WS50041
Client ID: 4%-D7
Digestion Date: 03/02/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.262	03/02/99	SW-846 6010
Lead by ICP	0.075	0.187	03/02/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Quality Control Analysis Result Reports

- Method Blanks
- Reference Samples
- Duplicate Analysis
- Matrix Spike Analysis
- Post-Digestion Spike Analysis
- Dilution Interference Check Analysis

Waste Stream Technology, Inc.
Metals Method Blank Analysis

2174

Site: FERNALD
Date Sampled: NA
Date Received: NA

Group Number: 9905-023
Units: mg/Kg

WST ID MB031099-S1
Client ID: NA
Digestion Date: 03/10/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As soil Method Blank	1.70	Not detected	03/10/99	SW-846 6010
Pb soil Method Blank	4.10	Not detected	03/10/99	SW-846 6010

MB denotes Method Blank
NA denotes Not Applicable

WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc
Total Metals Analysis Result Report
Reference Standard Analysis Summary

2174

Site : Fernald
Group Number: 9905-022 & 023

Report Units : % Recovery
Matrix : TCLP Extract

	Lab ID	RF031099-S1		
	Date Digested	3/10/99		
	Date Analyzed	3/10/99		
Analyte	Reference % Recovery QC Limits	% Recovery		Analysis Method
Lead	85 - 115	96		SW-846 6010
Arsenic	85 - 115	95		SW-846 6010

RF denotes Reference Sample.

Waste Stream Technology, Inc.

Total Metals Analysis Result Report
Duplicate Sample Analysis Summary

2174

Site : Fernald
Date Sampled : 3/1/99
Date Received : 3/1/99

Group Number : 9905-023
Report Units : mg/kg
Matrix : Soil

Lab ID Number	WS50041	WS50041 Dup		
Client ID	4%-D7	4%-D7		
Date Digested	3/10/99	3/10/99		
Date Analyzed	3/10/99	3/10/99	RPD	RPD
Analyte	Initial Result	Duplicate Result	(%)	QC Limits (%)
Lead	5040	4440	12.7	25
Arsenic	23.7	21.5	9.7	25

Waste Stream Technology, Inc.

2174

Total Metals Analysis Result Report

Matrix Spike Analysis Summary

Site : Fernald
Matrix : Soil

Group Number : 9905-023
Report Units : % Recovery

	Lab ID Number	WS50041	
	Client ID	4%-D7	
	Date Digested	3/10/99	
	Date Analyzed	3/10/99	**Analysis**
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	75 - 125	NC	SW-846 6010
Arsenic	75 - 125	62 #	SW-846 6010

NC denotes Not Calculated. The concentration of Lead in the unspiked sample was. greater than 10 times the amount of spike added to the matrix spike sample.

# denotes a recovery outside the QC limits.

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: NA
Date Received: NA

Group Number: 9905-023
Units: mg/L
TCLP Extraction Date: 03/01/99

WST ID: MBTC348-T1
Client ID: NA
Digestion Date: 03/02/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As TCLP Method Blank	0.009	Not detected	03/02/99	SW-846 6010
Pb TCLP Method Blank	0.015	Not detected	03/02/99	SW-846 6010

MB denotes Method Blank
NA denotes Not Applicable

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

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TCLP Metals Analysis Result Report

Matrix Spike Analysis Summary

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 3/1/99

Group Number : 9905-023
Report Units : % Recovery

	Lab ID Number	WS50041	
	Client ID	4%-D7	
	Date Digested	3/2/99	
	Date Analyzed	3/2/99	**Analysis**
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	75 - 125	115	SW-846 6010
Arsenic	75 - 125	118	SW-846 6010

Waste Stream Technology, Inc.

2174

TCLP Metals Analysis Result Report

Post-Digestion Spike Analysis Summary

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 3/1/99

Group Number : 9905-023
Report Units : % Recovery

	Lab ID Number	WS50038	
	Client ID	1%-D7	
	Date Digested	3/2/99	
	Date Analyzed	3/2/99	**Analysis**
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	85 - 115	101	SW-846 6010
Arsenic	85 - 115	105	SW-846 6010

Waste Stream Technology, Inc.

2174

TCLP Metals Analysis Result Report

Sample Dilution Interference Check Analysis Summary

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 3/1/99

Group Number : 9905-023
Report Units : % Recovery

Lab ID Number	WS50038
Client ID	1%-D7
Date Digested	3/2/99
Date Analyzed	3/2/99

Analyte	**Undiluted Result (mg/L)**	**Diluted Result (mg/L)**	**Percent Difference**	**QC Limits (%)**
Lead	4.35	4.45	2.3	10
Arsenic	0.370	0.378	2.2	10

TCLP Extraction Logs and Digestion Logs

PROJECT Fluid Determination Log - TCLP

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Date	Sample ID	Sample wt.	4.0	10.0	7.0	Slope	Temp	pH	HCl 3.5mL	pH 2	Fluid #	Initials
2/23/99	WS49864	5.01						9.30	✓	2.13	#1	LS
	865	5.00						9.44	✓	2.06		
	866	5.17						8.62	✓	1.98		
	867	5.00						4.88	—			
2/23/99	WS49905	5.15	1.01	10.06	6.95	101.0	19.3	6.36	✓	1.96	#1	RD/LS
	906	5.16						3.96	—			
	907	5.03						3.52	—			
	908	5.20						3.35	—			
	909	5.00						3.08	—			
	910	5.20						2.98	—			
	820	5.08						5.92	✓	2.47		
	821	5.11						6.73	✓	2.36		
	822	5.07						6.60	✓	2.55		
	823	5.00						5.80	✓	2.39		
	824	5.25						5.50	✓	2.03		
	825	5.02						6.81	✓	2.28		
	826	5.05						5.72	✓	2.36		
	827	5.15						6.59	✓	2.31		
	828	5.23						5.96	✓	2.10		
	829	5.04						5.68	✓	2.09		
	830	5.03						6.21	✓	2.09		
2/24/99	WS49867	Fluid determination done on 2/22/99									#1	LS/BB
	868	5.06						8.21	✓	2.02		
2/25/99	WS49961	5.18	4.0	10.07	7.02	101.5	19.3	5.98	✓	1.90	#1	LS
	962	5.10						4.67	—			
	963	5.03						3.96	—			
	964	5.16						3.36	—			
	965	5.05						3.11	—			
	966	5.14						2.96	—			
2/1/99	WS50036	5.00						6.57	✓	1.95	#1	LS/BB
	037	5.28						5.06	✓	1.94		
	038	5.01						4.17	—			
	039	5.00						3.77	—			
	040	5.06						3.43	—			
	041	5.02						3.42	—			

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PROJECT TCLP Extraction Log

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Date	Init.	Sample ID	Sample wt.	Part. Red.	% Solids	Fluid Amt.	Fluid ID Type	Time on	Time off	Final pH	Client	Analysis	Comments
2/22/99	LS/BB	WS49777	100.31	None	100%	2L	#1TC341 339	1400 LS	0830 LS	5-6	BSA	Full TCLP	2nd 2L = 101.06
2/22/99	LS	851	100.57					1620 LS	1000 LS		Nat. Fuel	Metals	
		WS49864	100.64				#1TC339				WATTS	Full TCLP	2nd 2L = 100.13
		865	100.43										2nd 2L = 100.28
		866	100.51										2nd 2L = 100.52
		~~867~~											~~2nd 2L =~~
2/23/99	RD/LS	WS49905	100.77	None	100%	2L	#1TC341 pH 4.89	1355 RD/LS	0915 LS/BB	5.04	RD Fernald	Metals	LS
		906	100.37							5.01			
		907	100.43							5.00			
		908	100.04							4.97			
		909	100.15							4.93			
		910	100.51							4.89			
		830	100.46							5-6			
		831	100.22								Hal Met	Pb	Bunnycardner LS
		832	100.38										
		833	100.96										
		834	100.98										
		835	100.58										
		836	100.16				#1TC345 pH 4.89						
		837	100.37										
		838	100.11										
		839	100.56										
		840	100.19										
2/24/99	LS/BB	WS49867	50.64	None	100%	1L	#1TC348	1115 LS/BB	0930	4-5	WATTS	Full TCLP	
2/25/99	LS	868	100.88							5-6			
		WS49961	100.25	None	100%	2L	#1TC349	1600 LS	0900 LS	4.91	Fernald	Metals	* Not enough sample for Full
		962	100.53							4.94			2nd 2L = 100.89
		963	100.25							4.91			
		964	100.45							4.86			
		965	100.14							4.81			
		966	100.08							4.76			
3/1/99	LS/BB	WS50036	100.05	None	100%	2L	#1TC348 pH: 4.89	1500 LS/BB	0840 LS	4.96	Fernall	As, Pb	
		037	100.27							4.91			
		038	100.36							4.92			
		039	100.29							4.89			

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PROJECT TCLP Extraction Log

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Notebook No.

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Date	Init.	Sample ID	Sampler wt.	Part. Red.	% Solids	Fluid amt.	Fluid ID & Type	Time On	Time Off	Final pH	Client	Analysis	Comments
3/1/99	MB	WS60040	100.51	None	100%	2L	#TC348	1500	0840	4.85	Fernald	As, Pb	
		041	100.09							4.80			
3-2-99	LS	WS49992								7-8	NOCO	Moto	Sample 100% aqueous - filtered for ASTM Chloride.
3-2-99	MB	WS50088	50.11	None	100%	1L	DI H_2O	1400					

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TCLP Digestion Log

Notebook No.

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Date + Initials	No.	Sample ID	Sample Wt/vol	Final vol	Method	Matrix	Sample Spike ID + Amount	Final Wt #	Client	Analysis	Comments		
3-1-99		MB030199-MP4	50ml	50ml	4.1.3	Ht. Plate		MD9034	NCSD#1	Ag, Pb, Tl, Be, Cd, Cr, Cu, Ni, Zn			
CS/MB		RFC030199-MP4	↓	↓	↓	—	1.0ml Met 1-6-5	↓	↓	↓			
		WS49891				—							
3-1-99	1	MBTC352-SP1	45ml	50ml	3015	SPLP			Supp	Pb, Cd, Sb	226.45	278.34	278.25
CS/AB	2	RFTC352-SP1	↓	↓	↓	—	0.5ml Met 1-5-3	↓	↓	↓	227.56	280.07	280.02
SPLP 2/26	3	WS50009				5					227.59	279.66	279.64
3-1-99	1	MBC030199-W1	45ml	50ml	3015	H2O			MDL Study	Mets	226.05	277.87	277.83
CS/AB	2	RFC030199-W1	↓			—	0.5ml Met 1-5-3				231.34	285.75	283.70
	3	MDL-1	50ml			—	50ml RF0647				231.77	284.18	284.12
	4	MDL-2				—					228.54	281.02	280.95
	5	MDL-3				—					225.28	277.62	277.57
	6	MDL-4				—					231.69	284.13	284.08
	7	MDL-5				—					226.78	279.29	279.23
	8	MDL-6				—					226.28	278.44	278.41
	9	MDL-7	↓	↓	↓	—	↓				226.14	278.59	278.54
3-2-99	1	MBTC353-SP1	45ml	50ml	3015	SPLP		MD9054	Supp	Pb, Cd, Sb	230.78	282.58	282.57
CS	2	RFTC353-SP1				—	0.5ml Met 1-5-3				226.39	278.51	278.49
SPLP 3-1	3	WS49717				6					227.06	278.91	278.87
	4	720				7					226.33	277.86	277.75
	5	766				8					228.67	280.22	280.15
	6	935				9					227.46	278.76	278.73
	7	953				10					227.44	279.40	279.38
	8	982	↓	↓	↓	11					228.07	279.45	279.45
3-2-99	1	MBTC348-T1	45ml	50ml	3015	TCLP		MD9054	Fernald	As, Pb	227.11	278.68	278.65
CS	2	RFTC348-T1				—	0.5ml Met 1-5-3				228.47	280.43	280.40
TCLP 3-1	3	WS50036				1					229.35	280.87	280.82
	4	037				2					228.32	280.00	279.94
	5	038				3					227.57	278.99	278.98
	6	039				4					226.93	278.79	278.79
	7	040				5					226.57	278.71	278.65
	8	041				6					227.45	279.18	279.17
	9	041 DUP				—					230.02	281.57	281.45
	10	041 SPK				—	0.5ml Met 1-5-3				226.51	278.45	278.43
3-3-99	1	MBC030399-W1	45ml	50ml	3015	TCLP			NCCO	Mets	228.09	279.16	278.61
CS/AB	2	RFC030399-W1	↓	↓	↓	—	0.5ml Met 1-5-3	↓	↓	↓	226.65	279.29	278.11

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Soil Digestion Log

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Date Started	Lab #	Sample ID	Sample wt + vol	Final vol	Method	Spiking	Sample spike Conc + Std.	HWO31 LOT#	Client	Analytes	Comments		
3-9-99 CS	5	WS49907	0.51g	50ml	3051	Soil L		M13035	Fernald	Pb, As	226.99	241.91	241.90
	6	908	0.56g	↓	↓	7		↓	↓	↓	227.03	241.95	241.91
	7	909	0.51g			8					226.63	241.45	241.43
	8	910	0.51g			9					229.47	244.15	244.10
	9	961	0.54g			10					226.96	241.79	241.76
	10	962	0.51g			11					228.03	242.78	242.61
	11	963	0.54g			12					227.83	242.76	242.73
	12	964	0.56g			13					226.31	241.20	241.17
3-9-99 TR		MB030999HP1	0.14g	100mL	3050	Hot Plate			NYSDEC	Pb in 0.1N HNO3	50ml 1:1 HNO3		5ml H2O
		RF030999HP	0.10	↓	↓	—	1ml Met 1-5-3		↓				
		WS49946	3.24g			—							
3-10-99 CS	1	MB031099-01	10ml	50ml	3051	Oil		M13035	NECO	As	227.37	241.56	241.49
	2	RF031099-01	↓	↓	↓	—	0.10g Met 1-5-3	↓	↓	↓	227.52	242.08	242.05
	3	WS50279	0.25g			7					227.59	242.13	240.72
	4	280	0.25g			8					228.57	243.09	241.68
	5	281	0.25g			9					227.38	242.07	240.53
	6	282	0.25g			10					229.31	243.92	243.52
	7	283	0.26g			11					230.81	245.80	245.36
3-10-99 CS	1	MB031099-S1	10ml	50ml	3051	Soil		M13035	Fernald	Pb, As	228.05	242.38	242.36
	2	RF031099-S1	↓	↓	↓	—	0.5ml Met 1-5-3	↓	↓	↓	227.16	241.98	241.97
	3	WS49965	0.54g			14					227.42	242.19	242.12
	4	49966	0.56g			15					227.90	242.85	242.84
	5	50036	0.53g			16					228.04	243.00	242.74
	6	50037	0.55g			17					227.27	242.23	242.13
	7	50038	0.52g			18					226.00	241.54	241.46
	8	50039	0.53g			19					227.95	242.77	242.74
	9	50040	0.50g			20					227.16	242.03	242.03
	10	50041	0.54g			21					229.54	244.40	244.27
	11	50041 DUP	0.55g			—					228.16	242.44	242.82
	12	50041 SPK	0.54g			—	0.5ml Met 1-5-3				228.13	243.56	243.55
3-12-99 CS		MB031299-HP1	10ml	100ml	3050A	Hot Plate			NYSDEC	METS			
		RF031299-HP1	↓	↓	↓	+	1.0ml Metals 5		↓	↓			
		WS49943	1.01g			—							
3-12-99 CS	1	MB031299-01	10ml	50ml	3051	Oil			NECO	As	230.55	245.30	245.19
	2	RF031299-01	↓	↓	↓	—	Continued on Page Met 1-5-3		↓	↓	227.65	242.36	242.92

Signed Date Signed Date Signed Date Signed Date

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2124

WASTESTREAM TECHNOLOGY

302 GROTE STREET
BUFFALO, NY 14207
(716) 876-5290

9905-023

CHAIN OF CUSTODY RECORD

PROJECT NO: 9905

SITE NAME: FERNALD

SAMPLERS (SIGNATURE): [illegible]

SAMPLE NO.	DATE	TIME	COMP	GRAB	MATRIX	SAMPLE LOCATION	SIZE & NO. OF CONTAINERS	TCLP-Pb, As							PRESERVATIVES	REMARKS
	3/1/99	900		X	Soil	0% - D7	1x4oz	X						4550	036	* Use 100g for TCLP Analysis
		905				0.5% - D7									037	
		910				1% - D7									038	
		915				2% - D7									039	
		920				3% - D7									040	
		925				4% - D7									041	

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
C. Smolkovich	3/1/99 930	[illegible]			
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)

SPECIAL INSTRUCTIONS:

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TURNAROUND TIME 24 Hours

LAB USE: REFRIGERATOR #_____ SHELF #_____ GROUP #_____ DUE DATE 3/12/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc.
302 Grote Street
Buffalo, NY 14207

2174

ANALYTICAL SERVICES REQUEST FORM

Request Taken By JBH Date Requested 3/4/99

Client Rd-Fernald Telephone

Client Contact Steve Sharp / SES mw Fax

Address

Start Date P.O. #

Lab/P.O. #	Number of Samples	Matrix	Analytical Parameters	Turnaround Time (Days)	Quoted Price
WS49905 →	10	Soil	Total Pb, As	5BD	
WS49961 →	66	#18 Total			
WS50036 →	41				

Sample Containers Required?

____ NO ____ YES (Please Complete Sample Container Request Form)

Special Instructions DW 3/11

Laboratory Use Only: Sample Group # 9905-021, 022, 023

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ORIGINAL-LAB

APPENDIX F

Laboratory Reports for Treated Soil, 14 Day Reaction Time

WASTE STREAM TECHNOLOGY, INC.

302 Grote Street
Buffalo, NY 14207
(716) 876-5290

2174

Analytical Data Report
Report Date : 03/23/99
Group Number : 9902-031

Prepared For :
Mr. Steve Sharp
Sevenson Environmental Services, Inc.
9245 Calumet Avenue
Suite 101
Munster, IN 46321

Site : Fernald

Field and Laboratory Information

Client Id	WST Lab #	Matrix	Date Sampled	Date Received	Time
0% - D14	WS50254	Soil	03/08/99	03/08/99	11:15
0.5% - D14	WS50255	Soil	03/08/99	03/08/99	11:15
1% - D14	WS50256	Soil	03/08/99	03/08/99	11:15
2% - D14	WS50257	Soil	03/08/99	03/08/99	11:15
3% - D14	WS50258	Soil	03/08/99	03/08/99	11:15
4% - D14	WS50259	Soil	03/08/99	03/08/99	11:15
Sample Status Upon Receipt : No irregularities.					

Analytical Services

Analytical Parameters	Number of Samples	Turnaround Time
TCLP Lead & Arsenic	6	Standard
Total Lead & Arsenic	6	Standard
pH of TCLP Extract	6	Standard

Report Released By : Daniel W. Voll
Daniel Vollmer, Laboratory QA/QC Officer

ENVIRONMENTAL LABORATORY ACCREDITATION CERTIFICATION NUMBERS 151
NYSDOH ELAP #11179 NJDEPE #73977 CDHS ELAP #2189

WASTE STREAM TECHNOLOGY

METHODOLOGIES

The specific methodologies employed in obtaining the analytical data reported are indicated on each of the result forms. The method numbers shown refer to the following U.S. Environmental Protection Agency Reference:

Methods for Chemical Analysis of Water and Wastes. EPA 600/4-79-020, March 1979, Revised 1983, U.S. Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

Federal Register, 40 CFR Part 136: Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act. Revised July 1992.

Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. Third Edition, Revised December 1996, U.S. EPA SW-846.

Annual Book of ASTM Standards, Volume II. ASTM, 100 Harbor Drive, West Conshohocken, PA 19428-2959.

Standard Methods for the Examination of Water and Wastewater. (18th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

Waste Stream Technology, Inc.

pH of TCLP Leachate

SW846 9040B

2174

Site: FERNALD
Date Sampled: 03/08/99
Date Received: 03/08/99

Group Number: 9905-031
Matrix: Soil
Units: pH Units

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS50254	0%-D14	NA	4.98	03/09/99
WS50255	0.5%-D14	NA	4.95	03/09/99
WS50256	1%-D14	NA	4.85	03/09/99
WS50257	2%-D14	NA	4.82	03/09/99
WS50258	3%-D14	NA	4.82	03/09/99
WS50259	4%-D14	NA	4.81	03/09/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/08/99
Date Received: 03/08/99

Group Number: 9905-031
Units: mg/Kg
Matrix: Soil

WST ID: WS50254
Client ID: 0%-D14
Digestion Date: 03/16/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	68.1	03/16/99	SW-846 6010
Lead by ICP	20.5	9610	03/16/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/08/99
Date Received: 03/08/99

Group Number: 9905-031
Units: mg/Kg
Matrix: Soil

WST ID: WS50255
Client ID: 0.5%-D14
Digestion Date: 03/16/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	25.8	03/16/99	SW-846 6010
Lead by ICP	20.5	5320	03/16/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/08/99
Date Received: 03/08/99

Group Number: 9905-031
Units: mg/Kg
Matrix: Soil

WST ID: WS50256
Client ID: 1%-D14
Digestion Date: 03/16/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	20.1	03/16/99	SW-846 6010
Lead by ICP	20.5	4650	03/16/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/08/99
Date Received: 03/08/99

Group Number: 9905-031
Units: mg/Kg
Matrix: Soil

WST ID: WS50257
Client ID: 2%-D14
Digestion Date: 03/16/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	22.2	03/16/99	SW-846 6010
Lead by ICP	20.5	4950	03/16/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/08/99
Date Received: 03/08/99

Group Number: 9905-031
Units: mg/Kg
Matrix: Soil

WST ID: WS50258
Client ID: 3%-D14
Digestion Date: 03/16/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	23.0	03/16/99	SW-846 6010
Lead by ICP	20.5	5070	03/16/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/08/99
Date Received: 03/08/99

Group Number: 9905-031
Units: mg/Kg
Matrix: Soil

WST ID: WS50259
Client ID: 4%-D14
Digestion Date: 03/16/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	8.50	20.2	03/16/99	SW-846 6010
Lead by ICP	20.5	4410	03/16/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/08/99
Date Received: 03/08/99

Group Number: 9905-031
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 03/08/99

WST ID: WS50254
Client ID: 0%-D14
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.424	03/10/99	SW-846 6010
Lead by ICP	0.075	55.8	03/10/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/08/99
Date Received: 03/08/99

Group Number: 9905-031
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 03/08/99

WST ID: WS50255
Client ID: 0.5%-D14
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.775	03/10/99	SW-846 6010
Lead by ICP	0.075	28.8	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/08/99
Date Received: 03/08/99

Group Number: 9905-031
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 03/08/99

WST ID: WS50256
Client ID: 1%-D14
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.439	03/10/99	SW-846 6010
Lead by ICP	0.075	4.28	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/08/99
Date Received: 03/08/99

Group Number: 9905-031
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 03/08/99

WST ID: WS50257
Client ID: 2%-D14
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.637	03/10/99	SW-846 6010
Lead by ICP	0.075	1.60	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/08/99
Date Received: 03/08/99

Group Number: 9905-031
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 03/08/99

WST ID: WS50258
Client ID: 3%-D14
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.497	03/10/99	SW-846 6010
Lead by ICP	0.075	0.667	03/10/99	SW-846 6010

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: 03/08/99
Date Received: 03/08/99

Group Number: 9905-031
Units: mg/L
Matrix: TCLP Extract
TCLP Extraction Date: 03/08/99

WST ID: WS50259
Client ID: 4%-D14
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
Arsenic by ICP	0.045	0.491	03/10/99	SW-846 6010
Lead by ICP	0.075	0.363	03/10/99	SW-846 6010

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WASTE STREAM TECHNOLOGY

Quality Control Analysis Result Reports

- Method Blanks
- Reference Samples
- Duplicate Analysis
- Matrix Spike Analysis
- Post-Digestion Spike Analysis
- Dilution Interference Check Analysis

Waste Stream Technology, Inc.
Metals Method Blank Analysis

2174

Site: FERNALD
Date Sampled: NA
Date Received: NA

Group Number: 9905-031
Units: mg/Kg

WST ID MB031699-S1
Client ID: NA
Digestion Date: 03/16/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As soil Method Blank	1.70	Not detected	03/16/99	SW-846 6010
Pb soil Method Blank	4.10	Not detected	03/16/99	SW-846 6010

MB denotes Method Blank
NA denotes Not Applicable

WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc
Total Metals Analysis Result Report
Reference Standard Analysis Summary

Site : Fernald
Group Number: 9905-031

Report Units : % Recovery
Matrix : TCLP Extract

	Lab ID	RF031699-S1		
	Date Digested	3/16/99		
	Date Analyzed	3/16/99		
Analyte	Reference % Recovery QC Limits	% Recovery		Analysis Method
Lead	85 - 115	97		SW-846 6010
Arsenic	85 - 115	94		SW-846 6010

RF denotes Reference Sample.

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Site: FERNALD
Date Sampled: NA
Date Received: NA

Group Number: 9905-031
Units: mg/L
TCLP Extraction Date: 03/08/99

WST ID: MBTC362-T1
Client ID: NA
Digestion Date: 03/09/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As TCLP Method Blank	0.009	Not detected	03/10/99	SW-846 6010
Pb TCLP Method Blank	0.015	Not detected	03/10/99	SW-846 6010

MB denotes Method Blank
NA denotes Not Applicable

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WASTE STREAM TECHNOLOGY

Waste Stream Technology Inc

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TCLP Metals Analysis Result Report

Reference Standard Analysis Summary

Site : Fernald
Group Number: 9905-031
TCLP Date : 3/8/99

Report Units : % Recovery
Matrix : TCLP Extract

	Lab ID	RFTC362-T1		
	Date Digested	3/9/99		
	Date Analyzed	3/10/99		
Analyte	Reference % Recovery QC Limits	% Recovery		Analysis Method
Lead	85 - 115	98		SW-846 6010
Arsenic	85 - 115	113		SW-846 6010

RF denotes Reference Sample.

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Waste Stream Technology, Inc.

TCLP Metals Analysis Result Report
Duplicate Sample Analysis Summary

Site : Fernald
Date Sampled : 3/8/99
Date Received : 3/8/99
TCLP Date : 3/8/99

Group Number : 9905-031
Report Units : mg/L
Matrix : TCLP Extract

Lab ID Number	WS50259	WS50259 Dup		
Client ID	4%-D14	4%-D14		
Date Digested	3/9/99	3/9/99		
Date Analyzed	3/10/99	3/10/99	**RPD**	**RPD**
Analyte	**Initial Result**	**Duplicate Result**	**(%)**	**QC Limits (%)**
Lead	0.363	0.36	0.8	25
Arsenic	0.491	0.501	2.1	25

Waste Stream Technology, Inc. 2174

TCLP Metals Analysis Result Report

Matrix Spike Analysis Summary

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 3/8/99

Group Number : 9905-031
Report Units : % Recovery

	Lab ID Number	WS50259	
	Client ID	4%-D14	
	Date Digested	3/9/99	
	Date Analyzed	3/10/99	Analysis
Analyte	QC Limits	% Recovery	Method
Lead	75 - 125	112	SW-846 6010
Arsenic	75 - 125	119	SW-846 6010

Waste Stream Technology, Inc.

TCLP Metals Analysis Result Report

Post-Digestion Spike Analysis Summary

2174

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 3/8/99

Group Number : 9905-031
Report Units : % Recovery

	Lab ID Number	WS50256	
	Client ID	1%-D14	
	Date Digested	3/9/99	
	Date Analyzed	3/10/99	**Analysis**
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	85 - 115	98	SW-846 6010
Arsenic	85 - 115	99	SW-846 6010

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2174

Sample Dilution Interference Check Analysis Summary

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 3/8/99

Group Number : 9905-031
Report Units : % Recovery

Lab ID Number	WS50256			
Client ID	1%-D14			
Date Digested	3/9/99			
Date Analyzed	3/10/99			
Analyte	**Undiluted Result (mg/L)**	**Diluted Result (mg/L)**	**Percent Difference**	**QC Limits (%)**
Lead	4.28	4.45	4.0	10
Arsenic	0.439	0.381	13.2 #	10

# denotes outside QC limits.

TCLP Extraction Logs and Digestion Logs

PROJECT TCLP Fluid Determination Log

Notebook No. _____

Continued From Page 2174

Date	Sample ID	Sample wt.	4.0	10.0	7.0	Slope	temp	pH	HCl 3.5ml	pH 2	Fluid #	Initial
3-3-99 LS/BB	50116	5.00	4.0	10.07	7.02	100.7	19.4	9.04	✓	1.99	#1	LS/BB
	156	5.07						6.69	✓	2.05		
	LS 3-3 ~~158~~ 157	5.13						6.66	✓	2.30		
3-4-99	50177	5.11						6.36	✓	2.38	#1	LS/TC
	178	5.08						6.10	✓	2.20		
	179	5.12						5.44	✓	2.22		
	180	5.30						6.15	✓	2.64		
	181	5.00						6.18	✓	2.43		
	182	5.19						6.52	✓	2.28		
	183	5.06						6.12	✓	2.29		
	184	5.11						6.15	✓	2.47		
	185	5.14						5.15	✓	2.17		
	186	5.07						6.17	✓	2.33		
	187	5.13						5.34	✓	2.25		
	188	5.09						5.11	✓	2.31		
	200	5.05						5.24	✓	2.08		
	201	5.06						3.54	—	—	#1	
	202	5.03						3.18	—	—		
	203	5.09						3.18	—	—		
3-8-99	50249	5.09						10.33	✓	2.35	#1	LS
	250	5.07						9.76	✓	2.49		
	254	5.00						7.64	✓	2.11		
	255	5.00						5.67	✓	2.09		
	256	5.00						4.76	—	—		
	257	5.04						4.26	—	—		
	258	5.13						3.90	—	—		
	259	5.06						3.45	—	—		
	276	5.00						3.14	—	—		
3-15-99	WS50289	5.01	4.01	10.00	7.01	104.4	20.0	8.28	✓	2.23	#1	LS
	274	5.01						6.02	✓	2.20		
	375	5.30						5.68	✓	2.26		
	376	5.20						4.41	—	—		
	~~377~~ LS 3/15/99											
3-16-99	50418	5.01	4.01	10.00	7.01	101.7	20.1	5.79	✓	2.42	#1	LS
	419	5.15						5.94	✓	2.5[illegible]		

Continued on Page

Read and Understood By

Signed Date Signed Date

46 PROJECT TCLP Extraction Log

Notebook No.

Continued From Page

Date	Init.	Sample ID	Sample wt.	Part. Red	% Solids	Fluid amt.	Fluid ID & Type	Time IN	Time OUT	Final pH	Client	Analysis	Comments
3/1/99	LS/BB	WS60040	100.51	None	100%	2L	#TC348	1500 LS/BB	0840 LS	4.85	Fernald	As, Pb	
		041	100.49							4.80	NOCO	Meta	
3-2-99	LS	WS49992								7-8			Sample 100% aqueous - filtered for T. ASTM criteria
3-2-99	MB	WS50088	50.11	None	100%	1L	DI H_2O	1400 BB	0830				
3-3-99	LS/BB	WS50116	100.17	None	100%	2L	#1TC357	1545 LS/BB	0930 LS	5-6	INT WASTE	Meta	
		156	100.45							5.57	RDITCORP	Meta	
		157	100.17							5.59			
3-4-99	LS/TE	WS50177	100.83	None	100%	2L	#1TC357	1600 LS	0930 LS	4-5	MIDMET	Pb	Bearing cadmium (LS)
		178	100.97										
		179	100.61										
		180	100.39										
		181	101.24										
		182	100.27										
		183	101.53										
		184	100.90				#1TC361						
		185	100.23										
		186	100.50										
		187	100.87										
		188	100.71										
		200	100.46							5.15	RD SPRING	Meta	
		201. ~~202~~ LS	100.00							5.09			
		202	100.01							5.05			
		203	100.07							4.99			
3-5-99	LS	WS50249	~~100.61~~	None	100%	1.2L	#1TC362	1100 LS	0930 LS	7.04	RD SPRING	Meta	
		250	100.12							5-6	WASTERES		
		254	100.01							4.98	RDFERNAL		
		255	100.12							4.95			
		256	100.27							4.85			
		257	100.76							4.82			
		258	100.05							4.82			
		259	100.76							4.81			
		276	~~100.76~~ 5/96			1L				4.85	RDSPRING		
3-15-99	LS	WS50259	100.18	None	100%	2L	#1TC363	1100 LS	0940 LS	4-5	Harrison Construction	FullTCLP Meta	2nd 2L = 100.72
		374	100.06										
		375	101.76										

Continued on Page

Read and Understood By

Signed Date Signed Date

Notebook No.

Continued From Page

PROJECT

Continued Page

Read and Understood By

Signed Date Signed Date

3-25-99

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PROJECT

TCLP Digestion Log

Notebook No.
Continued From Page

PROJECT

Notebook No.
Continued From Page

Date + Initials	VS #	Sample ID	Sample Wt/Vol	Final Vol	method	matrix	Sample Spike ID + Amt	MDS lot #	Client	Analysis	Comments		
3-5-99 LS	11	WS50203	45ml	50ml	3015	TCLP 15		M29494	~~MID~~ SPRING	TCLP metals Sb	227.30	279.26	279.26
3-5-99 LS	1	MBTC357-T2	45ml	50ml	3015	TCLP			MIDNIET	Pb	226.41	278.40	278.36
TCLP 3/4	2	RFTC357-T2				—	0.5ml Met 1-5-3				226.87	279.67	279.65
	3	WS50177				16					228.21	279.30	279.27
	4	178				17					230.25	281.76	281.77
	5	179				18					228.46	280.12	280.17
	6	180				19					226.94	278.34	278.31
	7	181				20					226.77	278.50	278.47
	8	181 Dup				—					228.54	280.28	280.25
	9	181 SPK				—	0.5ml Met 1-5-3				226.68	279.14	279.14
	10	182				1					227.81	279.65	279.63
	11	183				2					227.94	279.68	279.65
3-5-99 LS	1	MBC30599-W1	45ml	50ml	3015	H20			RD DZUS	Cd	228.41	280.39	280.31
	2	RFC30599-W1				—	0.5ml Met 1-5-3				226.17	278.43	278.37
	3	WS50234				20					228.30	280.03	280.01
3-8-99 LS	1	MBTC360-MP	45ml	50ml	3015	MEP		M34024	RD ITCORP	Pb	226.98	278.66	278.63
	2	RFTC360-MP1				—	0.5ml Met 1-5-3				229.56	281.57	281.56
	3	WS50156-MP1				—					226.07	277.63	277.62
	4	50157-MP1				—					230.08	281.58	281.46
3-9-99 LS	1	MBTC364-SP1	45ml	50ml	3015	~~TCLP~~ SPLP		M13025	SAPP	Pb, Cd, Sb	228.37	279.84	279.81
	2	RFTC364-SP1				—	0.5ml Met 1-5-3				227.61	279.50	279.47
SPLP 3/8	3	WS49939				13					224.87	276.39	276.35
	4	954				14					228.56	280.19	280.17
	5	983				15					227.07	278.73	278.73
	6	MBTC360-MP2				MEP			RD ITCORP	Pb	227.19	279.05	278.97
	7	RFTC360-MP2				—	0.5ml Met 1-5-3				228.36	281.04	281.02
	8	WS50156-MP2				—					225.54	277.37	277.37
	9	157-MP2				—					228.82	280.68	280.67
3-9-99 LS	1	MBTC362-T1	45ml	50ml	3015	TCLP			RD SPRING	Pb, Cd, Sb	229.82	281.32	281.31
	2	RFTC362-T1				—	0.5ml Met 1-5-3				227.52	279.91	279.91
TCLP 3/8	3	~~WS50249~~ D.V. 3/24/99				6					226.74	278.15	278.14
	4	~~250~~				7			RD TERNALD	Pb, As	228.56	280.30	280.23
	5	254				8					228.68	280.66	280.60
	6	255				9					226.83	278.61	278.58
	7	256				10					227.36	279.33	279.32

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Date + Initials	Vial #	Sample ID	Sample wt/vol	Final vol	method	matrix	Sample Spk ID + Amt	Reagent lot #	Analyst	Analysis	Comments			
3-9-99 LS	8	WS50257	45ml	50ml	3015	TCLP 11		MB3025	RD FERNALD	Pb, As	226.85	278.41	278.39	
	9	258				12					226.15	277.68	276.29	
	10	259				13					226.80	278.58	278.57	
	11	259 DUP				—	~~0.5ml Ac~~ LS 3/9				227.40	278.73	278.67	
	12	259 SPK				—	0.5ml Met 1-5-3				228.74	280.60	280.53	
3-9-99 LS TCLP 3/8	1	WS50276	45ml	50ml	3015	TCLP 1			RD SPRING	Pb, Cd, Sb	227.36	279.15	279.03	*Lin TC 3L2
	2	MBTC 365-SP2				SPLP			ROWEST MEM	SPLP Mets	226.68	275.47	278.30	
	3	RFTC 365-SP2				—	0.5ml Met 1-5-3				226.77	278.51	278.48	
	4	WS50251				16					230.26	282.09	282.08	
	5	252				17					227.89	279.48	279.45	
3-10-99 LS SPLP 3/9	1	MBTC 366-SP1	45ml	50ml	3015	SPLP		MB3025	SAPP	Pb, Cd, Sb	227.00	279.89	278.89	
	2	RFTC 366-SP1				—	0.5ml Met 1-5-3				226.99	279.31	279.22	
	3	WS50011				18					230.14	281.90	281.88	
	4	50286				19					227.03	278.54	278.54	
	5	50287				20					225.34	276.97	276.91	
	6	50288				21					227.38	279.23	279.23	
	7	50288 DUP				—					225.60	277.34	277.29	
	8	50288 SPK				—	0.5ml Met 1-5-3				229.17	281.35	281.33	
	9	MB031099-WI				H2O				Pb, Cd, Al	227.07	278.57	278.57	
	10	RFC31099-WI				—	LS 3/10 ~~Met~~ 1.0ml Met 1-6-5				224.91	277.65	277.65	
	11	WS50306				21					227.75	279.13	279.[illegible]	
3-11-99 LS		MB031199-HP1	50ml	50ml	4.1.3H	HI. PHc		MB3025	EREATLAK	Cd, Cr, Cu, Pb, Ni, Ag, Zn	*HCl lot # M34029			
		RFC31199-HP1				—	1.0ml Met 1-6-5							
		WS50054				20								
		054 DUP				—								
		054 SPK				—	1.0ml Met 1-6-5							
		055				1								
		057				2								
		058				3								
		060				4								
		061				5								
		135				6				APP	Cu, Al, Zn, Fe, Ag			
		147	~~50ml~~ 10ml			7				CECCS	Metals + Ag	* DF = 5		
3-11-99 LS	1	MBTC 360-MP3	45ml	50ml	3015	MEP				RD ITCCRP	Pb	227.72	279.42	279.47
	2	WS50150 MP3				—	Continued on Page					227.34	278.79	278.79

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PROJECT

Soil Digestion Log

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PROJECT

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Date + Initials	No. #	Sample ID	Sample Wt/Vol	Final Vol	Method	Matrix	Sample Spike Amt + ID	MDS Lot #	Client	Analyses	Comments		
3-12-99 CS	3	WSSC393	0.25g	50ml	3051	soil 12		M13C25	NOCC	As	228.01	242.52	240.84
	4	394	0.25g			13					227.67	242.16	240.65
	5	395	0.26g			14					227.11	241.78	239.32
	6	396	0.26g			15					227.12	241.72	241.70
	7	397	0.25g			16					231.04	245.64	243.85
3-16-99 CS	1	MBC31699-S1	10ml	50ml	3051	soil		M13C25	Fernald	Pb, As	227.96	242.25	242.05
	2	RFC31699-S1	↓			—	0.5ml Met 1-5-3				226.34	241.20	241.17
	3	WSSC254	0.54g			1					227.39	242.16	242.06
	4	255	0.51g			2					226.55	241.58	241.53
	5	256	0.51g			3					226.90	241.63	241.47
	6	257	0.53g			4					226.65	240.92	240.77
	7	258	0.53g			5					225.96	240.63	240.62
	8	259	0.52g			6					227.50	242.45	242.41
	9	398	0.51g			7			Hellert	Zn, Cu, Pb, Cr, Cd, Be, As	227.55	242.29	242.28
	10	399	0.56g			8					229.12	244.04	243.98
	11	421	0.52g			9					226.54	241.42	241.41
	12	377	0.54g			10			Great Lakes SAPP	RCRA Mets Pb	229.15	243.79	242.83
3-17-99 CS/BC	1	MBC31799-S1	10ml	50ml	3051	soil					227.36	241.71	241.70
	2	RFC31799-S1	↓			—	0.5ml Met 1-5-3				227.64	241.93	241.91
	3	WSSC436	0.54g			11					226.44	241.29	241.29
	4	SC437	0.50g			12					228.61	243.47	243.47
	5	SC438	0.55g			13					225.23	243.17	243.15
	6	SC502	0.52g			14			RD WILDER	Pb	228.67	242.73	242.73
	7	SC503	0.50g			15					232.52	243.90	243.56
3-18-99 CS	1	MBC31899-01	10ml	50ml	3051	soil		M13C25	NCCC	As	230.52	245.23	245.23
	2	RFC31899-01	↓			—	0.11g Met 1-5-3				230.98	245.42	245.41
	3	WSSC497	0.25g			17					227.32	241.89	241.00
	4	SC498	0.25g			18					227.36	241.98	241.95
	5	SC499	0.26g			19					227.93	242.48	242.35
	6	SC500	0.27g			20					228.01	242.67	242.65
	7	SC500 Dup	0.25g			—					228.07	242.75	242.63
	8	SC500 SPK	0.25g			—	0.12g Met 1-5-3				229.90	244.64	244.61
	9	SC501	0.26g			1					228.31	242.95	241.78
3-19-99 CS	1	MBC31999-S1	10ml	50ml	3051	soil		M13C46	Cominco	Cd, Cu, Pb	227.42	241.76	241.73
	2	RFC31999-S1	↓	↓	↓	—	0.5ml Met 1-5-3	↓	↓	↓	227.71	242.68	242.[illegible]

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WASTESTREAM TECHNOLOGY

302 GROTE STREET
BUFFALO, NY 14207
(716) 876-5290

9905-031

CHAIN OF CUSTODY RECORD

PROJECT NO: 9905

SITE NAME: FERNALD

SAMPLERS (SIGNATURE): CS

SAMPLE NO.	DATE	TIME	COMP	GRAB	MATRIX	SAMPLE LOCATION	SIZE & NO. OF CONTAINERS	TCLP-Pb, As						PRESERVATIVES	REMARKS
	3/8/99	10:40		X	Soil	0% - D14	1x4oz	X					WS50	254	* Use 100g
	↓	10:45		↓	↓	0.5% - D14	↓	↓					↓	255	sample for TCLP
	↓	10:50		↓	↓	1% - D14	↓	↓					↓	256	
	↓	10:55		↓	↓	2% - D14	↓	↓					↓	257	
	↓	11:00		↓	↓	3% - D14	↓	↓					↓	258	
	↓	11:05		↓	↓	4% - D14	↓	↓					↓	259	

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
C. Smolkovich	3-8-99 11:15	[illegible]			
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)

SPECIAL INSTRUCTIONS:

TURNAROUND TIME 24 hrs

LAB USE: REFRIGERATOR #_____ SHELF #_____ GROUP #_____ DUE DATE _____

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WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
302 Grote Street
Buffalo, NY 14207

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ANALYTICAL SERVICES REQUEST FORM

Request Taken By BH / RPD Date Requested 3/15/99

Client Fluor-Daniel Fernald Telephone

Client Contact Fax

Address

Start Date P.O. #

Lab/P.O. #	Number of Samples	Matrix	Analytical Parameters	Turnaround Time (Days)	Quoted Price
WS50254-59	6	Soil	Total Pb, Total As		

Sample Containers Required?

_____ NO _____ YES (Please Complete Sample Container Request Form)

Special Instructions results 3/17/99

Laboratory Use Only: Sample Group # 9905-03.1

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ACCOUNTING