2311

ADDENDUM TO TREATABILITY STUDY REPORT

Area 2 Phase I

Firing Range Stabilization Project

Prepared For:

Fluor Daniel Fernald

Cincinnati, Ohio

Prepared By:

Sevenson Environmental Services, Inc.

Midwest Division

May 1999

000002

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1.0 INTRODUCTION

Sevenson Environmental Services, Inc. (Sevenson) presents an addendum to the approved Treatability Study Report (TSR) for the Area 1 Phase II Trap Range Stabilization project at the Fernald Environmental Management Project (FEMP) site in Fernald, Ohio. This addendum has been prepared to evaluate design mixes for the stabilization of approximately 45 cubic yards of lead-impacted soils in the Area 2 Phase I Firing Range Area. This addendum is intended to supplement the TSR.

1.1 Goals

The overall objective of this bench scale treatability study is to determine the efficacy of Sevenson's MAECTITE® process on the stabilization of contaminated soils at the Area 2 Phase I Firing Range site on a bench scale. This study focuses on identifying the usefulness of MAECTITE® liquid reagent in reducing the leachability of lead from the source sample as defined by the Toxic Characteristic Leaching Procedure (TCLP). Stabilized end product must fulfill the criteria established by the Resource Conservation and Recovery Act (RCRA) of less than 5.0 mg/L leachable lead.

2.0 SAMPLE SHIPMENT AND RECEIPT

One bucket of soil from the Area 2 Phase I Firing Range area was taken by a representative of FDF on March 18, 1999, and was designated as A2P1PB-Treat. After testing by FDF for alpha, beta, and gamma emissions, the sample was 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. The 52 lb. sample was transported via FedEx and received by the treatability laboratory at Waste Stream Technology (WST) on March 24, 1999. The soil was dark brown,

cohesive, with some fibrous root matter, and was considerably drier than soil utilized in the Trap Range treatability study. The soil was homogenized thoroughly, and sub-sampled for use in the treatability study. All methods employed in this project are listed in Table 1.

Table 1
Treatability Study Analytical Methods
Area 2 Phase I Firing Range

Analysis	Method
Soil Digestion	USEPA SW-846 Method 3051
Total Lead	USEPA SW-846 Method 6010
TCLP Extraction	USEPA SW-846 Method 1311
Lead 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 associated with analytical testing and agreed to in pre-study meetings between FDF and WST is presented in the formal laboratory reports contained in the appendices.

3.0 TREATABILITY STUDY

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 involved the removal of 1,000g aliquots from the sample bucket 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. Specifically, duplicate microcosms received 10% (w/w) water followed by MAECTITE® liquid reagent at a concentration, by weight, of either 3% or 4%.

Based on the results of the Trap Range treatability study, the first experimental series on the Firing Range soil investigated 3% reagent dose. However, preliminary results indicated that this concentration of MAECTITE® liquid did not sufficiently reduce lead mobility, so a second experimental round was employed utilizing 4% MAECTITE® liquid. The final concentration of 4% was achieved two ways: (1) the entire mass of reagent was added in a single dose, or (2) soil amended with 3% MAECTITE® liquid from the first experimental series was treated with an additional 1% dose. There was enough soil remaining to investigate 1 reaction data point, so a 3 day cure time was utilized. Two control microcosms containing 10% water were employed during each round of 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 3 and 7 days reaction time and analyzed for TCLP lead, total lead, pH, density, and moisture content.

3.2 Observations and Results

Addition of MAECTITE® liquid reagent to the relatively small Firing Range soil samples showed no noticeable exothermic reaction or treatment-induced volatile emissions. However, when mixed with a larger soil sample, some foaming was observed. This is probably a result of calcium carbonates in the soil. 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. 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.

MAECTITE® liquid reagent reduced the leachability of lead in all of the treated microcosms for both reaction times (3 and 7 day) tested. For example, after a 3 day reaction time, 3% reagent reduced the TCLP lead concentration in duplicate microcosms to 4.0 and 1.74 mg/l, compared to 174 and 158 mg/l for the water control microcosm (Table 2 and Appendix B). Four percent (4%) MAECTITE® liquid, when added as a single dose and allowed to react for three days, reduced lead leaching in duplicate microcosms to 4.11 and 1.26 mg/l. When added incrementally as 3% + 1% dose to final MAECTITE® concentration of 4%, lead mobility was reduced to 1.79 and 1.59 mg/l. After 7 days reaction time, the TCLP lead concentration was 1.98 and 1.23 mg/l in the 3% MAECTITE® microcosms, and 0.762 and 0.780 mg/l in the 4% MAECTITE® microcosms (Table 3 and Appendix C). Total lead analysis of each soil sub-sample showed similar results among the microcosms, indicating that these observations were attributable to MAECTITE® liquid treatment, and not due to variable concentrations of lead found in the different samples.

The addition of MAECTITE® liquid reduced the soil pH, which after three days ranged from 7.88 and 8.14 in the control microcosms, to 4.85 and 4.78 in soil receiving 3% MAECTITE® liquid, and 4.68 and 4.50 in soil amended with 4% MAECTITE®. The pH of MAECTITE® treated soil began to increase over the 7 day experimental period, to 5.25 and 4.81 in the 3% microcosms, and 5.03 and 5.14 in the 4% treated soils.

Table 2 Analyses of Treated Soil - 3 Day Reaction Time Area 2 Phase I Firing Range								
Sample	**MAECTITE® Dosage - % (w/w)**							
Analysis	**0**	**0 Duplicate**	**3%**	**3% Duplicate**	**3%+1%**	**3%+1% Duplicate**	**4%**	**4% Duplicate**
TCLP Pb	174 mg/l	158 mg/l	1.74 mg/l	4.0 mg/l	1.79 mg/l	1.59 mg/l	4.11 mg/l	1.26 mg/l
Total Pb	3400 mg/kg	3230 mg/kg	2940 mg/kg	2650 mg/kg	13,400 mg/kg	NA[1]	2530 mg/kg	3310 mg/kg
pH	7.88	8.14	4.85	4.78	5.07	5.22	4.68	4.50
Density	1.89 g/ml	1.98 g/ml	1.79 g/ml	1.93 g/ml	1.73 g/ml	1.79 g/ml	1.97 g/ml	2.01 g/ml
Moisture Content	10.20%	11.42%	10.45%	13.27%	1.47%	1.95%	15.75%	16.17%

[1] NA = Not analyzed. Insufficient sample to perform analysis.

Table 3 Analyses of Treated Soil - 7 Day Reaction Time Area 2 Phase I Firing Range						
Sample	**MAECTITE® Dosage - % (w/w)**					
Analysis	**0**	**0 Duplicate**	**3%**	**3% Duplicate**	**4%**	**4% Duplicate**
TCLP Pb	76.7 mg/l	111 mg/l	1.98 mg/l	1.23 mg/l	0.762 mg/l	0.780 mg/l
Total Pb	3030 mg/kg	2860 mg/kg	10,100 mg/kg	2310 mg/kg	2760 mg/kg	2540 mg/kg
pH	7.38	7.60	5.25	4.81	5.03	5.14
Density	1.49 g/ml	1.45 g/ml	1.36 g/ml	1.32 g/ml	1.38 g/ml	1.41 g/ml
Moisture Content	1.62%	1.18%	1.64%	1.91%	3.36%	3.44%

4.0 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 on soils with similar characteristics (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 Firing Range site. Specifically, all dosages of MAECTITE® liquid reagent tested reduced lead leachability, with 4% (w/w) and 7 day reaction time necessary to reduce lead in TCLP extracts to < 1 mg/l.

The results of this treatability study will be used to scale up to full scale operations. Field implementability is discussed in Section 5.1 of the approved Treatability Study Report (Document No. 629-SES-02211-002) and full scale operations for the Firing Range Stabilization is described in the Addendum to the Full Scale Stabilization Work Plan (Document No. 629-SES-02211-004A).

Proper application and mixing in the field will be checked by pH measurements. Based on the results of this treatability study, consistent pH readings below 6 will indicate that proper application and mixing has occurred.

APPENDIX A

Chain-of-Custody Form and

FEMP Material Unrestricted Releases Forms

CHAIN OF CUSTODY / REQUEST FOR ANALYSIS RECORD

FERMCO

P.O. BOX 538704
CINCINNATI, OH 45253-6704

REFERENCE DOCUMENT NO.: SPL-99-0240

ORIGINAL MEF NO.: NA

CORRESPONDING REFERENCE DOCUMENT NO.: N/A

PAGE 1 OF 1

RELEASE NO.: 10000+~~8837~~ 88830	PROJECT NO.: 20402-PSP-0001	FOR SAMPLE RELATED PROBLEMS, ACS CONTACT / PHONE: BILL WESTERMAN [redacted]	CONTRACT PURCHASE ORDER / TASK ORDER NO.: N/A
PROJECT NAME: Lead @ A2P, Firing Range		REQUIRED REPORT DATE / LAB TAT: NORE PER Customer	SAMPLE SHIPMENT DATE: 3-23-99
PROJECT CONTACT / PHONE: Mike Rolfes [redacted]		RECEIVING LAB NAME: 16 NORE PER Customer 3/18/99 Waste Stream Technology	SAMPLE SHIPPER (Print): K. Helfferich
CHARGE NO.: 2EM14	LOT MARKING NO.: NA	RECEIVING LAB ADDRESS: Buffalo, NY	OFF-SITE LAB CONTACT: Chris Baughman
SAMPLING TEAM (Print) & GROUP NAME / PHONE: John DeMo SMMP [redacted] / JOYCE GRACE		/ JOHN VANDINE	
SAMPLING TEAM (Signature & Badge No.): John R. DeMo	/ Joyce Grace 10781	/ [redacted]	

ITEM NO.	SAMPLE NUMBER: FACTS ID	SAMPLE NUMBER: CUSTOMER ID / SAMPLE POINT	SAMPLE MATRIX		COMP	GRAB	FILTERED	COLLECTION DATE	COLLECTION TIME	CONTAINER TYPE	CONTAINER VOL.	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
1	200350588	A2P, PB-TREAT	S	SOIL		√	N	03/18/99	14:32	C	5 GAL	1	NONE	N/A	*	Y	
2															BD99042		
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

No samples below this line Jay 03/18/99

SPECIAL INSTRUCTIONS: * Bench-scale treatability

100000

RELINQUISHED: ITEM / REASON	RELINQUISHED BY (Signature) / AFFILIATION	BADGE NO.	DATE	TIME	RECEIVED: RECEIVED BY (Signature) / AFFILIATION	BADGE NO.	DATE	TIME
1 Bag	John DeMo SMMP	1 [redacted]	3-18-99	16:55	Bill Westerman, SMO	1 [redacted]	3/18/99	1655
1-to ship	Karen Helfferich / SAL	2 [redacted]	3-23-99	1300	[signature]	2	3/23/99	1300
		3				3		
		4				4		
		5				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

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

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

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

63175

FEMP

COVER SHEET

2311

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 #	DATE	TIME	BLDG/GRID#	FLR
101741	03/23/99	09:00	15A	1

SURVEY NUMBER 99-03-11-0162

RWP NUMBER -

COMMENTS Soil Sample Shipment Rel#18830

N/A

000013

REVIEWER THEL BADGE 741

SIGNATURE DATE 3-23-99

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

FEMP
MATERIAL UNRESTRICTED RELEASE FORM

SURVEY # 99--03-11-162

DATE:	LOCATION:	RCT (PRINT):	SIGNATURE:	BADGE #
3/23/99	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	4/99	0.35/1.85	0.297/0.427	5/7	X	N/A
M-3	77099	β,γ	6/99	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)
0900	DL	200350588 5 GALLON CAN TOP	SURF	-1*	N/A	19	<MDCR	RCR 3-3 ATT. A	KAREN HELFFERICH	
0900	DL	200350588 5 GALLON CAN BOTTOM	SURF	5*	N/A	5*	<MDCR	RCR 3-3 ATT. A	KAREN HELFFERICH	
		N/A							N/A	

Comments
N/A

	PRINT	SIGNATURE	BADGE #	DATE
REVIEW:	THIEL	[signature]	[illegible]	3-23-99

(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.

000014

2311

TUE MAR 23, 1999 08:58:08
GROUP D SMEARS (.5 MIN) COUNTED ON TENNELEC #7

2311

SAMPLE NUMBER	COUNT TIME	GROSS ALPHA	GROSS B-g	DPM ALPHA	DPM B-g	TIME COUNTED
1	0.50	0	5	-1	19	08:58:42
2	0.50	1	2	5	5	08:59:27

OPERATION COMPLETE

OPERATION COMPLETE

FEMP RADIOLOGICAL SURVEY REPORT # 313
SURVEY # 99-311-162 DATED 3/23/99
(NAME) (SIGNATURE)
RCT: Loebka Loebka
REVIEWER: LHRC

000015

TALLY SHEET

2311

RELEASE #: 1000018830 (WASTE STREAM TECHNOLOGY)
PO #: N/A 1 (5 GALLON) DRUM
DATE SHIPPED: 23-MARCH-1999
MATERIAL: SOIL

ANALYSIS: TREATABILITY

Composite Sample Number	Lot Number	Sample Container Size	AnaLis/ FACTS Number	Gross Weight lbs.	Tare Weight lbs.	Net Weight lbs.
A2P1 PB-TREAT	W060-730-P047-0447	1(5) GAL. DRUM	200350588			
				0.000	0.000	0.000

DATE 19-MAR-1999
TIME 08:04:35

WORK CARD REPORT
ALPHA/BETA SCREENING

2311

SAMPLE ID:	200350589	USER SAMPLE ID:	A2P1PB-TREAT-AB
		SAMPLE FAMILY NO:	199903181655
		RELEASE NUMBER:	1000018829
STUDY:	SOILS REMEDIATION	SUBMISSION ID:	1000060029
PROJECT NAME:	20.03.13.04 A2PI PB DELIN @ FIRING RANGE	RELEASE NUMBER:	1000018829
SAMPLING SITE:		CHARGE NUMBER:	2FM14
SAMPLING GROUP:	GLOBAL	DATE SAMPLED:	18-MAR-199
MATERIAL NAME:	SOIL	SPL RECEIVED:	18-MAR-1999 16:55:00
		LOGGED SINCE:	
COMMENT:	SEND RESULTS TO	DRY: ✓	AS IS: NA:
Release Notes:			

TASK ID: 300989045

HOLDING TIME DAYS: 182
HOLD TIME EXPIRATION DATE:

DUE DATE: 22-MAR-1999
SUFFIX:

METHOD/OPERATION	INSTRUMENT CLASS/ INSTRUMENT NAME	ASL/ EST CONC
4510/ALPHA/BETA SCREEN, (LAB)	COUNTER	B
4510/DET. ALPHA/BETA SCREEN, (LAB)	PROPORTIONAL COUNTER	

COMPONENT	UNITS	RESULTS	LTPU	LCE	LMDC	LBC	LQ
ALPHA	pCi/g	9.3	15	15	17	4	U
BETA	pCi/g	15	16	16	19	4	U

BATCH NUMBER	DATE TASK PERFORMED	ANALYST	APPROVED BY
24 HR A/B-99-007	3/22/99	Jerry L. Daniels	

1 TASK PRINTED

*** END OF REPORT ***

000017

ENTERED BY : _____

REVIEWED BY : _____

APPENDIX B

APPENDIX B

Laboratory Reports for Treated Soil, 3 Day Reaction Time

WASTE STREAM TECHNOLOGY, INC.

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

Analytical Data Report
Report Date : 05/13/99
Group Number : 9905-061

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% MP-A D3	WS51315	Soil	04/15/99	04/15/99	10:00
0% MP-B D3	WS51316	Soil	04/15/99	04/15/99	10:00
3% MP-A D3	WS51317	Soil	04/15/99	04/15/99	10:00
3% MP-B D3	WS51318	Soil	04/15/99	04/15/99	10:00
Sample Status Upon Receipt : No irregularities.					

Analytical Services

Analytical Parameters	Number of Samples	Turnaround Time
Total Metals	4	Standard
TCLP Metals	4	Standard

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

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. (20th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

Waste Stream Technology, Inc.

Metals Analysis Report

Arsenic by ICP

SW-846 6010

2311

Site: FERNALD
Date Sampled: 04/15/99
Date Received: 04/15/99

Date Digested: 04/16/99

Group Number: 9905-061
Units: mg/Kg
Matrix: Soil

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS51315	0% MP-A D3	8.50	Not detected	04/20/99
WS51316	0% MP-B D3	8.50	Not detected	04/20/99
WS51317	3% MP-A D3	8.50	Not detected	04/20/99
WS51318	3% MP-B D3	8.50	Not detected	04/20/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

Metals Analysis Report
Lead by ICP
SW-846 6010

2311

Site: FERNALD
Date Sampled: 04/15/99
Date Received: 04/15/99

Date Digested: 04/16/99

Group Number: 9905-061
Units: mg/kg
Matrix: Soil

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS51315	0% MP-A D3	20.5	3400	04/20/99
WS51316	0% MP-B D3	20.5	3230	04/20/99
WS51317	3% MP-A D3	20.5	2940	04/20/99
WS51318	3% MP-B D3	20.5	2650	04/20/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

TCLP Metals Analysis Report

Arsenic by ICP

SW-846 6010

2311

Site: FERNALD
Date Sampled: 04/15/99
Date Received: 04/15/99

Group Number: 9905-061
Units: mg/L
Matrix: TCLP Extract(s)

TCLP Extraction Date: 04/15/99
Date Digested: 04/20/99

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS51315	0% MP-A D3	0.045	Not detected	04/20/99
WS51316	0% MP-B D3	0.045	Not detected	04/20/99
WS51317	3% MP-A D3	0.045	Not detected	04/20/99
WS51318	3% MP-B D3	0.045	Not detected	04/20/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

TCLP Metals Analysis Report

Lead by ICP

SW-846 6010

2311

Site: FERNALD
Date Sampled: 04/15/99
Date Received: 04/15/99

Group Number: 9905-061
Units: mg/L
Matrix: TCLP Extract(s)

TCLP Extraction Date: 04/15/99
Date Digested: 04/20/99

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS51315	0% MP-A D3	0.075	174	04/20/99
WS51316	0% MP-B D3	0.075	158	04/20/99
WS51317	3% MP-A D3	0.075	1.74	04/20/99
WS51318	3% MP-B D3	0.075	4.00	04/20/99

WASTE STREAM TECHNOLOGY

WASTE STREAM TECHNOLOGY

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

9905 - ~~060~~ 061 DR 4/16/99

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	Total-Pb, As						PRESERVATIVES	REMARKS
	4/15/99	915		X	Soil	0%-MP-A D3	1x4oz	X	X							VS 5 13 15
	↓	920		↓	↓	0%-MP-B	↓	↓	↓							16
		925				3%-MP-A										17
		930				3%-MP-B										18

000026

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
C. Smolkovich	4/15/99 945	[signature] 4.15.99 10:00			
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
		[signature]			

SPECIAL INSTRUCTIONS:

TURNAROUND TIME 24 hours.

23 11

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

WASTE STREAM TECHNOLOGY

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

2311

ANALYTICAL SERVICES REQUEST FORM

Request Taken By GJT / R&D Date Requested 4/15/99

Client FERNALD Telephone

Client Contact Fax

Address

Start Date P.O. #

Lab/P.O. #	Number of Samples	Matrix	Analytical Parameters	Turnaround Time (Days)	Quoted Price
W51215 216 217 218	4	SOIL	TOTAL PB, AS		
ADDITIONAL WORK					

Sample Containers Required?

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

Special Instructions

Laboratory Use Only: Sample Group #

000027

ACCOUNTING

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

Analytical Data Report
Report Date : 05/13/99
Group Number : 9905-074

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
3% MP + 1% MP-A	WS51954	Soil	04/29/99	04/29/99	09:15
3% MP + 1% MP-B	WS51955	Soil	04/29/99	04/29/99	09:15
4% MP-A D3	WS51956	Soil	04/29/99	04/29/99	09:15
4% MP-B D3	WS51957	Soil	04/29/99	04/29/99	09:15
Sample Status Upon Receipt : No irregularities.					

Analytical Services

Analytical Parameters	Number of Samples	Turnaround Time
Total Metals	3	Standard
TCLP Metals	4	Standard

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

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. (20th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

Waste Stream Technology, Inc.

Metals Analysis Report

Arsenic by ICP

SW-846 6010

2311

Site: FERNALD
Date Sampled: 04/29/99
Date Received: 04/29/99

Date Digested: 05/03/99

Group Number: 9905-074
Units: mg/Kg
Matrix: Soil

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS51954	3% MP + 1% MP - A	8.50	Not detected	05/04/99
WS51956	4% MP - A D3	8.50	Not detected	05/04/99
WS51957	4% MP - B D3	8.50	Not detected	05/04/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

Metals Analysis Report

Lead by ICP

SW-846 6010

2311

Site: FERNALD
Date Sampled: 04/29/99
Date Received: 04/29/99

Date Digested: 05/03/99

Group Number: 9905-074
Units: mg/kg
Matrix: Soil

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS51954	3% MP + 1% MP - A	4.10	13400	05/04/99
WS51956	4% MP - A D3	4.10	2530	05/04/99
WS51957	4% MP - B D3	4.10	3310	05/04/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

TCLP Metals Analysis Report

Arsenic by ICP

SW-846 6010

2311

Site: FERNALD
Date Sampled: 04/29/99
Date Received: 04/29/99

Group Number: 9905-074
Units: mg/L
Matrix: TCLP Extract(s)

TCLP Extraction Date: 04/30/99
Date Digested: 04/30/99

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS51954	3% MP + 1% MP - A	0.045	0.218	05/05/99
WS51955	3% MP + 1% MP - B	0.045	Not detected	05/05/99
WS51956	4% MP - A D3	0.045	Not detected	05/05/99
WS51957	4% MP - B D3	0.045	0.081	05/05/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

TCLP Metals Analysis Report

Lead by ICP

SW-846 6010

2311

Site: FERNALD
Date Sampled: 04/29/99
Date Received: 04/29/99

Group Number: 9905-074
Units: mg/L
Matrix: TCLP Extract(s)

TCLP Extraction Date: 04/30/99
Date Digested: 04/30/99

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS51954	3% MP + 1% MP - A	0.075	1.79	05/05/99
WS51955	3% MP + 1% MP - B	0.075	1.59	05/05/99
WS51956	4% MP - A D3	0.075	4.11	05/05/99
WS51957	4% MP - B D3	0.075	1.26	05/05/99

WASTE STREAM TECHNOLOGY

WASTE STREAM TECHNOLOGY

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

9905-074

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
	4/29/99	830		X	Soil	3%mp + 1%mp - A	1x250ml	X	X							WS 5 19 54
	↓	835		↓	↓	3%mp + 1%mp - B	↓		X							55
	↓	840		↓	↓	4%mp - A, D3	↓	X	X							56
	↓	845		↓	↓	4%mp - B, D3	↓	X	X							57

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
C. Smolkovich	4/29/99 915	[illegible]			
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
		[illegible]			

SPECIAL INSTRUCTIONS:

TURNAROUND TIME 24 hours

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

000034

23311

Quality Control Analysis Result Reports

Metals Analysis Data

Sample Group Numbers 9905-061 & 9905-063

Waste Stream Technology, Inc.
Metals Method Blank Analysis

2311

Site: FERNALD
Date Sampled: NA
Date Received: NA

Group Number: 9905-061
Units: mg/Kg

WST ID MB041699
Client ID: NA
Digestion Date: 04/16/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As soil Method Blank	1.70	Not detected	04/20/99	SW-846 6010
Pb soil Method Blank	4.10	Not detected	04/20/99	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 Numbers: 9905-061 & 063

Report Units : % Recovery
Matrix : Soil

	Lab ID	RF041699-S1	RF042099-S1	
	Date Digested	4/16/99	4/20/99	
	Date Analyzed	4/20/99	4/20/99	
Analyte	Reference % Recovery QC Limits	% Recovery	% Recovery	Analysis Method
Lead	85 - 115	103	104	SW-846 6010
Arsenic	85 - 115	99	101	SW-846 6010

RF denotes Reference Sample.

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2311

Site: FERNALD
Date Sampled: NA
Date Received: NA

Group Number: 9905-063
Units: mg/L
TCLP Extraction Date: 04/19/99

WST ID: MBTC403-T2
Client ID: NA
Digestion Date: 04/20/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As TCLP Method Blank	0.045	Not detected	04/20/99	SW-846 6010
Pb TCLP Method Blank	0.075	Not detected	04/20/99	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

Site : Fernald
Group Numbers: 9905-061 & 063
TCLP Date : 4/15/99 & 4/19/99

Report Units : % Recovery
Matrix : TCLP Extract

	Lab ID	RFTC403-T2		
	Date Digested	4/20/99		
	Date Analyzed	4/20/99		
Analyte	Reference % Recovery QC Limits	% Recovery		Analysis Method
Lead	85 - 115	102		SW-846 6010
Arsenic	85 - 115	122 #		SW-846 6010

RF denotes Reference Sample.
# denotes a recovery outside the stated QC limits.

Waste Stream Technology, Inc.

TCLP Metals Analysis Result Report
Duplicate Sample Analysis Summary

2311

Site : Fernald
Date Sampled : 4/19/99
Date Received : 4/19/99
TCLP Date : 4/19/99

Group Numbers : 9905-061 & 063
Report Units : mg/L
Matrix : TCLP Extract

Lab ID Number	WS51412	WS51412 Dup		
Client ID	0% MP-B D7	0% MP-B D7		
Date Digested	4/20/99	4/20/99		
Date Analyzed	4/20/99	4/20/99	**RPD**	**RPD**
Analyte	**Initial Result**	**Duplicate Result**	**(%)**	**QC Limits (%)**
Lead	111	110	0.4	25
Arsenic	< 0.045	< 0.045	< 0.1	25

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report
Matrix Spike Analysis Summary

2311

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 4/19/99

Group Numbers : 9905-061 & 063
Report Units : % Recovery

	Lab ID Number	WS51412	
	Client ID	0% MP-B D7	
	Date Digested	4/20/99	
	Date Analyzed	4/20/99	**Analysis**
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	75 - 125	NC	SW-846 6010
Arsenic	75 - 125	106	SW-846 6010

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

Waste Stream Technology, Inc.

TCLP Metals Analysis Result Report

Post-Digestion Spike Analysis Summary

2311

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 4/15/99

Group Number : 9905-061 & 063
Report Units : % Recovery

	Lab ID Number	WS51318	
	Client ID	3% MP-B D3	
	Date Digested	4/20/99	
	Date Analyzed	4/20/99	Analysis
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	85 - 115	98	SW-846 6010
Arsenic	85 - 115	106	SW-846 6010

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2311

Sample Dilution Interference Check Analysis Summary

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 4/15/99

Group Number : 9905-061 & 063
Report Units : % Recovery

Lab ID Number	WS51318
Client ID	3% MP-B D3
Date Digested	4/20/99
Date Analyzed	4/20/99

Analyte	**Undiluted Result (mg/L)**	**Diluted Result (mg/L)**	**Percent Difference**	**QC Limits (%)**
Lead	4.00	3.57	10.8 #	10
Arsenic	< 0.045	< 0.045	< 0.1	10

# denotes outside QC limits.

APPENDIX C

APPENDIX C

Laboratory Reports for Treated Soil, 7 Day Reaction Time

WASTE STREAM TECHNOLOGY, INC.

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

2311

Analytical Data Report
Report Date : 05/13/99
Group Number : 9905-077

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
4% MP-A D7	WS52058	Soil	05/03/99	05/03/99	09:20
4% MP-B D7	WS52059	Soil	05/03/99	05/03/99	09:20
Sample Status Upon Receipt : No irregularities.					

Analytical Services

Analytical Parameters	Number of Samples	Turnaround Time
Total Metals	2	Standard
TCLP Metals	2	Standard

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

000046

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

WASTE STREAM TECHNOLOGY

METHODOLOGIES

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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. (20th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

Metals Analysis Report

Arsenic by ICP

SW-846 6010

2311

Site: FERNALD
Date Sampled: 05/03/99
Date Received: 05/03/99

Date Digested: 05/03/99

Group Number: 9905-077
Units: mg/Kg
Matrix: Soil

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS52058	4% MP-A D7	8.50	Not detected	05/04/99
WS52059	4% MP-B D7	8.50	Not detected	05/04/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

Metals Analysis Report
Lead by ICP
SW-846 6010

2311

Site: FERNALD
Date Sampled: 05/03/99
Date Received: 05/03/99

Date Digested: 05/03/99

Group Number: 9905-077
Units: mg/kg
Matrix: Soil

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS52058	4% MP-A D7	4.10	2760	05/04/99
WS52059	4% MP-B D7	4.10	2540	05/04/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

TCLP Metals Analysis Report

Arsenic by ICP

SW-846 6010

2311

Site: FERNALD
Date Sampled: 05/03/99
Date Received: 05/03/99

Group Number: 9905-077
Units: mg/L
Matrix: TCLP Extract(s)

TCLP Extraction Date: 05/03/99
Date Digested: 05/04/99

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS52058	4% MP-A D7	0.045	Not detected	05/04/99
WS52059	4% MP-B D7	0.045	Not detected	05/04/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

TCLP Metals Analysis Report

Lead by ICP

SW-846 6010

2311

Site: FERNALD
Date Sampled: 05/03/99
Date Received: 05/03/99

Group Number: 9905-077
Units: mg/L
Matrix: TCLP Extract(s)

TCLP Extraction Date: 05/03/99
Date Digested: 05/04/99

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS52058	4% MP-A D7	0.075	0.762	05/04/99
WS52059	4% MP-B D7	0.075	0.780	05/04/99

WASTE STREAM TECHNOLOGY

WASTE STREAM TECHNOLOGY

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

9905-077

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	Total-Pb, As						PRESERVATIVES	REMARKS
	5/3/99	900		X	Soil	4%.mp-A, D7	1x250mL	X	X						W552058	# Use 100g
	↓	910		↓	↓	4%.mp-B, D7	↓	↓	↓						↓ 059	Sample

000052

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
C. Smolkovich	5/3/99 920				
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, INC.
302 Grote Street
Buffalo, NY 14207
(716) 876-5290

Analytical Data Report
Report Date : 05/13/99
Group Number : 9905-063

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% MP-A D7	WS51411	Soil	04/19/99	04/19/99	11:00
0% MP-B D7	WS51412	Soil	04/19/99	04/19/99	11:00
3% MP-A D7	WS51413	Soil	04/19/99	04/19/99	11:00
3% MP-B D7	WS51414	Soil	04/19/99	04/19/99	11:00
Sample Status Upon Receipt : No irregularities.					

Analytical Services

Analytical Parameters	Number of Samples	Turnaround Time
Total Metals	4	Standard
TCLP Metals	4	Standard

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

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

WASTE STREAM TECHNOLOGY

METHODOLOGIES

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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. (20th Edition). American Public Health Association, 1105 18th Street, NW, Washington, D.C. 20036.

Waste Stream Technology, Inc.

Metals Analysis Report

Arsenic by ICP

SW-846 6010

2311

Site: FERNALD
Date Sampled: 04/19/99
Date Received: 04/19/99

Date Digested: 04/20/99

Group Number: 9905-063
Units: mg/Kg
Matrix: Soil

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS51411	0%MP-A D7	8.50	Not detected	04/20/99
WS51412	0%MP-B D7	8.50	Not detected	04/20/99
WS51413	3%MP-A D7	8.50	Not detected	04/20/99
WS51414	3%MP-B D7	8.50	Not detected	04/20/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

Metals Analysis Report
Lead by ICP
SW-846 6010

2311

Site: FERNALD
Date Sampled: 04/19/99
Date Received: 04/19/99

Date Digested: 04/20/99

Group Number: 9905-063
Units: mg/kg
Matrix: Soil

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS51411	0%MP-A D7	20.5	3030	04/20/99
WS51412	0%MP-B D7	20.5	2860	04/20/99
WS51413	3%MP-A D7	20.5	10100	04/20/99
WS51414	3%MP-B D7	4.10	2310	04/20/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

TCLP Metals Analysis Report

Arsenic by ICP

SW-846 6010

2311

Site: FERNALD
Date Sampled: 04/19/99
Date Received: 04/19/99

Group Number: 9905-063
Units: mg/L
Matrix: TCLP Extract(s)

TCLP Extraction Date: 04/19/99
Date Digested: 04/20/99

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS51411	0%MP-A D7	0.045	Not detected	04/20/99
WS51412	0%MP-B D7	0.045	Not detected	04/20/99
WS51413	3%MP-A D7	0.045	Not detected	04/20/99
WS51414	3%MP-B D7	0.045	Not detected	04/20/99

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.

TCLP Metals Analysis Report

Lead by ICP

SW-846 6010

2311

Site: FERNALD
Date Sampled: 04/19/99
Date Received: 04/19/99

Group Number: 9905-063
Units: mg/L
Matrix: TCLP Extract(s)

TCLP Extraction Date: 04/19/99
Date Digested: 04/20/99

WST ID	Client ID	Detection Limit	Result	Date Analyzed
WS51411	0%MP-A D7	0.075	76.7	04/20/99
WS51412	0%MP-B D7	0.075	111	04/20/99
WS51413	3%MP-A D7	0.075	1.98	04/20/99
WS51414	3%MP-B D7	0.075	1.23	04/20/99

WASTE STREAM TECHNOLOGY

WASTE STREAM TECHNOLOGY

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

9905-063

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
	4/19/99	10:30		X	Soil	0% MP-A, D7	1x4oz	X	X							WS51411
	↓	10:35		↓	↓	0% MP-B, D7	↓	↓	↓							412
		10:40				3% MP-A, D7										413
		10:45				3% MP-B, D7										414

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
C. Smolkovich	4/19/99 1100	[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 _____

000059

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Quality Control Analysis Result Reports

Metals Analysis Data

Sample Group Numbers 9905-074 & 9905-077

Waste Stream Technology, Inc.
Metals Method Blank Analysis

2311

Site: FERNALD
Date Sampled: NA
Date Received: NA

Group Number: 9905-077
Units: mg/Kg

WST ID MB050399
Client ID: NA
Digestion Date: 05/03/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As soil Method Blank	1.70	Not detected	05/04/99	SW-846 6010
Pb soil Method Blank	4.10	Not detected	05/04/99	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

2311

Site : Fernald
Group Numbers: 9905-074 & 077

Report Units : % Recovery
Matrix : Soil

	Lab ID	RF050399-S1		
	Date Digested	5/3/99		
	Date Analyzed	5/4/99		
Analyte	Reference % Recovery QC Limits	% Recovery		Analysis Method
Lead	85 - 115	103		SW-846 6010
Arsenic	85 - 115	99		SW-846 6010

RF denotes Reference Sample.

Waste Stream Technology, Inc.

Total Metals Analysis Result Report
Duplicate Sample Analysis Summary

2311

Site : Fernald
Date Sampled : 5/3/99
Date Received : 5/3/99

Group Numbers : 9905-074 & 077
Report Units : mg/kg
Matrix : Soil

Lab ID Number	WS52059	WS52059 Dup		
Client ID	4% MP-B D7	4% MP-B D7		
Date Digested	5/3/99	5/3/99		
Date Analyzed	5/4/99	5/4/99	RPD	RPD
Analyte	Initial Result	Duplicate Result	(%)	QC Limits (%)
Lead	2540	3130	21.0	25
Arsenic	< 8.5	< 8.5	< 0.1	25

Waste Stream Technology, Inc.

Total Metals Analysis Result Report

Matrix Spike Analysis Summary

2311

Site : Fernald
Matrix : Soil

Group Numbers : 9905-074 & 077
Report Units : % Recovery

	Lab ID Number	WS52059	
	Client ID	4% MP-B D7	
	Date Digested	5/3/99	
	Date Analyzed	5/4/99	Analysis
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	75 - 125	NC	SW-846 6010
Arsenic	75 - 125	97	SW-846 6010

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

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2311

Site: FERNALD
Date Sampled: NA
Date Received: NA

Group Number: 9905-074
Units: mg/L
TCLP Extraction Date: 05/03/99

WST ID: MBTC427-T1
Client ID: NA
Digestion Date: 05/05/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As TCLP Method Blank	0.045	Not detected	05/05/99	SW-846 6010
Pb TCLP Method Blank	0.075	Not detected	05/05/99	SW-846 6010

MB denotes Method Blank
NA denotes Not Applicable

WASTE STREAM TECHNOLOGY

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

2311

Site: FERNALD
Date Sampled: NA
Date Received: NA

Group Number: 9905-077
Units: mg/L
TCLP Extraction Date: 04/30/99

WST ID: MBTC419-T1
Client ID: NA
Digestion Date: 05/04/99

Analyte	Detection Limit	Result	Date Analyzed	Analysis Method
As TCLP Method Blank	0.045	Not detected	05/04/99	SW-846 6010
Pb TCLP Method Blank	0.075	Not detected	05/04/99	SW-846 6010

MB denotes Method Blank
NA denotes Not Applicable

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TCLP Metals Analysis Result Report
Reference Standard Analysis Summary

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Site : Fernald
Group Numbers: 9905-074 & 077
TCLP Date : 4/29/99 & 5/3/99

Report Units : % Recovery
Matrix : TCLP Extract

	Lab ID	RFTC419-T1	RFTC427-T1	
	Date Digested	4/30/99	5/4/99	
	Date Analyzed	4/30/99	5/4/99	
Analyte	Reference % Recovery QC Limits	% Recovery	% Recovery	Analysis Method
Lead	85 - 115	100	94	SW-846 6010
Arsenic	85 - 115	113	107	SW-846 6010

RF denotes Reference Sample.

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TCLP Metals Analysis Result Report
Duplicate Sample Analysis Summary

Site : Fernald
Date Sampled : 4/29/99
Date Received : 4/29/99
TCLP Date : 4/29/99

Group Numbers : 9905-074 & 077
Report Units : mg/L
Matrix : TCLP Extract

Lab ID Number	WS51957	WS51957 Dup		
Client ID	4% MP-B D3	4% MP-B D3		
Date Digested	4/30/99	4/30/99		
Date Analyzed	4/30/99	4/30/99	**RPD**	**RPD**
Analyte	**Initial Result**	**Duplicate Result**	**(%)**	**QC Limits (%)**
Lead	1.26	1.25	0.6	25
Arsenic	0.081	< 0.045	57 #	25

# denotes an RPD outside the stated QC limits.

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TCLP Metals Analysis Result Report

Matrix Spike Analysis Summary

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 4/29/99

Group Numbers : 9905-074 & 077
Report Units : % Recovery

	Lab ID Number	WS51957	
	Client ID	4% MP-B D3	
	Date Digested	4/30/99	
	Date Analyzed	4/30/99	Analysis
Analyte	QC Limits	% Recovery	Method
Lead	75 - 125	100	SW-846 6010
Arsenic	75 - 125	120	SW-846 6010

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TCLP Metals Analysis Result Report

Post-Digestion Spike Analysis Summary

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 4/29/99

Group Number : 9905-074
Report Units : % Recovery

	Lab ID Number	WS51956	
	Client ID	4% MP-A D3	
	Date Digested	4/30/99	
	Date Analyzed	4/30/99	Analysis
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	85 - 115	99	SW-846 6010
Arsenic	85 - 115	104	SW-846 6010

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TCLP Metals Analysis Result Report

Post-Digestion Spike Analysis Summary

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Site : Fernald
Matrix : TCLP Extract
TCLP Date : 5/3/99

Group Number : 9905-077
Report Units : % Recovery

	Lab ID Number	WS52059	
	Client ID	4% MP-B D7	
	Date Digested	5/4/99	
	Date Analyzed	5/4/99	**Analysis**
Analyte	**QC Limits**	**% Recovery**	**Method**
Lead	85 - 115	91	SW-846 6010
Arsenic	85 - 115	98	SW-846 6010

Waste Stream Technology, Inc.
TCLP Metals Analysis Result Report

Sample Dilution Interference Check Analysis Summary

Site : Fernald
Matrix : TCLP Extract
TCLP Date : 4/29/99

Group Number : 9905-074
Report Units : % Recovery

Lab ID Number	WS51956
Client ID	4% MP-A D3
Date Digested	4/30/99
Date Analyzed	4/30/99

Analyte	Undiluted Result (mg/L)	Diluted Result (mg/L)	Percent Difference	QC Limits (%)
Lead	4.110	4.310	4.9	10
Arsenic	< 0.045	< 0.045	< 0.1	10