



PROJECT NOTE NO. 2

To: Callahan Mine Hazard Ranking System Project File

From: Michelle Fasolino, Roy F. Weston, Inc., Region I START 2000

MF

Date: 20 June 2001

RE: Adjusted Values for Soil/Sediment Samples Data
Case 7743
TDD No. 01-05-0161, PCS No. 2660-50

Introduction

The following notes describe the usability of analytical results for soil/sediment samples collected from Callahan Mine, Brooksville, Maine. The samples were collected by the Maine Department of Environmental Protection (ME DEP) for the purpose of performing an Expanded Site Inspection under the U.S. Environmental Protection Agency's (EPA) Hazard Ranking System (HRS). The analytical data were validated at Modified Tier III level according to the EPA New England Regional Functional Guidelines. The memorandum detailing the validated results is included in Attachment A of this Project Note.

Some modifications to the Modified Tier III validated data were required to meet the criteria of the EPA Headquarters guidelines for using qualified data to document an observed release and observed contamination. The modifications include changes to the sample reporting limits, documentation of the sample reporting limits, identification of the bias direction for qualified results, and application of a designated qualification factor to adjust qualified results. This Project Note was created to document the modifications and the process used to revise the analytical results for inclusion in the Callahan Mine HRS/National Priorities List (NPL) Documentation Record.

Sample Detection Limit Determination

The EPA Headquarters guidelines require that the sample results are reported to the Contract Required Detection Limit (CRDL) for HRS evaluation, while data validation guidelines require that sample results are reported to the Instrument Detection Limit (IDL). To meet the EPA Headquarters guidelines, the analytical results were revised by using the adjusted CRDL as the detection limit, where applicable. Revised results are summarized in Table 1 of this Project Note. The laboratory did not achieve the CRDL for lead, selenium, and zinc; therefore, lead, selenium, and zinc results are reported to the laboratory reporting limit (RL). Table 2 reports the Sample Detection Limit (SDL) which is either the adjusted CRDL or the RL (for lead, selenium, and zinc). The SDLs in milligrams per kilogram (mg/kg) for cadmium, copper, and silver are calculated as follows:

$$\text{SDL (mg/kg; Cd, Cu, Ag)} = \frac{\text{CRDL (mg/kg)} \times \text{final volume (mL)} \times 1.5 \text{ g dry weight}}{100 \text{ mL} \times \text{dry weight digested (g)}}$$

The laboratory dried and sieved the samples prior to analysis; therefore, results need not be corrected for percent solids. The laboratory digested approximately 1.5 grams (g) dry sample and diluted to a volume of approximately 100 milliliters (mL) for metals analysis.

The SDLs for mercury are calculated as follows:

$$\text{SDL (mg/kg; Hg)} = \frac{\text{CRDL (mg/kg)} \times 1.0 \text{ g dry weight}}{\text{dry weight digested (g)}}$$

The laboratory digested approximately 1.0 g dry sample and diluted to a volume of 50.0 mL for mercury analysis.

The SDLs for lead, selenium, and zinc are reported as follows:

$$\text{SDL (mg/kg; Pb, Se, Zn)} = \text{Laboratory RL}$$

The laboratory did not achieve the CRDL for lead, selenium, and zinc; therefore, the results are reported to the laboratory RL. Since the laboratory did not adjust the reporting limits of non-detected sample results by digested weights or final volumes, the SDLs for lead, selenium, and zinc reported in this project note have not been adjusted either.

Copies of the pertinent Form I Equivalents and laboratory preparation logs have been included in Attachment B of this Project Note. CRDLs are listed in the *USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-media Multi-concentration, ILMO4.1*, the pertinent portion of which is included in Attachment C of this Project Note.

Data Usability

The solid samples used to support the Callahan Mine HRS/NPL Documentation Record fall into two groups: background samples and release samples. The background samples were collected to document background concentrations at the site. The release samples were collected to establish observed releases of hazardous substances. The following samples were selected for HRS evaluation.

Sample Type	Sample Number	Sample Location
Background	99-BKSS-01	Upgradient
Background	99-BKSS-02	Upgradient
Background	99-BKSS-03	Upgradient
Background	99-BKSD-23	Horseshoe Cove
Background	99-BKSD-24	Horseshoe Cove

Sample Type	Sample Number	Sample Location
Background	99-BKSD-25	Horseshoe Cove
Release	99-SD-29	Goose Pond
Release	99-SD-31	Goose Pond
Release	99-SD-33	Goose Pond
Release	99-SD-35	Goose Pond
Release	99-SD-37 (d)	Dyer Cove
Release	99-SD-39 (d)	Dyer Cove
Release	99-WRP2-06	Waste Rock Pile 2
Release	99-WRP2-10	Waste Rock Pile 2
Release	99-WRP2-47	Waste Rock Pile 2
Release	99-WRP-22	Waste Rock Pile
Release	99-TPD-12	Tailings Pond
Release	99-TPD-13(d)	Tailings Pond
Release	99-TPD-14(d)	Tailings Pond

Upon review of the validated analytical results, certain data were found to be qualified with a "J". These data were further reviewed in accordance with EPA guidance detailed in *Using Qualified Data to Document an Observed Release and Observed Contamination*, included as Attachment D of this Project Note, in order to determine their usability.

EPA guidance indicates that qualified data may be used to support site proposal to the NPL, although, in some cases the data must be modified using an adjustment factor, depending upon the use of the data (data for a release sample or a background sample). Exhibit 3 of the aforementioned EPA guidance summarizes the use of adjustment factors for "J" qualified data, and is reproduced below.

Exhibit 3 Use of Adjustment Factors for "J" Qualified Data		
Type of Sample	Type of Bias	Action Required
Background Sample	No Bias	None: Use Concentration Without Adjustment Factor
	Low Bias	Multiply by Adjustment Factor
	High Bias	None: Use Concentration Without Adjustment Factor
	Unknown Bias	Multiply by Adjustment Factor
Release Sample	No Bias	None: Use Concentration Without Adjustment Factor
	Low Bias	None: Use Concentration Without Adjustment Factor
	High Bias	Divide by Adjustment Factor
	Unknown Bias	Divide by Adjustment Factor

In some cases, the direction of bias was reported in the Modified Tier III data validation package. In many cases, however, the direction of bias in the "J" qualified data was not included in the Modified Tier III data validation package. In such cases, the data were reviewed by a START data validator, and the direction of bias was determined, where possible. In some cases, multiple, conflicting biases were identified, which made it impossible to determine the direction of bias.

Table 3 summarizes the results of the review of the analytical results used in the Callahan Mine HRS/NPL Documentation Record. All of the elements are listed, whether qualified or not. The validated analytical result, the reason for qualification, the direction of bias (if known), the EPA Adjustment Factor (from *Using Qualified Data to Document an Observed Release and Observed Contamination*, Table 4 for inorganic analytes), and the adjusted result, where pertinent, are listed in the table.

Table 1
Inorganic Soil/Sediment Analysis
mg/Kg dry weight

SITE NAME: CALLAHAN MINE - BROOKSVILLE, ME
CASE NO.: 7743 LABORATORY: MAINE HETL

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SAMPLE LOCATION:	99-SD-29	99-TPD-14 (d)	99-TPD-15	99-SS-08	99-WRP-21	99-WRP2-47	99-WRP2-06
METALS - LABORATORY NUMBER:	99E-DIN-10866	99E-DIN-10868	99E-DIN-10869	99E-DIN-10871	99E-DIN-10875	99E-DIN-10878	99E-DIN-10880
% SOLIDS - LABORATORY NUMBER:	99E-DIN-11429	99E-DIN-10895	99E-DIN-10887	99E-DIN-11415	99E-DIN-10873	99E-DIN-10877	99E-DIN-11388

INORGANIC ELEMENTS	CRDL/RL mg/Kg, ppm	METHOD	99-SD-29	99-TPD-14 (d)	99-TPD-15	99-SS-08	99-WRP-21	99-WRP2-47	99-WRP2-06
Cadmium	1	P	33	16	--	38	8.7	12	--
Copper	5	P	1800 J	1400 J	180 J	2300 J	1600 J	4000 J	4000 J
Lead	2	P	770	700	290	840	780	2100	1600
Mercury	0.1	CV	0.7 J	0.5 J	0.4 J	0.7 J	1.0 J	1.3 J	4.4 J
Selenium	4	P	6.9	4.9	9.8	--	7.0	11	46
Silver	2	P	4.6	3.7	2.0	3.9	4.1	8.3	19.0
Zinc	8	P	6900	3800	50	9100	2400	5800	510
% SOLIDS:			54.3	84.7	85.1	83.3	89.5	80.7	83.2
DATE SAMPLED:			10/05/99	10/06/99	10/06/99	10/05/99	10/04/99	10/04/99	10/04/99

SAMPLE LOCATION:	99-WRP2-10	99-WRP2-48	99-TPD-12	99-TPD-11	99-TPD-13 (d)	99-BKSD-23	99-BKSD-24
METALS - LABORATORY NUMBER:	99E-DIN-10881	99E-DIN-10884	99E-DIN-10889	99E-DIN-10890	99E-DIN-10897	99E-DIN-11351	99E-DIN-11354
% SOLIDS - LABORATORY NUMBER:	99E-DIN-10882	99E-DIN-10885	99E-DIN-10892	99E-DIN-10891	99E-DIN-10898	99E-DIN-11352	99E-DIN-11355

INORGANIC ELEMENTS	CRDL/RL mg/Kg, ppm	METHOD	99-WRP2-10	99-WRP2-48	99-TPD-12	99-TPD-11	99-TPD-13 (d)	99-BKSD-23	99-BKSD-24
Cadmium	1	P	32	--	25	15	19	--	--
Copper	5	P	1100 J	540 J	1400 J	470 J	1800 J	14 J	18 J
Lead	2	P	790	220	990	780	840	10	11
Mercury	0.1	CV	0.9 J	R	0.5 J	0.5 J	0.5 J	R	R
Selenium	4	P	--	9.5	9.9	4.9	5.2	--	--
Silver	2	P	2.7	--	4.4	4.0	4.3	--	--
Zinc	8	P	7700	150	5800	4200	4400	49	64
% SOLIDS:			91.0	87.4	86.9	79.2	85.6	52.8	60.3
DATE SAMPLED:			10/04/99	10/04/99	10/06/99	10/05/99	10/06/99	10/06/99	10/06/99

ANALYTICAL METHOD:

- F - Furnace
- P - ICP/Flame AA
- CV - Cold Vapor
- C - Colorimetric

QUALIFIERS:

- J - Quantitation is approximate due to limitations identified in the quality control review (Data Review).
- R - Value is rejected.
- U - Detection limit is raised.
- UJ - Value is non-detected and detection limit is estimated.
- - Result is below the sample detection limit.

CRDL - Contract Required Detection Limit
RL - Reporting Limit

NOTE: This table contains data revised by using the CRDL as the detection limit, except for lead, selenium, and zinc results. Those results are reported to the RL since the CRDL was not achieved by the laboratory.

Table 1
Inorganic Soil/Sediment Analysis
mg/Kg dry weight

SITE NAME: CALLAHAN MINE - BROOKSVILLE, ME

CASE NO.: 7743

LABORATORY: MAINE HETL

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SAMPLE LOCATION:	99-BKSD-25	99-SS-04	99-SS-05	99-TPL-18	99-TPL-17	99-SS-09	99-BKSS-03
METALS - LABORATORY NUMBER:	99E-DIN-11357	99E-DIN-11360	99E-DIN-11361	99E-DIN-11364	99E-DIN-11367	99E-DIN-11372	99E-DIN-11375
% SOLIDS - LABORATORY NUMBER:	99E-DIN-11358	99E-DIN-11370	99E-DIN-11362	99E-DIN-11363	99E-DIN-11366	99E-DIN-11373	99E-DIN-11376

INORGANIC ELEMENTS	CRDL/RL mg/Kg, ppm	METHOD	99-BKSD-25	99-SS-04	99-SS-05	99-TPL-18	99-TPL-17	99-SS-09	99-BKSS-03
Cadmium	1	P	--	--	27	--	--	44	--
Copper	5	P	14 J	1400 J	1800 J	630 J	520 J	2400 J	49 J
Lead	2	P	10	210	640	150	410	880	110
Mercury	0.1	CV	R	0.5 J	0.7 J	0.3 J	1.0 J	0.7 J	R
Selenium	4	P	--	11	--	6.6	4.9	4.2	4.0
Silver	2	P	--	2.9	3.1	--	4.0	4.2	--
Zinc	8	P	52	310	8400	220	390	9700	260
% SOLIDS:			55.5	79.3	82.6	87.9	90.0	81.9	70.7
DATE SAMPLED:			10/06/99	10/06/99	10/06/99	10/04/99	10/04/99	10/05/99	10/06/99

SAMPLE LOCATION:	99-SS-44	99-WRP-19	99-WRP-22	99-WRP-20	99-TPL-16	99-SS-45	99-BKSS-01
METALS - LABORATORY NUMBER:	99E-DIN-11378	99E-DIN-11379	99E-DIN-11382	99E-DIN-11383	99E-DIN-11384	99E-DIN-11390	99E-DIN-11393
% SOLIDS - LABORATORY NUMBER:	99E-DIN-11396	99E-DIN-11386	99E-DIN-11381	99E-DIN-10894	99E-DIN-11369	99E-DIN-11389	99E-DIN-11377

INORGANIC ELEMENTS	CRDL/RL mg/Kg, ppm	METHOD	99-SS-44	99-WRP-19	99-WRP-22	99-WRP-20	99-TPL-16	99-SS-45	99-BKSS-01
Cadmium	1	P	17	22	13	4.5	--	--	--
Copper	5	P	480 J	1600 J	2100 J	240 J	670 J	80 J	56 J
Lead	2	P	210	430	3000	99	230	120	110
Mercury	0.1	CV	0.2 J	0.3 J	0.5 J	0.1 J	0.7 J	0.1 J	0.1 J
Selenium	4	P	--	5.9	--	--	20	--	--
Silver	2	P	--	2.7	2.3	--	3.0	--	--
Zinc	8	P	4200	6500	7200	3100	90	130	290
% SOLIDS:			89.2	88.5	90.7	93.0	88.1	83.7	69.1
DATE SAMPLED:			10/06/99	10/04/99	10/04/99	10/04/99	10/04/99	10/06/99	10/06/99

ANALYTICAL METHOD:

F - Furnace
P - ICP/Flame AA
CV - Cold Vapor
C - Colorimetric

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Table 1
Inorganic Soil/Sediment Analysis
mg/Kg dry weight

SITE NAME: CALLAHAN MINE - BROOKSVILLE, ME
CASE NO.: 7743 LABORATORY: MAINE HETL

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SAMPLE LOCATION:	99-BKSS-02	99-SS-46	99-SD-31	99-SS-07	99-SS-43	99-SD-39 (d)	99-SD-37 (d)
METALS - LABORATORY NUMBER:	99E-DIN-11395	99E-DIN-11398	99E-DIN-11400	99E-DIN-11403	99E-DIN-11406	99E-DIN-11409	99E-DIN-11412
% SOLIDS - LABORATORY NUMBER:	99E-DIN-11394	99E-DIN-11401	99E-DIN-11427	99E-DIN-10867	99E-DIN-11405	99E-DIN-11408	99E-DIN-11411

INORGANIC ELEMENTS	CRDL/RL mg/Kg, ppm	METHOD	99-BKSS-02	99-SS-46	99-SD-31	99-SS-07	99-SS-43	99-SD-39 (d)	99-SD-37 (d)
Cadmium	1	P	--	17	27	51	25	7.3	5.5
Copper	5	P	51 J	24000 J	1200 J	2600 J	1300 J	350 J	190 J
Lead	2	P	110	8500	590	1100	440	150	120
Mercury	0.1	CV	R	7.2 J	0.3 J	0.4 J	0.4 J	0.1 J	R
Selenium	4	P	4.0	39	5.7	4.8	--	--	--
Silver	2	P	--	45.0	3.2	5.3	2.3	--	--
Zinc	8	P	270	4700	5400	9600	6300	1700	1400
% SOLIDS:			69.1	84.4	33.0	89.5	91.8	53.0	47.1
DATE SAMPLED:			10/06/99	10/05/99	10/05/99	10/05/99	10/05/99	10/05/99	10/05/99

SAMPLE LOCATION:	99-SD-33	99-SD-35	99-SD-27
METALS - LABORATORY NUMBER:	99E-DIN-11416	99E-DIN-11419	99E-DIN-11425
% SOLIDS - LABORATORY NUMBER:	99E-DIN-11417	99E-DIN-11420	99E-DIN-11414

INORGANIC ELEMENTS	CRDL/RL mg/Kg, ppm	METHOD	99-SD-33	99-SD-35	99-SD-27
Cadmium	1	P	5.2	3.9	--
Copper	5	P	1900 J	170 J	18 J
Lead	2	P	210	52	16
Mercury	0.1	CV	0.2 J	R	R
Selenium	4	P	--	--	--
Silver	2	P	--	--	--
Zinc	8	P	3100	840	84
% SOLIDS:			54.3	30.7	68.6
DATE SAMPLED:			10/05/99	10/05/99	10/05/99

ANALYTICAL METHOD:

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NOTE: This table contains data revised by using the CRDL as the detection limit, except for lead, selenium, and zinc results. Those results are reported to the RL since the CRDL was not achieved by the laboratory.

Table 2
Inorganic Soil/Sediment Sample Detection Limits
mg/Kg dry weight

SITE NAME: CALLAHAN MINE - BROOKSVILLE, ME

CASE NO.: 7743

LABORATORY: MAINE HETL

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SAMPLE LOCATION:	99-SD-29	99-TPD-14	99-TPD-15	99-SS-08	99-WRP-21	99-WRP2-47	99-WRP2-06
METALS - LABORATORY NUMBER:	99E-DIN-10866	99E-DIN-10868	99E-DIN-10869	99E-DIN-10871	99E-DIN-10875	99E-DIN-10878	99E-DIN-10880
% SOLIDS - LABORATORY NUMBER:	99E-DIN-11429	99E-DIN-10895	99E-DIN-10887	99E-DIN-11415	99E-DIN-10873	99E-DIN-10877	99E-DIN-11388

INORGANIC ELEMENTS	CRDL/RL mg/Kg, ppm	METHOD							
Cadmium	1	P	1.0	1.0	1.0	1.0	1.0	0.9	1.1
Copper	5	P	5.0	4.8	4.9	5.1	4.9	4.7	5.4
Lead	2	P	2	2	2	2	2	2	2
Mercury	0.1	CV	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Selenium	4	P	4	4	4	4	4	4	4
Silver	2	P	2.0	1.9	2.0	2.0	2.0	1.9	2.2
Zinc	8	P	8	8	8	8	8	8	8
% SOLIDS:			54.3	84.7	85.1	83.3	89.5	80.7	83.2
DATE SAMPLED:			10/05/99	10/06/99	10/06/99	10/05/99	10/04/99	10/04/99	10/04/99

SAMPLE LOCATION:	99-WRP2-10	99-WRP2-48	99-TPD-12	99-TPD-11	99-TPD-13	99-BKSD-23	99-BKSD-24
METALS - LABORATORY NUMBER:	99E-DIN-10881	99E-DIN-10884	99E-DIN-10889	99E-DIN-10890	99E-DIN-10897	99E-DIN-11351	99E-DIN-11354
% SOLIDS - LABORATORY NUMBER:	99E-DIN-10882	99E-DIN-10885	99E-DIN-10892	99E-DIN-10891	99E-DIN-10898	99E-DIN-11352	99E-DIN-11355

INORGANIC ELEMENTS	CRDL/RL mg/Kg, ppm	METHOD							
Cadmium	1	P	0.8	1.0	1.0	1.0	1.0	1.0	1.0
Copper	5	P	3.9	4.8	5.1	5.0	5.1	5.1	4.9
Lead	2	P	2	2	2	2	2	2	2
Mercury	0.1	CV	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Selenium	4	P	4	4	4	4	4	4	4
Silver	2	P	1.6	1.9	2.1	2.0	2.0	2.0	2.0
Zinc	8	P	8	8	8	8	8	8	8
% SOLIDS:			91.0	87.4	86.9	79.2	85.6	52.8	60.3
DATE SAMPLED:			10/04/99	10/04/99	10/06/99	10/05/99	10/06/99	10/06/99	10/06/99

ANALYTICAL METHOD:

- F - Furnace
- P - ICP/Flame AA
- CV - Cold Vapor
- C - Colorimetric

NOTE:

This table contains data revised by using the CRDL as the detection limit, except for lead, selenium, and zinc results. Those results are reported to the RL since the CRDL was not achieved by the laboratory.

CRDL - Contract Required Detection Limit
RL - Reporting Limit

Table 2
Inorganic Soil/Sediment Sample Detection Limits
mg/Kg dry weight

SITE NAME: CALLAHAN MINE - BROOKSVILLE, ME
CASE NO.: 7743 LABORATORY: MAINE HETL

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SAMPLE LOCATION:	99-BKSD-25	99-SS-04	99-SS-05	99-TPL-18	99-TPL-17	99-SS-09	99-BKSS-03
METALS - LABORATORY NUMBER:	99E-DIN-11357	99E-DIN-11360	99E-DIN-11361	99E-DIN-11364	99E-DIN-11367	99E-DIN-11372	99E-DIN-11375
% SOLIDS - LABORATORY NUMBER:	99E-DIN-11358	99E-DIN-11370	99E-DIN-11362	99E-DIN-11363	99E-DIN-11366	99E-DIN-11373	99E-DIN-11376

INORGANIC ELEMENTS	CRDL/RL mg/Kg, ppm	METHOD	99-BKSD-25	99-SS-04	99-SS-05	99-TPL-18	99-TPL-17	99-SS-09	99-BKSS-03
Cadmium	1	P	1.0	1.0	1.0	1.1	1.0	1.0	1.0
Copper	5	P	4.9	5.0	4.9	5.3	5.0	5.0	4.8
Lead	2	P	2	2	2	2	2	2	2
Mercury	0.1	CV	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Selenium	4	P	4	4	4	4	4	4	4
Silver	2	P	2.0	2.0	2.0	2.1	2.0	2.0	1.9
Zinc	8	P	8	8	8	8	8	8	8
% SOLIDS:			55.5	79.3	82.6	87.9	90.0	81.9	70.7
DATE SAMPLED:			10/06/99	10/06/99	10/06/99	10/04/99	10/04/99	10/05/99	10/06/99

SAMPLE LOCATION:	99-SS-44	99-WRP-19	99-WRP-22	99-WRP-20	99-TPL-16	99-SS-45	99-BKSS-01
METALS - LABORATORY NUMBER:	99E-DIN-11378	99E-DIN-11379	99E-DIN-11382	99E-DIN-11383	99E-DIN-11384	99E-DIN-11390	99E-DIN-11393
% SOLIDS - LABORATORY NUMBER:	99E-DIN-11396	99E-DIN-11386	99E-DIN-11381	99E-DIN-10894	99E-DIN-11369	99E-DIN-11389	99E-DIN-11377

INORGANIC ELEMENTS	CRDL/RL mg/Kg, ppm	METHOD	99-SS-44	99-WRP-19	99-WRP-22	99-WRP-20	99-TPL-16	99-SS-45	99-BKSS-01
Cadmium	1	P	1.0	0.9	1.0	1.0	0.9	1.0	1.0
Copper	5	P	5.0	4.7	4.9	5.1	4.3	5.1	5.1
Lead	2	P	2	2	2	2	2	2	2
Mercury	0.1	CV	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Selenium	4	P	4	4	4	4	4	4	4
Silver	2	P	2.0	1.9	2.0	2.1	1.7	2.1	2.0
Zinc	8	P	8	8	8	8	8	8	8
% SOLIDS:			89.2	88.5	90.7	93.0	88.1	83.7	69.1
DATE SAMPLED:			10/06/99	10/04/99	10/04/99	10/04/99	10/04/99	10/06/99	10/06/99

ANALYTICAL METHOD:

- F - Furnace
- P - ICP/Flame AA
- CV - Cold Vapor
- C - Colorimetric

NOTE:

This table contains data revised by using the CRDL as the detection limit, except for lead, selenium, and zinc results. Those results are reported to the RL since the CRDL was not achieved by the laboratory.

CRDL - Contract Required Detection Limit
RL - Reporting Limit

Table 2
Inorganic Soil/Sediment Sample Detection Limits
mg/Kg dry weight

SITE NAME: CALLAHAN MINE - BROOKSVILLE, ME

CASE NO.: 7743

LABORATORY: MAINE HETL

Page 3 of 3

SAMPLE LOCATION:	99-BKSS-02	99-SS-46	99-SD-31	99-SS-07	99-SS-43	99-SD-39	99-SD-37
METALS - LABORATORY NUMBER:	99E-DIN-11395	99E-DIN-11398	99E-DIN-11400	99E-DIN-11403	99E-DIN-11406	99E-DIN-11409	99E-DIN-11412
% SOLIDS - LABORATORY NUMBER:	99E-DIN-11394	99E-DIN-11401	99E-DIN-11427	99E-DIN-10867	99E-DIN-11405	99E-DIN-11408	99E-DIN-11411

INORGANIC ELEMENTS	CRDL/RL mg/Kg, ppm	METHOD							
Cadmium	1	P	1.1	1.0	1.0	0.9	1.0	1.0	1.0
Copper	5	P	5.3	4.9	5.2	4.7	5.2	5.1	5.1
Lead	2	P	2	2	2	2	2	2	2
Mercury	0.1	CV	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Selenium	4	P	4	4	4	4	4	4	4
Silver	2	P	2.1	1.9	2.1	1.9	2.1	2.0	2.0
Zinc	8	P	8	8	8	8	8	8	8
% SOLIDS:			69.1	84.4	33.0	89.5	91.8	53.0	47.1
DATE SAMPLED:			10/06/99	10/05/99	10/05/99	10/05/99	10/05/99	10/05/99	10/05/99

SAMPLE LOCATION:	99-SD-33	99-SD-35	99-SD-27
METALS - LABORATORY NUMBER:	99E-DIN-11416	99E-DIN-11419	99E-DIN-11425
% SOLIDS - LABORATORY NUMBER:	99E-DIN-11417	99E-DIN-11420	99E-DIN-11414

INORGANIC ELEMENTS	CRDL/RL mg/Kg, ppm	METHOD			
Cadmium	1	P	1.0	1.1	1.1
Copper	5	P	4.9	5.5	5.3
Lead	2	P	2	2	2
Mercury	0.1	CV	0.1	0.1	0.1
Selenium	4	P	4	4	4
Silver	2	P	1.9	2.2	2.1
Zinc	8	P	8	8	8
% SOLIDS:			54.3	30.7	68.6
DATE SAMPLED:			10/05/99	10/05/99	10/05/99

ANALYTICAL METHOD:

- F - Furnace
- P - ICP/Flame AA
- CV - Cold Vapor
- C - Colorimetric

NOTE: This table contains data revised by using the CRDL as the detection limit, except for lead, selenium, and zinc results. Those results are reported to the RL since the CRDL was not achieved by the laboratory.

CRDL - Contract Required Detection Limit
 RL - Reporting Limit

**Table 3 - Solid Samples Data
Data Qualification Table
Callahan Mine, Brooksville, Maine**

Background Samples

Sample ID	Compound	Results Inorganic - mg/kg	Qualifications due to:	Biased High Biased Low or Unknown	Qualification Factor (Att D)	Adjusted Value Inorganic - mg/kg	Notes
99-BKSS-01	Cadmium	--	NA	NA	NA	--	
	Copper	56 J	Field Duplicates	Unknown	× 1.22	68	
	Lead	110	NA	NA	NA	110	
	Mercury	0.1 J	Holding Time, MS Recovery	Biased Low	NA	0.1	
	Selenium	--	NA	NA	NA	--	
	Silver	--	NA	NA	NA	--	
	Zinc	290	NA	NA	NA	290	
99-BKSS-02	Cadmium	--	NA	NA	NA	--	
	Copper	51 J	Field Duplicates	Unknown	× 1.22	62	
	Lead	110	NA	NA	NA	110	
	Mercury	R	Holding Time, MS Recovery	Biased Low	NA	R	
	Selenium	4.0	NA	NA	NA	4.0	
	Silver	--	NA	NA	NA	--	
	Zinc	270	NA	NA	NA	270	

**Table 3 - Solid Samples Data
Data Qualification Table
Callahan Mine, Brooksville, Maine**

Background Samples

Sample ID	Compound	Results Inorganic - mg/kg	Qualifications due to:	Biased High Biased Low or Unknown	Qualification Factor (Att D)	Adjusted Value Inorganic - mg/kg	Notes
99-BKSS-03	Cadmium	--	NA	NA	NA	--	
	Copper	49 J	Field Duplicates	Unknown	× 1.22	60	
	Lead	110	NA	NA	NA	110	
	Mercury	R	Holding Time, MS Recovery	Biased Low	NA	R	
	Selenium	4.0	NA	NA	NA	4.0	
	Silver	--	NA	NA	NA	--	
	Zinc	260	NA	NA	NA	260	
99-BKSD-23	Cadmium	--	NA	NA	NA	--	
	Copper	14 J	Field Duplicates	Unknown	× 1.22	17	
	Lead	10	NA	NA	NA	10	
	Mercury	R	Holding Time, MS Recovery	Biased Low	NA	R	
	Selenium	--	NA	NA	NA	--	
	Silver	--	NA	NA	NA	--	
	Zinc	49	NA	NA	NA	49	

**Table 3 - Solid Samples Data
Data Qualification Table
Callahan Mine, Brooksville, Maine**

Background Samples

Sample ID	Compound	Results Inorganic - mg/kg	Qualifications due to:	Biased High Biased Low or Unknown	Qualification Factor (Att D)	Adjusted Value Inorganic - mg/kg	Notes
99-BKSD-24	Cadmium	--	NA	NA	NA	--	
	Copper	18 J	Field Duplicates	Unknown	× 1.22	22	
	Lead	11	NA	NA	NA	11	
	Mercury	R	Holding Time, MS Recovery	Biased Low	NA	R	
	Selenium	--	NA	NA	NA	--	
	Silver	--	NA	NA	NA	--	
	Zinc	64	NA	NA	NA	64	
99-BKSD-25	Cadmium	--	NA	NA	NA	--	
	Copper	14 J	Field Duplicates	Unknown	× 1.22	17	
	Lead	10	NA	NA	NA	10	
	Mercury	R	Holding Time, MS Recovery	Biased Low	NA	R	
	Selenium	--	NA	NA	NA	--	
	Silver	--	NA	NA	NA	--	
	Zinc	52	NA	NA	NA	52	

**Table 3 - Solid Sample Data
Data Qualification Table
Callahan Mine, Brooksville, Maine**

Release Samples

Sample ID	Compound	Results Inorganic - mg/kg	Qualifications due to:	Biased High Biased Low or Unknown	Qualification Factor (Att D)	Adjusted Value Inorganic - mg/kg	Notes
99-SD-29	Cadmium	33	NA	NA	NA	33	
	Copper	1,800 J	Field Duplicates	Unknown	+ 1.22	1,500	
	Lead	770	NA	NA	NA	770	
	Mercury	0.7 J	Holding Time, MS Recovery	Low	NA	0.7	
	Selenium	6.9	NA	NA	NA	6.9	
	Silver	4.6	NA	NA	NA	4.6	
	Zinc	6,900	NA	NA	NA	6,900	
99-SD-31	Cadmium	27	NA	NA	NA	27	
	Copper	1,200 J	Field Duplicates	Unknown	+ 1.22	980	
	Lead	590	NA	NA	NA	590	
	Mercury	0.3 J	Holding Time, MS Recovery	Low	NA	0.3	
	Selenium	5.7	NA	NA	NA	5.7	
	Silver	3.2	NA	NA	NA	3.2	
	Zinc	5,400	NA	NA	NA	5,400	

**Table 3 - Solid Sample Data
Data Qualification Table
Callahan Mine, Brooksville, Maine**

Release Samples

Sample ID	Compound	Results Inorganic - mg/kg	Qualifications due to:	Biased High Biased Low or Unknown	Qualification Factor (Att D)	Adjusted Value Inorganic - mg/kg	Notes
99-SD-33	Cadmium	5.2	NA	NA	NA	5.2	
	Copper	1,900 J	Field Duplicates	Unknown	÷ 1.22	1,600	
	Lead	210	NA	NA	NA	210	
	Mercury	0.2 J	Holding Time, MS Recovery	Low	NA	0.2	
	Selenium	--	NA	NA	NA	--	
	Silver	--	NA	NA	NA	--	
	Zinc	3,100	NA	NA	NA	3,100	
99-SD-35	Cadmium	3.9	NA	NA	NA	3.9	
	Copper	170 J	Field Duplicates	Unknown	+ 1.22	140	
	Lead	52	NA	NA	NA	52	
	Mercury	R	Holding Time, MS Recovery	Low	NA	R	
	Selenium	--	NA	NA	NA	--	
	Silver	--	NA	NA	NA	--	
	Zinc	840	NA	NA	NA	840	

**Table 3 - Solid Sample Data
Data Qualification Table
Callahan Mine, Brooksville, Maine**

Release Samples

Sample ID	Compound	Results Inorganic - mg/kg	Qualifications due to:	Biased High Biased Low or Unknown	Qualification Factor (Att D)	Adjusted Value Inorganic - mg/kg	Notes
99-SD-37 (d)	Cadmium	5.5	NA	NA	NA	5.5	
	Copper	190 J	Field Duplicates	Unknown	+ 1.22	160	
	Lead	120	NA	NA	NA	120	
	Mercury	R	Holding Time, MS Recovery	Low	NA	R	
	Selenium	--	NA	NA	NA	--	
	Silver	--	NA	NA	NA	--	
	Zinc	1,400	NA	NA	NA	1,400	
99-SD-39 (d)	Cadmium	7.3	NA	NA	NA	7.3	
	Copper	350 J	Field Duplicates	Unknown	+ 1.22	290	
	Lead	150	NA	NA	NA	150	
	Mercury	0.1 J	Holding Time, MS Recovery	Low	NA	0.1	
	Selenium	--	NA	NA	NA	--	
	Silver	--	NA	NA	NA	--	
	Zinc	1,700	NA	NA	NA	1,700	

**Table 3 - Solid Sample Data
Data Qualification Table
Callahan Mine, Brooksville, Maine**

Release Samples

Sample ID	Compound	Results Inorganic - mg/kg	Qualifications due to:	Biased High Biased Low or Unknown	Qualification Factor (Att D)	Adjusted Value Inorganic - mg/kg	Notes
99- WRP2-06	Cadmium	--	NA	NA	NA	--	
	Copper	4,000 J	Field Duplicates	Unknown	+ 1.22	3,300	
	Lead	1,600	NA	NA	NA	1,600	
	Mercury	4.4 J	Holding Time, MS Recovery	Low	NA	4.4	
	Selenium	46	NA	NA	NA	46	
	Silver	19.0	NA	NA	NA	19.0	
	Zinc	510	NA	NA	NA	510	
99- WRP2-10	Cadmium	32	NA	NA	NA	32	
	Copper	1,100 J	Field Duplicates	Unknown	+ 1.22	900	
	Lead	790	NA	NA	NA	790	
	Mercury	0.9 J	Holding Time, MS Recovery	Low	NA	0.9	
	Selenium	--	NA	NA	NA	--	
	Silver	2.7	NA	NA	NA	2.7	
	Zinc	7,700	NA	NA	NA	7,700	

**Table 3 - Solid Sample Data
Data Qualification Table
Callahan Mine, Brooksville, Maine**

Release Samples

Sample ID	Compound	Results Inorganic - mg/kg	Qualifications due to:	Biased High Biased Low or Unknown	Qualification Factor (Att D)	Adjusted Value Inorganic - mg/kg	Notes
99- WRP2-47	Cadmium	12	NA	NA	NA	12	
	Copper	4,000 J	Field Duplicates	Unknown	+ 1.22	3,300	
	Lead	2,100	NA	NA	NA	2,100	
	Mercury	1.3 J	Holding Time, MS Recovery	Low	NA	1.3	
	Selenium	11	NA	NA	NA	11	
	Silver	8.3	NA	NA	NA	8.3	
	Zinc	5,800	NA	NA	NA	5,800	
99-WRP- 22	Cadmium	13	NA	NA	NA	13	
	Copper	2,100 J	Field Duplicates	Unknown	+ 1.22	1,700	
	Lead	3,000	NA	NA	NA	3,000	
	Mercury	0.5 J	Holding Time, MS Recovery	Low	NA	0.5	
	Selenium	--	NA	NA	NA	--	
	Silver	2.3	NA	NA	NA	2.3	
	Zinc	7,200	NA	NA	NA	7,200	

**Table 3 - Solid Sample Data
Data Qualification Table
Callahan Mine, Brooksville, Maine**

Release Samples

Sample ID	Compound	Results Inorganic - mg/kg	Qualifications due to:	Biased High Biased Low or Unknown	Qualification Factor (Att D)	Adjusted Value Inorganic - mg/kg	Notes
99-TPD-12	Cadmium	25	NA	NA	NA	25	
	Copper	1,400 J	Field Duplicates	Unknown	+ 1.22	1,100	
	Lead	990	NA	NA	NA	990	
	Mercury	0.5 J	Holding Time, MS Recovery	Low	NA	0.5	
	Selenium	9.9	NA	NA	NA	9.9	
	Silver	4.4	NA	NA	NA	4.4	
	Zinc	5,800	NA	NA	NA	5,800	
99-TPD-13(d)	Cadmium	19	NA	NA	NA	19	
	Copper	1,800 J	Field Duplicates	Unknown	+ 1.22	1,500	
	Lead	840	NA	NA	NA	840	
	Mercury	0.5 J	Holding Time, MS Recovery	Low	NA	0.5	
	Selenium	5.2	NA	NA	NA	5.2	
	Silver	4.3	NA	NA	NA	4.3	
	Zinc	4,400	NA	NA	NA	4,400	

**Table 3 - Solid Sample Data
Data Qualification Table
Callahan Mine, Brooksville, Maine**

Release Samples

Sample ID	Compound	Results Inorganic - mg/kg	Qualifications due to:	Biased High Biased Low or Unknown	Qualification Factor (Att D)	Adjusted Value Inorganic - mg/kg	Notes
99-TPD-14(d)	Cadmium	16	NA	NA	NA	16	
	Copper	1,400 J	Field Duplicates	Unknown	÷ 1.22	1,200	
	Lead	700	NA	NA	NA	700	
	Mercury	0.5 J	Holding Time, MS Recovery	Low	NA	0.5	
	Selenium	4.9	NA	NA	NA	4.9	
	Silver	3.7	NA	NA	NA	3.7	
	Zinc	3,800	NA	NA	NA	3,800	
99-TPL-17	Cadmium	--	NA	NA	NA	--	
	Copper	520 J	Field Duplicates	Unknown	÷ 1.22	430	
	Lead	410	NA	NA	NA	410	
	Mercury	1.0 J	Holding Time, MS Recovery	Low	NA	1.0	
	Selenium	4.9	NA	NA	NA	4.9	
	Silver	4.0	NA	NA	NA	4.0	
	Zinc	390	NA	NA	NA	390	

NA - Not Applicable
 -- - Not Detected Above the CRDL/RL
 R - Value is rejected
 J - Quantitation is approximate due to limitations identified in the quality control review (Data Review).

Attachment A

**Data Validation Memorandum
Case No. 7743**

Steve Stodola

US EPA Approval Signature

6/16/00

Date

Ms. Christine Clark
Regional Sample Control Center
U.S. EPA Region I
60 Westview Street
Lexington, Massachusetts 02421

May 31, 2000
B-00-05-P-01
Revised: June 15, 2000

RE: WA No.: 01-00-4-02, Task No.: 2, TDF No.: 107
Case No.: 7743
ME - Health and Environmental Testing Laboratory (HETL)
Callahan Mine, Brooksville, ME
Inorganic Data Validation

Metals: 10/Surface Water/99E-DIN-10900, -10901, -10902, -10908, -10909, -10910,
-10914, -10916, -10918, -10919
(Field Duplicate Pairs/99E-DIN-10908 and -10909)

38/Soil/Sediment/99E-DIN-10866, -10868, -10869, -10871, -10875, -10878,
-10880, -10881, -10884, -10889, -10890, -10897, -11351,
-11354, -11357, -11360, -11361, -11364, -11367, -11372,
-11375, -11378, -11379, -11382, -11383, -11384, -11390,
-11393, -11395, -11398, -11400, -11403, -11406, -11409,
-11412, -11416, -11419, -11425
(Field Duplicate Pairs/99E-DIN-10868 and -10897,
99E-DIN-10871 and -11372, 99E-DIN-11409 and -11412)

2/Aqueous Rinsate Blanks/99E-DIN-10906, -10907

Dear Ms. Clark:

A modified Tier III data validation was performed on the inorganic analytical data for ten surface water samples, thirty-eight soil/sediment samples, and two aqueous rinsate blanks collected by the Maine DEP for the U.S. EPA at the Callahan Mine site in Brooksville, Maine. The samples were analyzed for seven inorganic analytes using the Maine Health and Environmental Testing Laboratory SOP: EVMETALS-Analysis of Trace Metals in Environmental Water, November 1996 and SOP: DW245-Analysis of Mercury, July 1997, as specified in the Maine DEP's Quality Assurance Project Plan for Callahan Mine, Brooksville, Sampling Event for the Expanded Site Inspection Report, September 1, 1999. The data validation was performed using first the criteria in the Maine Health and Environmental Testing Laboratory SOP: EVMETALS-Analysis of Trace Metals in Environmental Water, November 1996 and SOP: DW245-Analysis of Mercury, July 1997; defaulting next to the Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, February 1989 criteria; and finally to the Region

I. EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses,
December 1996 procedures.

The thirty-eight soil/sediment samples were analyzed for percent solids according to Standard Methods-2540B. A sieve analysis was also performed on the thirty-eight soil/sediment samples according to ASTM Method C136-96a and ASTM Method C117-95. The sieve analysis data were not validated. The sieve analysis parameter is not part of the validation procedure and no specification for its validation was noted in the Quality Assurance Project Plan. The attached sieve analysis data summary table is a tabulated listing of the results reported by the laboratory.

The data were evaluated based on the following parameters:

- Overall Evaluation of Data and Potential Usability Issues
- Data Completeness (CSF Audit - Tier I)
- Preservation and Technical Holding Times
- PE Samples/Accuracy Check
- * ● Percent Solids
- Calibration Verification
- * ● Laboratory and Field Blank Analysis
- ICP Interference Check Sample Results
- Matrix Spike Results
- * ● Laboratory Duplicates
- Field Duplicates
- * ● Laboratory Control Sample Results
- NA ● Furnace Atomic Absorption Results
- NA ● ICP Serial Dilution Results
- * ● Detection Limit Results
- Sample Quantitation
- System Performance

* - All criteria were met for this parameter.

NA - Not Applicable

The following information was used to generate the Data Validation Memorandum attachments:

Table I: Recommendation Summary Table - summarizes validation recommendations

Table II: Overall Evaluation of Data - summarizes site objectives and potential usability issues

Data Summary Tables/Inorganic Analysis - summarize accepted, qualified, and rejected data

Overall Evaluation of Data and Potential Usability Issues

The following is a summary of the site DQOs:

- To collect sufficient data of acceptable quality to use in developing a Hazard Ranking System (HRS) score for the site.

No ICP interference check samples were analyzed for this project, therefore, this parameter could not be evaluated. The common ICP interfering elements (aluminum, iron, calcium, and magnesium) were not reported analytes and were not part of the raw data. Therefore, there is no information on which to evaluate the possibility or degree of interference from these elements in either the soil/sediment samples or the aqueous samples. However, the laboratory discusses their procedures that account for spectral interferences in section 4.1 of their SOP: EVMETALS (11/20/96).

The aqueous reporting limit standard for the ICP analysis showed poor recovery for copper, lead, and zinc. This demonstrated an inability to accurately quantify those elements near the reporting limit for the aqueous samples. Qualifiers have been applied to the data where needed.

The matrix spike sample 99E-DIN-11375 (99-BKSS-03) exhibited a recovery of 29% for mercury. This demonstrated a problem with the quantitative recovery of mercury in the soil/sediment samples. The positive mercury results were estimated (J). The non-detected mercury results were rejected (R) due to the possibility of false negatives. See Table I for details of the matrix spike recovery qualifications.

The mercury analysis holding time was exceeded for 19 of the soil/sediment samples. The holding times for these 19 samples ranged from 37 to 39 days. The positive mercury results for the affected samples were estimated (J). No actions were required for the non-detects in the affected samples since they were rejected (R) due to the low mercury matrix spike recovery noted above. See Table I for details of the holding time qualifications.

With the exception of the rejected mercury results noted above, the data are usable for the site objectives.

Data Completeness

The data validation revealed missing information and/or discrepancies in the data package submitted by the laboratory. The following missing information/discrepancies were noted:

1. The raw data for the aqueous mercury analysis (data package pages: 151-158) are unreadable due to the very light photocopy quality. The laboratory was asked to resubmit

a readable copy of these pages.

2. No interference check samples were analyzed. The laboratory was asked to explain how they determine the presence and amount of interference from the common interfering elements, and whether inter-element corrections are performed.
3. The ICP metals QC reports for the solid samples include results for a reference material identified as "PPS-46(SRM)." The laboratory was asked to submit the QC acceptance ranges specified for this material.
4. The mercury QC reports for the solid samples include results for a reference material identified as "PACS." The laboratory was asked to submit the QC acceptance ranges specified for this material.
5. The mercury raw data for the samples does not include the original absorbance measurements made by the instrument. The laboratory was asked to submit the mercury absorbance data for these runs.
6. Some of the samples are reported as "ND4ppm" and others are listed as "K4ppm" where "K" is noted as meaning "Less Than." The laboratory was asked to explain the difference between "ND" and "K," since both appear to indicate that the result is less than the reporting limit.
7. A Reporting Limit Standard was included in the ICP analysis sequence but the known concentrations or % recoveries were not included. The laboratory was asked to submit the True Values for the Reporting Limit Standard.
8. A standard identified as ERA was used in the ICP runs. The results and recoveries for this standard are tabulated on the QC pages 133, 136, and 146 of the data package. The element zinc was listed as having a True Value of 0.1ppm on pages 133 and 136, and a True Value of 0.11ppm on page 146. The True Values of the five other elements were unchanged. The laboratory was asked to explain the concentration difference for this element.

Items 1 thru 6 were requested via the WAM on April 25, 2000. Items 7 and 8 were requested via the WAM on May 01, 2000. All items were received via the WAM on May 10, 2000 and were adequately addressed.

Preservation and Technical Holding Times

Mercury

The mercury analysis holding time criterion of 28 days, as specified in the Maine Health and Environmental Testing Laboratory SOP: DW245-Analysis of Mercury, July 1997, was exceeded for 19 of the soil/sediment samples. The holding times for these 19 samples ranged from 37 to 39 days. The actions and affected samples were as follows:

Problem	Actions		Positive Results (99E-DIN-)	NDs (99E-DIN-)
	Positive Detects	NDs		
Mercury analysis holding time exceeded.	J	UJ	10866, 10868, 10869, 10871, 10875, 10878, 10880, 10890, 10897, 11360, 11361, 11364, 11367, 11372,	10884, 11351, 11354, 11357, 11375

The positive mercury results were estimated (J) for the samples listed above. No actions were required for the non-detects since they were rejected (R) due to low mercury matrix spike recovery (see Matrix Spike Results section for details).

PE Samples/Accuracy Check

The use of PE samples was not discussed in the Quality Assurance Project Plan. No PE samples were available for evaluation. The laboratory did analyze some standard reference materials with this project, however, there are no established PE acceptance limits. Therefore, no qualifications to the data were made based on the results.

Calibration Verification

- Initial/Continuing Calibration - Aqueous Samples

The ICV/CCV results for zinc were outside of the 90-110% recovery criterion as specified in the Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, February 1989. The results, actions, and affected samples were as follows:

Analyte	ICV/ CCV #	Recovery %	Actions		Affected Samples
			Positive Detects	NDs	
Zinc	ICV (10/13/99)	114	J	A	All Aqueous Samples
Zinc	CCV-1 (10/13/99)	118	J	A	
Zinc	CCV-2 (10/13/99)	114	J	A	

The positive zinc results were estimated (J) and the non-detects were accepted (A) for all aqueous samples.

- Reporting Limit Standard - Aqueous Samples

An ICP Reporting Limit (RL) standard was included in the analytical sequence for the aqueous samples. The results for copper, lead, and zinc were outside of the 80-120% recovery criterion as specified in the Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, February 1989. The results, actions, and affected samples were as follows:

Analyte	Recovery %	Actions		Affected Samples (99E-DIN-)
		Positive Detects <3x RL	NDs	
Copper	70	J	UJ	10906, 10907, 10914, 10916, 10918
Lead	125	J	UJ	10900, 10901, 10902, 10906, 10907, 10908, 10909, 10914, 10916, 10918, 10919
Zinc	46	J	UJ	10906, 10907, 10914

The positive results <3x RL and the non-detects were estimated (J,UJ) for copper, lead, and zinc for the samples listed above.

- Reporting Limit Standard - Soil/Sediment Samples

The standards identified as ERA2 and ERA3 were evaluated as ICP reporting limit standards for the soil/sediment samples. The concentrations of these standards were nearest to the equivalent aqueous concentrations of the soil/sediment reporting limits used by the laboratory. All of the

results were within the 80-120% recovery criterion as specified in the Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, February 1989 and no qualifications were needed.

ICP Interference Check Sample

No ICP interference check samples were analyzed for this project, therefore, this parameter could not be evaluated. The common interfering elements (aluminum, iron, calcium, and magnesium) were not reported analytes and were not part of the raw data. Therefore, there is no information on which to evaluate the possibility or degree of interference from these elements in either the soil/sediment samples or the aqueous samples. However, the laboratory discusses their procedures that account for spectral interferences in section 4.1 of their SOP: EVMETALS (11/20/96).

Matrix Spike Results

MS recovery conditions and actions are as follows:

Criteria %R:	<30%	30% - 70%	>130%
Positive Sample Results	J	J	J
Non-detected Results	R	UJ	A

Actions apply to all samples of the same matrix.

- Soil/Sediment Samples

For sample 99E-DIN-11375, mercury did not meet the matrix spike recovery (%R) criterion of 70-130% as specified in the Maine Health and Environmental Testing Laboratory SOP: DW245-Analysis of Mercury, July 1997. In addition, mercury did not meet the matrix spike recovery (%R) criterion of 30% as specified in the Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, February 1989. The result, actions, and affected samples were as follows:

99E-DIN-11375						
Analyte	Spike Sample Result mg/Kg	Sample Result mg/Kg	Recovery %	Action		Affected Samples
				Positive Detects	NDs	
Mercury	0.1496	0.0627	29	J	R	All soil/sediment samples

The positive results were estimated (J) and non-detects were rejected (R) for mercury in all soil/sediment samples.

Field Duplicates

- Soil/Sediment Samples

The table below summarizes the soil/sediment field duplicate results that did not meet the Relative Percent Difference duplicate criterion of (RPD) < 50% as specified in the Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, February 1989:

Analyte	99E-DIN-11409	99E-DIN-11412	RPD %	Action		Affected Samples
	Sample Conc. (mg/Kg)	Duplicate Conc. (mg/Kg)		Positive Detects	NDs	
	% Solids = 53.0	% Solids = 47.1				
Copper	350	190	59	J	UJ	All Soil/Sediment Samples

The positive results for copper for all soil/sediment samples were estimated (J).

Sample Quantitation

The standard instrument output from HETL contains only concentration summaries of the results. The instruments do not print out direct intensity measurements. Therefore, the actual calculation of the results could not be checked manually by the validator. The calculations were carried out automatically by the instruments with no output of the raw data used in the calculations. A summary report was printed showing only the final concentrations in the samples. The validator confirmed that the concentrations reported from the instruments were accurately transcribed to the HETL reporting forms.

A few samples had reporting limit results which were flagged "K" on the Form Is by the laboratory. The "K" flag was defined as "LESS THAN." When used with the reporting limit values, the "K" flag has the same meaning as the qualifier "U." Therefore, all "K" flags were replaced by "U" on the Data Summary Table.

System Performance

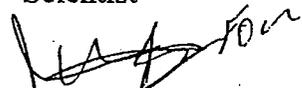
The aqueous reporting limit standard for the ICP analysis showed recoveries outside the acceptance criteria for copper, lead, and zinc. This demonstrated an inability to accurately quantify those elements near the reporting limit for the aqueous samples.

The results did not indicate any other data quality trends or problems.

Very truly yours,

LOCKHEED
ENVIRONMENTAL


Robert Peary
Scientist


Louis Macri
Team Manager

Attachments: Table I: Recommendation Summary Table
Table II: Overall Evaluation of Data
Data Summary Tables - Inorganic Analysis
Data Summary Tables - Sieve Analysis
Data Validation Worksheets
Supporting Documentation

CALLAHAN MINE

Case No. 7743

TABLE I - RECOMMENDATION SUMMARY TABLE
Aqueous Samples

Cadmium	A	Selenium	A.
Copper	J ¹	Silver	A
Lead	J ¹	Zinc	J ^{1,2}
Mercury	A		

A - Accept results.

J¹ - The positive results were estimated (J) for Cu in samples 99E-DIN-10916 and -10918, and for Pb in samples 99E-DIN-10900, -10901, -10902, -10908 and -10919; the non-detects were estimated (UJ) for Cu in samples 99E-DIN-10906, -10907, and -10914, for Pb in samples 99E-DIN-10906, -10907, -10909, -10914, -10916 and -10918, and for Zn in samples 99E-DIN-10906, -10907, and -10914 due to reporting limit standard recovery outside acceptance criteria.

J² - The positive results were estimated (J) for Zn in samples 99E-DIN-10900, -10901, -10902, -10908, -10909, -10910, -10916, -10918, and -10919 due to ICV/CCV recoveries outside acceptance criteria.

CALLAHAN MINE

Case No. 7743

TABLE I - RECOMMENDATION SUMMARY TABLE
Soil/Sediment Samples

Cadmium	A	Selenium	A
Copper	J ³	Silver	A
Lead	A	Zinc	A
Mercury	J ^{1,2} , R		

A - Accept results.

J¹ - The positive results for Hg were estimated (J) for samples 99E-DIN-10866, -10868, -10869, -10871, -10875, -10878, -10880, -10881, -10889, -10890, -10897, -11360, -11361, -11364, -11367, -11372, -11378, -11379, -11382, -11383, -11384, -11390, -11393, -11398, -11400, -11403, -11406, -11409, and -11416 due to low matrix spike recovery.

J² - Hg analysis technical holding time exceeded; estimate positive results (J) for samples 99E-DIN-10866, -10868, -10869, -10871, -10875, -10878, -10880, -10890, -10897, -11360, -11361, -11364, -11367, and -11372.

J³ - The positive results for copper were estimated (J) for all soil/sediment samples due to field duplicate precision outside acceptance criteria.

R - The non-detects for Hg were rejected (R) for samples 99E-DIN-10884, -11351, -11354, -11357, -11375, -11395, -11412, -11419, and -11425 due to low matrix spike recovery.

EPA-NE - Data Validation Worksheet
 Overall Evaluation of Data - Data Validation Memorandum - Table II

INORGANIC AQUEOUS ANALYSIS					
DQO (list all DQOs)	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability	Potential Usability Issues
		Analytical Error	Sampling Error		
To collect sufficient data of acceptable quality to use in developing a Hazard Ranking System (HRS) score for the site.	Yes, Sampling Method appropriate for all samples. Yes, Analytical Method appropriate for all samples.	Refer to qualification in R/S Key on Table I. J ^{1,2}	Refer to qualification in R/S Key on Table I. None	**	No ICP interference check samples were analyzed for this project, therefore, this parameter could not be evaluated. The common interfering elements (aluminum, iron, calcium, and magnesium) were not reported analytes and were not part of the raw data. Therefore, there is no information on which to evaluate the possibility or degree of interference from these elements in either the soil/sediment samples or the aqueous samples. The aqueous reporting limit standard for the ICP analysis showed poor recovery for copper, lead, and zinc. This demonstrated an inability to accurately quantify those elements near the reporting limit for the aqueous samples. Qualifiers have been applied to the data where needed. With the exception of the items mentioned above, the data are usable for the site objectives.

* The evaluation of "sampling error" cannot be completely assessed in the data validation.
 ** Sampling variability is not assessed in data validation.

Validator: *R. P. [Signature]*

Date: 6/15/00

EPA-NE - Data Validation Worksheet
Overall Evaluation of Data - Data Validation Memorandum - Table II

INORGANIC SOIL/SEDIMENT ANALYSIS					
DQO (list all DQOs)	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability	Potential Usability Issues
		Analytical Error	Sampling Error		
<p>To collect sufficient data of acceptable quality to use in developing a Hazard Ranking System (HRS) score for the site.</p>	<p>Yes, Sampling Method appropriate for all samples.</p> <p>Yes, Analytical Method appropriate for all samples.</p>	<p>Refer to qualification in R/S Key on Table I.</p> <p>J^{1,2}, R</p>	<p>Refer to qualification in R/S Key on Table I.</p> <p>J¹</p>	<p style="text-align: center;">**</p>	<p>No ICP interference check samples were analyzed for this project, therefore, this parameter could not be evaluated. The common interfering elements (aluminum, iron, calcium, and magnesium) were not reported analytes and were not part of the raw data. Therefore, there is no information on which to evaluate the possibility or degree of interference from these elements in either the soil/sediment samples or the aqueous samples.</p> <p>The matrix spike sample 99E-DIN-11375 (99-BKSS-03) exhibited a recovery of 29% for mercury. This demonstrated a problem with the quantitative recovery of mercury in the soil/sediment samples. The positive results were estimated (J). The non-detects were rejected (R) due to the possibility of false negatives. See Table I for details of the matrix spike recovery qualifications.</p> <p>The mercury analysis holding time was exceeded for 19 of the soil/sediment samples. The holding times for these 19 samples ranged from 37 to 39 days. The positive mercury results for the affected samples were estimated (J). No actions were required for the non-detects in the affected samples since they were rejected (R) due to the low mercury matrix spike recovery noted above. See Table I for details of the holding time qualifications.</p> <p>With the exception of the rejected mercury results noted above, the data are usable for the site objectives.</p>

* The evaluation of "sampling" error cannot be completely assessed in the data validation.
 ** Sampling variability is not assessed in data validation.

Validator: R. Peary

Date: 6/15/00

Inorganic Aqueous Analysis
ug/L

SITE NAME: CALLAHAN MINE - BROOKSVILLE, ME
CASE NO.: 7743
LABORATORY: MAINE HETL

		SAMPLE LOCATION:		99-SW-34	99-SW-36	99-SW-30	99-RBB-44A	99-RBK-43A	99-SW-40
		LABORATORY NUMBER:		99E-DIN-10900	99E-DIN-10901	99E-DIN-10902	99E-DIN-10906	99E-DIN-10907	99E-DIN-10908
		METHOD							
NORGANIC ELEMENTS	REPORTING LIMITS	DETECTION LIMITS							
	ug/L, ppb	ug/L, ppb							
Cadmium	0.5	0.3	P	2.7	1.0	1.2	0.5 U	0.5 U	1.0
Copper	2	0.45	P	50	14	26	2 UJ	2 UJ	7
Lead	3	1.6	P	4 J	3 J	8 J	3 UJ	3 UJ	3 J
Mercury	0.2	0.048	CV	0.2 U					
Selenium	6	2	P	6 U	6 U	6 U	6 U	6 U	6 U
Silver	0.5	0.3	P	0.5 U					
Zinc	5	0.9	P	790 J	270 J	420 J	5 UJ	5 UJ	260 J
		DATE SAMPLED:		10/05/99	10/05/99	10/05/99	10/05/99	10/05/99	10/05/99

		SAMPLE LOCATION:		99-SW-38	99-TPR-50	99-BKSW-26	99-SW-42	99-SW-49	99-SW-32
		LABORATORY NUMBER:		99E-DIN-10909	99E-DIN-10910	99E-DIN-10914	99E-DIN-10916	99E-DIN-10918	99E-DIN-10919
		METHOD							
NORGANIC ELEMENTS	REPORTING LIMITS	DETECTION LIMITS							
	ug/L, ppb	ug/L, ppb							
Cadmium	0.5	0.3	P	1.1	23	0.5 U	0.5 U	1.2	2.9
Copper	2	0.45	P	7	84	2 UJ	2 J	3 J	46
Lead	3	1.6	P	3 UJ	31	3 UJ	3 UJ	3 UJ	4 J
Mercury	0.2	0.048	CV	0.2 U					
Selenium	6	2	P	6 U	6 U	6 U	6 U	6 U	6 U
Silver	0.5	0.3	P	0.5 U	0.5 U	0.5 U	0.5 U	2.3	0.5 U
Zinc	5	0.9	P	260 J	5860 J	5 UJ	87 J	110 J	850 J
		DATE SAMPLED:		10/05/99	10/05/99	10/05/99	10/05/99	10/05/99	10/05/99

ANALYTICAL METHOD:

- Furnace
- ICP/Flame AA
- V - Cold Vapor
- Colorimetric

QUALIFIERS:

- J - Quantitation is approximate due to limitations identified in the quality control review (Data Review).
- R - Value is rejected.
- U - Value is non-detected and sample detection limit is reported.
- UJ - Value is non-detected and sample detection limit is estimated.

Inorganic Soil/Element Analysis
mg/Kg dry weight.

SITE NAME: CALLAHAN MINE - BROOKSVILLE, ME

Page 1 of 3

CASE NO.: 7743

LABORATORY: MAINE HETL

SAMPLE LOCATION:		99-SD-29	99-TPD-14	99-TPD-15	99-SS-08	99-WRP-21	99-WRP2-47	99-WRP2-06		
METALS - LABORATORY NUMBER:		99E-DIN-10866	99E-DIN-10868	99E-DIN-10869	99E-DIN-10871	99E-DIN-10875	99E-DIN-10878	99E-DIN-10880		
% SOLIDS - LABORATORY NUMBER:		99E-DIN-11429	99E-DIN-10895	99E-DIN-10887	99E-DIN-11415	99E-DIN-10873	99E-DIN-10877	99E-DIN-11388		
METHOD										
REPORTING	DETECTION									
INORGANIC	LIMITS	LIMITS								
ELEMENTS	mg/Kg, ppm	mg/Kg, ppm								
Cadmium	0.8	0.27	P	33	16	0.8 U	38	8.7	12	0.8 U
Copper	1	0.39	P	1800 J	1400 J	180 J	2300 J	1600 J	4000 J	4000 J
Lead	2	0.60	P	770	700	290	840	780	2100	1600
Mercury	0.1	0.10	CV	0.7 J	0.5 J	0.4 J	0.7 J	1.0 J	1.3 J	4.4 J
Selenium	4	1.1	P	6.9	4.9	9.8	4 U	7.0	11	46
Silver	0.8	0.27	P	4.6	3.7	2.0	3.9	4.1	8.3	19.0
Zinc	8	2.7	P	6900	3800	50	9100	2400	5800	510
% SOLIDS:		54.3	84.7	85.1	83.3	89.5	80.7	83.2		
DATE SAMPLED:		10/05/99	10/06/99	10/06/99	10/05/99	10/04/99	10/04/99	10/04/99		

SAMPLE LOCATION:		99-WRP2-10	99-WRP2-48	99-TPD-12	99-TPD-11	99-TPD-13	99-BKSD-23	99-BKSD-24		
METALS - LABORATORY NUMBER:		99E-DIN-10881	99E-DIN-10884	99E-DIN-10889	99E-DIN-10890	99E-DIN-10897	99E-DIN-11351	99E-DIN-11354		
% SOLIDS - LABORATORY NUMBER:		99E-DIN-10882	99E-DIN-10885	99E-DIN-10892	99E-DIN-10891	99E-DIN-10898	99E-DIN-11352	99E-DIN-11355		
METHOD										
REPORTING	DETECTION									
INORGANIC	LIMITS	LIMITS								
ELEMENTS	mg/Kg, ppm	mg/Kg, ppm								
Cadmium	0.8	0.27	P	32.0	0.8 U	25	15	19	0.8 U	0.8 U
Copper	1	0.39	P	1100 J	540 J	1400 J	470 J	1800 J	14 J	18 J
Lead	2	0.60	P	790	220	990	780	840	10	11
Mercury	0.1	0.10	CV	0.9 J	R	0.5 J	0.5 J	0.5 J	R	R
Selenium	4	1.1	P	4 U	9.5	9.9	4.9	5.2	4 U	4 U
Silver	0.8	0.27	P	2.7	1.9	4.4	4.0	4.3	0.8 U	0.8 U
Zinc	8	2.7	P	7700	150	5800	4200	4400	49	64
% SOLIDS:		91.0	87.4	86.9	79.2	85.6	52.8	60.3		
DATE SAMPLED:		10/04/99	10/04/99	10/06/99	10/05/99	10/06/99	10/06/99	10/06/99		

ANALYTICAL METHOD:

- F - Furnace
- P - ICP/Flame AA
- CV - Cold Vapor
- C - Colorimetric

QUALIFIERS:

- J - Quantitation is approximate due to limitations identified in the quality control review (Data Review).
- R - Value is rejected.
- U - Value is non-detected and sample detection limit is reported.
- UJ - Value is non-detected and sample detection limit is estimated.

02

Data Summary Table
Inorganic Soil/Sediment Analysis
mg/Kg dry weight

SITE NAME: CALLAHAN MINE - BROOKSVILLE, ME
CASE NO.: 7743
LABORATORY: MAINE HETL

		SAMPLE LOCATION:		99-BKSD-25	99-SS-04	99-SS-05	99-TPL-18	99-TPL-17	99-SS-09	99-BKSS-03
METALS - LABORATORY NUMBER:		99E-DIN-11357	99E-DIN-11360	99E-DIN-11361	99E-DIN-11364	99E-DIN-11367	99E-DIN-11372	99E-DIN-11375	99E-DIN-11378	99E-DIN-11375
% SOLIDS - LABORATORY NUMBER:		99E-DIN-11358	99E-DIN-11370	99E-DIN-11362	99E-DIN-11363	99E-DIN-11366	99E-DIN-11373	99E-DIN-11376	99E-DIN-11379	99E-DIN-11376
METHOD		REPORTING LIMITS	DETECTION LIMITS							
INORGANIC ELEMENTS	mg/Kg, ppm	mg/Kg, ppm								
Cadmium	0.8	0.27	P	0.8 U	0.8 U	27	0.8 U	0.8 U	44	0.8 U
Copper	1	0.39	P	14 J	1400 J	1800 J	630 J	520 J	2400 J	49 J
Lead	2	0.60	P	10	210	640	150	410	880	110
Mercury	0.1	0.10	CV	R	0.5 J	0.7 J	0.3 J	1.0 J	0.7 J	R
Selenium	4	1.1	P	4 U	11	4 U	6.6	4.9	4.2	4.0
Silver	0.8	0.27	P	0.8 U	2.9	3.1	1.5	4.0	4.2	0.8
Zinc	8	2.7	P	52	310	8400	220	390	9700	260
% SOLIDS:				55.5	79.3	82.6	87.9	90.0	81.9	70.7
DATE SAMPLED:				10/06/99	10/06/99	10/06/99	10/04/99	10/04/99	10/05/99	10/06/99

		SAMPLE LOCATION:		99-SS-44	99-WRP-19	99-WRP-22	99-WRP-20	99-TPL-16	99-SS-45	99-BKSS-01
METALS - LABORATORY NUMBER:		99E-DIN-11378	99E-DIN-11379	99E-DIN-11382	99E-DIN-11383	99E-DIN-11384	99E-DIN-11387	99E-DIN-11390	99E-DIN-11393	99E-DIN-11393
% SOLIDS - LABORATORY NUMBER:		99E-DIN-11396	99E-DIN-11386	99E-DIN-11381	99E-DIN-10894	99E-DIN-11369	99E-DIN-11389	99E-DIN-11377	99E-DIN-11377	99E-DIN-11377
METHOD		REPORTING LIMITS	DETECTION LIMITS							
INORGANIC ELEMENTS	mg/Kg, ppm	mg/Kg, ppm								
Cadmium	0.8	0.27	P	17	22	13	4.5	0.8 U	0.8 U	0.8 U
Copper	1	0.39	P	480 J	1600 J	2100 J	240 J	670 J	80 J	56 J
Lead	2	0.60	P	210	430	3000	99	230	120	110
Mercury	0.1	0.10	CV	0.2 J	0.3 J	0.5 J	0.1 J	0.7 J	0.1 J	0.1 J
Selenium	4	1.1	P	4 U	5.9	4 U	4 U	20	4 U	4 U
Silver	0.8	0.27	P	0.9	2.7	2.3	0.8 U	3.0	0.8 U	1.1
Zinc	8	2.7	P	4200	6500	7200	3100	90	130	290
% SOLIDS:				89.2	88.5	90.7	93.0	88.1	83.7	69.1
DATE SAMPLED:				10/06/99	10/04/99	10/04/99	10/04/99	10/04/99	10/06/99	10/06/99

ANALYTICAL METHOD:

- Furnace
- ICP/Flame AA
- V - Cold Vapor
- Colorimetric

QUALIFIERS:

- J - Quantitation is approximate due to limitations identified in the quality control review (Data Review).
- R - Value is rejected.
- U - Value is non-detected and sample detection limit is reported.
- UJ - Value is non-detected and sample detection limit is estimated.

Inorganic Soil/Slurry Analysis
mg/Kg dry weight

SITE NAME: CALLAHAN MINE - BROOKSVILLE, ME

CASE NO.: 7743

LABORATORY: MAINE HETL

		METHOD									
INORGANIC ELEMENTS	REPORTING LIMITS mg/Kg, ppm	DETECTION LIMITS mg/Kg, ppm		99-BKSS-02	99-SS-46	99-SD-31	99-SS-07	99-SS-43	99-SD-39	99-SD-37	
SAMPLE LOCATION:				99-BKSS-02	99-SS-46	99-SD-31	99-SS-07	99-SS-43	99-SD-39	99-SD-37	
METALS - LABORATORY NUMBER:				99E-DIN-11395	99E-DIN-11398	99E-DIN-11400	99E-DIN-11403	99E-DIN-11406	99E-DIN-11409	99E-DIN-11412	
% SOLIDS - LABORATORY NUMBER:				99E-DIN-11394	99E-DIN-11401	99E-DIN-11427	99E-DIN-10867	99E-DIN-11405	99E-DIN-11408	99E-DIN-11411	
Cadmium	0.8	0.27	P	0.8 U	17	27	51	25	7.3	5.5	
Copper	1	0.39	P	51 J	24000 J	1200 J	2600 J	1300 J	350 J	190 J	
Lead	2	0.60	P	110	8500	590	1100	440	150	120	
Mercury	0.1	0.10	CV	R	7.2 J	0.3 J	0.4 J	0.4 J	0.1 J	R	
Selenium	4	1.1	P	4.0	39	5.7	4.8	4 U	4 U	4 U	
Silver	0.8	0.27	P	1.1	45.0	3.2	5.3	2.3	0.8 U	0.8 U	
Zinc	8	2.7	P	270	4700	5400	9600	6300	1700	1400	
% SOLIDS:				69.1	84.4	33.0	89.5	91.8	53.0	47.1	
DATE SAMPLED:				10/06/99	10/05/99	10/05/99	10/05/99	10/05/99	10/05/99	10/05/99	

		METHOD				
INORGANIC ELEMENTS	REPORTING LIMITS mg/Kg, ppm	DETECTION LIMITS mg/Kg, ppm		99-SD-33	99-SD-35	99-SD-27
SAMPLE LOCATION:				99-SD-33	99-SD-35	99-SD-27
METALS - LABORATORY NUMBER:				99E-DIN-11416	99E-DIN-11419	99E-DIN-11425
% SOLIDS - LABORATORY NUMBER:				99E-DIN-11417	99E-DIN-11420	99E-DIN-11414
Cadmium	0.8	0.27	P	5.2	3.9	0.8 U
Copper	1	0.39	P	1900 J	170 J	18 J
Lead	2	0.60	P	210	52	16
Mercury	0.1	0.10	CV	0.2 J	R	R
Selenium	4	1.1	P	4 U	4 U	4 U
Silver	0.8	0.27	P	0.8 U	0.8 U	0.8 U
Zinc	8	2.7	P	3100	840	84
% SOLIDS:				54.3	30.7	68.6
DATE SAMPLED:				10/05/99	10/05/99	10/05/99

ANALYTICAL METHOD:

- F - Furnace
- P - ICP/Flame AA
- CV - Cold Vapor
- C - Colorimetric

QUALIFIERS:

- J - Quantitation is approximate due to limitations identified in the quality control review (Data Review).
- R - Value is rejected.
- U - Value is non-detected and sample detection limit is reported.
- UJ - Value is non-detected and sample detection limit is estimated.

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68

Data Summary Table - Not Validated

Sieve Analysis

%

SITE NAME: CALLAHAN MINE - BROOKSVILLE, ME

CASE NO.: 7743

LABORATORY: MAINE HETL

SAMPLE LOCATION: 99-TPD-11 99-WRP-20 99-WRP-21 99-WRP2-47 99-TPL-18 99-WRP2-10 99-WRP2-48 99-TPD-15 99-TPD-12 99-TPD-14
 SIEVE - LABORATORY NUMBER: 99E-DIN-10870 99E-DIN-10872 99E-DIN-10874 99E-DIN-10876 99E-DIN-10879 99E-DIN-10883 99E-DIN-10886 99E-DIN-10888 99E-DIN-10893 99E-DIN-10896

SIEVE SIZE	%	%	%	%	%	%	%	%	%	%	%
3/4" Amount Passing	100	100	100	100	100	100	100	100	100	100	100
1/2" Amount Passing	100	93.3	95.1	100	96.6	96.3	98.0	100	100	100	100
3/8" Amount Passing	100	82.0	92.5	100	88.4	90.2	93.4	100	100	100	100
#4 Amount Passing	100	54.5	82.7	98.2	75.8	79.4	76.2	100	100	100	100
#8 Amount Passing	100	39.1	70.3	91.1	62.5	67.1	60.0	100	100	100	100
#10 Amount Passing	100	34.3	67.9	88.9	58.9	63.9	55.6	100	100	100	100
#16 Amount Passing	100	28.0	59.3	79.6	47.9	52.8	43.3	99.9	100	100	100
#20 Amount Passing	100	25.1	53.6	73.7	41.7	46.1	36.8	99.8	100	100	100
#30 Amount Passing	100	22.6	48.2	67.9	36.0	40.3	31.4	99.4	99.8	100	100
#40 Amount Passing	100	20.1	41.9	61.8	30.0	34.3	26.1	97.5	99.1	99.9	99.9
#50 Amount Passing	99.9	18.0	36.7	56.5	25.1	29.8	22.0	86.4	91.7	98.4	98.4
#60 Amount Passing	99.6	16.9	33.8	53.6	22.7	27.5	20.1	71.8	77.9	93.6	93.6
#100 Amount Passing	90.5	14.4	27.6	46.0	17.5	22.2	16.3	37.4	39.6	64.2	64.2
#140 Amount Passing	80.4	12.9	23.9	40.5	14.7	18.8	14.4	26.0	27.4	48.9	48.9
#200 Amount Passing	72.9	11.6	21.5	36.1	12.9	17.1	12.6	20.0	20.1	39.9	39.9
Lost During Sieve Process	-0.03	0.12	0.12	0.31	0.05	0.26	0.10	0.21	0.00	0.03	0.03
Initial Dry Weight (g)	354.5	404.7	430.8	420.5	440.8	390.0	502.5	380.3	328.9	343.2	343.2
Date Sampled	10/05/99	10/04/99	10/04/99	10/04/99	10/04/99	10/04/99	10/04/99	10/06/99	10/06/99	10/06/99	10/06/99

Sieve Analysis

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SITE NAME: CALLAHAN MINE - BROOKSVILLE, ME

CASE NO.: 7743

LABORATORY: MAINE HETL

SAMPLE LOCATION: 99-TPD-13 99-SS-45 99-BKSS-03 99-BKSD-23 99-BKSD-24 99-BKSD-25 99-TPL-17 99-TPL-16 99-SS-44 99-SS-09
 SIEVE - LABORATORY NUMBER: 99E-DIN-10899 99E-DIN-11349 99E-DIN-11350 99E-DIN-11353 99E-DIN-11356 99E-DIN-11359 99E-DIN-11365 99E-DIN-11368 99E-DIN-11371 99E-DIN-11374

SIEVE		%	%	%	%	%	%	%	%	%	%
3/4"	Amount Passing	100	100	100	100	100	100	97.1	100	100	100
1/2"	Amount Passing	100	100	100	100	100	100	94.2	95.2	97.3	98.8
3/8"	Amount Passing	100	99.6	96.5	100	100	100	88.7	90.8	95.7	95.0
#4	Amount Passing	100	96.8	92.5	100	100	100	76.3	80.1	85.4	90.7
#8	Amount Passing	100	87.9	87.0	99.8	100	100	53.5	64.1	74.2	83.5
#10	Amount Passing	100	85.2	84.8	98.4	99.3	99.4	48.9	59.9	71.6	81.3
#16	Amount Passing	99.9	72.6	77.3	96.1	98.2	97.6	28.2	46.9	62.8	74.8
#20	Amount Passing	99.9	63.7	72.0	94.5	97.1	96.2	21.5	40.4	57.4	70.9
#30	Amount Passing	99.8	54.3	66.8	92.6	96.1	94.5	16.3	34.8	52.0	67.1
#40	Amount Passing	99.8	44.3	61.2	90.2	94.7	92.4	11.8	29.2	46.0	62.8
#50	Amount Passing	99.0	36.6	56.5	87.6	93.2	90.2	8.7	24.7	40.6	58.8
#60	Amount Passing	95.9	33.1	53.7	85.9	92.3	88.7	7.2	22.4	37.8	56.6
#100	Amount Passing	72.7	26.7	46.7	80.9	88.5	83.5	4.5	18.1	31.0	50.5
#140	Amount Passing	58.6	23.8	43.4	77.2	85.9	80.2	3.2	15.8	27.2	45.9
#200	Amount Passing	49.1	20.2	40.2	74.2	83.7	78.1	2.4	14.3	24.9	40.5
	Lost During Sieve Process	0.10	0.20	0.31	0.08	0.17	0.00	0.21	-0.11	0.22	0.18
	Initial Dry Weight (g)	304.4	380.7	227.6	256.8	173.3	164.1	481.9	524.1	452.8	381.0
	Date Sampled	10/06/99	10/06/99	10/06/99	10/06/99	10/06/99	10/06/99	10/04/99	10/04/99	10/06/99	10/05/99

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Data Summary Table - Not Validated

Sieve Analysis

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ITE NAME: CALLAHAN MINE - BROOKSVILLE, ME

ASE NO.: 7743

LABORATORY: MAINE HETL

SAMPLE LOCATION:	99-WRP-22	99-WRP-19	99-WRP2-06	99-SS-04	99-SS-05	99-SS-08	99-SS-46	99-SS-07	99-SS-43	99-SD-39
EVE - LABORATORY NUMBER:	99E-DIN-11380	99E-DIN-11385	99E-DIN-11387	99E-DIN-11391	99E-DIN-11392	99E-DIN-11397	99E-DIN-11399	99E-DIN-11402	99E-DIN-11404	99E-DIN-11407

SIEVE SIZE	%	%	%	%	%	%	%	%	%	%
3/4" Amount Passing	100	100	100	100	100	100	100	100	100	100
1/2" Amount Passing	92.6	95.2	98.8	97.2	100	100	100	94.9	98.6	90.0
3/8" Amount Passing	89.1	92.5	97.2	92.8	100	100	98.4	89.7	93.5	85.1
#4 Amount Passing	69.3	79.2	85.6	84.1	99.6	94.5	87.5	77.8	78.6	74.9
#8 Amount Passing	50.8	61.8	74.1	77.0	96.9	86.6	77.0	66.7	62.8	67.9
#10 Amount Passing	47.4	57.6	71.6	71.2	95.6	84.3	75.1	64.2	59.1	66.5
#16 Amount Passing	39.9	51.0	64.7	66.7	90.2	77.1	69.3	56.3	49.0	62.3
#20 Amount Passing	36.7	47.7	61.1	63.6	86.4	73.1	66.0	51.6	43.7	59.6
#30 Amount Passing	33.9	44.4	57.6	60.6	82.4	69.1	62.6	46.8	38.9	56.7
#40 Amount Passing	31.0	40.6	53.6	57.4	77.8	64.6	58.7	41.1	33.9	52.9
#50 Amount Passing	28.4	36.9	49.8	54.8	73.2	60.4	54.7	36.1	29.2	48.5
#60 Amount Passing	27.1	35.1	47.6	53.2	70.8	58.1	52.6	33.3	27.3	45.8
#100 Amount Passing	23.9	30.2	42.0	48.4	58.6	51.9	46.7	26.3	22.2	39.0
#140 Amount Passing	22.1	27.7	38.4	44.6	48.8	46.9	42.7	20.4	19.6	34.1
#200 Amount Passing	20.7	25.5	35.4	41.3	42.2	42.2	39.2	18.9	17.9	29.4
Lost During Sieve Process	0.16	0.08	0.06	0.16	0.06	0.00	0.22	0.36	0.05	0.23
Initial Dry Weight (g)	445.9	365.4	361.7	315.8	323.9	321.6	371.4	421.6	364.6	262.3
Date Sampled	10/04/99	10/04/99	10/04/99	10/06/99	10/06/99	10/05/99	10/05/99	10/05/99	10/05/99	10/05/99

Data Summary Table - Not Validated

Sieve Analysis

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SITE NAME: CALLAHAN MINE - BROOKSVILLE, ME

CASE NO.: 7743

LABORATORY: MAINE HETL

SAMPLE LOCATION: 99-SD-37 99-SD-27 99-SD-33 99-SD-35 99-SD-31 99-SD-29 99-BKSS-02 99-BKSS-01

SIEVE - LABORATORY NUMBER: 99E-DIN-11410 99E-DIN-11413 99E-DIN-11418 99E-DIN-11421 99E-DIN-11426 99E-DIN-11428 99E-DIN-11949 99E-DIN-11950

SIEVE

SIZE		%	%	%	%	%	%	%	%
3/4"	Amount Passing	100	96.5	100	100	100	100	100	100
1/2"	Amount Passing	92.3	94.7	100	100	100	100	98.2	98.5
3/8"	Amount Passing	86.9	92.7	100	100	100	100	95.1	95.7
#4	Amount Passing	74.9	87.8	100	100	100	100	90.4	89.8
#8	Amount Passing	67.5	81.4	100	98.2	100	100	84.6	84.0
#10	Amount Passing	66.0	80.2	100	93.1	100	100	82.9	82.2
#16	Amount Passing	62.1	75.6	99.6	88.8	100	100	76.0	75.6
#20	Amount Passing	59.7	72.7	99.4	86.0	100	99.9	71.2	71.0
#30	Amount Passing	56.9	69.6	99.2	83.6	100	99.7	66.4	66.2
#40	Amount Passing	53.0	65.9	98.8	80.7	99.6	99.5	61.2	61.1
#50	Amount Passing	48.8	62.2	98.1	77.5	99.4	99.3	56.7	56.5
#60	Amount Passing	45.7	60.0	97.7	74.9	99.2	99.1	54.1	54.0
#100	Amount Passing	38.4	53.5	96.2	69.4	98.8	98.5	47.0	46.6
#140	Amount Passing	33.1	47.3	94.1	67.2	98.5	98.0	43.4	43.6
#200	Amount Passing	27.1	39.4	91.2	65.2	98.0	97.3	40.8	41.4
	Lost During Sieve Process	0.12	0.34	0.00	0.34	0.39	0.20	0.19	0.09
	Initial Dry Weight (g)	249.0	264.8	178.0	118.9	103.4	153.1	412.9	427.3
	Date Sampled	10/05/99	10/05/99	10/05/99	10/05/99	10/05/99	10/05/99	10/06/99	10/06/99

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