0047977 S0003-222S

Sample Disposition Record

Control #: B97-042
Revision#: 0
Date Initiated: 5/27/97

Section 1 - BACKGROUND

SAF#: B97-076
OU: N/A
Project ID: 105-N BASIN
Task ID: 1
Sampling Event: 105-N ~~Basin~~ Sediment Samples
Laboratory: 222-S Laboratory
Project Coordinator: Weiss, RL
Task Manager: Duncan, Garth

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Section 2 - SAMPLE INFORMATION

Number of Samples: 1
ID Numbers: B0KBH6
MATRIX: Other Solid
Collection Date: 04/21/97

Section 3 - ISSUE

Class: Lab Direction
NCR Number: N/A
Type: Revision of Direction - Addition of Analyses
Description: Client requested additional analyses.

N/A
NCR Validation (Print/Sign) Date

Section 4 - DISPOSITION

Type: Use As Is
Description: Add the following analyses: Cyanide
Hydroxide Demand
Percent Solids/Percent Moisture
Endo/Exotherm assessment via DSC

Weiss, RL
Project Coordinator (Print/Sign) Date

Duncan, Garth
Task Manager (Print/Sign) Date 6/5/97

N/A
QA (Print/Sign) Date

Section 5 - INSPECTION (Issue Class: Nonconformance Only)

Inspection Number: N/A
Inspection Results: N/A

N/A
Inspector (Print/Sign) Date

Sample Disposition Record

Control #: B97-043
Revision#: 0
Date Initiated: 5/27/97

Section 1 - BACKGROUND

SAF#: B97-076
OU: N/A
Project ID: 105-N BASIN
Task ID: 1
Sampling Event: 105-N ~~Basin~~ Lift station Sediment Samples
Laboratory: 222-S Laboratory
Project Coordinator: Weiss, RL
Task Manager: Duncan, Garth

Section 2 - SAMPLE INFORMATION

Number of Samples: 1
ID Numbers: B0KBH6
MATRIX: Other Solid
Collection Date: 04/21/97

Section 3 - ISSUE

Class: Lab Direction
NCR Number: N/A
Type: Revision of Direction - Cancellation of Analyses
Description: Insufficient material received to allow performance of all Physical Property Analyses requiring large sample volumes
Client requested deletion of Laser Ablation Mass Spectroscopy

N/A
NCR Validation (Print/Sign) Date

Section 4 - DISPOSITION

Type: Use As Is
Description: Delete the following analyses:
Particle Size
Viscosity
Laser Ablation Mass Spectroscopy

Weiss, RL
Project Coordinator (Print/Sign) Date

Duncan, Garth
Task Manager (Print/Sign) Date 6/5/97

N/A
QA (Print/Sign) Date

Section 5 - INSPECTION (Issue Class: Nonconformance Only)

Inspection Number: N/A
Inspection Results: N/A

N/A
Inspector (Print/Sign) Date

Sample Disposition Record

Control #: B97-044
Revision#: 0
Date Initiated: 5/28/97

Section 1 - BACKGROUND

SAF#: B97-076
OU: N/A
Project ID: 105-N BASIN
Task ID: 1
Sampling Event: 105-N ~~Basin~~ Sediment Samples
Laboratory: 222-S Laboratory
Project Coordinator: Weiss, RL
Task Manager: Duncan, Garth

Section 2 - SAMPLE INFORMATION

Number of Samples: 1
ID Numbers: B0KBH6
MATRIX: Other Solid
Collection Date: 04/21/97

Section 3 - ISSUE

Class: Lab Direction
NCR Number: N/A
Type: Clarification of Direction
Description: Analyses added by SDR B97-042 are not fully identified in the associated project SAP regarding detection limits and QC requirements.

N/A
NCR Validation (Print/Sign) Date

Section 4 - DISPOSITION

Type: Use As Is
Description: Use the following Target PQLs: Cyanide - 5ppm, Hydroxide Demand - NA, % Solids/% Moisutre - NA, Endo/Exotherms via DSC -NA
Use Precison and Accuracy requrtements from SAP (BHI-00973). No matrix spikes required for Hydroxide Demand, % Solid/% Moisture, and Edo/Exotherm determinations

Weiss, RL
Project Coordinator (Print/Sign) Date

Duncan, Garth
Task Manager (Print/Sign) Date 6/5/97

N/A
QA (Print/Sign) Date

Section 5 - INSPECTION (Issue Class: Nonconformance Only)

Inspection Number: N/A
Inspection Results: N/A

N/A
Inspector (Print/Sign) Date

Sample Disposition Record

Control #: B97-045
Revision#: 0
Date Initiated: 6/9/97

Section 1 - BACKGROUND

SAF#: B97-076
OU: N/A
Project ID: 105-N BASIN
Task ID: 1
Sampling Event: 105-N Basin Sediment Samples
Laboratory: 222-S Laboratory
Project Coordinator: Weiss, RL
Task Manager: Duncan, Garth

Section 2 - SAMPLE INFORMATION

Number of Samples: 1
ID Numbers: B0KBH6
MATRIX: Other Solid
Collection Date: 04/21/97

Section 3 - ISSUE

Class: Lab Direction
NCR Number: N/A
Type: Revision of Direction
Description: Current lab capabilities cannot provide analysis for PCBs or Ni-63

N/A

NCR Validation (Print/Sign) Date

Section 4 - DISPOSITION

Type: Repair
Description: Cancel 222-S performance of PCBs & N-63 analysis
Prepare and transfer to Qanterra St. Louis Lab - Solid Aliquots - 3 at 30mg each for PCB analysis
Prepare and transfer to Quanterra Richland Lab - 25ml of Acid Digest solution for Ni-63 analysis

Weiss, RL

Project Coordinator (Print/Sign) Date

Duncan, Garth

Task Manager (Print/Sign) Date

N/A

QA (Print/Sign) Date

Section 5 - INSPECTION (Issue Class: Nonconformance Only)

Inspection Number: N/A
Inspection Results: N/A

N/A

Inspector (Print/Sign) Date

HNF-SD-WM-DP-246, REV. 0

ANALYTICAL SERVICES

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ANALYTICAL RESULTS FOR THE 105-N LIFT STATION SEDIMENT DISPOSITION SAMPLE CHARACTERIZATION PROJECT

Project Coordinator: George L. Miller

Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management

by

222-S Laboratory
Rust Federal Services of Hanford Inc.
P.O. Box 700
Richland, Washington

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This Document consists of pages 1 through 130. Pages ii, 2, 45, 77, 81, 88 and 91 were intentionally left blank.

TRADEMARKS:

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ANALYTICAL RESULTS FOR THE 105-N LIFT STATION SEDIMENT DISPOSITION SAMPLE CHARACTERIZATION PROJECT,

INTRODUCTION

Project Documentation and Direction

Analytical direction for this project was provided in the following References.

1. Thompson, W. S., BHI-00973, Rev. 0, *Sampling and Analysis Plan for the 107-N Basin Recirculation Building Liquid/Sediment*, published on February 6, 1997, Bechtel Hanford, Inc., Richland, Washington 99352.

2. Logan, T. E., *Letter of Instruction for the 105-N Lift Station Sediment Disposition Task*, written to J. L. Jacobsen, Fluor Daniel Hanford, Inc. on April 3, 1997.

3. Meznarich, H. K., WHC-SD-CP-QAPP-016, Rev. 1A, *222-S Laboratory Quality Assurance Plan*, released on August 31, 1995, Westinghouse Hanford Company, Richland, WA 99352.

4. Changes in project requirements as documented by Sample Disposition Records (included as Appendix 1).

Project Description

Turnaround time for this project was 60 days, as required in Reference 2. The analyses were to be performed using SW-846 procedures whenever possible to meet analytical requirements as a Resource Conservation Recovery Act (RCRA) protocol project. Except for the preparation and analyses of particle size distribution, viscosity, laser ablation/mass spectrometry, polychlorinated biphenyl hydrocarbons (PCB) and Nickel-63 (which the program deleted as a required analyte for 222-S Laboratory) and bulk asbestos (which was analyzed by the Waste Sampling and Waste Characterization Laboratory [WSCF]), all preparative and analytical work was performed at the 222-S Laboratory. Quanterra Environmental Services of Earth City, Missouri, performed the PCB analyses, and Quanterra, Inc. of Richland, Washington, performed the Nickel-63 analyses.

Only one sample from this project was submitted for analysis. The sample was submitted in two fractions: 1) the material collected from the bottom of the facility by suction into the sample bottle, and 2) the fine particulate material trapped on a pleated, in-line cartridge filter. As much particulate material on the filter was resuspended as was possible, then these two sample fractions were combined prior to further sample processing.

SAMPLE COLLECTION AND RECEIVING

Table 1 provides dates of sample collection, and the receiving and analyses of this sample at the 222-S Laboratory. Table 1 also indicates RCRA sample holding times.

Reference 2, page 11, requires documentation for 9 items associated with the chain-of-custody. Although all items were observed during sample receipt, they were not documented. These omissions are not quality affecting for this project, but will be addressed in a quality assessment for future improvement.

ANALYTICAL REQUIREMENTS

On May 23, 1997, the Laboratory was informed by the program via electronic mail that the accuracy control limits for this project were changed from ±2 standard deviations (based on LCS data) for the spikes and LCS standards to ±3 standard deviations for LCS standards and to 75 to 125 percent recovery for spikes.

The original quality control (QC) limits for this project for accuracy (specified in Reference 1) were unusually restrictive as well as being incongruous with the use normal quality control evaluation methods. The program specified that spike accuracy would be acceptable when the analytically derived spike values fell within ±2 standard deviations of the mean recovery for Laboratory Control Samples (LCS). The LCS, however, is a sample containing a standard compound of known concentration in an interference-free matrix. The 222-S Laboratory maintains historical data and routinely controls all analyses to within ±3 standard deviations for LCS. Thus, not only was the limit of ±2 standard deviations more restrictive than that of normal 222-S operations, but it was also required on spikes (unrelated in sample matrix to the LCS system), which often have significant matrix interference. The consequence of such restrictive QC limits was that many analytical results which would ordinarily be acceptable would have been flagged as being out of control.

As noted above, the accuracy QC requirements were changed prior to completion of this project. The quality control requirements, which are summarized in Table 2 of this report, are based on the revised requirements. These new quality control requirements will be reflected in revised documents to be produced by the program, and are now synchronous with those in Reference 3.

For settled density, centrifuged density and volume percent solids, the data were generated during the sample breakdown process. Breakdown was required to provide subsamples for subsequent analyses. Because the density and percent solids data cannot be provided after the samples have already been broken down, they are considered to be part of the breakdown process. Controlled procedure, LT-519-103, Revision A-0, was specifically developed for the breakdown of these N-Basin samples to meet the requirements of Reference 3.

Table 1. Sample Collection and Analytical Dates

Sample Collection		Sample Receiving		Sample Identification			Analytical Operations		
Date	Time	Date	Time	Customer Sample Number	Laboratory Sample Number	Sample Description	Analyte or Procedure	Analysis Date	Sample Holding Time, days
4/21/97	1035	4/23/97	1335	BOKBH6	S97N000056	Original Sample	Settled Density	5/27/97	36
							Centrifuged Density	5/27/97	36
					S97N000063	Centrifuged Solid	Shipped to Quanterra for PCB Analysis	6/12/97	n/a
					S97N000062	Centrifuged Liquid	Anions by IC	6/4/97	44
							pH	6/4/97	44
							Ammonia	6/4/97	44
					S97N000059	Centrifuged Solid, Direct	TIC/TOC	6/4/97	44
							Cyanide	6/10/97	50
							DSC	6/6/97	46
							Percent Water (gravimetric)	6/13/97	53
							Hydroxide Demand	6/5/97	45
							Mercury	6/6/97	46
					S97N000060	Centrifuged Solid, Acid Digest	Acid Digestion	6/4/97	44
							Bulk Asbestos (WSCF Lab)	6/5/97	45
							Total Alpha/Beta	6/9/97	49
							Am-241 & Cm-244	6/4/97	44
							Pu-238/239/240	6/4/97	44
							Gamma Energy Analyses	6/5/97	45
							Sr-90	6/9/97	49
							Tc-99	6/5/97	45
							Isotopic Th and U by ICP/MS	6/9/97	49
							Metals by ICP	6/5/97	45
							Shipped to Quanterra for Ni-63 Analysis	6/13/97	n/a
					S97N000058	Centrifuged Solid, TCLP	TCLP Preparation	6/4/97	44
					S97N000064	TCLP Extract	Metals by ICP	6/6/97	46
							Mercury	6/10/97	50
					S97N000066	Acid Digestion of TCLP Extract	Acid Digestion	6/15/97	55
							Metals by ICP	6/16/97	56

Table 2. Project Requirements for 105-N Lift Station

Procedure	Analyte	LABCORE Procedure #	QC Requirements (see note 2)		Target MDA / MDL µCi/g or µg/g
			Duplicate RPD	Spike % Recovery	
Gross Alpha	Alpha	@AB-01	±30	75-125	0.05
Gross Beta	Beta	@AB-01	±30	75-125	0.1
GEA	Am-241	@GEA-04	±30	n/a	0.05
GEA	Sb-125	@GEA-04	±30	n/a	0.05
GEA	Co-60	@GEA-04	±30	n/a	0.05
GEA	Cs-134	@GEA-04	±30	n/a	0.05
GEA	Cs-137	@GEA-04	±30	n/a	0.05
GEA	Eu-152	@GEA-04	±30	n/a	0.05
GEA	Eu-154	@GEA-04	±30	n/a	0.05
GEA	Eu-155	@GEA-04	±30	n/a	0.05
GEA	Ra-226	@GEA-04	±30	n/a	0.05
GEA	Ac-228	@GEA-04	±30	n/a	0.05
Sr-90	Sr-90	@SR90-01	±30	n/a	0.05
Tc-99 (Chemical separation/LCS)	Tc-99	@TC99-01	±30	n/a	0.1
Isotopic Thorium (ICP/MS)	Th-228/230/232	ICPMS-01	±30	n/a	0.1
Isotopic Uranium (ICP/MS)	U-234/235/238	ICPMS-01	±30	n/a	0.1
Am-241, Cm-244 (AEA)	Am-241 and Cm-244	@AM24102	±30	n/a	0.02
Pu-238/239/240 (AEA)	Pu-238/239/240	@PU23902	±30	n/a	0.02
Total Metals (ICP)	Ag	@ICP-A02	±30	75-125	6
Total Metals (ICP)	Al	@ICP-A02	±30	75-125	20
Total Metals (ICP)	As	@ICP-A02	±30	75-125	100
Total Metals (ICP)	Ba	@ICP-A02	±30	75-125	150
Total Metals (ICP)	Be	@ICP-A02	±30	75-125	0.25
Total Metals (ICP)	Cd	@ICP-A02	±30	75-125	3.5
Total Metals (ICP)	Cr	@ICP-A02	±30	75-125	15
Total Metals (ICP)	Fe	@ICP-A02	±30	75-125	10
Total Metals (ICP)	Mn	@ICP-A02	±30	75-125	2
Total Metals (ICP)	Na	@ICP-A02	±30	75-125	60
Total Metals (ICP)	Ni	@ICP-A02	±30	75-125	100
Total Metals (ICP)	Si	@ICP-A02	±30	75-125	3
Total Metals (ICP)	Pb	@ICP-A02	±30	75-125	7
Total Metals (ICP)	Sb	@ICP-A02	±30	75-125	40
Total Metals (ICP)	Se	@ICP-A02	±30	75-125	3
Total Metals (ICP)	Tl	@ICP-A02	±30	75-125	1.5
Total Metals (ICP)	V	@ICP-A02	±30	75-125	4.5
Total Metals (ICP)	Zn	@ICP-A02	±30	75-125	3
Mercury (AA/Cold Vapor)	Hg	HG-02	±30	75-125	0.5
TCLP Metals	Sb (see note 1)	@ICP-T01	±30	75-125	2
TCLP Metals	As	@ICP-T01	±30	75-125	5
TCLP Metals	Ba	@ICP-T01	±30	75-125	7
TCLP Metals	Be (see note 1)	@ICP-T01	±30	75-125	0.01
TCLP Metals	Cd	@ICP-T01	±30	75-125	0.2
TCLP Metals	Cr	@ICP-T01	±30	75-125	0.8
TCLP Metals	Pb	@ICP-T01	±30	75-125	0.4
TCLP Metals	Ni (see note 1)	@ICP-T01	±30	75-125	5
TCLP Metals	Se	@ICP-T01	±30	75-125	0.2
TCLP Metals	Ag	@ICP-T01	±30	75-125	0.3
TCLP Metals	Tl (See note 1)	@ICP-T01	±30	75-125	0.08
TCLP Metals	V (see note 1)	@ICP-T01	±30	75-125	0.2
TCLP Metals	Hg	HG-02	±30	75-125	0.02
Anions (Ion Chromatography)	Br	@IC-01	±30	75-125	5
Anions (Ion Chromatography)	Cl	@IC-01	±30	75-125	5
Anions (Ion Chromatography)	F	@IC-01	±30	75-125	5
Anions (Ion Chromatography)	NO3	@IC-01	±30	75-125	5
Anions (Ion Chromatography)	NO2	@IC-01	±30	75-125	5
Anions (Ion Chromatography)	PO4	@IC-01	±30	75-125	5
Anions (Ion Chromatography)	SO4	@IC-01	±30	75-125	5
Ammonia (Ion Selective Electrode)	NH3	NH3-01	±30	75-125	10
TOC (Combustion)	TOC	TOC-01	±30	75-125	200
TIC (Acidification/Coulometric)	TIC	TIC-02	±30	75-125	50
pH	pH	PH-01	±30	n/a	0.1 pH unit
Caustic Demand	Caustic Demand	OHDEMAND	±30	n/a	n/a
Percent Solids/Percent Moisture (grav)	Percent Water	WATER-01	n/a	n/a	n/a
Cyanide	Cyanide	CN-03	±30	75-125	5
Differential Scanning Calorimetry	DSC	DSC-03	±30	n/a	n/a
Bulk Asbestos (see note 5)	Asbestos	n/a	n/a	n/a	n/a
Density (Settled and Centrifuged)	Density	Test Plan	n/a	n/a	n/a

Note 1. Although the project requested this analysis, the regulatory definition of TCLP in SW-846, section 7.4.3, does not include these metals.

Note 2. Accuracy is ±3 standard deviations for the statistically derived LCS standard or 75 to 125 percent recovery for the spike.

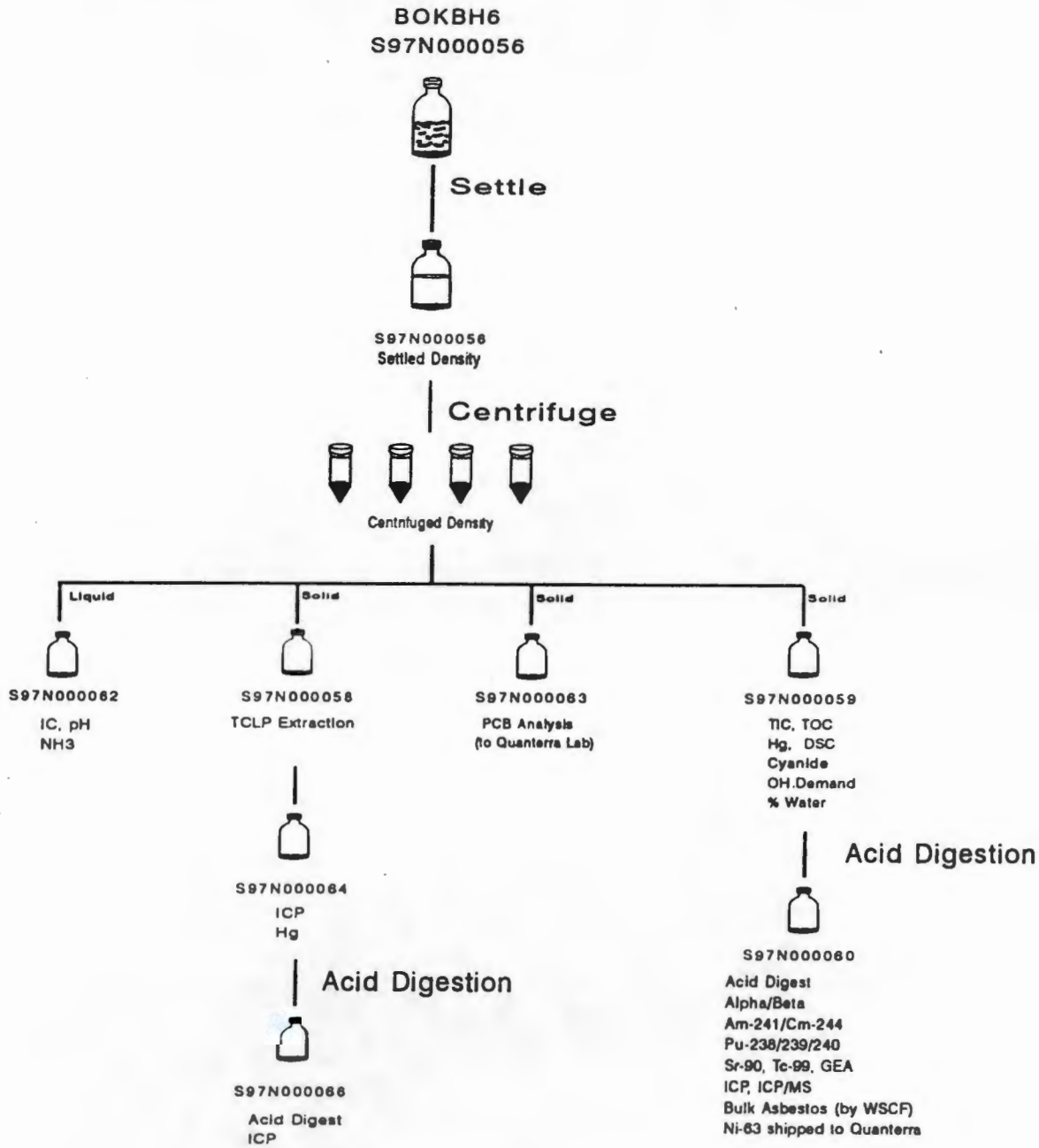
Note 3. Laser ablation/mass spectrometry, viscosity and particle size distribution were not included in the table because they were deleted from the project subsequent to release of the Letter of Instruction.

Note 4. Polychlorinated biphenyl analysis and Ni-63 were not included in the table because these analyses were assigned to Quanterra laboratories, which will provide separate reports.

Note 5. Asbestos analysis was performed by the Waste Sampling and Characterization Laboratory (WSCF).

Figure 1. 105-N Lift Station Sample Processing Scheme

Labcore Group #97000331



SAMPLE PREPARATION

Figure 1 depicts the processing scheme for samples and indicates the relationships between subsamples.

For those analyses requiring fully solubilized solids in an acid matrix, an acid digestion was performed on subsamples using procedure LA-505-159, Rev. D-0. The procedure was taken directly from EPA SW-846, Method 3050.

DISCUSSION OF ANALYTICAL RESULTS

Summary analytical results, including analyte-specific chemist's narratives are presented on pages 46 through 75. Results for the PCB analyses will be provided to the program separately by the Quanterra Environmental Services laboratory. Results for the Ni-63 analyses will be provided to the program separately by the Quanterra, Inc. laboratory.

All of the reported data have met the ±3 standard deviation accuracy requirement for LCS (when an LCS is associated with that analyte).

Sample Visual Appearance

The composited sample consisted of fine dark brown solids and gravel-like solids, including pebbles, paint or metal flakes, bits of metal wire and other objects. The sample composition had approximately the same volumes of fines and gravel-like solids. A combined total of 1.5 liters of water was separated from the solids during the initial processing.

Settled and Centrifuged Density

Density data are presented in tabular form on page 47 as part of the Chemist's physical testing narrative.

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: not specified
Procedure Used: LT-519-103, Rev. A-0
Required Precision: n/a (These measurements were performed in triplicate. The relative standard deviation for the settled and centrifuged densities were 20.6 and 22.6 percent, respectively.)
Met Precision Requirement?: n/a
Required Spike Accuracy: n/a
Met Accuracy Requirement?: n/a
Target Practical Quant Limit (PQL): not specified
Samples Not Meeting Target PQL: n/a
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blanks Contaminated?: n/a

Bulk Asbestos

Sample Preparation: The sample was prepared for this analysis by acid digestion. An initial weight of 0.4999 grams was digested using procedure LA-505-159, and the insoluble residue, which was captured on a membrane filter, was rinsed to remove excess dissolved solids.
Procedural Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: not specified
Asbestos Procedure Used: Performed by Waste Sampling and Characterization Laboratory using Industrial Hygiene Laboratory Procedure HAPR70-5, based on 40 CFR Part 763, Subpart E, App. E and EPA method EPA/600/R-93/113.
Required Precision: not specified
Met Precision Requirement?: n/a
Required Spike Accuracy: n/a
Met Accuracy Requirement?: n/a
Target Practical Quant Limit (PQL): not specified
Samples Not Meeting Target PQL: n/a
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: n/a

Percent Moisture (Percent Water/Solids) by Gravimetric Analysis

Procedural Anomalies/Difficulties: None noted. The Percent Moisture (percent water) analysis was performed twice. The initial results were invalidated because the LCS failed to meet recovery control limits. The rerun, performed two days later, yielded results that the water in the sediment was 44.8 percent. The initial (invalidated) results yielded an average value of 47.6 percent water, and despite being invalidated because of a failed LCS, the initial results may be more accurate because in time all samples desiccate, losing weight and thus lowering the percentage. Percent solids may be determined be subtraction of the percent water from 100 percent.
Required RCRA Procedure: not specified
Procedure Used: LA-564-101, Rev. G-0
Required Precision: not specified
Met Precision Requirement?: n/a (RPD was 0.0)
Required Spike Accuracy: not specified
Met Accuracy Requirement?: Recovery of LCS was within ±3 standard deviations (97.6% recovery)
Target Practical Quant Limit (PQL): not specified
Samples Not Meeting Target PQL: n/a
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: n/a

Differential Scanning Calorimetry (DSC)

Procedural Anomalies/Difficulties: None noted. The chemist integrated the thermograms such that a small, broad exotherm was observed. This exotherm extended slightly off of baseline from approximately 300 to 450°C for the sample (270 to 360°C for the duplicate). By using an alternative integration along that baseline, it may be possible that a very small endotherm may exist instead, ranging from approximately 240 to 290°C.
Required RCRA Procedure: not specified
Procedure Used: LA-514-114, Rev. D-0
Required Precision: ±30 RPD
Met Precision Requirement?: no (77.8 RPD; imprecision is potentially attributable to sample inhomogeneity)
Required Spike Accuracy: not specified
Met Accuracy Requirement?: Recovery of LCS was within ±3 standard deviations (94.8% recovery)
Target Practical Quant Limit (PQL): not specified
Samples Not Meeting Target PQL: n/a
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: n/a

pH (Electrometric)

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: not specified
Procedure Used: LA-212-106, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: yes (1.15 RPD)
Required Spike Accuracy: n/a
Met Accuracy Requirement?: n/a. Recovery of LCS was within ±3 standard deviations.
Target Practical Quant Limit (PQL): 0.1 pH unit
Samples Not Meeting Target PQL: none
Maximum Sample Holding Time (RCRA): immediate field analysis
Samples Exceeding Max Holding Time: all
Blank Contaminated?: n/a

Hydroxide (Caustic) Demand by Titration

Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	not specified
Procedure Used:	LA-211-104, Rev. A-1
Required Precision:	±30 RPD
Met Precision Requirement?:	yes (12.3 RPD)
Required Spike Accuracy:	n/a
Met Accuracy Requirement?:	n/a. Recovery of LCS was within ±3 standard deviations (96.9 %Recovery)
Target Practical Quant Limit (PQL):	not specified
Samples Not Meeting Target PQL:	n/a
Maximum Sample Holding Time (RCRA):	not specified
Samples Exceeding Max Holding Time:	n/a
Blank Contaminated?:	n/a

Total Inorganic Carbon (Acid/Coulometric)

Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 9060 modified
Procedure Used:	LA-342-100, Rev. E-0
Required Precision:	±30 RPD
Met Precision Requirement?:	yes (1.7 RPD)
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (79.3 %Recovery)
Target Practical Quant Limit (PQL):	50 µg/g
Samples Not Meeting Target PQL:	n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA):	not specified
Samples Exceeding Max Holding Time:	n/a
Blank Contaminated?:	contamination is insignificant

Total Organic Carbon (Combustion/Coulometric)

The combustion procedure (specified in Reference 2) for TOC has been inactivated at 222-S Laboratory and replaced with a persulfate oxidation procedure.

Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	not specified
Procedure Used:	LA-342-100, Rev. E-0, Persulfate Oxidation
Required Precision:	±30 RPD
Met Precision Requirement?:	yes (15.8 RPD)
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (93.5 %Recovery)
Target Practical Quant Limit (PQL):	200 µg/g
Samples Not Meeting Target PQL:	n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA):	28 days
Sample Exceeded Max Holding Time:	yes (analyzed on day 44)
Blank Contaminated?:	contamination is insignificant

Ammonia by Ion Selective Electrode

Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	not specified
Procedure Used:	LA-631-001, Rev. C-0
Required Precision:	±30 RPD
Met Precision Requirement?:	RPD not calculable
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (106.0 %Recovery)
Target Practical Quant Limit (PQL):	10 µg/ml
Samples Not Meeting Target PQL:	none
Maximum Sample Holding Time (RCRA):	not specified
Samples Exceeding Max Holding Time:	n/a
Blank Contaminated?:	no

Total Cyanide by Microdistillation and Spectrophotometric Analysis

Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	not specified
Procedure Used:	LA-695-102, Rev. G-1
Required Precision:	±30 RPD
Met Precision Requirement?:	RPD not calculable
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (92.7 %Recovery)
Target Practical Quant Limit (PQL):	5 µg/g
Sample Not Meeting Target PQL?:	yes
Maximum Sample Holding Time (RCRA):	14 days
Sample Exceeded Max Holding Time:	yes (analyzed on day 50)
Blank Contaminated?:	no

Bromide by Ion Chromatography

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: SW-846, 9056
Procedure Used: LA-533-105, Rev. D-1, equivalent to 9056
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: yes (96.6 %Recovery)
Target Practical Quant Limit (PQL): 5 µg/ml
Sample Not Meeting Target PQL?: yes due to procedural requirement for sample dilution. A 101x dilution was used for these analyses.
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Chloride by Ion Chromatography

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: SW-846, 9056
Procedure Used: LA-533-105, Rev. D-1, equivalent to 9056
Required Precision: ±30 RPD
Met Precision Requirement?: yes (2.8 RPD)
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: yes (92.2 %Recovery)
Target Practical Quant Limit (PQL): 5 µg/ml
Samples Not Meeting Target PQL: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): 28 days
Sample Exceeded Max Holding Time: yes (analyzed on day 44)
Blank Contaminated?: no

Fluoride by Ion Chromatography

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: SW-846, 9056
Procedure Used: LA-533-105, Rev. D-1, equivalent to 9056
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: yes (87.1 %Recovery)
Target Practical Quant Limit (PQL): 5 µg/ml
Samples Not Meeting Target PQL: yes due to procedural requirement for sample dilution. A 101x dilution was used for these analyses.
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Nitrate by Ion Chromatography

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: SW-846, 9056
Procedure Used: LA-533-105, Rev. D-1, equivalent to 9056
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: yes (95.9 %Recovery)
Target Practical Quant Limit (PQL): 5 µg/ml
Sample Not Meeting Target PQL?: yes due to procedural requirement for sample dilution. A 101x dilution was used for these analyses.
Maximum Sample Holding Time (RCRA): 48 hours
Sample Exceeded Max Holding Time?: yes (analyzed on day 44)
Blank Contaminated?: no

Nitrite by Ion Chromatography

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: SW-846, 9056
Procedure Used: LA-533-105, Rev. D-1, equivalent to 9056
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: yes (92.3 %Recovery)
Target Practical Quant Limit (PQL): 5 µg/ml
Sample Not Meeting Target PQL?: yes due to procedural requirement for sample dilution. A 101x dilution was used for these analyses.
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Phosphate by Ion Chromatography

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: SW-846, 9056
Procedure Used: LA-533-105, Rev. D-1, equivalent to 9056
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: yes (97.6 %Recovery)
Target Practical Quant Limit (PQL): 5 µg/ml
Sample Not Meeting Target PQL?: yes due to procedural requirement for sample dilution. A 101x dilution was used for these analyses.
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Sulfate by Ion Chromatography

Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 9056
Procedure Used:	LA-533-105, Rev. D-1, equivalent to 9056
Required Precision:	±30 RPD
Met Precision Requirement?:	yes (0.2 RPD)
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (96.5 %Recovery)
Target Practical Quant Limit (PQL):	5 µg/ml
Sample Not Meeting Target PQL?:	n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA):	28 days
Sample Exceeded Max Holding Time?:	yes (analyzed on day 44)
Blank Contaminated?:	no

Mercury by Acid Digestion/Cold Vapor Atomic Absorption Spectrometry

Procedural Anomalies/Difficulties: A rerun was required for this analyte when the original sample's optical absorbance results exceeded the calibration curve because the sample's mercury concentration was quite high. Matrix interference was noted to not be from copper. The chemist's narrative noted,

> "The results reported for the sample and dup are averages of two replicates. A post digest spike was done with an average recovery of 45.05% which indicates matrix interference. We checked for Cu interference based on the ICP results but the Cu did not produce the low spike recovery seen with the sample."

A predigestion spike was not able to be performed on this sample. Due to the already very small solid aliquot taken for digestion, it was not reasonable to reduce the aliquot further to keep the analyte concentration within the calibration curve. The solution was to dilute the digestate, however this eliminated the possibility of providing a pre-digestion spike. Thus, only a post-digestion spike was able to be prepared and analyzed. See the chemist's narrative attached to the worklist for a more detailed explanation.

Sample Number	S97N000059
Required RCRA Procedure:	SW-846, 7471
Procedure Used:	LA-325-104, Rev. D-0, equivalent to 7471
Required Precision:	±30 RPD
Met Precision Requirement?:	no (54.7 RPD)
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	no (45.5% Post-Spike Recovery)
Target Practical Quant Limit (PQL):	0.5 µg/g
Sample Not Meeting Target PQL?:	n/a (detectable concentration was greater than the PQL).
Maximum Sample Holding Time (RCRA):	28 days
Sample Exceeded Max Holding Time?:	yes (analyzed on day 46)
Blank Contaminated?:	no

Aluminum by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000060
Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: SW-846, 6010A
Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
Required Precision: ±30 RPD
Met Precision Requirement?: yes (1.6 RPD)
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: no (228.0 %Recovery) The concentration exceeded 1000 µg/g, which is the upper limit for detector linearity. Consequently, percent recovery of the pre-digestion spike is not a valid measure of accuracy for this analyte. The LCS had a recovery of 89.2 %Recovery, which was within the ±3 standard deviation control limit and the post-digestion spike had a recovery of 99.1%.
Target Practical Quant Limit (PQL): 20 µg/g
Samples Not Meeting Target PQL: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): 6 months
Samples Exceeding Max Holding Time: none
Blank Contaminated?: contamination was insignificant

Antimony by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000060
Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: SW-846, 6010A
Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
Required Precision: ±30 RPD
Met Precision Requirement?: yes (8.1 RPD)
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: yes (96.6 %Recovery)
Target Practical Quant Limit (PQL): 40 µg/g
Sample Not Meeting Target PQL?: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): 6 months
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Arsenic by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 6010A
Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
Required Precision:	±30 RPD
Met Precision Requirement?:	RPD not calculable
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (102.0 %Recovery)
Target Practical Quant Limit (PQL):	100 µg/g
Sample Not Meeting Target PQL?:	yes due to ALARA requirement. To meet the PQL would require digestion of 10 times the amount of sample originally digested.
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	no

Barium by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 6010A
Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
Required Precision:	±30 RPD
Met Precision Requirement?:	yes (0.4 RPD)
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (95.2 %Recovery)
Target Practical Quant Limit (PQL):	150 µg/g
Sample Not Meeting Target PQL?:	n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	no

Beryllium by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 6010A
Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
Required Precision:	±30 RPD
Met Precision Requirement?:	RPD not calculable
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (98.8 %Recovery)
Target Practical Quant Limit (PQL):	0.25 µg/g
Sample Not Meeting Target PQL?:	yes due to ALARA requirement. To meet the PQL would require digestion of 200 times the amount of sample originally digested.
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	no

Cadmium by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 6010A
Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
Required Precision:	±30 RPD
Met Precision Requirement?:	yes (25.9 RPD)
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (98.2 %Recovery)
Target Practical Quant Limit (PQL):	3.5 µg/g
Samples Not Meeting Target PQL:	n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	no

Chromium by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 6010A
Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
Required Precision:	±30 RPD
Met Precision Requirement?:	yes (3.8 RPD)
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (121.0 %Recovery)
Target Practical Quant Limit (PQL):	15 µg/g
Samples Not Meeting Target PQL:	n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	no

Iron by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 6010A
Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
Required Precision:	±30 RPD
Met Precision Requirement?:	yes (4.4 RPD)
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	no (-134 %Recovery). The concentration exceeded 1000 µg/g, which is the upper limit for detector linearity. Consequently, percent recovery of the pre-digestion spike is not a valid measure of accuracy for this analyte. The LCS had a recovery of 92.4 %Recovery, which was within the ±3 standard deviation control limit and the post-digestion spike had a recovery of 92.3%.
Target Practical Quant Limit (PQL):	10 µg/g
Samples Not Meeting Target PQL:	n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	contamination was insignificant

Lead by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000060
Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: SW-846, 6010A
Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
Required Precision: ±30 RPD
Met Precision Requirement?: yes (14.9 RPD)
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: no (71.0 %Recovery) The concentration exceeded 1000 µg/g, which is the upper limit for detector linearity. Consequently, percent recovery of the pre-digestion spike is not a valid measure of accuracy for this analyte. The LCS had a recovery of 85.2 %Recovery, which was within the ±3 standard deviation control limit and the post-digestion spike had a recovery of 101.4%.
Target Practical Quant Limit (PQL): 7 µg/g
Samples Not Meeting Target PQL: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): 6 months
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Manganese by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000060
Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: SW-846, 6010A
Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
Required Precision: ±30 RPD
Met Precision Requirement?: yes (2.3 RPD)
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: yes (95.0 %Recovery)
Target Practical Quant Limit (PQL): 2 µg/g
Samples Not Meeting Target PQL: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): 6 months
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Nickel by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 6010A
Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
Required Precision:	±30 RPD
Met Precision Requirement?:	yes (19.5 RPD)
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (99.2 %Recovery)
Target Practical Quant Limit (PQL):	100 µg/g
Sample Not Meeting Target PQL?:	yes due to ALARA requirement. To meet the PQL would require digestion of 2 times the amount of sample originally digested.
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	no

Selenium by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 6010A
Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
Required Precision:	±30 RPD
Met Precision Requirement:	RPD not calculable
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (88.2 %Recovery)
Target Practical Quant Limit (PQL):	3 µg/g
Samples Not Meeting Target PQL:	all due to ALARA requirement. To meet the PQL would require digestion of 333 times the amount of sample originally digested.
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	no

Silicon by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000060
Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: SW-846, 6010A
Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
Required Precision: ±30 RPD
Met Precision Requirement: yes (2.8 RPD)
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: no (70.8 %Recovery) The concentration exceeded 1000 µg/g, which is the upper limit for detector linearity. Consequently, percent recovery of the pre-digestion spike is not a valid measure of accuracy for this analyte. The LCS had a recovery of 128.4 %Recovery, which was within the ±3 standard deviation control limit and the post-digestion spike had a recovery of 105.7%.
Target Practical Quant Limit (PQL): 3 µg/g
Sample Not Meeting Target PQL?: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): 6 months
Samples Exceeding Max Holding Time: none
Blank Contaminated?: yes as expected due to acid digestion in glassware, but insignificant relative to the concentrations in the samples.

Silver by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000060
Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: SW-846, 6010A
Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
Required Precision: ±30 RPD
Met Precision Requirement: RPD not calculable
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: yes (86.7 %Recovery)
Target Practical Quant Limit (PQL): 6 µg/g
Sample Not Meeting Target PQL?: all due to ALARA requirement. To meet the PQL would require digestion of 17 times the amount of sample originally digested.
Maximum Sample Holding Time (RCRA): 6 months
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Sodium by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 6010A
Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
Required Precision:	±30 RPD
Met Precision Requirement:	yes (2.9 RPD)
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (106.2 %Recovery)
Target Practical Quant Limit (PQL):	60 µg/g
Sample Not Meeting Target PQL?:	n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	contamination was insignificant

Thallium by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 6010A
Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
Required Precision:	±30 RPD
Met Precision Requirement?:	RPD not calculable
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	no (62.6 %Recovery)
Target Practical Quant Limit (PQL):	1.5 µg/g
Sample Not Meeting Target PQL?:	yes due to ALARA requirement. To meet the PQL would require digestion of 1333 times the amount of sample originally digested.
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	no

Vanadium by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 6010A
Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
Required Precision:	±30 RPD
Met Precision Requirement?:	RPD not calculable
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement:	yes (101.0 %Recovery)
Target Practical Quant Limit (PQL):	4.5 µg/g
Sample Not Meeting Target PQL?:	yes due to ALARA requirement. To meet the PQL would require digestion of 111 times the amount of sample originally digested.
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	no

Zinc by Acid Digestion/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	SW-846, 6010A
Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
Required Precision:	±30 RPD
Met Precision Requirement?:	yes (2.2 RPD)
Required Spike Accuracy:	75 - 125 %Recovery
Met Accuracy Requirement?:	yes (88.4 %Recovery)
Target Practical Quant Limit (PQL):	3 µg/g
Sample Not Meeting Target PQL?:	n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	contamination was insignificant

Mercury by TCLP Extraction/Acid Digest/Cold Vapor AAS

Sample Number S97N000064
TCLP Anomalies/Difficulties: The "preparation standard", which was a liquid matrix standard, was subjected to the same reagents as the solid samples (which went through the TCLP extraction procedure). It yielded a recovery of only 63.8%, indicating that sample analyte was lost (chelated?) during exposure to the extraction reagents, particularly because the initial calibration verification (ICV), low level standard (LLS) and continuing calibration verification (CCV), which can be considered to be equivalent to LCS standards, had acceptable recoveries between 108 and 116 percent. As a consequence, there was no need to quantify by standard additions because the recovery requirement (for TCLP method 1311) of 50 to 150 percent was met.
Procedural Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: SW-846, 7471
Analytical Procedure Used: LA-325-104, Rev. D-0, equivalent to 7471
TCLP Method 1311 Used: LA-544-134, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: 75 to 125 %Recovery
Met Accuracy Requirement?: no (34.5 %Recovery) As was noted for the preparation standard, the spike appeared to lose analyte during the TCLP processing. A spike is only "recommended" in the TCLP method 1311.
Target Practical Quant Limit (PQL): 0.02 µg/g
Sample Not Meeting Target PQL?: yes The detection limit multiplied by 10 (to calculate the analytically derived PQL) was 0.05 µg/g.
Maximum Sample Holding Time (RCRA): 28 days to TCLP Extraction, and 28 additional days to analysis.
Sample Exceeded Max Holding Time?: yes (TCLP extraction was performed on day 44. However the holding time requirement between extraction and analysis was met with an additional lapse of 6 days.)
Blank Contaminated?: contamination was insignificant

Toxicity Characteristic Leach Procedure/ICP Analytes

Toxicity Characteristic Leach Procedure (TCLP) results are reported in the summary data table (page 51) for ICP analytes in two ways:

1) determined on the TCLP extract directly (shown in the table as sample number S97N000064), and
2) determined on an acid digestion of the TCLP extract (shown in the table as sample number S97N000066). Only results based on the acid digestion of the TCLP extract may be used to demonstrate that the waste is not hazardous. The mercury analysis incorporates an acid digestion in the procedure, consequently those data are presented on an analysis of the direct TCLP extract (sample S97N000064), and can be used to demonstrate that the waste is not hazardous.

SW-846 Method 1311 lists only seven regulated metals (excluding mercury). Quality control data are presented in this narrative for only these seven ICP analytes (As, Ba, Cd, Cr, Pb, Se and Ag) for both the acid digested and non-acid digested TCLP extracts. The LCS accuracy control limits (50 to 150 %Recovery) stated in SW-846 for TCLP metals are different than the project's specified control limit of ±3 sigma. The results in this project were controlled to the SW-846 control limit.

Less than 100 grams were used for extraction due to the need to limit radiation exposure to laboratory staff. A discussion of these deviations from SW-846 regulatory requirements for TCLP is provided as Appendix 2.

Arsenic by TCLP Extraction/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000064
TCLP Anomalies/Difficulties:	None Noted
ICP Anomalies/Difficulties:	None noted
Required RCRA Analytical Procedure:	SW-846, 6010A
Analytical Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used:	LA-544-134, Rev. B-0
Required Precision:	±30 RPD
Met Precision Requirement?:	RPD not calculable
Required Spike Accuracy:	75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?:	yes (103.1% spike Recovery; 105.4% LCS Recovery)
Target Practical Quant Limit (PQL):	5 µg/g
Sample Not Meeting Target PQL?:	no
Maximum Sample Holding Time (RCRA):	180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	no

Barium by TCLP Extraction/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000064
TCLP Anomalies/Difficulties: None Noted
ICP Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: SW-846, 6010A
Analytical Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used: LA-544-134, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: yes (27.5 RPD)
Required Spike Accuracy: 75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?: yes (105.6% spike Recovery; 114.8% LCS Recovery)
Target Practical Quant Limit (PQL): 7 µg/g
Sample Not Meeting Target PQL?: no
Maximum Sample Holding Time (RCRA): 180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Cadmium by TCLP Extraction/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000064
TCLP Anomalies/Difficulties: None Noted
ICP Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: SW-846, 6010A
Analytical Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used: LA-544-134, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: yes (15.0 RPD)
Required Spike Accuracy: 75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?: yes (102.4% spike Recovery; 105.1% LCS Recovery)
Target Practical Quant Limit (PQL): 0.2 µg/g
Sample Not Meeting Target PQL?: no
Maximum Sample Holding Time (RCRA): 180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Chromium by TCLP Extraction/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000064
TCLP Anomalies/Difficulties: None Noted
ICP Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: SW-846, 6010A
Analytical Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used: LA-544-134, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: no (51.2 RPD)
Required Spike Accuracy: 75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?: yes (103.4% spike Recovery; 105.1% LCS Recovery)
Target Practical Quant Limit (PQL): 0.8 µg/g
Sample Not Meeting Target PQL?: no
Maximum Sample Holding Time (RCRA): 180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Lead by TCLP Extraction/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000064
TCLP Anomalies/Difficulties: None Noted
ICP Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: SW-846, 6010A
Analytical Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used: LA-544-134, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: no (34.9 RPD)
Required Spike Accuracy: 75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?: yes (94.8% spike Recovery; 107.3% LCS Recovery)
Target Practical Quant Limit (PQL): 0.4 µg/g
Samples Not Meeting Target PQL: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): 180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Selenium by TCLP Extraction/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000064
TCLP Anomalies/Difficulties: None Noted
ICP Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: SW-846, 6010A
Analytical Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used: LA-544-134, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement: RPD not calculable
Required Spike Accuracy: 75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?: no (153.7% spike Recovery; 136.1% LCS Recovery exceeded the LCS control limit)
Target Practical Quant Limit (PQL): 0.2 µg/g
Sample Not Meeting Target PQL?: yes
Maximum Sample Holding Time (RCRA): 180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time: none
Blank Contaminated?: contamination was insignificant

Silver by TCLP Extraction/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000064
TCLP Anomalies/Difficulties: None Noted
ICP Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: SW-846, 6010A
Analytical Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used: LA-544-134, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement: RPD not calculable
Required Spike Accuracy: 75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?: no (58.6% spike recovery) for the project, but yes for LCS (102.0 %Recovery)
Target Practical Quant Limit (PQL): 0.3 µg/g
Sample Not Meeting Target PQL?: yes
Maximum Sample Holding Time (RCRA): 180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Arsenic by TCLP Extraction/Acid Digest/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000066
TCLP Anomalies/Difficulties: None Noted
ICP Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: SW-846, 6010A
Analytical Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used: LA-544-134, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: 75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?: yes (99.3% spike Recovery; 101.0% LCS Recovery)
Target Practical Quant Limit (PQL): 5 μg/g
Sample Not Meeting Target PQL?: no
Maximum Sample Holding Time (RCRA): 180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Barium by TCLP Extraction/Acid Digest/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000066
TCLP Anomalies/Difficulties: None Noted
ICP Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: SW-846, 6010A
Analytical Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used: LA-544-134, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: yes (19.8 RPD)
Required Spike Accuracy: 75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?: yes (103.2% spike Recovery; 96.2% LCS Recovery)
Target Practical Quant Limit (PQL): 7 μg/g
Sample Not Meeting Target PQL?: no
Maximum Sample Holding Time (RCRA): 180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Cadmium by TCLP Extraction/Acid Digest/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000066
TCLP Anomalies/Difficulties: None Noted
ICP Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: SW-846, 6010A
Analytical Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used: LA-544-134, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: yes (14.1 RPD)
Required Spike Accuracy: 75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?: yes (98.6% spike Recovery; 95.8% LCS Recovery)
Target Practical Quant Limit (PQL): 0.2 µg/g
Sample Not Meeting Target PQL?: no
Maximum Sample Holding Time (RCRA): 180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Chromium by TCLP Extraction/Acid Digest/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000066
TCLP Anomalies/Difficulties: None Noted
ICP Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: SW-846, 6010A
Analytical Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used: LA-544-134, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: no (42.9 RPD)
Required Spike Accuracy: 75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?: yes (101.0% spike Recovery; 96.8% LCS Recovery)
Target Practical Quant Limit (PQL): 0.8 µg/g
Sample Not Meeting Target PQL?: no
Maximum Sample Holding Time (RCRA): 180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Lead by TCLP Extraction/Acid Digest/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000066
TCLP Anomalies/Difficulties: None Noted
ICP Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: SW-846, 6010A
Analytical Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used: LA-544-134, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: yes (26.4 RPD)
Required Spike Accuracy: 75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?: yes (92.8% spike Recovery; 94.8% LCS Recovery)
Target Practical Quant Limit (PQL): 0.4 µg/g
Samples Not Meeting Target PQL: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): 180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Selenium by TCLP Extraction/Acid Digest/ICP/Atomic Emission Spectroscopy

Sample Number: S97N000066
TCLP Anomalies/Difficulties: None Noted
ICP Anomalies/Difficulties: None noted
Required RCRA Analytical Procedure: SW-846, 6010A
Analytical Procedure Used: LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used: LA-544-134, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement: RPD not calculable
Required Spike Accuracy: 75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?: no for spike recovery with 132.8%; yes for LCS recovery at 91.4%
Target Practical Quant Limit (PQL): 0.2 µg/g
Sample Not Meeting Target PQL?: yes
Maximum Sample Holding Time (RCRA): 180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time: none
Blank Contaminated?: no

Silver by TCLP Extraction/Acid Digest/ICP/Atomic Emission Spectroscopy

Sample Number	S97N000066
TCLP Anomalies/Difficulties:	None Noted
ICP Anomalies/Difficulties:	None noted
Required RCRA Analytical Procedure:	SW-846, 6010A
Analytical Procedure Used:	LA-505-161, Rev. C-1, equivalent to 6010
TCLP Method 1311 Used:	LA-544-134, Rev. B-0
Required Precision:	±30 RPD
Met Precision Requirement:	RPD not calculable
Required Spike Accuracy:	75 to 125 spike %Recovery for the project, and 50 to 150 LCS %Recovery per SW-846.
Met Accuracy Requirement?:	no (39.7% spike recovery) for the project, but yes for LCS (97.9 %Recovery)
Target Practical Quant Limit (PQL):	0.3 µg/g
Sample Not Meeting Target PQL?:	yes
Maximum Sample Holding Time (RCRA):	180 days to TCLP Extraction, and 180 additional days to analysis.
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	no

Isotopic Uranium by Acid Digestion/ICP/Mass Spectrometry

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Analytical Procedure:	none specified
Analytical Procedure Used:	LT-506-101, Rev. A-1
Required Precision:	±30 RPD
Met Precision Requirement:	yes: U-235 at 4.2 RPD and U-238 at 6.4 RPD; Not calculable for U-234
Required Spike Accuracy:	not specified
Met Accuracy Requirement?:	n/a (The spike recovery of 95.4% for U-238 was good, as was also the LCS recovery of 94.2% for U-238)
Target Practical Quant Limit (PQL):	0.1 µg/g
Sample Not Meeting Target PQL?:	The sample did not meet the PQL limit for U-234. The PQL did not apply to U-235 and U-238 because they were detected at concentrations greater than the PQL.
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	insignificant contamination for U-238

Isotopic Thorium by Inductively Coupled Plasma/Mass Spectrometry

Sample Number	S97N000060
Procedural Anomalies/Difficulties:	None noted
Required RCRA Analytical Procedure:	none specified
Analytical Procedure Used:	LT-506-101, Rev. A-1
Required Precision:	±30 RPD
Met Precision Requirement:	RPD was not calculable for Th-228, Th-230 or for Th-232.
Required Spike Accuracy:	not specified
Met Accuracy Requirement?:	No spike or LCS standard was available for Thorium isotopes, however for U-238 (which was analyzed simultaneously) the spike recovery was 95.4%, which was quite good.
Target Practical Quant Limit (PQL):	0.1 µg/g
Sample Not Meeting Target PQL?:	None of the samples met the PQL for Th-228, Th-230 or Th-232.
Maximum Sample Holding Time (RCRA):	6 months
Samples Exceeding Max Holding Time:	none
Blank Contaminated?:	no

Total Alpha by Gas Proportional Counting

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-508-101, Rev. G-0
Required Precision: ±30 RPD
Met Precision Requirement?: yes (4.3 RPD). LCS recovery was within ±3 standard deviations.
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: yes (119.4 %Recovery)
Target Practical Quant Limit (PQL): 0.05 µCi/g
Sample Not Meeting Target PQL?: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): 6 months
Sample Exceeded Max Holding Time?: no
Blank Contaminated?: no

Total Beta by Gas Proportional Counting

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-508-101, Rev. G-0
Required Precision: ±30 RPD
Met Precision Requirement?: yes (4.3 RPD)
Required Spike Accuracy: 75 - 125 %Recovery
Met Accuracy Requirement?: yes (108.8 %Recovery)
Target Practical Quant Limit (PQL): 0.1 µCi/g
Sample Not Meeting Target PQL?: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): 6 months
Sample Exceeded Max Holding Time?: no
Blank Contaminated?: no

Strontium-89/90 by Chemical Separation/Beta Proportional Count

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-220-101, Rev. E-1
Required Precision: ±30 RPD
Met Precision Requirement?: yes (5.2 RPD)
Required Spike Accuracy: spike not requested
Met Accuracy Requirement?: n/a. LCS recovery was within ±3 standard deviations. Carrier recovery was 89.7%.
Target Practical Quant Limit (PQL): 0.05 µCi/g
Sample Not Meeting Target PQL?: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Technetium-99 by Chemical Separation/Liquid Scintillation

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-438-101, Rev. E-0
Required Precision: ±30 RPD
Met Precision Requirement?: yes (1.4 RPD)
Required Spike Accuracy: spike not requested
Met Accuracy Requirement?: n/a. LCS recovery was within ±3 standard deviations. Tracer recovery was 39.9%.
Target Practical Quant Limit (PQL): 0.1 µCi/g
Sample Not Meeting Target PQL?: no
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Americium-241 by Chemical Separation/Alpha Energy Analysis

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-953-104, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: yes (5.0 RPD)
Required Spike Accuracy: spike not requested
Met Accuracy Requirement: n/a. LCS recovery was within ±3 standard deviations. Tracer recovery was 90.0%.
Target Practical Quant Limit (PQL): 0.02 µCi/g
Sample Not Meeting Target PQL?: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Curium-244 by Chemical Separation/Alpha Energy Analysis

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-953-104, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: spike not requested
Met Accuracy Requirement: n/a There is no LCS standard for Cm-244, therefore the control limit to LCS does not apply. Tracer recovery was 90.0%.
Target Practical Quant Limit (PQL): 0.02 µCi/g
Sample Not Meeting Target PQL?: yes
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Plutonium-239/240 by Chemical Separation/Alpha Energy Analysis

Procedural Anomalies/Difficulties: none noted
Required RCRA Procedure: none specified
Procedure Used: LA-953-104, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: yes (8.0 RPD)
Required Spike Accuracy: spike not requested
Met Accuracy Requirement?: n/a LCS recovery was within ±3 standard deviations. Tracer recovery was 104.0%.
Target Practical Quant Limit (PQL): 0.02 µCi/g
Samples Not Meeting Target PQL: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Plutonium-238 by Chemical Separation/Alpha Energy Analysis

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-953-104, Rev. B-0
Required Precision: ±30 RPD
Met Precision Requirement?: yes (6.8 RPD)
Required Spike Accuracy: n/a
Met Accuracy Requirement?: n/a There is no LCS standard for Pu-238, therefore the control limit for LCS does not apply. Tracer recovery was 104.0%.
Target Practical Quant Limit (PQL): 0.02 µCi/g
Samples Not Meeting Target PQL: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Americium-241 by Gamma Energy Analysis

Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	none specified
Procedure Used:	LA-548-121, Rev. E-0
Required Precision:	±30 RPD
Met Precision Requirement?:	yes (29.7 RPD)
Required Spike Accuracy:	n/a
Met Accuracy Requirement?:	n/a
Target Practical Quant Limit (PQL):	0.05 µCi/g
Sample Not Meeting Target PQL?:	n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA):	not specified
Samples Exceeding Max Holding Time:	n/a
Blank Contaminated?:	no

Cesium-134 by Gamma Energy Analysis

Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	none specified
Procedure Used:	LA-548-121, Rev. E-0
Required Precision:	±30 RPD
Met Precision Requirement?:	RPD not calculable
Required Spike Accuracy:	n/a
Met Accuracy Requirement?:	n/a
Target Practical Quant Limit (PQL):	0.05 µCi/g
Sample Not Meeting Target PQL?:	yes
Maximum Sample Holding Time (RCRA):	not specified
Samples Exceeding Max Holding Time:	n/a
Blank Contaminated?:	no

Cesium-137 by Gamma Energy Analysis

Procedural Anomalies/Difficulties:	None noted
Required RCRA Procedure:	none specified
Procedure Used:	LA-548-121, Rev. E-0
Required Precision:	±30 RPD
Met Precision Requirement?:	yes (1.8 RPD)
Required Spike Accuracy:	n/a
Met Accuracy Requirement?:	n/a LCS recovery was within control limits.
Target Practical Quant Limit (PQL):	0.05 µCi/g
Samples Not Meeting Target PQL:	n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA):	not specified
Samples Exceeding Max Holding Time:	n/a
Blank Contaminated?:	no

Cobalt-60 by Gamma Energy Analysis

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-548-121, Rev. E-0
Required Precision: ±30 RPD
Met Precision Requirement?: yes (6.2 RPD)
Required Spike Accuracy: n/a
Met Accuracy Requirement?: n/a LCS recovery was within control limits.
Target Practical Quant Limit (PQL): 0.05 µCi/g
Samples Not Meeting Target PQL: n/a (detectable concentration was greater than the PQL)
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Europium-152 by Gamma Energy Analysis

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-548-121, Rev. E-0
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: n/a
Met Accuracy Requirement?: n/a
Target Practical Quant Limit (PQL): 0.05 µCi/g
Sample Not Meeting Target PQL?: yes
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Europium-154 by Gamma Energy Analysis

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-548-121, Rev. E-0
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: n/a
Met Accuracy Requirement?: n/a
Target Practical Quant Limit (PQL): 0.05 µCi/g
Sample Not Meeting Target PQL?: yes
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Europium-155 by Gamma Energy Analysis

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-548-121, Rev. E-0
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: n/a
Met Accuracy Requirement?: n/a
Target Practical Quant Limit (PQL): 0.05 µCi/g
Sample Not Meeting Target PQL?: yes
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Radium-226 by Gamma Energy Analysis

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-548-121, Rev. E-0
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: n/a
Met Accuracy Requirement?: n/a
Target Practical Quant Limit (PQL): 0.05 µCi/g
Sample Not Meeting Target PQL?: yes due to ALARA requirement. To meet the PQL would require digestion of 34 times the amount of sample originally digested.
Maximum Sample Holding Time (RCRA): 6 months
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Antimony-125 by Gamma Energy Analysis

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-548-121, Rev. E-0
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: n/a
Met Accuracy Requirement?: n/a
Target Practical Quant Limit (PQL): 0.05 µCi/g
Sample Not Meeting Target PQL?: yes
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

Actinium-228 by Gamma Energy Analysis

Procedural Anomalies/Difficulties: None noted
Required RCRA Procedure: none specified
Procedure Used: LA-548-121, Rev. E-0
Required Precision: ±30 RPD
Met Precision Requirement?: RPD not calculable
Required Spike Accuracy: n/a
Met Accuracy Requirement?: n/a
Target Practical Quant Limit (PQL): 0.05 µCi/g
Sample Not Meeting Target PQL?: yes due to ALARA requirement. To meet the PQL would require digestion of 12 times the amount of sample originally digested.
Maximum Sample Holding Time (RCRA): not specified
Samples Exceeding Max Holding Time: n/a
Blank Contaminated?: no

General Evaluation of Analytical Data

There was a reasonably good correlation of alpha radioactivity results between the total alpha activity (**0.467 µCi/g**) and the summation of activities (**0.518 µCi/g**) of Am-241 (by GEA or AEA), Pu-238 and Pu-239/240. This indicated it was probable that all of the major alpha emitters were accounted for and that for these radionuclides there were not large analytical errors.

The correlation total beta activity (**7.86 µCi/g**) with the summation of beta activities (**5.09 µCi/g**) of Cs-137, Sr-90 (and Y-90 which was equal to Sr-90) and Tc-99 was also reasonably good. Then there is less than a two-fold difference between these two values, it is probable that all of the major beta emitters were accounted for and that for these radionuclides there were not large analytical errors.

Table 3 displays the major chemical constituents in the 105-N Lift Station sediment sample and provides a determination of the mass balance. It was assumed that the constituents in the sediment were oxidized, which is typical of environmental samples. The total metal concentrations, which were determined by ICP, were converted to oxides. Total inorganic carbon was converted to carbonate and total organic carbon was assumed to be present as acetate. The major constituent was water with iron present as the second most abundant constituent. These two components accounted for approximately 90% of the identified masses. The summation of major masses accounts for approximately 71 percent of the mass of moist centrifuged sediment.

Table 3. Mass Balance of Major Chemical Constituents

Constituent	Constituent Concentration µg/g	Conversion Factor (to oxide or organic compound)	Probable Mass of Constituent µg/g
Aluminum	6,080	1.889	11,485
Barium	489	1.117	546
Calcium	3,750	1.399	5,246
Chromium	289	1.923	556
Copper	455	1.252	570
Iron	137,000	1.382	189,334
Magnesium	1,400	1.658	2,321
Manganese	527	1.582	834
Sodium	383	1.000	383
Nickel	164	1.273	209
Lead	1,210	1.154	1,396
Phosphorus	3,960	3.066	12,141
Silicone	1,080	2.139	2,310
Sulfur	1,470	2.996	4,404
Uranium	1,620	1.202	1,947
Zinc	1,380	1.245	1,718
Total Inorganic Carbon	760	4.996	3,797
Total Organic Carbon *	8,420	2.750	23,155
Water	448,000	1.000	448,000
Summation			**710,353** (or **71%**)

* Converted to acetate

SUMMARY DATA TABLES AND CHEMIST'S NARRATIVES

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Internal Memo

From: Process Chemistry 8C510-97-015
Phone: 373-4995 T6-07
Date: June 10, 1997
Subject: RESULTS OF PHYSICAL TESTING ON 105-N LIFT STATION SAMPLE S97N000056

To: G. L. Miller T6-06

cc: D. L. Herting DLH T6-07
J. R. Jewett T6-07
K. L. Powell T6-12
A. D. Rice T6-06
C. M. Seidel T6-14
JFO File/LB

This letter reports the results of the physical testing conducted by Process Chemistry on sediment collected from the 105-N Lift Station. The settled and centrifuged solids measurements were completed on May 27, 1997 using Laboratory Technology Procedure LT-519-103 (Revision A-0). All information associated with this testing was recorded in laboratory notebook HNF-N-22-1.

The average settled and centrifuged solids densities for sample S97N000056 were determined to be 1.59 g/mL and 1.75 g/mL, respectively. The settled solids densities were measured after the sediment was divided into centrifuge cones and allowed to sit undisturbed for several days. The cones were then centrifuged for greater than an hour and the centrifuged solids densities were determined. The average settled and centrifuged solids densities were calculated by taking the arithmetic mean of the individual values.

The individual settled and centrifuged solids densities are presented in Table 1. A substantial variation exists between the individual density measurements. The first cone primarily contained fine particulates, while the other cones consisted of a greater percentage of the gravel-like material. Despite the variability observed in the individual results, the average settled and centrifuged densities are thought to be accurate as the three cones contained all of the sediment present in the original sample.

TABLE 1 SETTLED AND CENTRIFUGED DENSITIES

	SETTLED DENSITY (g/mL)	CENTRIFUGED DENSITY (g/mL)
CONE A	1.22	1.30
CONE B	1.71	1.89
CONE C	1.84	2.05
AVERAGE	1.59	1.75

If you have any questions on this letter, feel free to call me at 373-4995.

J. F. O'Rourke
Process Chemistry
Numatec Hanford Corporation

Sample S97N000056

Centrifuge Cone 56A

Tare Weight 13.581 g

Initial Settled Volume 30.0 mL Date/Time 5/27/97 1315 JPO 5/27/97

Interim Settled Volume ___ mL Date/Time ___

Final Settled Volume 21.5 mL Date/Time 5/27/97 1305

Final Water Volume 18.5 mL Date/Time 5/27/97 1305

Final Settled Weight (Excess Water Removed) 39.75 g

Centrifuged Volume 12.0 ~~g~~ mL

Centrifuged Weight (Excess Water Removed) 29.14 g

Comments: SETTLED DENSITY = $\frac{39.75 - 13.58}{21.5}$ = 1.22 g/mL

CENT. DENSITY = $\frac{29.14 - 13.58}{12.0}$ = 1.30 g/mL

SOLIDS REMOVED FOR SAMPLE S97N000059

Centrifuge Cone 56B

Tare Weight 13.555 g

Initial Settled Volume 35.0 mL Date/Time 5/27/97 1315 JPO 5/27/97

Interim Settled Volume ___ mL Date/Time ___

Final Settled Volume 29.0 mL Date/Time 5/27/97 1305

Final Water Volume 11.0 mL Date/Time 5/27/97 1305

Final Settled Weight (Excess Water Removed) 63.02 g

Centrifuged Volume 22.0 ~~g~~ mL

Centrifuged Weight (Excess Water Removed) 55.13 g

Comments: SETTLED DENSITY = $\frac{63.02 - 13.56}{29.0}$ = 1.71 g/mL

CENT. DENSITY = $\frac{55.13 - 13.56}{22.0}$ = 1.89 g/mL

CONE SAVE FOR TCLP (S97N000058)

May. 28. 1997 2:36PM WHC 222S LAB ROOM 2F BACKSIDE No. 3391 P. 1/3

Sample S97N000056

Centrifuge Cone 56C

Tare Weight 13.549 g

Initial Settled Volume 32.5 mL — Date/Time ~~5/22/97~~ JTO 5/22/97 1315

Interim Settled Volume ___ mL — Date/Time ___ JTO 5/22/97

Final Settled Volume 31.0 mL — Date/Time 5/22/97 1305

Final Water Volume 0 mL — Date/Time 5/22/97 1305

Final Settled Weight (Excess Water Removed) 70.56 g

Centrifuged Volume 27.0 ~~8~~ mL

Centrifuged Weight (Excess Water Removed) 68.93 g

Comments: SETTLED DENSITY = $\frac{70.56 - 13.55}{31.0}$ = 1.84 g/mL

AVE SETTLED DENSITY = 1.59 g/mL

% VOLUME SETTLED SEDIMENT = $\frac{21.5 + 29.0 + 31.0}{(21.5 + 29.0 + 31.0) + (18.5 + 11.0 + 0)} \times 10$

% VOLUME SETTLED SEDIMENT = $\frac{81.5}{81.5 + 29.5} \times 100$ = 73.4%

CENT DENSITY = $\frac{\text{JTO 6/27/97 } \cancel{70.56}\ 68.93 - 13.55}{27.0}$ = 2.05 g/mL

AVE CENT DENSITY = $\frac{1.30 + 1.89 + 2.05}{3}$ = 1.75 g/mL

SOLIDS REMOVED FOR SAMPLE S97N000059

May. 28. 1997 2:37PM WHC 222S LAB ROOM 2F BACKSIDE No. 3391 P. 3/3

105-N Lift Station Summary Analytical Results
105N LIFT ST

SAMPLING EVENT: 1
CUSTOMER SAMPLE NUMBER: BOKBH6

CUSTOMER SAMPLE NUMBER: BOKBH6

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S97N000056			Volume % Solids	%	n/a	n/a	73.41	n/a	n/a	n/a	n/a	n/a	n/a
S97N000058		T	TOXICICTY LEACHING PROCEDURE	DF	n/a	n/a	1.060	n/a	n/a	n/a	n/a	1.00e-02	n/a
S97N000059			Cyanide Water Distillation	ug/g	107.2	<5.30e-02	< 1.640	<1.60e0	n/a	n/a	92.70	1.640	n/a
S97N000059			DSC Exotherm on Perkin Elmer	Joules/g	94.76	n/a	1.25e+02	55.03	90.10	77.8	n/a	n/a	n/a
S97N000059			Mercury by CVAA (Perkin Elmer)	ug/g	119.7	0.00e+00	43.05	24.55	33.80	54.7	n/a	4.40e-01	n/a
S97N000059			Caustic Demand	Moles OH-/KG	96.91	n/a	2.16e-01	1.91e-01	2.04e-01	12.3	n/a	1.07e-01	n/a
S97N000059			% Water by Gravimetric	%	97.63	n/a	44.80	44.80	44.80	0.00	n/a	1.00e-02	n/a
S97N000059			TIC by Acid/Coulometry	ug/g	102.5	4.500	7.53e+02	766.0	759.5	1.71	79.30	5.000	n/a
S97N000059			TOC by Persulfate/Coulometry	ug/g	98.00	4.00e-01	7.75e+03	9.08e+03	8.42e+03	15.8	93.50	40.00	n/a
S97N000060		A	Acid Dig.ICP/AA/Radchem Aliq.	g/L	n/a	n/a	9.998	n/a	n/a	n/a	n/a	1.00e-04	n/a
S97N000060		A	Technetium-99 Liq. Scint.	uCi/g	104.5	<1.33e-03	3.63e-02	3.58e-02	3.60e-02	1.39	n/a	1.00e-03	3.40E+00
S97N000060		A	Strontium-89/90 High Level	uCi/g	100.0	<3.69e-03	1.390	1.320	1.355	5.17	n/a	5.00e-03	1.82E+00
S97N000060		A	Pu-239/240 by TRU-SPEC Resin	uCi/g	95.68	<6.98e-03	2.59e-01	2.39e-01	2.49e-01	8.03	n/a	1.60e-02	1.69E+00
S97N000060		A	Pu-238 by Ion Exchange	uCi/g	n/a	<6.98e-03	5.05e-02	4.72e-02	4.89e-02	6.76	n/a	1.60e-02	2.88E+00
S97N000060		A	Silver -ICP-Acid Digest	ug/g	88.80	<1.00e-02	< 10.00	<1.00e1	n/a	n/a	86.70	10.00	n/a
S97N000060		A	Aluminium -ICP-Acid Digest	ug/g	89.20	1.68e-01	6.03e+03	6.13e+03	6.08e+03	1.64	228.0	50.00	n/a
S97N000060		A	Arsenic -ICP-Acid Digest	ug/g	90.20	<1.00e-01	<1.00e+02	<1.00e2	n/a	n/a	102.0	100.0	n/a
S97N000060		A	Barium -ICP-Acid Digest	ug/g	89.40	<5.00e-02	4.90e+02	488.0	489.0	0.41	95.20	50.00	n/a
S97N000060		A	Beryllium -ICP-Acid Digest	ug/g	91.40	<5.00e-03	< 5.000	<5.00e0	n/a	n/a	98.80	5.000	n/a
S97N000060		A	Cadmium -ICP-Acid Digest	ug/g	86.40	<5.00e-03	5.410	7.020	6.215	25.9	98.20	5.000	n/a
S97N000060		A	Chromium -ICP-Acid Digest	ug/g	88.40	<1.00e-02	2.94e+02	283.0	288.5	3.81	121.0	10.00	n/a
S97N000060		A	Iron -ICP-Acid Digest	ug/g	92.40	2.52e-01	1.40e+05	1.34e+05	1.37e+05	4.38	-1.340e2	50.00	n/a
S97N000060		A	Manganese -ICP-Acid Digest	ug/g	85.60	<1.00e-02	5.33e+02	521.0	527.0	2.28	95.00	10.00	n/a
S97N000060		A	Sodium -ICP-Acid Digest	ug/g	104.6	1.060	3.77e+02	388.0	382.5	2.88	106.2	100.0	n/a
S97N000060		A	Nickel -ICP-Acid Digest	ug/g	90.20	<2.00e-02	1.80e+02	148.0	164.0	19.5	99.20	20.00	n/a
S97N000060		A	Lead -ICP-Acid Digest	ug/g	85.20	<1.00e-01	1.30e+03	1.12e+03	1.21e+03	14.9	71.00	100.0	n/a
S97N000060		A	Antimony -ICP-Acid Digest	ug/g	86.80	<6.00e-02	91.20	98.90	95.05	8.10	96.60	60.00	n/a
S97N000060		A	Selenium -ICP-Acid Digest	ug/g	82.80	<1.00e-01	<1.00e+02	<1.00e2	n/a	n/a	88.20	100.0	n/a
S97N000060		A	Silicon -ICP-Acid Digest	ug/g	128.4	2.140	1.09e+03	1.06e+03	1.08e+03	2.79	70.80	50.00	n/a
S97N000060		A	Thallium -ICP-Acid Digest	ug/g	82.20	<2.00e-01	<2.00e+02	<2.00e2	n/a	n/a	62.60	200.0	n/a
S97N000060		A	Vanadium -ICP-Acid Digest	ug/g	88.80	<5.00e-02	< 50.00	<5.00e1	n/a	n/a	101.0	50.00	n/a
S97N000060		A	Zinc -ICP-Acid Digest	ug/g	80.80	3.30e-02	1.37e+03	1.40e+03	1.38e+03	2.17	88.40	10.00	n/a
S97N000060		A	Cobalt-60 by GEA	uCi/g	96.60	<2.47e-03	1.560	1.660	1.610	6.21	n/a	n/a	1.53
S97N000060		A	Cesium-134 by GEA	uCi/g	n/a	<2.24e-03	<9.40e-03	<9.89e-3	n/a	n/a	n/a	9.00e-03	n/a
S97N000060		A	Cesium-137 by GEA	uCi/g	103.0	<6.55e-03	2.170	2.210	2.190	1.83	n/a	n/a	1.55
S97N000060		A	Europium-152 by GEA	uCi/g	n/a	<1.44e-02	<2.00e-02	<1.98e-2	n/a	n/a	n/a	2.00e-02	n/a
S97N000060		A	Europium-154 by GEA	uCi/g	n/a	<8.73e-03	<2.93e-02	<3.02e-2	n/a	n/a	n/a	2.90e-02	n/a
S97N000060		A	Europium-155 by GEA	uCi/g	n/a	<6.66e-03	<2.53e-02	<2.53e-2	n/a	n/a	n/a	2.50e-02	n/a
S97N000060		A	Radium-226 by GEA	uCi/g	n/a	<3.93e-02	<1.66e-01	<1.64e-1	n/a	n/a	n/a	1.66e-01	n/a
S97N000060		A	Actinium-228 by GEA	uCi/g	n/a	<1.26e-02	<5.68e-02	<5.80e-2	n/a	n/a	n/a	5.70e-02	n/a
S97N000060		A	Americium-241 by GEA	uCi/g	n/a	<1.57e-02	1.89e-01	2.55e-01	2.22e-01	29.7	n/a	n/a	32.7
S97N000060		A	Am-241 by Extraction	uCi/g	114.4	<1.72e-02	2.25e-01	2.14e-01	2.20e-01	5.01	n/a	2.60e-02	1.75E+00
S97N000060		A	Cm-243/244 by Extraction	uCi/g	n/a	<1.72e-02	<2.64e-02	<2.58E-2	n/a	n/a	n/a	2.60e-02	1.00E+02
S97N000060		A	Alpha of Digested Solid	uCi/g	92.50	<3.03e-03	4.77e-01	4.57e-01	4.67e-01	4.28	119.4	8.00e-03	6.60E+00

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S97N000060		A	Beta of Solid Sample	uCi/g	103.3	<2.03e-02	8.030	7.690	7.860	4.33	108.8	2.40e-02	1.29E+00
S97N000062			Ammonia by ISE-Std Additions	ug/mL	102.0	<1.000	<1.00e+0	<1.00e+0	n/a	n/a	106.0	1.00e-02	n/a
S97N000062			pH Direct	pH	99.75	n/a	7.780	7.870	7.825	1.15	n/a	1.00e-02	n/a
S97N000062			Fluoride-IC-Dionex 4000/4500	ug/mL	99.15	<1.20e-02	< 1.212	<1.21e0	n/a	n/a	87.12	1.212	n/a
S97N000062			Chloride-IC-Dionex 4000/4500	ug/mL	99.49	<1.70e-02	46.40	45.10	45.75	2.84	92.15	1.717	n/a
S97N000062			Nitrite-IC - Dionex 4000/4500	ug/mL	98.35	<1.08e-01	< 10.91	<1.09e1	n/a	n/a	92.28	10.91	n/a
S97N000062			Bromide by Ion Chromatograph	ug/mL	99.15	<1.25e-01	< 12.62	<1.26e1	n/a	n/a	96.60	12.62	n/a
S97N000062			Nitrate by IC-Dionex 4000/4500	ug/mL	98.32	<1.39e-01	< 14.04	<1.40e1	n/a	n/a	95.79	14.04	n/a
S97N000062			Phosphate-IC-Dionex 4000/4500	ug/mL	99.63	<1.20e-01	< 12.12	<1.21e1	n/a	n/a	97.61	12.12	n/a
S97N000062			Sulfate by IC-Dionex 4000/4500	ug/mL	97.62	<1.38e-01	73.12	72.20	72.66	1.24	94.61	13.94	n/a
S97N000064		T	Mercury by CVAA (Perkin Elmer)	ug/mL	63.84	5.00e-03	<5.00e-03	<0.005	n/a	n/a	34.50	5.00e-03	n/a
S97N000064		T	Silver -ICP-TCLP Digest-Liquid	ug/mL	102.0	<1.00e-02	<4.24e-02	<4.56e-2	n/a	n/a	58.56	4.20e-02	n/a
S97N000064		T	Arsenic -ICP-TCLP Digest-Liq	ug/mL	105.4	<1.00e-01	<4.24e-01	<4.56e-1	n/a	n/a	103.1	4.24e-01	n/a
S97N000064		T	Barium -ICP-TCLP Digest-Liquid	ug/mL	114.8	<5.00e-02	3.790	5.000	4.395	27.5	105.6	2.12e-01	n/a
S97N000064		T	Cadmium -ICP-TCLP Digest-Liq	ug/mL	105.1	<5.00e-03	1.17e-01	1.36e-01	1.27e-01	15.0	102.4	2.10e-02	n/a
S97N000064		T	Chromium -ICP-TCLP Digest-Liq	ug/mL	105.1	<1.00e-02	3.85e-01	6.50e-01	5.18e-01	51.2	103.4	4.20e-02	n/a
S97N000064		T	Lead -ICP-TCLP Digest-Liquid	ug/mL	107.3	<1.00e-01	5.440	7.740	6.590	34.9	94.86	4.24e-01	n/a
S97N000064		T	Selenium -ICP-TCLP Digest-Liq	ug/mL	136.1	1.51e-01	<4.24e-01	<4.56e-1	n/a	n/a	153.7	4.24e-01	n/a
S97N000066		B	Acid Digest	DF	n/a	1.000	1.000	1.000	1.000	0.00	100.0	1.00e-02	n/a
S97N000066		A	Silver -ICP-Acid Digest	ug/mL	97.90	<1.00e-02	<4.00e-02	<4.00e-2	n/a	n/a	39.67	4.00e-02	n/a
S97N000066		A	Arsenic -ICP-Acid Digest	ug/mL	101.0	<1.00e-01	<4.00e-01	<4.00e-1	n/a	n/a	99.18	4.00e-01	n/a
S97N000066		A	Barium -ICP-Acid Digest	ug/mL	96.20	<5.00e-02	3.500	4.270	3.885	19.8	103.3	2.00e-01	n/a
S97N000066		A	Beryllium -ICP-Acid Digest	ug/mL	104.0	<5.00e-03	<2.00e-02	<2.00e-2	n/a	n/a	0.00e+00	2.00e-02	n/a
S97N000066		A	Cadmium -ICP-Acid Digest	ug/mL	95.80	<5.00e-03	1.45e-01	1.67e-01	1.56e-01	14.1	98.67	2.00e-02	n/a
S97N000066		A	Chromium -ICP-Acid Digest	ug/mL	96.80	<1.00e-02	3.55e-01	5.49e-01	4.52e-01	42.9	100.9	4.00e-02	n/a
S97N000066		A	Nickel -ICP-Acid Digest	ug/mL	99.00	<2.00e-02	8.84e-01	8.98e-01	8.91e-01	1.57	0.00e+00	8.00e-02	n/a
S97N000066		A	Lead -ICP-Acid Digest	ug/mL	94.80	<1.00e-01	5.040	6.570	5.805	26.4	92.68	4.00e-01	n/a
S97N000066		A	Antimony -ICP-Acid Digest	ug/mL	95.80	<6.00e-02	<2.40e-01	<2.40e-1	n/a	n/a	0.00e+00	2.40e-01	n/a
S97N000066		A	Selenium -ICP-Acid Digest	ug/mL	91.40	<1.00e-01	<4.00e-01	<4.00e-1	n/a	n/a	132.9	4.00e-01	n/a
S97N000066		A	Thallium -ICP-Acid Digest	ug/mL	90.60	<2.00e-01	<8.00e-01	<8.00e-1	n/a	n/a	0.00e+00	8.00e-01	n/a
S97N000066		A	Vanadium -ICP-Acid Digest	ug/mL	95.80	<5.00e-02	<2.00e-01	<2.00e-1	n/a	n/a	0.00e+00	2.00e-01	n/a

Antimony-125 Analytical Results

Sample #	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err%
S97N000060	A	Antimony-125 by GEA	µCi/g	n/a	<7.00E-03	<3.39E-02	<3.41E-02	n/a	n/a	n/a	7.00E-03	n/a

NHC
Numatec
Hanford Corporation
An SGN/Cogema, Inc. Company

Internal
Memo

From: B. A. Crawford
R. K. Fuller
Phone: 373-1972
373-1883
Date: June 17, 1997
Subject: TOXICITY CHARACTERISTIC LEACH RESULTS FROM 105-N LIFT STATION SAMPLES

To: G. L. Miller T6-06

cc: W. I. Winters T6-07
J. Y. Bourges T6-07
C. M. Seidel T6-14
R. Akita T6-20
A. D. Rice T6-06
2 copies for file

One 105-N Lift Station sample has been analyzed after leaching according to LA-544-134 "Toxicity Characteristic Leach Procedure (TCLP) - Nonvolatile Samples". The results for this sample are provided in attachment 1 and are available on LabCore under sample numbers S97N000064 and S97N000066 (acid digest ICP results). The sample was received as a solid for TCLP extraction under LabCore identification S97N000058. Subsequent to leaching the sample identification number was changed to S97N000064 so that it could be tracked in LabCore as a liquid matrix. LabCore data entry templates are included at the end of the data provided in attachment 1. These templates report the sample dilution factors that were used to provide the results reported under the sample number S97N000064. The dilution factor used in the acid digestion of the leachate (S97N000066) is 1 in all cases.

The sample was fine sand with some larger gravel pieces that passed the <9.5 mm particle size criterion on inspection. Sample was weighed onto a suction filtration system. A 5.291 g. subsample of the waste was dried in a oven set at 105°C for four hours and 45 minutes. The pH of the solids were determined after adding 23.0 mL of Q-water to 1.190 g. of solids and stirring for 5 minutes. The pH was 6.04. Upon adding 833 μl of HCl to the slurry and heating to 50°C and cooling to 25°C (room temperature), the pH dropped to 2.74. This pH was less than 5.0, so extract #1 was selected for the leaching procedure. After drying was complete, the solids remaining from the first sample aliquot were 92.47 wt. % of the original sample.

The remaining sample from S97N000058 was divided into two subsamples: 20.230 g of sample was transferred to a pre-rinsed polyethylene extraction bottle labeled "S97N000064 sample" and 9.658 g of sample was transferred to an extraction bottle labeled "S97N000064 duplicate". The sample and duplicate were extracted for 19.5 hours in 388.194 g and 104.900 g of extract #1 respectively.

A preparation blank was obtained by pouring approximately 40 mL of extract #1 in a vial labeled "Prep. Blank." A preparation standard was also prepared by adding 8.0 mL of a TCLP standard containing Ba, As, Cr, Pb, Ag, Cd and Se and 400 μl of a standard containing Hg to 40 mL of extract #1. This extract was then acidified to pH 1.55 by addition of 8.0 mL of 1 N HNO_3 to the spiked extract.

A matrix spike was prepared by splitting the sample into two equal volume aliquots of 120.0 mL each. One sample was set aside. The second sample, labeled S97N000064 matrix spike, was spiked with 16.0 mL of the TCLP multielement standard and 200 μl of the Hg standard. The pH of the matrix spike was 1.98. The pH of the duplicate sample was 1.95 after addition of 10 mL of 1 N HNO_3. The dilution factors used in LabCore calculations account for any acid added to the samples.

All elements with the exception of Pb are below regulatory limits in the sample. The Pb concentration in the undigested leachate is at 5.44 μg/mL for both the sample and the duplicate (regulatory limit is 5.00 μg/mL). The preliminary results for the acid digested leachate were 5.04 μg/mL and 6.15 μg/mL for the duplicate reflecting a higher result than observed in the undigested leachate. The spike recovery for Pb in the undigested leachate was 95% which also reflects the conservative result of 5.44 μg/mL found in the undigested TCLP extract. Other ICP metal results were well below regulatory limits. The spike recovery for Hg in the TCLP matrix was notably below the 50% recovery criterion at 35%. However the reported concentration of Hg in the leachate was below detection limits at <0.005 μg/mL. If the poor spike recovery is considered with the current detection limit for mercury the "corrected" mercury result is still below 10% of the regulatory limit concentration.

ICP results from the matrix spike sample indicate all other elements with the exception of Ag are near or slightly greater than 100%. The Ag spike recovery was 58.6%. As mentioned previously the spike recovery for Hg was below 50%. However, standard additions were not performed because the concentration of Hg found in the sample was well below the regulatory concern limit.

The process notes from the extraction of these samples are attached to this report (attachment 2) if additional information is needed. Further questions may also be addressed by Bev Crawford 373-1972 or Keith Fuller 373-1883.

B. A. Crawford
B. A. Crawford
Numatec Hanford Corp.

Keith Fuller
R. K. Fuller
Rust Federal Services

cw

Attachment

NHC
Numatec
Hanford Corporation
An SGN/Cogema, Inc. Company

Internal Memo

From: Analytical Technology
Phone: 372-2653 T6-50
Date: June 13, 1997
Subject: INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY (ICP/MS) RESULTS FOR 105-N LIFT STATION

To: G. L. Miller T6-06

cc: J. Y. Bourges T6-07
B. A. Crawford T6-50
C. M. Seidel T6-14
W. I. Winters T6-50
JWB/LB

Attached is the ICP/MS data table for 105-N Lift Station. Isotopic thorium and uranium data were collected on June 9, 1997. The instrument was mass and response calibrated in the actinide region using thorium and uranium calibration standards. The preliminary data was distributed on June 9, 1997 for the customer to review.

In order to monitor the isotopic uranium performance, a certified natural uranium test standard was utilized (NIST SRM-4321B). As indicated by the data table, recoveries within 1.5% of the certified value were achieved for the U-235/U-238 ratio. This check standard was run before and after the 105-N Lift Station samples. As indicated by the attached data table, the absolute concentrations for this standard varied between runs. This is a result of different dilutions being prepared for each standard run. The important data, however, are the U-235/U-238 recoveries rather than the absolute concentrations of the isotopes.

Although the levels of U-235 and U-238 can be accurately computed, the U-234 concentrations are estimated based on the U-234 response relative to U-235. The mass response at 234 was not directly calibrated due to the small concentration of U-234 in available standards. As a result, the U-234 results are estimated to be accurate within 50%.

The Th-232 concentration indicated <0.50 ppm using a direct calibration method. Th-232 was calibrated with 50, 100, and 250 ppb calibration standards. This sample was in the ppt range as analyzed (digested and diluted). The calibration standards were too high to achieve an accurate trace level determination. Ion counts were detected for Th-232, however. Since U-235 was calibrated with low level standards, an estimate could be made for the Th-232 concentration by comparing its ion count to U-235.

Using this approach, the Th-232 concentration was estimated to be approximately 0.7 ± 0.1 ppm for the sample and duplicate. Although Th-232 could be quantified using this approach, the concentration was conservatively reported in the data table as <1.0 ppm.

If you have any questions regarding these results, please feel free to call me at 372-2653.

J. W. Ball, Ph.D.
Scientist I

Attachment

ICP/MS RESULTS FOR 105-N LIFT STATION

INSTRUMENT QC (initial)

	Th-228	Th-230	Th-232	U-234	U-235	U-238
ICB	< 0.050 ppb	< 0.050 ppb	< 0.050 ppb	< 0.050 ppb	< 0.050 ppb	< 0.050 ppb
ICV	NA	NA	102%	NA	NA	102%

ISOTOPIC URANIUM CERTIFIED CHECK STANDARD

	U-234	U-235	U-238	235/238	235/238 (certified ratio)	Recovery
SRM 4321B	< 0.050 ppb	0.697 ppb	97.3 ppb	0.00716	0.00725	98.8%

SAMPLE RESULTS

	Th-228	Th-230	Th-232	U-234	U-235	U-238	235/238
S97N000060	< 0.50 ppm	< 0.50 ppm	< 1.0 ppm (1)	< 0.50 ppm	12.1 ppm	1610 ppm	0.00753
S97N...60_DUP	< 0.50 ppm	< 0.50 ppm	< 1.0 ppm (1)	< 0.50 ppm	11.6 ppm	1510 ppm	0.00768

ISOTOPIC URANIUM CERTIFIED CHECK STANDARD

	U-234	U-235	U-238	235/238	235/238 (certified)	Recovery
SRM 4321B	< 0.050 ppb	0.668 ppb	91.02 ppb	0.00734	0.00725	101.0%

PREP QC

	Th-228	Th-230	Th-232	U-234	U-235	U-238	U-238 Rec.
Prep Blank	< 0.050 ppb	< 0.050 ppb	0.114 ppb	< 0.050 ppb	< 0.050 ppb	0.090 ppb	NA
LCS Std	NA	NA	NA	NA	NA	9420 ppb	94.2%
S97N...60_SPK	NA	NA	NA	NA	NA	9540 ppb	95.4%

INSTRUMENT QC (final)

	Th-228	Th-230	Th-232	U-234	U-235	U-238
CCB	< 0.050 ppb	< 0.050 ppb	< 0.050 ppb	< 0.050 ppb	< 0.050 ppb	< 0.050 ppb
CCV	NA	NA	93.5%	NA	NA	95.6%

Footnotes:

1) Although the Th-232 in the sample and duplicate for S97N000060 was below the method detection limit, it was detected and is estimated to be approximately 0.7 ppm.

WSCF
ANALYTICAL LABORATORY REPORT

ANALYSIS OF BULK SAMPLES FOR FIBER CONTENT

for

Rust Federal Services of Hanford, Inc.
Richland , WA 99352

Attention: GL MILLER MSIN T6-06

Survey ID

Data Validator MK Hamilton
(Approved Signatory)

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Group#: 97000865
Report Date 16-jun-1997
bulk/rev.2

Rust Federal Services of Handford, Inc.
MSIN: S3-28
Richland, WA 99352

WSCF
ANALYTICAL LABORATORY REPORT

ANALYSIS OF BULK SAMPLES FOR FIBER CONTENT

Your samples have been analyzed for fiber content using polarized light microscopy and dispersion staining in accordance with Industrial Hygiene Laboratory Procedure HAPR70-5, based on 40 CFR Part 763, Subpart E, App. E and EPA method EPA/600/R-93/116. The results are attached.

This method provides a visual estimate of the precentage of each fiber type present. It is a semiquantitative method intended to identify materials containing > or = 1% asbestos fibers.* Reported fiber percentages for samples and sample layers are based on the samples as received by the laboratory. The laboratory cannot verify that these values are representative of the original material sampled.

The Waste Sampling and Charcaterization Facility, is accredited by the National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP), to analyze bulk samples for asbestos content. This accreditation does not constitute approval or endorsement of analytical results by NIST nor does it apply to other analyses performed by this laboratory.

If there are questions concerning this report, please contact the approved signatory listed on the cover page of this report.

* Because of the nonhomogeneous nature of soils, results will be reported using the following terms rather than percentages:

1. None - No asbestos fibers found.

2. Trace detectable - With extensive searching, a few fibers of the type indicated were found; concentration very low, well below 1%.

3. Obvious presence - Fibers easily found but overall concentration still low.

4. Significant presence - Fibers readily found; overall concentration may approach or exceed 1% level.

Polarized light microscopy (PLM) may not be the preferred method for identification of asbestos in floor tile. Most vinyl floor tiles marketed in the late sixties to mid-seventies contained asbestos milled so fine as to be below detection limits for PLM techniques. Tiles of that vintage, showing any detectable asbestos fibers should be considered to be asbestos-containing material. Non-detection of asbestos by PLM should not be considered conclusive proof that the tiles do not contain asbestos. Follow-up analysis by other techniques may be required.

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WSCF
ANALYTICAL LABORATORY REPORT

Attention: GL MILLER MSIN T6-06 **Group #:** 97000865

Sample #	Client ID	Test Performed	Range	Result	Units	Analyst	Sampled	Received	Analyzed
W971001103	BOKBH6	The following are the results of this test- Bulk Asbestos Layer 1							
		Amosite Asbestos		present	%	dwe1	04/21/97	06/04/97	06/05/97
		Cellulose		present	%	dwe1	04/21/97	06/04/97	06/05/97
		Chrysotile Asbestos		present	%	dwe1	04/21/97	06/04/97	06/05/97
		Mineral Wool		present	%	dwe1	04/21/97	06/04/97	06/05/97
		Synthetic		present	%	dwe1	04/21/97	06/04/97	06/05/97

SAMPLE COMMENT--- Sample consisted of fibers and other debris collected on a
SAMPLE COMMENT--- filter. Amosite, mineral wool, and synthetic fibers were
SAMPLE COMMENT--- present at significant levels (probably greater than 1%).
SAMPLE COMMENT--- Chrysotile was obviously present (easy to find but at low
SAMPLE COMMENT--- concentrations) and celulose was found at trace levels
SAMPLE COMMENT--- (extensive searching, concentration probably well below 1%)
SAMPLE COMMENT---
SAMPLE COMMENT--- It should be noted that the refractive indices for both the
SAMPLE COMMENT--- amosite and chrysotile asbestos fibers were lower than
SAMPLE COMMENT--- normally seen for these minerals. All morphological
SAMPLE COMMENT--- characteristics were as expected. The shifts in refractive
SAMPLE COMMENT--- indices appeared to be due to the hot acid digestion. When
SAMPLE COMMENT--- NIST-traceable amosite and chrysotile were taken through the
SAMPLE COMMENT--- same acid digestion procedure as the 105-N basin sample,
SAMPLE COMMENT--- similar refractive index shifts were observed; therefore,
SAMPLE COMMENT--- the shifts do not in any way compromise or invalidate the
SAMPLE COMMENT--- asbestos identifications in the 105-N basin sample.

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HNF-SD-WM-DP-246, REV. 0

MDL=Minimum Detection Limit
RQ=Result Qualifier B - The analyte was detected in the associated method blank. J - Estimated value.
N - Identification is based on a mass spectral library search. U - The analyte was analyzed for but not detected.

bulk/rev.2 This report may not be reproduced, except in its entirety without the written approval of the WSCF Laboratory.

WSCF
ANALYTICAL COMMENT REPORT

Attention: GL MILLER MSIN T6-06 **Group #:** 97000865

Sample #	Client ID	Lab Area	Test	Comment
		VALGROUP		Validated 6/16/97 by MK Hamilton.
W97I001103	BOKBH6	LOGSAMP		LOGGED BY MKG 6/5/97.
				Sample is reportedly acid digestion residue of 105-N Basin sludge, deposited on a filter.
		TESTDATA	Bulk Asbestos Layer 1	Sample consisted of fibers and other debris collected on a filter. Amosite, mineral wool, and synthetic fibers were present at significant levels (probably greater than 1%). Chrysotile was obviously present (easy to find but at low concentrations) and celulose was found at trace levels (extensive searching, concentration probably well below 1%)
				It should be noted that the refractive indices for both the amosite and chrysotile asbestos fibers were lower than normally seen for these minerals. All morphological characteristics were as expected. The shifts in refractive indices appeared to be due to the hot acid digestion. When NIST-traceable amosite and chrysotile were taken through the same acid digestion procedure as the 105-N basin sample, similar refractive index shifts were observed; therefore, the shifts do not in any way compromise or invalidate the asbestos identifications in the 105-N basin sample.

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HNF-SD-WM-DP-246, REV. 0

Lab Areas: VALGROUP - Group Validation VALTEST - Test Validation TESTDATA - Test Data Entry
LOGSAMP - Login for Sample LOGTEST - Login for Tests

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KFSH 7100086S

Westinghouse Hanford Company	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C. No.
		Page 1 of 1

Collector: 222-S Laboratory	Contact/Requestor: George L. Miller	Telephone No.: 373-4739 MSIN: T6-06 FAX: 372-1878
SAF No.	Sample Origin: 105-N Lift Station, BOKBH6	Purchase Order/Charge Code: W/O #DB7311, Org Code 31130
Project Title: 105-N Lift Station Project (ERC)	Logbook No.	Ice Chest No. Temp.
Shipped To (Lab): WSCF, Sandra Cobb	Method of Shipment	Bill of Lading/Air Bill No.
Protocol	Data Turnaround: Analysis and report required by 6/16/97	Offsite Property No.

Sample No.	Lab ID	*	Date	Time	No./Type Container	Sample Analysis	Preservative
BOKBH6	W97S001103 S97N000060	SO			1 fltr in dish	Bulk Asbestos on acid digestion residue of 105-N Basin sludge	None

POSSIBLE SAMPLE HAZARDS/REMARKS (List all known wastes) MSDS ☐ Yes ☒ No

Dose rate is expected to be insignificant; Sample has potential to contain asbestos fibers.

This sample is suspected to contain PCBs. Segregate and dispose of wastes accordingly.

SPECIAL INSTRUCTIONS

During handling and transportation of this sample, care should be exercised to keep the sample and its container upright, and to keep the petri dish lid closed to prevent loss of dry fiber materials.

This sample is suspected to contain PCBs.

Hold Time: n/a

Relinquished By (Print / Sign)	Date/Time	Received By (Print / Sign)	Date/Time
George L Miller	6/4/97 1428	Verne Poirier	6-4-97 14:30
Verne Poirier	6-4-97 1445	[illegible]	6/4/97 1445

Matrix*

S = Soil		DS = Drum Solids	
SE = Sediment		DL = Drum Liquids	
SO = Solid		T = Tissue	
SL = Sludge		WI = Wipe	
W = Water		L = Liquid	
O = Oil		V = Vegetation	
A = Air		X = Other	

FINAL SAMPLE DISPOSITION: Disposal Method (e.g., Return to customer, per lab procedure, used in process): Return to 222-S for disposal. This sample is suspected to contain PCBs. Disposed By: Date/Time:

All samples containing hazardous materials shall be picked up by requestor and returned to parent container or site of origin.

DISTRIBUTION: White - Remain with Samples Color - Customer

BC-6000-828 (12/95)

HNF-SD-WM-DP-246, REV. 0

REQUEST FOR SPECIAL ANALYSIS (RSA)

RSA No.

1. Sample Origin: 105-N Lift Station
2. Date Submitted:
3. Submitted By: George L Miller
4. Requester Name: George L Miller
5. Requester Phone/MSIN: 373-4739
6. Charge Code/Work Package: W/O # DB7311, Org Code 31130
7. Date Required: 6/16/97

8. Customer ID	Collected Date	Collected Time	9. Laboratory ID
BOKBH6	4/21/97	1035	
(S97N000060)			

12. Number of Samples: 1 membrane filter
13. Volume of Samples: N/A
14. Protocols: ☐ None ☐ RCRA ☐ NQA-1 ☑ Other ☐ CERCLA EPA/600/R-93/110

15. Sample Type: ☐ Solid ☐ Soil ☐ Slurry ☐ Gas ☐ Water ☐ Waste ☐ Solution ☐ Sludge ☐ Oil ☑ Other (specify) Acid Digested Solid Residue (d

16. Storage Requirements: ☑ None ☐ Specify

17. Process Knowledge/Known Listed Wastes: ☑ Unknown ☐ Known (Please attach list) ☐ Previously submitted for this Project

10. Determination	11. Expected Range
Asbestos, Bulk	Procedure: HAPR30-5

18. Survey: [signature] HPT Signature — Dose Rate <0.5

19. Disposition of Waste: ☑ Return to Client/Location 222-S Laboratory ☐ Dispose per 222-S Procedures ☐ Other (Sample suspected to contain PCB)

20. Additional Information: Report results to George L Miller, 222-S Laboratory. Include narrative in report, referencing date of analysis, procedure, estimate of asbestos quantity, anomalies and visual observations.

21. Chain of Custody: ☒ No ☐ Yes Number:

22. Assigned Custodial Group (select one): ☐ PCL ☐ PDSU ☐ ENV ☐ Process

23. Sample Received By: [signature] Date: 6/4/97 Time: 1445

24. Laboratory Manager (if required): 74 Date:

BC-6700-181 (11/92)

Waste Sampling and Characterization Facility
P.O. BOX 1970 S3-30, Richland, WA 99352
PHONE: (509) 373-7004/FAX: (509) 373-7134

ACKNOWLEDGMENT OF SAMPLES RECEIVED

Rust Federal Services of Hanford, Inc.
Richland, WA 99352
Attn: GL MILLER MSIN T6-06

Customer Code: RFSH-IH2
PO#: DB7311/31130
Group#: 97000865

The following samples were received from you on 06/04/97. They have been scheduled for the tests listed beside each sample. If this information is incorrect, please contact your service representative. Thank you for using Waste Sampling and Characterization Facility.

Sample#	Sample Id	Matrix	Sample Date
	Tests Scheduled		
W97I001103	BOKBH6	Solid, or handle as if solid	04/21/97
	@BULK1		

Test Acronym Description

Test Acronym	Description
@BULK1	Bulk Asbestos Layer 1

Bechtel Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	B97-076-01	Page 1 of 1

Collector Doug Bowers	**Company Contact** Steve Trent	**Telephone No.** 373-1482	**Project Coordinator** Weiss, RL	**Data Turnaround** 60 Days
Project Designation 105-N Basin Lift Station Sediment Samples	**Sampling Location** 105 lift station (100N)		**SAF No.** B97-076	
Ice Chest No.	**Field Logbook No.** EFL 1133-3		**Method of Shipment** Gov vehicle	
Shipped To 222-S Laboratory	**Offsite Property No.**		**Bill of Lading/Air Bill No.**	

POSSIBLE SAMPLE HAZARDS/REMARKS
Radioactive

Special Handling and/or Storage
cool to 4C

SAMPLE ANALYSIS												
Preservation	~~Cooled~~ 0 2-4-21-97 None		None									
Type of Container	~~P~~ 0 8784-21-97 P		P *									
No. of Container(s)	1		1									
Volume	~~150g~~ 0 8784-21-97 1 L		~750 ml									
	See item (1) in Special Instructions.		See item #1 below									

Sample No.	Matrix *	Sample Date	Sample Time										
B0KBH6	Other Solid	4-27-97	1035	X		X							
See LOI for 105-N Lift Station													

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By	Date/Time	Received By	Date/Time
Doug Bowers	4-23-97 / 1335	[illegible]	4-23-97 1335
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

SPECIAL INSTRUCTIONS
See SAF (B97-076) for all analysis. See LOI/SOW for 105-N Lift Station

(1) Pest/PCBs - 8080 (TCL); ICP Metals - 6010A (SW-846) {Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Iron, Manganese, Nickel, Silicon, Silver, Sodium, Vanadium, Zinc}; Lead - 7421 - (GFAA); Mercury - 7471 - (CV); Selenium - 7740 - (GFAA)

* is a filter housing with filter in it. Composite contents of sample jar and filter.

Matrix *
- S = Soil
- SE = Sediment
- SO = Solid
- SL = Sludge
- W = Water
- O = Oil
- A = Air
- DS = Drum Solids
- DL = Drum Liquids
- T = Tissue
- WI = Wipe
- L = Liquid
- V = Vegetation
- X = Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

Apr. 29. 1997 8:57AM WHC 222S LAB 3:3M 2F BACKSIDE No. 2501 P. 2/2
HNF-SD-WM-DP-246, REV. 0

REQUEST FOR SAMPLE ANALYSIS (RSA)

RSA No.

1. Sample Origin	2. Date Sampled	4. Requestor's Name	6. TPCN/Org. Code
105 lift station 100N	4-21-97	Steve Trent	

3. Submitted By	5. Requestor's Phone/MSIN/FAX
Doug Bowers	Joan Kessner 372-9538

7. Customer ID No.	8. Laboratory ID No.	9. Group ID No.	10. Volume of Sample	11. Matrix of Sample	12. Determination(s)	13. Expected Range
BOKBH6			2x1L	Solid	See LOI for 105N	up to 120mr/hr
					lift station sediment	
					sample	

14. QC Required

- [ ] Per 222-S Laboratory Quality Assurance Plan (WHC-SD-CP-QAPP-016)
- [x] Other (list reference document or attach) Per LOI

15. Chemical Constituents

- [x] Unknown
- [ ] Known (MSDS required)

16. Special Storage Requirements

- [x] No
- [ ] Yes

If Yes, Specify:

17. Do samples contain listed waste?

- [x] No
- [ ] Yes (If Yes, list as an attachment)

18. Special Instructions (Reporting format, holding times, etc.)

Follow analysis per LOI Fax results to Joan Kessner

19. Requested Turnaround Time

- [ ] 2 Weeks
- [ ] 4 Weeks
- [x] Other

per LOI

20. Sample Remitted By:

Date: 4/23/97 Time: 1335

21. Chain of Custody

- [x] No
- [ ] Yes

Number: B97-076-01

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046386

Job No. 22192
Written Response Required? NO
Closes CCN N/A
OU: N/A
TSD N/A
ERA N/A
Subject Code 8610

Environmental Restoration Contractor **ERC Team**

Interoffice Memorandum

TO: S. J. Trent X0-37

DATE: May 23, 1997

COPIES: See Below

FROM: J. H. Kessner
Laboratory and Analytical Services
B1-35/372-9538

SUBJECT: **CLARIFICATION OF ACCURACY REQUIREMENTS - 107N ANALYSIS**

A need for clarification has been identified for the "Sampling and Analysis Plan for the 107-N Basin Recirculation Building Liquid/Sediment," BHI-00973 (SAP). The QA section on Accuracy requirements for sample analyses does not clearly identify how Laboratory Control Sample (LCS) and spiked sample results are to be evaluated. Section 4.7.2 of the SAP may be clarified as per the following:

> "Accuracy is a measure of bias in a measurement system. The closer the value of the measurement agrees with the true value, the more accurate the measurement. This will be expressed as the percent recovery of a known spike analyte or a standard reference sample. For all laboratory analyses, accuracy is +/-3 sigma for the laboratory control sample or +/- 25% recovery for spiked samples. Deviations will be documented in the data report."

Any revisions of the document should incorporate the above in place of the existing Section 4.7.2. This internal memo shall be used guidance and authority for evaluation of LCS and spiked sample results from analyses performed in accordance to the SAP until revisions are made.

RLW:jmd

Copies
R. S. Day X5-54
G. M. Duncan X5-54
W. H. Price H0-20
W. S. Thompson N1-28
R. L. Weiss B1-35
Document and Info Services H0-09

NHC
Numatec
Hanford Corporation
An SGN/Cogema, Inc. Company

Internal
Memo

From: Analytical Chemistry
Phone: 373-1972 T6-50
Date: March 24, 1997
Subject: DEVIATION FROM REGULATORY REQUIREMENTS FOR TOXICITY CHARACTERISTIC LEACH PROCEDURE

To:	G. L. Miller	T6-06	R. L. Weiss	B1-35
	A. D. Rice	T6-06		
cc:	R. Akita	T6-20	L. P. Markel	T6-16
	J. Y. Bourges	T6-07	R. T. Steele	T6-20
	R. K. Fuller	T6-50	T. L. Tung	T6-04
	J. E. Hyatt	T6-03	W. I. Winters 3/21/97	T6-50
	A. G. King	T6-03	BAC File/LB	

A new procedure, LA-544-134 (Attachment 1) has been issued for the use of the Toxicity Characteristic Leach Procedure (TCLP) for non-volatile analysis of N-Basin samples at the 222-S Laboratory. This letter serves to inform you that according to the latest version of the SW-846, method number 1311 (dated July 1992), the requirement for 100 gram minimum samples of waste be used in TCLP, appears to still be binding. However, as was previously stated in correspondence concerning the same procedure on grout samples (Westinghouse Hanford Company Internal Memo 12200-A093-021), the sample size is still not clearly defined for solids. In particular, the TCLP indicates in some sections (7.1, 7.1.5, 7.2, 7.2.1 and 7.2.5) that a minimum sample size of 100 grams is required. However, section 7.2 for metal extraction, which is the subject of the new procedure, also states that, "A minimum sample size of 100 grams (solid and liquid phases) is recommended." The guidance continues to state that, "enough solids should be generated for extraction such that the volume of TCLP extract will be sufficient to support all the analyses required." Based on these statements rendered in the SW-846 document and a jointly drafted guidance from the EPA and U.S. Nuclear Regulatory Commission (NRC), titled "Clarification of RCRA Hazardous Waste Testing Requirements for Mixed Waste," dated March 1992, which states, "The TCLP recommends a minimum sample size of 100 grams (section 7.2), but samples sizes of less than 100g can be used if the result is that the test is still sufficiently sensitive, and can measure the constituents of interest at the regulatory levels prescribed by the Toxic Characteristic," sample sizes of 10 grams have been delineated in the procedure above without reference to minimum quantities. Smaller sample sizes are used in this case and have been used in others to manage radiation exposure to personnel handling mixed wastes.

If there is further concern that these changes affect regulatory requirements for land disposal, it is strongly recommended that the Washington Department of Ecology be notified for concurrence prior to analysis.

B. A. Crawford

B. A. Crawford, PhD.
Principal Scientist
Analytical Chemistry

pad