Remedial Action Report
Red Top Retort Site
Aleknagik, Alaska

Prepared for

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HLA Project 41475

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DISTRIBUTION

1.0 INTRODUCTION

Harding Lawson Associates/Wilder Construction Company Joint Venture (HLA/Wilder) prepared this remedial action report (RAR) for the Bureau of Land Management (BLM) to present results of work completed at the Red Top Retort site in 1998, including: 1) emergency response activities, 2) additional site characterization, 3) confirmation sampling, and 4) disposal of waste materials. The BLM assigned this project to HLA/Wilder under Modifications 1, 2, and 3 to Delivery Order 11 of Contract 1422-N660-C97-3025.

1.1 Site Background

The Red Top Retort site is on the north bank of the Wood River in Section 32, Township 10 South, Range 55 West, Seward Meridian. The site is approximately 1/8 acre in size and is approximately 18 miles north of Dillingham, Alaska, and 2 miles east-southeast of Aleknagik, Alaska (Figure 1).

The Red Top Retort site processed mercury ore (cinnabar) derived at the Red Top Mine from approximately 1952 to 1955. Mercury was extracted by heating crushed ore in a retort chamber (steel cylinder 8.5 feet long and 2 feet in diameter). The chamber was housed in a small wood structure, approximately 10 feet wide and 15 feet long. Heat for the process was produced by burning wood and bunker C fuel.

Previous Investigation and Remedial Action

In June 1994, Quest Environmental (Quest) performed a site assessment of the Red Top Retort site. Laboratory analytical results indicated soils in the vicinity of the retort structure contained mercury and diesel-range organics (DRO) at concentrations exceeding state and federal regulatory levels. In September 1994, the retort building and associated equipment and supplies (including asbestos-containing heat panels and gaskets) were decommissioned and placed in 1-cubic yard (yd^3) plastic storage boxes (totes) and stored onsite. Soil at the former retort building was excavated, placed in 1 yd^3 totes, and stored onsite. The approximate dimensions of the resulting excavation were 55 feet wide, 75 feet long, and 2 to 3 feet deep (Quest, 1995). Samples collected from the limits of the excavation contained total mercury at concentrations ranging from 0.1 milligrams per kilogram (mg/kg) to 97 mg/kg, and DRO at concentrations to 5,800 mg/kg. A liner was placed in the excavation before backfilling with fill obtained from onsite. Approximately 30 yd^3 of DRO-contaminated soil was stockpiled east of the excavation and covered (Quest, 1995).

The U.S. Geological Survey (USGS) performed a mercury speciation study for the geographic area encompassing the Red Top Retort site (USGS, 1996). The results of this report suggest background levels of mercury in the Red Top area are approximately 0.1 to 1.0 mg/kg.

1998 Flood Conditions

During high tide events, the Wood River flooded the Red Top Retort site in late May 1998. By mid-June the water depth at the site was approximately 3 feet during low tide events (near the top of the first layer of totes stored at the site). The site remained flooded until mid July 1998 when the water level dropped and the Wood River returned to normal seasonal flow.

Preliminary Action and Site Cleanup Level

The BLM implemented a preliminary action level for total mercury in soil at 23 mg/kg. This value is based on the U.S. Environmental Protection Agency (EPA) Region 10 risk-based concentration for soil ingestion under a residential scenario.

The Alaska Department of Environmental Conservation (ADEC) cleanup criteria established for the site for total mercury is 1 mg/kg (July 2, 1998, draft of Title 18, Alaska Administrative Code, Chapter 75 [18 AAC 75] - Table B1, Migration to Groundwater). (Note: The cleanup value for total mercury currently established in Table B1 is 0.006 mg/kg. The ADEC informed HLA/Wilder and BLM that this is a typographical error and the actual cleanup value is 1 mg/kg.)

1.2 Site Restoration Objectives

The following objectives were established for the Red Top Retort site during 1998:

- Mobilize an emergency response team to the site during the Wood River flooding to 1) reduce the potential for release of contaminants from the soil stockpile, totes, and drums stored onsite, and 2) where possible, collect samples to assess the potential release of contaminants.
- Characterize, transport, and dispose the stockpiled soil, and wastes stored at the site from the 1994 remedial activities.
- Perform background and confirmation sampling to 1) further characterize background concentrations of total mercury in soil near the site, 2) confirm waste stream storage areas and excavation backfill material are free of contaminants, and 3) confirm treated water discharged at the site meets the requirements of wastewater general permit approved by the ADEC (HLA/Wilder, 1998).
- Collect in situ soil and Wood River sediment samples for target analyte list (TAL) metals (Note: performed as per EPA request to fulfill preliminary assessment/site inspection [PA/SI] requirements and update the site's hazard ranking system [HRS] score).
- Attempt to reestablish the limits of the 1994 excavation and corresponding Quest soil sample locations. Excavate additional soils at those sample locations that contained total mercury at concentrations exceeding 23 mg/kg (the preliminary action site cleanup level), and DRO at concentrations exceeding 100 mg/kg. Collect additional soil samples from within the excavation for laboratory analyses. If the 1994 sample locations cannot be reestablished with confidence, reestablish a new grid and collect soil samples for total mercury analysis.
- Characterize, transport, and dispose additional soil and wastes generated during 1998 remedial activities.

2.0 FIELD ACTIVITIES

HLA/Wilder commenced with field activities on May 31, 1998. Work was performed periodically at the site through early October 1998. The following is a summary of completed field activities:

- Site visit to assess Wood River flooding and logistics required for moving the stored materials to higher ground (May 31, 1998);
- Emergency response to Wood River flooding (June 9 to June 13, 1998);
- Flood stage characterization sampling (June 30, 1998);
- Site characterization, and transport and disposal of waste activities (August 31 through December 1998);
- Excavation of additional soil (from within the 1994 excavation) thought to contain elevated levels of total mercury and/or DRO (September 1998);
- Retort area site characterization (September 1998);
- Characterization and classification of wastes stored onsite since 1994 (June and September 1998);
- Confirmation soil sampling below and adjacent to waste storage liners (September 1998);
- Background sampling of soils near the site (September 1998);
- Handling, labeling, transporting, and disposing wastes generated in 1994 and 1998 (September through December 1998);
- Performing onsite treatment and confirmation sampling of rinse and decontamination water generated during the 1998 field activities (September 1998);
- Collecting in situ soil samples from within the limits of the excavation area and sediment samples from the Wood River, and submitting the samples for TAL metals laboratory analysis (September 1998).

A photographic log of 1998 field activities is presented in Appendix A.

2.1 Emergency Response and Sampling

On May 29, 1998, the ADEC informed the BLM that Wood River waters were flooding the Red Top Retort site. The ADEC, in concurrence with the EPA, required the BLM to initiate emergency response measures to move the totes from the Wood River flood plain.

On May 31, 1998, BLM personnel and HLA/Wilder's project manager mobilized to the site to assess conditions and logistics required for moving the stored materials to higher ground. HLA/Wilder prepared a work plan/site safety and health plan and mobilized a construction crew, equipment, and materials to the site on June 9, 1998, to move stored materials. On June 10, 1998, the increasing high-water levels of the Wood River presented unsafe conditions for moving the totes.

As an alternative measure, sandbags were placed upstream of the stored materials to form a low-permeable wall and minimize the flow of water through the tote storage area. Reinforced plastic sheeting was then wrapped around the stored materials and a new cover of reinforced plastic was placed over the DRO-contaminated soil stockpile and secured with sandbags.

On June 30, 1998, collocated sediment and surface water samples were collected in the tote storage area, and at upgradient and downgradient locations, and submitted to CT&E Environmental Services, Inc. (CT&E), in Anchorage, Alaska, for total mercury analysis. Collocated sediment and surface water samples were also collected upstream and downstream of the DRO-contaminated soil stockpile and submitted to the CT&E for DRO, total mercury, and benzene, toluene, ethylbenzene, and total xylenes (BTEX) analyses. A sample collection summary is provided in Table 1, and locations are shown on Figure 2.

In early July 1998, the Wood River water level subsided and the retort site was exposed. On August 31, 1998, the HLA/Wilder field crew remobilized to the site to complete site restoration objectives.

2.2 Additional Excavation and Site Characterization

HLA/Wilder removed backfill from the 1994 excavation area and exposed the liner placed by Quest. The excavation dimensions did not correlate with the dimensions documented in Quest's 1995 RAR, and sample locations could not be reestablished with confidence.

HLA/Wilder located areas for additional excavation by interpolating between actual excavation limits and the limits of the excavation as documented in the RAR (Quest, 1995). Approximately 9 yd^3 of soil was removed from locations shown on Figure 3. Excavated soils were placed in 1 yd^3 supersacks for transport and disposal.

Because the 1994 sample locations could not be accurately relocated, HLA/Wilder established a new sampling grid over the excavated area (Figure 3). Soil samples were collected at each node of the grid and submitted to CT&E for total mercury analysis. Selected samples were also submitted to CT&E for TAL metals analysis (part of the EPA request for additional data to satisfy PA/SI requirements). One sample from each supersack was collected and submitted to CT&E for mercury toxicity characteristic leaching procedure (TCLP) analysis. Analysis, location, and quantity of site characterization samples are summarized in Table 1.

Sections of reinforced plastic liner were placed over sample locations and in areas where the 1994 liner was damaged. The excavation was backfilled with clean fill and regraded to blend with the surrounding topography.

Table 1. 1998 Sample Collection Summary – Red Top Retort

			Number of Samples						
		Parameter	BTEX	DRO	PAHs	Total Mercury	TCLP Mercury	TAL Metals	QC Samples
		Method	EPA 602	AK 102	EPA 610	EPA 7470	EPA 1311/7470	EPA 7000/6010	
Location	Material	Notes							
EMERGENCY RESPONSE SAMPLING									
Retort Area During Wood River Flooding	Sediment	Samples	2	2	--	5	--	--	1/DRO,BTEX, Mercury
Retort Area During Wood River Flooding	Surface Water	Samples	2	2	--	5	--	--	1/DRO,BTEX, Mercury
ADDITIONAL EXCAVATION AND SITE CHARACTERIZATION									
Retort Excavation Limits	Soil	25 node sampling grid established	--	--	--	25	--	3	3/Total Mercury
WASTE STREAM CHARACTERIZATION									
Totes	Soil	178 totes containing soil contaminated with mercury	--	--	--	46 (9 composite)	139 (6 composite)	--	12/TCLP Mercury
Supersacks (additional retort excavation)	Soil	9 supersacks containing soil contaminated with mercury	--	--	--	--	9	--	--

Table 1. 1998 Sample Collection Summary – Red Top Retort (continued)

		Parameter	Number of Samples						
			BTEX	DRO	PAHs	Total Mercury	TCLP Mercury	TAL Metals	QC Samples
		Method	EPA 602	AK 102	EPA 610	EPA 7470	EPA 1311/7470	EPA 7000/6010	
Location	Material	Notes							
DRO Contaminated Soil Stockpile	Soil	69 supersacks containing soil contaminated with DRO	--	3	--	3	1 (composite)	--	1/DRO, mercury, TCLP mercury
55-gallon Drum of Waste Water Sludge	Soil	Sludge from water treatment process	--	--	--	--	--	1	--
CONFIRMATION AND BACKGROUND SAMPLING									
DRO Contaminated Soil Stockpile Area	Soil	Center and outside footprint area	2 (EPA Method 8021)	2	--	2	--	--	--
Material (tote) Storage Area	Soil	Center of liner footprint	--	--	--	1	--	--	--
1994 Retort Excavation Fill	Soil	Center of fill	--	--	--	1	--	--	--
Background Mercury Sample	Soil	Sample location shown on Figure 2	--	--	--	1	--	--	--
Water Treatment Confirmation Samples	Water	Two, 500-gallon batches of treated	3	--	3	--	--	3	1/BTEX, PAHs, TAL metals

Table 1. 1998 Sample Collection Summary – Red Top Retort (continued)

			Number of Samples						
		Parameter	BTEX	DRO	PAHs	Total Mercury	TCLP Mercury	TAL Metals	QC Samples
		Method	EPA 602	AK 102	EPA 610	EPA 7470	EPA 1311/7470	EPA 7000/6010	
Location	Material	Notes							
WOOD RIVER SEDIMENT SAMPLING									
Wood River	Sediment	Samples locations shown on Figure 2	--	--	--	--	--	5	1/TAL metals

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-- Not applicable
ADEC Alaska Department of Environmental Conservation
BTEX Benzene, toluene, ethylbenzene, and xylenes
DRO Diesel-range organics
EPA U.S. Environmental Protection Agency
ft Feet
PAHs Polynuclear aromatic hydrocarbons
QC Quality control
TAL Target Analyte List
TCLP Toxicity Characteristic Leaching Procedure

2.3 Waste Stream Characterization

HLA/Wilder performed characterization sampling of waste streams generated at the site in 1994 and 1998. The following waste streams are attributed to work performed in 1994:

- 178 totes (1-yd^3 each) containing mercury-contaminated soil and debris.
- The DRO-contaminated soil stockpile (HLA/Wilder transferred into 69 supersacks).
- Miscellaneous scrap metal and debris from the retort shack demolition and scrap 55-gallon drums (strapped to eight pallets).
- One tote with liner material from the DRO stockpile.
- One supersack with liner material from the tote storage area.
- One 55-gallon drum with waste oil.

The following waste streams were generated during work completed in 1998:

- Nine supersacks of mercury-contaminated soil.
- One 55-gallon drum of waste water sludge.
- One 55-gallon drum of used personal protection equipment.
- Two drums of Zeolite™ (used for onsite water treatment).
- One drum of granular activated carbon (used for onsite water treatment).

Waste characterization samples were collected using decontaminated spade shovels or hand trowels. Samples were submitted to CT&E for laboratory analyses (Table 1). The following is a summary of the sampling activities completed for each of the waste streams.

Totes and Supersacks Containing Mercury-Contaminated Soil

Waste stream characterization samples were collected from near the center of each tote and at a depth of approximately 12 to 18 inches. One sample was also collected from each of the nine supersacks generated in 1998. The samples were submitted to CT&E for composite or discrete sample TCLP mercury and/or total mercury analysis. Appendix B includes sampling logs and analytical data tables.

DRO-Contaminated Soil Stockpile

Waste characterization samples were collected at three locations from a minimum depth of 18 inches before excavating and placing the soil stockpile in supersacks.

Samples were submitted to CT&E for total mercury and DRO analyses. A composite sample was prepared from the three locations and analyzed for TCLP mercury.

55-Gallon Drums

One sample was collected from one 55-gallon drum of waste water sludge generated in 1998. The sample was submitted to CT&E for TAL metals analysis.

All rinse and decontamination water generated during 1998 construction activities was treated and discharged onsite (section 2.4).

2.4 Confirmation and Background Sampling

HLA/Wilder collected confirmation samples during the course of 1998 field activities to verify waste storage areas, excavation backfill, and treated water were free of contamination. One background sample was collected to evaluate background mercury concentrations. The following is a summary of confirmation and background sampling:

- One surface soil sample was collected from fill material in the center of the 1994 excavation footprint. The sample was submitted to CT&E for total mercury analysis.
- One surface soil sample was collected under the center of the waste material storage area liner. The sample was submitted to CT&E for total mercury analysis.

- A sample grid was established around the DRO-contaminated soil stockpile footprint (see Figure 2). A surface soil sample was collected from each node of the sample grid and field screened for organic vapors using a photoionization detector. The two samples with the highest field screening results were submitted to CT&E for total mercury, DRO, and BTEX analyses.
- Three water samples were collected from two 500-gallon batches of treated rinsate/decontamination water. The samples were submitted to CT&E for BTEX, polynuclear aromatic hydrocarbons (PAHs), and TAL metals analyses.
- One background sample was collected near the retort site (Figure 2) and submitted to CT&E for total mercury analysis.

Sample locations are shown on Figure 2.

2.5 Waste Handling, Transport, and Disposal

Transport and disposal of wastes began in September 1998. BLM anticipates completing transporting and disposing the wastes by January 1999. Totes that exhibited any sign of deterioration, such as cracks or breaks, were reinforced with steel banding before being moved. All other soils were loaded into supersacks for shipment to disposal facilities. Waste oil was transported in a 55-gallon steel drum with bung-type opening. Scrap metal and other debris too large to fit into totes were strapped to wood pallets with steel banding.

HLA/Wilder maintained a waste record log that documented container identification numbers, container type, contents, associated sample numbers, field observations, and shipping information. The contents of each tote were photographed for documentation purposes.

The waste streams were transported via barge to Dillingham, Alaska. In Dillingham the containers were transferred into 20-foot steel connexes that were transported via a commercial barge carrier to Phillip Services Corporation in Seattle, Washington. Containers were then segregated into waste steams for shipment to treatment, storage, and disposal facilities (TSDFs) in Oregon and Wisconsin.

2.6 Wood River Sediment Sampling

Wood River sediment samples were collected and submitted to CT&E for TAL metals analysis. Five samples were collected by wading into the river, standing downstream of the sample location, and scooping sediments from the bottom of the river with a spade shovel. Sample SD6SD was collected from a boat approximately 108 feet from the shoreline. The approximate sediment sample locations are shown on Figure 2.

3.0 ANALYTICAL RESULTS

This section presents the analytical results for 1) flood-stage surface water and sediment samples, 2) in situ samples from the limits of the retort site excavation, 3) characterization samples of waste streams transported off site, 4) confirmation and background samples, and 5) Wood River sediment samples.

3.1 Emergency Response Sampling

Analytical results for surface water and sediment samples collected during emergency response to Wood River flooding are shown on Figure 2 and are included in Appendix B. All surface water and sediment samples were collocated. Three surface water samples contained contaminants at concentrations slightly above detection levels. One of two surface water samples (duplicates) collected within the tote storage area contained a detectable concentration of mercury (0.000219 milligrams per liter [mg/L]). The surface water sample collected upstream of the DRO soil stockpile contained DRO at a concentrations of 0.134 mg/L and p&m-xylene at a concentration of 0.00101 mg/L. The surface water sample collected downstream of the DRO soil stockpile contained benzene at a concentration of 0.00108 mg/L.

All sediment samples contained detectable concentrations of total mercury ranging from 0.074 to 0.65 mg/kg. DRO was detected in the samples collected upstream and downstream of the DRO soil stockpile at concentrations of 42.8 mg/kg and 6.97 mg/kg, respectively. BTEX compounds were not detected in sediment samples.

3.2 In Situ Soil Characterization

Sample locations and corresponding laboratory analytical results for 25 soil samples collected from the limits of the 1998 excavation are shown on Figure 3. Analytical data tables are also included in Appendix B.

All soil samples collected within the limits of the excavation contained total mercury at concentrations ranging from 0.0407 to 40.6 mg/kg. All soil samples collected outside the excavated area contained total mercury at concentrations below 1 mg/kg.

Antimony, arsenic, barium, beryllium, cadmium, chromium, nickel, vanadium and zinc were detected in all samples at concentrations that exceed the 18 AAC 75 - Table B1, Cleanup Standards (migration to groundwater criteria) by one to two orders of magnitude. Selenium and silver were not detected, or were detected at concentrations that did not exceed the cleanup standards.

3.3 Waste Stream Characterization

Waste stream analytical results were used to classify and direct transportation and disposal.

Characterization sample analytical results indicated that 175 of 178 totes, and all 9 supersacks, contained TCLP mercury concentrations less than 0.2 mg/L. These totes and supersacks were transported to Oregon Waste Systems' Columbia Ridge Solid Waste Landfill in Arlington, Oregon (CRSWL), for disposal.

Of the 3 totes containing soil with TCLP mercury concentrations greater than 0.2 mg/L, two totes contained soil with total mercury at concentrations greater than 260 mg/kg. These two totes were transported to Mercury Waste Solutions in Union Grove, Wisconsin, for retort and disposal. The tote with the total mercury concentration below 260 mg/kg was stabilized and transported to CRSWL for disposal.

Sixty-nine supersacks of soil containing detectable concentrations of DRO, and TCLP mercury concentrations below 0.2 mg/L, were transported to CRSWL for disposal.

All other waste materials were characterized to allow for transport from the Red Top Retort site, and disposal at CRSWL. Analytical results for waste stream characterization samples are in Appendix B. Waste stream certificates of disposal are in Appendix C.

3.4 Confirmation and Background Samples

Confirmation and background sample locations are shown on Figure 2, and analytical results are included in Appendix B.

Total mercury was not detected in the background sample. Total mercury was detected at 0.042 mg/kg in the confirmation sample collected under the tote storage area liner, and 0.137 mg/kg in the confirmation sample collected under the DRO contaminated soil stockpile liner. Total mercury was not detected in the confirmation sample collected adjacent to the DRO contaminated soil stockpile, but DRO was detected at 26.8 mg/kg. Total mercury was detected at 1.97 mg/kg in the sample collected from excavation backfill material. BTEX compounds were either not detected, or detected at concentrations near detection limits, in the two confirmation samples collected at the DRO contaminated soil stockpile.

Confirmation samples collected from each batch of treated water met the standards established by the ADEC in Wastewater General Permit No. 9440-DB006 (HLA/Wilder, 1998), and 18 AAC 75 Table B1 for TAL metals. Following receipt of the laboratory analytical results and confirmation that standards were not exceeded, the batches of treated water were discharged at the site.

3.5 Wood River Sediment Samples

Wood River sediment sample locations are shown on Figure 2 and analytical results are included in Appendix B.

The six sediment samples (including one QC duplicate) contained total mercury at concentrations ranging from 0.044 mg/kg to 0.458 mg/kg, which are less than the 1 mg/kg cleanup criteria. The sediment samples also contained antimony, arsenic, barium, beryllium, cadmium, chromium, nickel, and vanadium at concentrations that exceed the 18 AAC 75 - Table B1, Cleanup Standards (migration to groundwater criteria) by one to two orders of magnitude. Zinc was detected at concentrations slightly exceeding the cleanup standards. Selenium and silver were not detected, or were detected at concentrations that did not exceed the cleanup standards.

4.0 DATA QUALITY REVIEW

All samples were analyzed by CT&E. The data quality review included examination and review of sample holding times, temperatures, custody records, and reported results for samples and extraction quality control (QC). Analytical data was reviewed according to the Chemical Quality Assurance for Hazardous, Toxic, and Radioactive Waste (HTRW) Projects, USACE EM-200-1-6, 10 October 1997. Samples were analyzed for BTEX, DRO, PAHs, total mercury, TAL metals, and TCLP mercury. Where composited samples were analyzed, compositing was performed at the laboratory. Samples are soil, water, and sediment and were taken from June 12 to September 27, 1998. Samples were received in good condition and within 4.0 degrees Celsius (°C) +/- 2.0°C.

BTEX samples were analyzed by EPA Method 8021. The BTEX surrogate recovery for sample 98RTR927WA is outside acceptance criteria due to sample dilution. Results are not affected.

DRO samples were analyzed by State of Alaska Method AK102. The laboratory standard (LS) run directly before sample 98RTR02SP is outside acceptance criteria due to a concentrated standard. The opening continuing calibration verification standard and closing LS are within quality control goals. DRO surrogate recoveries for 98RTR02SP, 98RTR03SP, and 98RTR04SP do not meet acceptance criteria due to high levels of target analyte in the samples. Results are not affected.

PAH samples were analyzed by EPA Method 610. The laboratory control sample (LCS) for samples 98RTRW01WA, 98RTRW02WA, and 98RTRW03WA was outside acceptance criteria, biased high for benzo(b)fluoranthene and dibenzo(a,h)anthracene. The LCS duplicate (LCSD) was outside acceptance criteria, biased high for dibenzo(a,h)anthracene. Samples without detectable levels of benzo(b)fluoranthene and dibenzo(a,h)-anthracene are not affected. Sample 98RTRW-03WA may be biased high for benzo(b)-fluoranthene. The LCS/LCSD for sample 98RTR-927WA are outside acceptance criteria, biased high for dibenzo(a,h)anthracene. This analyte was not found in the sample, therefore, results are not affected.

Total mercury samples were analyzed by EPA Method 7471. Sample 98RTR144SL was analyzed one day past hold time, 29 days after sample collection. Results may be biased low, but should not be significantly affected. Matrix spike (MS) and MS duplicate (MSD) failed for some total mercury samples. Poor MS/MSD recoveries and relative percent difference (RPD) may be due to nonhomogeneity of the sample or due to matrix interference. In cases where the LCS/LCSD and/or bench spike results is within quality control limits, the results are not affected.

TAL metal samples were analyzed by EPA Method 6010B/7000. The method blank (MB) result for samples 98RTRSD1SD, 98RTRSD2SD, 98RTRSD3SD, 98RTRSD4SD, 98RTRSD5SD,

and 98RTRSD6SD is 3.98 mg/kg, above the practical quantitation limit (PQL) of 1.00 mg/kg. Results for all samples were greater than 10 times the level of the MB, therefore, results are not affected. TCLP mercury samples were analyzed by EPA method 1311/7471. MS/MSD failed for some TCLP mercury samples. Poor MS/MSD recoveries and RPDs may be due to nonhomogeneity of the sample or due to matrix interference. In cases where the LCS/LCSD and/or bench spike results is within quality control limits, the results are not affected.

Field duplicates were sampled at a rate of 10 percent of the project samples. Field duplicate RPDs were less than 50 percent for all samples, except as noted. Total mercury field duplicates for samples 98RTR005SD/98RTR006SD, 98RTRW01WA/ 98RTRW02WA, 98RTRSD2SD/ 98RTRSD3SD, and 98RTRIS21SL/98RTRIS22SL disagree with RPDs of 91.7 percent, 118 percent, 79.7 percent, and 54.0 percent, respectively. High RPDs are possibly due to nonhomogeneity of the sample and these results should be considered estimated. The total mercury field duplicate 98RTRIS12SL/ 98RTRIS13SL strongly disagree with a RPD of 200 percent. The most conservative should be used. Field duplicates for samples 98RTR01WA/ 98RTR02WA disagree with a RPD of 53.5 percent. Aluminum results for these samples should be considered estimated.

TCLP mercury field duplicates for samples 98RTR092SL/98RTR093SL, 98RTR111SL/ 98RTR112SL, 98RTR117SL/ 98RTR118SL, 98RTR156SL/98RTR157SL, and 98RTR146SL/ 98RTR147SL disagree with RPDs of 104 percent, 79.7 percent, 57.2 percent, 125 percent, and 50.8 percent, respectively. High RPDs are possibly due to nonhomogeneity of the sample and these results should be considered estimated. TCLP mercury field duplicates 98RTR163SL/98RTR164SL, 98RTR171SL/98RTR172SL, and 98RTR141SL/ 98RTR142SL strongly disagree with a RPD of 195 percent, 186 percent, and 189 percent. The most conservative results from the duplicate samples should be used.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Analytical results for soil samples collected from the retort area excavation indicate contaminants remain above field action levels and ADEC cleanup criteria. Of the 10 sample locations exceeding the cleanup criteria of 1 mg/kg, 3 exceed by more than 1.5 mg/kg. Two of these three samples also exceeded the field action level of 23 mg/kg. These three sample locations are adjacent to each other in the south corner of the excavation (Figure 3).

Emergency Response Sampling

Analytical results of sediment and surface water samples collected at the site during the Wood River flooding did not contain detectable concentrations of mercury or DRO.

Waste Stream Characterization

All solid waste materials stored onsite from 1994 remedial activities, and all solid waste materials generated during 1998 field activities, were characterized, transported, and disposed at TSDFs in Oregon and Wisconsin.

Analytical results confirmed the requirements of the ADEC-approved wastewater general permit were satisfied and treated wastewater was discharged at the site.

Confirmation and Background Sampling

Analytical results of confirmation samples collected at the waste storage areas (totes and DRO-contaminated soil stockpile) were below 1 mg/kg for mercury, and ADEC Level A criteria for DRO and BTEX.

The confirmation sample collected from the excavation backfill material at the retort site contained total mercury at a concentration of 1.97 mg/kg. According to BLM personnel, the source of this backfill material was from onsite soil.

Total mercury was not detected in the background sample collected at the site. However, data generated by the USGS suggest the naturally occurring concentration of total mercury at the site may range from 0.1 mg/kg to 1.0 mg/kg.

TAL Metals

The soil samples collected from the limits of the 1998 excavation, and the sediment samples collected from the Wood River contained similar concentrations of TAL metals. Antimony, arsenic, barium, beryllium, cadmium, chromium, nickel, and vanadium were present in soil and sediment samples at one to two orders of magnitude higher than the 18 AAC 75 - Table B1, Cleanup Standards (migration to groundwater criteria). Selenium and silver were not detected, or did not exceed the cleanup standards.

The TAL metals concentrations in the sediment sample collected upstream of the site are not appreciably different than those concentrations in samples collected adjacent to, and downstream from the site. The upstream sediment sample location may not be representative of undisturbed background conditions. In addition, metals may be ubiquitous throughout the area based on geological conditions.

5.2 Recommendations

No further action is recommended for the waste storage areas (former DRO contaminated soil stockpile and tote storage area).

A preliminary risk evaluation is recommended for soils in the area of the former retort site. The risk evaluation is recommended to review the current data set, evaluate data gaps, and consider cost and feasibility of preparing a site-specific risk assessment. HLA/Wilder recommends the BLM work with the ADEC to establish a plan for conducting a preliminary risk evaluation and potential risk assessment.

6.0 BIBLIOGRAPHY

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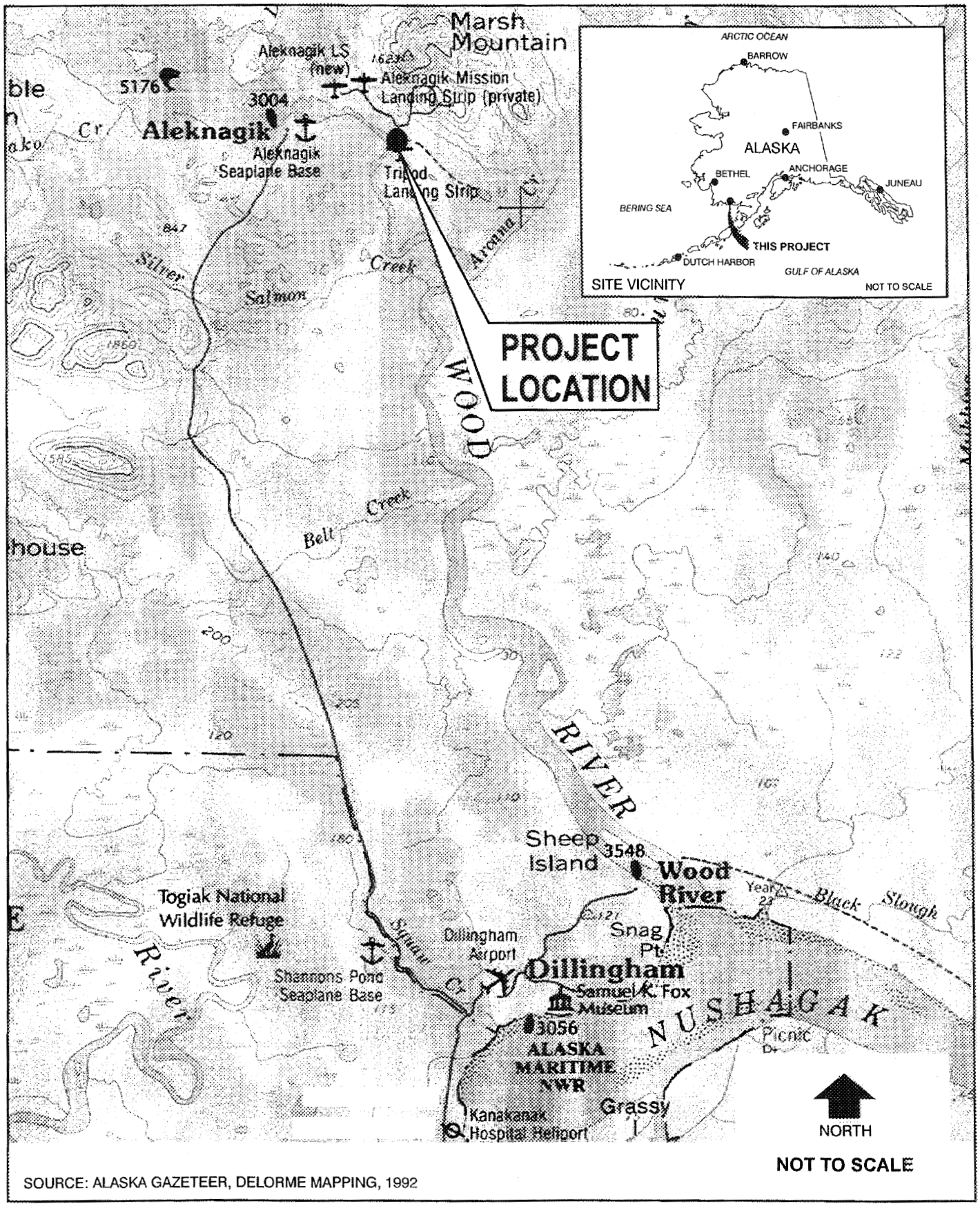
FIGURES



SOURCE: ALASKA GAZETEER, DELORME MAPPING, 1992

WILDER

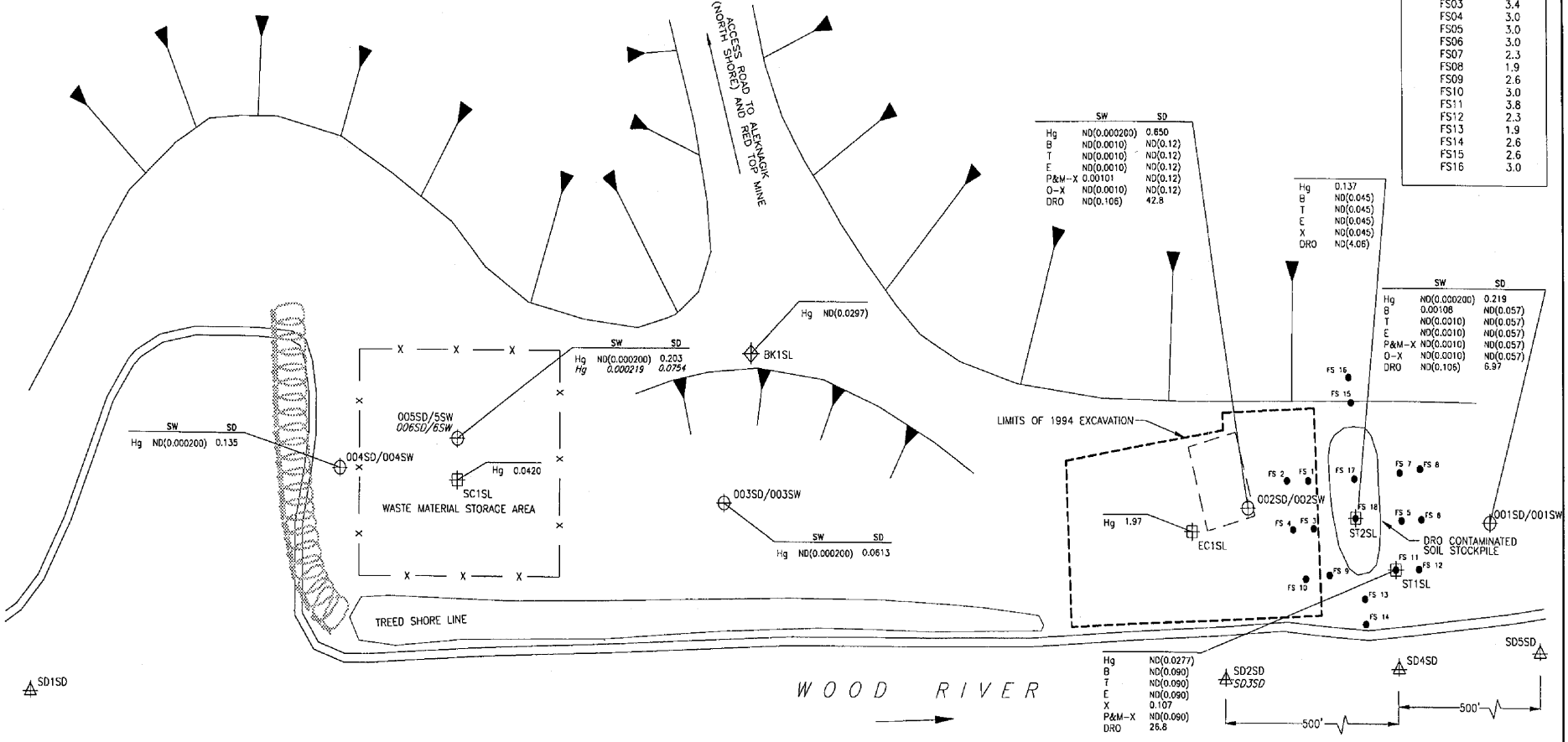
Harding Lawson Associates/
Wilder Construction
Joint Venture

Site Vicinity and Project Location Map

Red Top Retort Site
Aleknagik, Alaska

FIGURE 1

DRAWN	PROJECT NUMBER	APPROVED	DATE	FILE NAME
JP	41475	JWM	12/98	357c1



FIELD SCREENING SAMPLE NUMBER	OVM (ppm)
FS01	2.3
FS02	2.6
FS03	3.4
FS04	3.0
FS05	3.0
FS06	3.0
FS07	2.3
FS08	1.9
FS09	2.6
FS10	3.0
FS11	3.8
FS12	2.3
FS13	1.9
FS14	2.6
FS15	2.6
FS16	3.0

LEGEND:

- LOCATION OF SANDBAG WALL PLACED DURING WOOD RIVER FLOODING
- DRO STOCKPILE FIELD SCREENING SURFACE SAMPLE LOCATIONS
- BACKGROUND SAMPLE LOCATION
- CONFIRMATION SAMPLE LOCATION
- WOOD RIVER SEDIMENT SAMPLE LOCATION
- WOOD RIVER SEDIMENT SAMPLE LOCATION
- X — CHAIN LINK FENCE

Hg	MERCURY (TOTAL)
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
P&M-X	P&M XYLENE
O-X	O-XYLENE
DRO	DIESEL-RANGE ORGANICS
NTS	NOT TO SCALE
PPM	PARTS PER MILLION

NOTES:

1. 98RTR LEFT OFF BEGINNING OF ALL SAMPLE NUMBERS FOR BREVITY.
2. DUPLICATE SAMPLE NUMBERS SHOWN IN ITALICS.
3. ALL ANALYTICAL RESULTS SHOWN IN MILLIGRAMS PER KILOGRAM FOR SOIL AND SEDIMENTS, AND MILLIGRAMS PER LITER IN WATER.
4. WOOD RIVER SEDIMENT SAMPLE RESULTS NOT SHOWN FOR CLARITY.
5. SURVEY WAS NOT PERFORMED. ALL SAMPLE LOCATIONS WERE TAPED FROM PROMINENT SITE FEATURES.

SD6SD
(COLLECTED 108' FROM SHORE)

NORTH

0 12.5 25 50
APPROXIMATE SCALE IN FEET

HLA WILDER

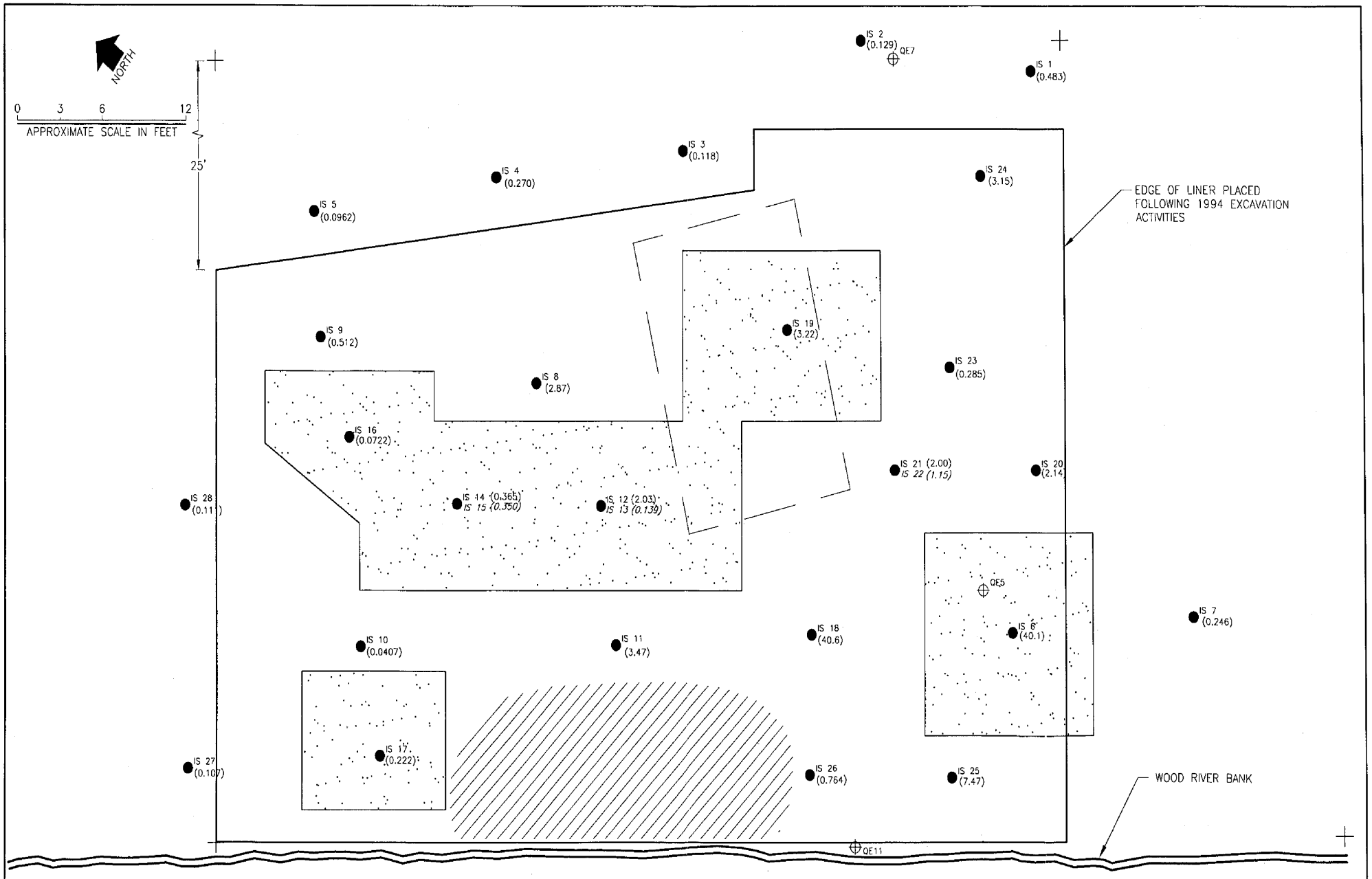
Harding Lawson Associates/
Wilder Construction Company
Joint Venture

Site Plan, Sample Locations, and Results

FIGURE 2

Red Top Retort Size
Aleknagik, Alaska

DRAWN	PROJECT NUMBER	APPROVED	DATE	FILE NAME
JP	41475	JWM	12/98	1035j



IS 5 HLA/WILDER SAMPLE LOCATION AND ASSOCIATED SAMPLE NUMBER

QE7 LOCATION OF BENTONITE PLUG FROM QUEST ENVIRONMENTAL SITE ASSESSMENT ACTIVITIES AND ASSOCIATED NUMBER (ESTIMATED BASED ON QUEST ENVIRONMENTAL SITE MAPS)

LOCATION OF REBAR PLACED FOR REFERENCE MARKERS

ESTIMATED LOCATION OF FORMER RETORT SHACK BASED ON INTERPOLATED QUEST ENVIRONMENTAL SITE MAPS AND HLA/WILDER FIELD NOTES

AREA DISTURBED BY BARGE PLACEMENT, AND LOADING AND UNLOADING ACTIVITIES. REPRESENTATIVE SAMPLE COULD NOT BE COLLECTED FROM THIS AREA

AREAS OF ADDITIONAL EXCAVATION COMPLETED BY HLA/WILDER (BACKFILL WAS REMOVED TO EXPOSE LINER, LINER WAS CUT AND AN ADDITIONAL 6-8 INCHES OF MATERIAL WAS REMOVED)

HLA WILDER

Harding Lawson Associates/
Wilder Construction Company
Joint Venture

Excavation Area and In Situ Characterization Sample Locations

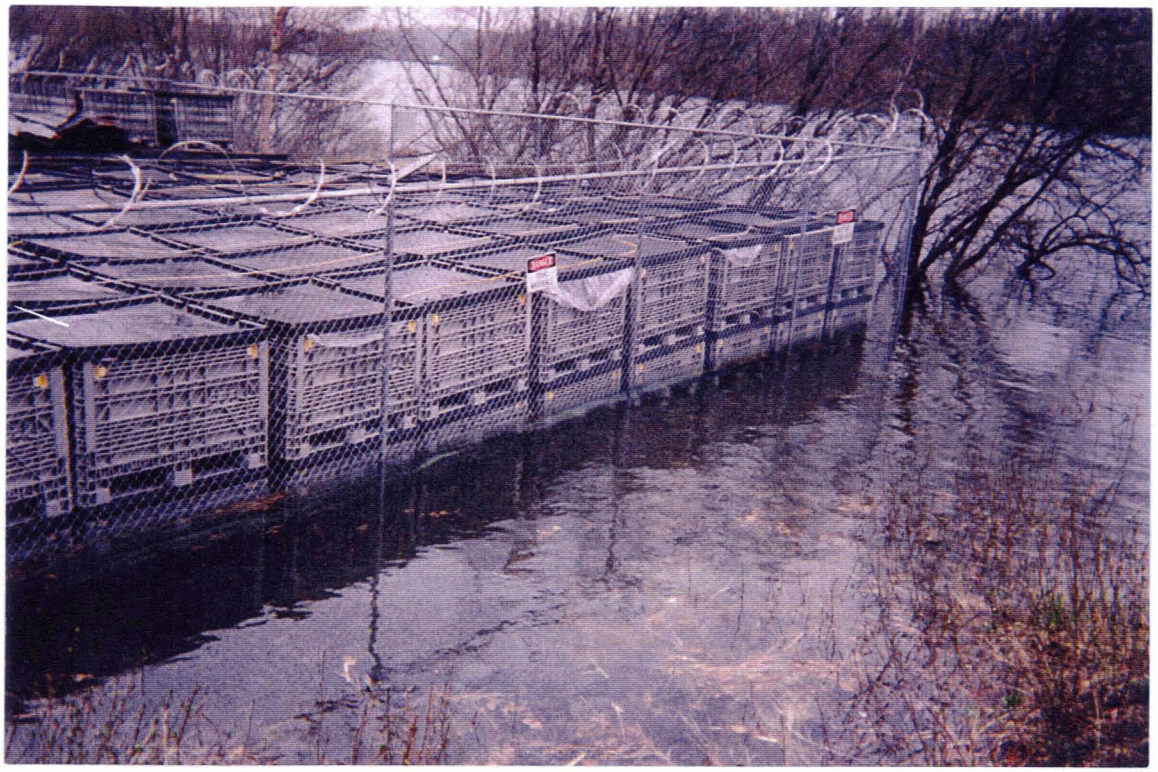
Red Top Retort Site
Aleknagik, Alaska

FIGURE 3

DRAWN	PROJECT NUMBER	APPROVED	DATE	FILE NAME
JP	41475	JWM	12/98	1035j

APPENDIX A

PHOTOGRAPHS



Tote storage area during May 31, 1998, Wood River flooding. Picture taken during high tide.

May 31, 1998, picture taken during low tide from retort area towards waste material storage area.

May 31, 1998, picture of DRO-contaminated soil stockpile (low tide).

June 10, 1998, picture from Wood River of DRO-contaminated soil stockpile.

Placing sandbag wall upriver of waste material storage area.

Recovering DRO-contaminated soil stockpile in June 1998.

Sampling of a tote. Typical of 178 stored tote samples.

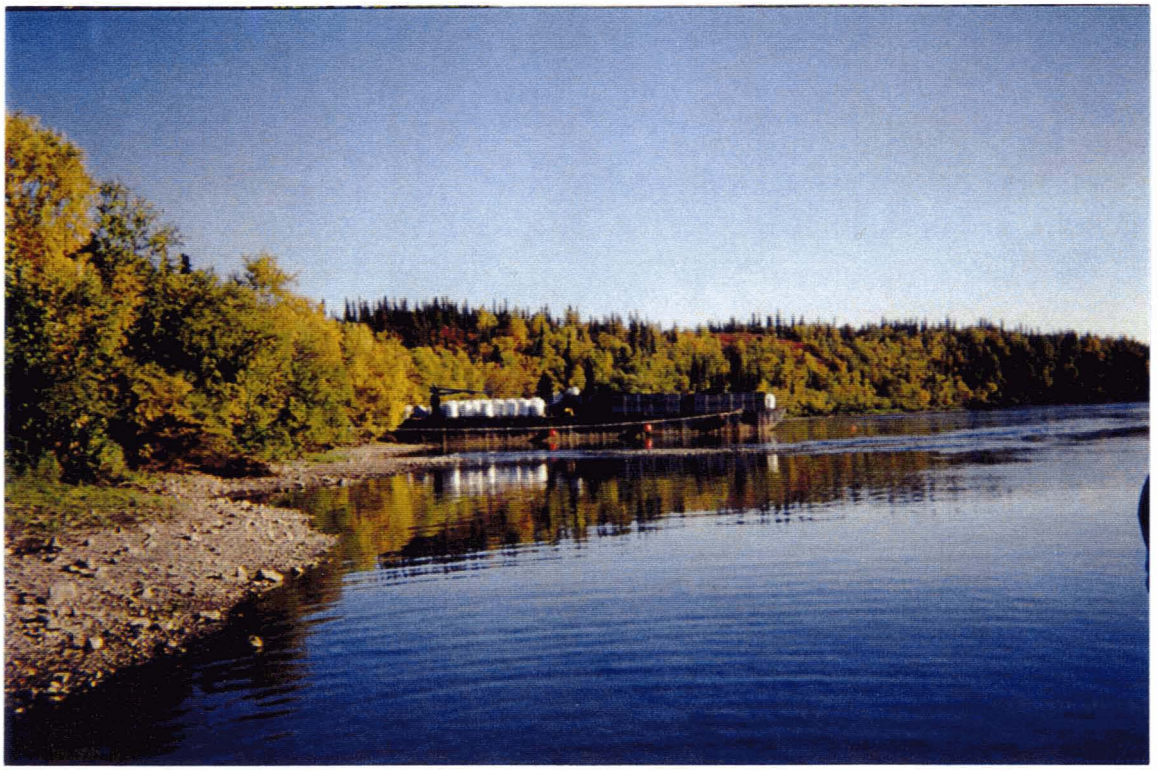
Waste material storage area after chain-link fence and a majority of totes have been removed.

Background soil sample collection.

Screening tote materials with a PID and mercury vapor monitor.

Loading waste materials on barge anchored in Wood River.

Placing DRO-contaminated soil stockpile in supersacks.



Picture of barge loading from upriver near waste material storage area.

Looking toward barge from Wood River sediment sample location (1,000 feet downriver of the retort site).

Onsite water treatment system.

Wood River sediment sample collection adjacent to the retort site.

Removal of DRO-contaminated soil stockpile. Liner material being exposed.

Exposed southeast corner of liner material from 1994 retort site excavation activities.

Backfill and liner removed during additional excavation at the retort site.

Sample collection points following additional excavation at the retort site.

Final site grading following additional excavation activities.

Offloading of waste materials at the dock in Dillingham.

September field activities. Picture taken from waste materials storage area facing DRO-contaminated soil stockpile.

Preparing, sorting, and labeling wastes for transport and disposal.

APPENDIX B

SAMPLING RECORDS AND RESULTS

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type PR	Sample Type QC	Matrix	Analytical Method	Analyte	Result	Units	Detection Level
Emergency Response Sediment and Surface Water Sampling										
98RTR001SW	downstream from DRO stockpile	6/30/98	X		water	EPA 7470	total mercury	**ND**	mg/L	0.0002
98RTR001SW	downstream from DRO stockpile	6/30/98	X		water	EPA 8021	benzene	**0.001**	mg/L	0.001
98RTR001SW	downstream from DRO stockpile	6/30/98	X		water	EPA 8021	toluene	**ND**	mg/L	0.001
98RTR001SW	downstream from DRO stockpile	6/30/98	X		water	EPA 8021	ethylbenzene	**ND**	mg/L	0.001
98RTR001SW	downstream from DRO stockpile	6/30/98	X		water	EPA 8021	p&m-xylene	**ND**	mg/L	0.001
98RTR001SW	downstream from DRO stockpile	6/30/98	X		water	EPA 8021	o-xylene	**ND**	mg/L	0.001
98RTR001SW	downstream from DRO stockpile	6/30/98	X		water	AK102	DRO	**ND**	mg/L	0.106
98RTR002SW	upstream from DRO stockpile	6/30/98	X		water	EPA 7470	total mercury	**ND**	mg/L	0.0002
98RTR002SW	upstream from DRO stockpile	6/30/98	X		water	EPA 8021	benzene	**ND**	mg/L	0.001
98RTR002SW	upstream from DRO stockpile	6/30/98	X		water	EPA 8021	toluene	**ND**	mg/L	0.001
98RTR002SW	upstream from DRO stockpile	6/30/98	X		water	EPA 8021	ethylbenzene	**ND**	mg/L	0.001
98RTR002SW	upstream from DRO stockpile	6/30/98	X		water	EPA 8021	p&m-xylene	**0.001**	mg/L	0.001
98RTR002SW	upstream from DRO stockpile	6/30/98	X		water	EPA 8021	o-xylene	**ND**	mg/L	0.001
98RTR002SW	upstream from DRO stockpile	6/30/98	X		water	AK102	DRO	**0.134**	mg/L	0.11
98RTR003SW	downstream from tote storage area	6/30/98	X		water	EPA 7470	total mercury	**ND**	mg/L	0.0002
98RTR004SW	upstream from tote storage area	6/30/98	X		water	EPA 7470	total mercury	**ND**	mg/L	0.0002
98RTR005SW	inside tote storage area	6/30/98	X		water	EPA 7470	total mercury	**ND**	mg/L	0.0002
98RTR006SW	inside tote storage area - duplicate	6/30/98		X	water	EPA 7470	total mercury	**0.000**	mg/L	0.0002
98RTRTBSW	trip blank	--			water	EPA 8021	benzene	**ND**	mg/L	0.001
98RTRTBSW	trip blank	--			water	EPA 8021	toluene	**ND**	mg/L	0.001
98RTRTBSW	trip blank	--			water	EPA 8021	ethylbenzene	**ND**	mg/L	0.001
98RTRTBSW	trip blank	--			water	EPA 8021	p&m-xylene	**ND**	mg/L	0.001
98RTRTBSW	trip blank	--			water	EPA 8021	o-xylene	**ND**	mg/L	0.001
98RTR001SD	downstream from DRO stockpile	6/30/98	X		soil	EPA 7471	total mercury	**0.219**	mg/kg	0.0201
98RTR001SD	downstream from DRO stockpile	6/30/98	X		soil	EPA 8021	benzene	**ND**	mg/kg	0.057
98RTR001SD	downstream from DRO stockpile	6/30/98	X		soil	EPA 8021	toluene	**ND**	mg/kg	0.057
98RTR001SD	downstream from DRO stockpile	6/30/98	X		soil	EPA 8021	ethylbenzene	**ND**	mg/kg	0.057
98RTR001SD	downstream from DRO stockpile	6/30/98	X		soil	EPA 8021	p&m-xylene	**ND**	mg/kg	0.057
98RTR001SD	downstream from DRO stockpile	6/30/98	X		soil	EPA 8021	o-xylene	**ND**	mg/kg	0.057
98RTR001SD	downstream from DRO stockpile	6/30/98	X		soil	AK102	DRO	**6.970**	mg/kg	4.79
98RTR002SD	upstream from DRO stockpile	6/30/98	X		soil	EPA 7471	total mercury	**0.650**	mg/kg	0.0396

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type PR	Sample Type QC	Matrix	Analytical Method	Analyte	Result	Units	Detection Level
98RTR002SD	upstream from DRO stockpile	6/30/98	X		soil	EPA 7471	benzene	**ND**	mg/kg	0.12
98RTR002SD	upstream from DRO stockpile	6/30/98	X		soil	EPA 7471	toluene	**ND**	mg/kg	0.12
98RTR002SD	upstream from DRO stockpile	6/30/98	X		soil	EPA 7471	ethylbenzene	**ND**	mg/kg	0.12
98RTR002SD	upstream from DRO stockpile	6/30/98	X		soil	EPA 7471	p&m-xylene	**ND**	mg/kg	0.12
98RTR002SD	upstream from DRO stockpile	6/30/98	X		soil	EPA 7471	o-xylene	**ND**	mg/kg	0.12
98RTR002SD	upstream from DRO stockpile	6/30/98	X		soil	EPA 7471	DRO	**42.800**	mg/kg	9.41
98RTR003SD	downstream from tote storage area	6/30/98	X		soil	EPA 7471	total mercury	**0.061**	mg/kg	0.0172
98RTR004SD	upstream from tote storage area	6/30/98	X		soil	EPA 7471	total mercury	**0.135**	mg/kg	0.0215
98RTR005SD	inside tote storage area	6/30/98	X		soil	EPA 7471	total mercury	**0.203**	mg/kg	0.0332
98RTR006SD	inside tote storage area - duplicate	6/30/98		X	soil	EPA 7471	total mercury	**0.075**	mg/kg	0.0211
Confirmation and Background Sampling										
98RTRBK1SL	background	9/3/98	X		soil	EPA 7471	total mercury	**ND**	mg/kg	0.0297
98RTREC1SL	center of excavation backfill	9/1/98	X		soil	EPA 7471	total mercury	**1.970**	mg/kg	0.218
98RTRSC1SL	under tote storage liner confirmation	9/11/98	X		soil	EPA 7471	total mercury	**0.042**	mg/kg	0.0171
98RTRST1SL	next to DRO stockpile confirmation	9/3/98	X		soil	EPA 7471	total mercury	**ND**	mg/kg	0.0277
98RTRST1SL	next to DRO stockpile confirmation	9/3/98	X		soil	EPA 8021	benzene	**ND**	mg/kg	0.09
98RTRST1SL	next to DRO stockpile confirmation	9/3/98	X		soil	EPA 8021	toluene	**ND**	mg/kg	0.09
98RTRST1SL	next to DRO stockpile confirmation	9/3/98	X		soil	EPA 8021	ethylbenzene	**ND**	mg/kg	0.09
98RTRST1SL	next to DRO stockpile confirmation	9/3/98	X		soil	EPA 8021	p&m-xylene	**0.107**	mg/kg	0.09
98RTRST1SL	next to DRO stockpile confirmation	9/3/98	X		soil	EPA 8021	o-xylene	**ND**	mg/kg	0.09
98RTRST1SL	next to DRO stockpile confirmation	9/3/98	X		soil	AK102	DRO	**26.800**	mg/kg	6.49
98RTRST2SL	under DRO stkple liner confirmation	9/12/98	X		soil	EPA 7471	total mercury	**0.137**	mg/kg	0.017
98RTRST2SL	under DRO stkple liner confirmation	9/12/98	X		soil	EPA 8021	benzene	**ND**	mg/kg	0.045
98RTRST2SL	under DRO stkple liner confirmation	9/12/98	X		soil	EPA 8021	toluene	**ND**	mg/kg	0.045
98RTRST2SL	under DRO stkple liner confirmation	9/12/98	X		soil	EPA 8021	ethylbenzene	**ND**	mg/kg	0.045
98RTRST2SL	under DRO stkple liner confirmation	9/12/98	X		soil	EPA 8021	p&m-xylene	**ND**	mg/kg	0.045
98RTRST2SL	under DRO stkple liner confirmation	9/12/98	X		soil	EPA 8021	o-xylene	**ND**	mg/kg	0.045
98RTRST2SL	under DRO stkple liner confirmation	9/12/98	X		soil	AK102	DRO	**ND**	mg/kg	4.06
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 6010	aluminum	**0.339**	mg/L	0.114
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 6010	barium	**0.013**	mg/L	0.0114
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 6010	calcium	**33.700**	mg/L	11.4
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 6010	cobalt	**ND**	mg/L	0.0114

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type PR	Sample Type QC	Matrix	Analytical Method	Analyte	Result	Units	Detection Level
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 6010	copper	**ND**	mg/L	0.0114
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 6010	iron	**1.890**	mg/L	0.0568
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 6010	potassium	**21.100**	mg/L	5.11
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 6010	magnesium	**4.760**	mg/L	0.114
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 6010	manganese	**0.277**	mg/L	0.0227
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 6010	sodium	**29.000**	mg/L	1.14
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 6010	nickel	**ND**	mg/L	0.0227
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 6010	vanadium	**ND**	mg/L	0.0114
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 6010	zinc	**0.028**	mg/L	0.0227
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 7041	antimony	**ND**	mg/L	0.00568
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 7060	arsenic	**0.010**	mg/L	0.00568
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 7091	beryllium	**ND**	mg/L	0.000568
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 7131	cadmium	**ND**	mg/L	0.000568
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 7191	chromium	**ND**	mg/L	0.00568
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 7421	lead	**ND**	mg/L	0.00568
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 7470	total mercury	**ND**	mg/L	0.0002
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 7740	selenium	**ND**	mg/L	0.00568
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 7761	silver	**ND**	mg/L	0.00114
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 7841	thallium	**ND**	mg/L	0.00568
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 602	benzene	**ND**	mg/L	0.001
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 602	toluene	**ND**	mg/L	0.001
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 602	ethylbenzene	**ND**	mg/L	0.001
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 602	p&m-xylene	**ND**	mg/L	0.001
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 602	o-xylene	**ND**	mg/L	0.001
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	naphthalene	**ND**	ug/L	10
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	acenaphthylene	**ND**	ug/L	10
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	acenaphthene	**ND**	ug/L	10
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	fluorene	**ND**	ug/L	1
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	phenanthrene	**ND**	ug/L	0.5
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	anthracene	**ND**	ug/L	0.5
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	fluoranthene	**ND**	ug/L	0.025
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	pyrene	**ND**	ug/L	0.5

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type		Matrix	Analytical Method	Analyte	Result	Units	Detection Level
			PR	QC						
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	benzo(a)anthracene	**ND**	ug/L	0.01
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	chrysene	**ND**	ug/L	0.5
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	benzo[b]fluoranthene	**ND**	ug/L	0.01
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	benzo[k]fluoranthene	**ND**	ug/L	0.01
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	benzo[a]pyrene	**ND**	ug/L	0.1
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	dibenzo[a,h]anthracene	**ND**	ug/L	0.1
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	benzo[g,h,I]perylene	**ND**	ug/L	0.05
98RTRW01WA	1st batch treated water (500g)	9/11/98	X		water	EPA 610	indeno[1,2,3-c,d]pyrene	**ND**	ug/L	0.1
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 6010	aluminum	**0.196**	mg/L	0.114
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 6010	barium	**0.013**	mg/L	0.0114
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 6010	calcium	**35.000**	mg/L	11.4
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 6010	cobalt	**ND**	mg/L	0.0114
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 6010	copper	**ND**	mg/L	0.0114
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 6010	iron	**1.520**	mg/L	0.0568
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 6010	potassium	**21.500**	mg/L	5.11
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 6010	magnesium	**4.750**	mg/L	0.114
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 6010	manganese	**0.276**	mg/L	0.0227
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 6010	sodium	**29.600**	mg/L	1.14
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 6010	nickel	**ND**	mg/L	0.0227
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 6010	vanadium	**ND**	mg/L	0.0114
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 6010	zinc	**0.031**	mg/L	0.0227
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 7041	antimony	**ND**	mg/L	0.00568
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 7060	arsenic	**0.010**	mg/L	0.00568
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 7091	beryllium	**ND**	mg/L	0.000568
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 7131	cadmium	**ND**	mg/L	0.000568
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 7191	chromium	**ND**	mg/L	0.00568
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 7421	lead	**ND**	mg/L	0.00568
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 7470	total mercury	**0.001**	mg/L	0.0002
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 7740	selenium	**ND**	mg/L	0.00568
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 7761	silver	**ND**	mg/L	0.00114
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 7841	thallium	**ND**	mg/L	0.00568
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 602	benzene	**ND**	mg/L	0.001

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type PR	Sample Type QC	Matrix	Analytical Method	Analyte	Result	Units	Detection Level
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 602	toluene	**ND**	mg/L	0.001
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 602	ethylbenzene	**ND**	mg/L	0.001
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 602	p&m-xylene	**ND**	mg/L	0.001
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 602	o-xylene	**ND**	mg/L	0.001
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	naphthalene	**ND**	ug/L	10.3
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	acenaphthylene	**ND**	ug/L	10.3
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	acenaphthene	**ND**	ug/L	10.3
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	fluorene	**ND**	ug/L	1.03
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	phenanthrene	**ND**	ug/L	0.515
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	anthracene	**ND**	ug/L	0.515
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	fluoranthene	**ND**	ug/L	0.0258
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	pyrene	**ND**	ug/L	0.515
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	benzo(a)anthracene	**ND**	ug/L	0.0103
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	chrysene	**ND**	ug/L	0.515
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	benzo[b]fluoranthene	**ND**	ug/L	0.0103
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	benzo[a]pyrene	**ND**	ug/L	0.0515
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	dibenzo[a,h]anthracene	**ND**	ug/L	0.103
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	benzo[g,h,I]perylene	**ND**	ug/L	0.0515
98RTRW02WA	1st batch treated water (500g) - QC	9/11/98		X	water	EPA 610	indeno[1,2,3-c,d]pyrene	**ND**	ug/L	0.103
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 6010	aluminum	**9.460**	mg/L	0.114
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 6010	barium	**0.092**	mg/L	0.0114
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 6010	calcium	**49.500**	mg/L	11.4
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 6010	cobalt	**ND**	mg/L	0.0114
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 6010	copper	**0.014**	mg/L	0.0114
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 6010	iron	**22.200**	mg/L	0.0568
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 6010	potassium	**29.700**	mg/L	5.11
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 6010	magnesium	**6.440**	mg/L	0.114
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 6010	manganese	**0.957**	mg/L	0.0227
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 6010	sodium	**29.600**	mg/L	1.14
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 6010	nickel	**ND**	mg/L	0.0227
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 6010	vanadium	**0.018**	mg/L	0.0114
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 6010	zinc	**0.273**	mg/L	0.0227

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type		Matrix	Analytical Method	Analyte	Result	Units	Detection Level
			PR	QC						
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 7041	antimony	**ND**	mg/L	0.00568
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 7060	arsenic	**ND**	mg/L	0.00568
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 7091	beryllium	**ND**	mg/L	0.000568
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 7131	cadmium	**ND**	mg/L	0.000568
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 7191	chromium	**0.006**	mg/L	0.00568
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 7421	lead	**0.011**	mg/L	0.00568
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 7470	total mercury	**0.003**	mg/L	0.0002
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 7740	selenium	**ND**	mg/L	0.00568
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 7761	silver	**ND**	mg/L	0.00114
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 7841	thallium	**ND**	mg/L	0.00568
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 602	benzene	**0.004**	mg/L	0.001
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 602	toluene	**0.013**	mg/L	0.001
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 602	ethylbenzene	**0.003**	mg/L	0.001
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 602	p&m-xylene	**0.007**	mg/L	0.001
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 602	o-xylene	**0.003**	mg/L	0.001
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	naphthalene	**18.000**	ug/L	10.4
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	acenaphthylene	**ND**	ug/L	10.4
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	acenaphthene	**ND**	ug/L	10.4
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	fluorene	**ND**	ug/L	1.04
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	phenanthrene	**ND**	ug/L	0.521
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	anthracene	**ND**	ug/L	0.521
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	fluoranthene	**0.159**	ug/L	0.026
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	pyrene	**ND**	ug/L	0.521
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	benzo(a)anthracene	**ND**	ug/L	0.0104
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	chrysene	**ND**	ug/L	0.521
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	benzo[b]fluoranthene	**0.052**	ug/L	0.0104
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	benzo[k]fluoranthene	**0.027**	ug/L	0.0104
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	benzo[a]pyrene	**ND**	ug/L	0.0521
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	dibenzo[a,h]anthracene	**ND**	ug/L	0.104
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	benzo[g,h,l]perylene	**ND**	ug/L	0.0521
98RTRW03WA	2nd batch treated water (500g)	9/12/98	X		water	EPA 610	indeno[1,2,3-c,d]pyrene	**ND**	ug/L	0.104

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type PR	Sample Type QC	Matrix	Analytical Method	Analyte	Result	Units	Detection Level
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 6010	aluminum	**4.890**	mg/L	1
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 7041	antimony	**ND**	mg/L	0.05
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 7060	arsenic	**ND**	mg/L	0.05
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 6010	barium	**ND**	mg/L	0.1
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 7091	beryllium	**ND**	mg/L	0.005
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 7131	cadmium	**ND**	mg/L	0.005
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 6010	calcium	**61.300**	mg/L	10
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 7191	chromium	**ND**	mg/L	0.05
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 6010	cobalt	**ND**	mg/L	0.1
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 6010	copper	**ND**	mg/L	0.1
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 6010	iron	**11.200**	mg/L	0.5
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 7421	lead	**ND**	mg/L	0.05
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 6010	magnesium	**8.620**	mg/L	1
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 6010	manganese	**0.564**	mg/L	0.2
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 6010	nickel	**ND**	mg/L	0.2
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 6010	potassium	**ND**	mg/L	45
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 7740	selenium	**ND**	mg/L	0.05
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 7761	silver	**ND**	mg/L	0.01
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 6010	sodium	**48.300**	mg/L	10
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 7841	thallium	**ND**	mg/L	0.05
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 6010	vanadium	**ND**	mg/L	0.1
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 6010	zinc	**ND**	mg/L	0.2
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 7470	total mercury	**0.001**	mg/L	0.0002
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	naphthalene	**ND**	ug/L	10.2
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	acenaphthylene	**ND**	ug/L	10.2
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	acenaphthene	**ND**	ug/L	10.2
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	fluorene	**ND**	ug/L	1.02
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	phenanthrene	**ND**	ug/L	0.51
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	anthracene	**ND**	ug/L	0.51
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	fluoranthene	**0.165**	ug/L	0.0255
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	pyrene	**ND**	ug/L	0.51
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	benzo(a)anthracene	**0.020**	ug/L	0.0102

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type PR	Sample Type QC	Matrix	Analytical Method	Analyte	Result	Units	Detection Level
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	chrysene	**ND**	ug/L	0.51
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	benzo[b]fluoranthene	**0.053**	ug/L	0.0102
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	benzo[k]fluoranthene	**0.036**	ug/L	0.0102
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	benzo[a]pyrene	**ND**	ug/L	0.051
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	dibenzopa,h]anthracene	**ND**	ug/L	0.102
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	benzo[g,h,l]perylene	**0.058**	ug/L	0.051
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 610	indeno[1,2,3-c,d]pyrene	**0.153**	ug/L	0.102
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 602	benzene	**ND**	mg/L	0.01
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 602	toluene	**0.057**	mg/L	0.01
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 602	ethylbenzene	**ND**	mg/L	0.01
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 602	p&m-xylene	**0.033**	mg/L	0.01
98TRT927WA	3rd batch treated water (500g)	9/27/98	X		water	EPA 602	o-xylene	**0.014**	mg/L	0.01
In Situ Characterization Sampling										
98RTRIS1SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**0.483**	mg/kg	0.0154
98RTRIS2SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**0.129**	mg/kg	0.0161
98RTRIS3SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**0.118**	mg/kg	0.0169
98RTRIS4SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**0.270**	mg/kg	0.0169
98RTRIS5SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**0.096**	mg/kg	0.0187
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**40.100**	mg/kg	2.07
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	aluminum	**13300.000**	mg/kg	671
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 7041	antimony	**ND**	mg/kg	0.253
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 7060	arsenic	**14.700**	mg/kg	2.53
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	barium	**59.000**	mg/kg	6.76
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 7091	beryllium	**0.439**	mg/kg	0.253
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 7131	cadmium	**0.160**	mg/kg	0.0253
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	calcium	**7180.000**	mg/kg	6,710
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 7191	chromium	**12.800**	mg/kg	2.53
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	cobalt	**6.920**	mg/kg	0.671
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	copper	**22.100**	mg/kg	6.76
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	iron	**32400.000**	mg/kg	33.8
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 7421	lead	**12.500**	mg/kg	2.53
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	magnesium	**5700.000**	mg/kg	67.6

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type		Matrix	Analytical Method	Analyte	Result	Units	Detection Level
			PR	QC						
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	manganese	**1220.000**	mg/kg	13.5
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	nickel	**14.500**	mg/kg	13.5
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	potassium	**554.000**	mg/kg	304
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 7740	selenium	**ND**	mg/kg	0.253
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 7761	silver	**0.062**	mg/kg	0.0505
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	sodium	**205.000**	mg/kg	67.6
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 7841	thallium	**ND**	mg/kg	0.253
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	vanadium	**60.000**	mg/kg	6.76
98RTRIS6SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	zinc	**43.500**	mg/kg	13.4
98RTRIS7SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**0.246**	mg/kg	0.0221
98RTRIS8SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**2.870**	mg/kg	0.154
98RTRIS9SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**0.512**	mg/kg	0.0158
98RTRIS10SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**0.041**	mg/kg	0.0173
98RTRIS11SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**3.470**	mg/kg	0.171
98RTRIS12SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**2.030**	mg/kg	0.17
98RTRIS13SL	in situ confirmation sample	9/15/98		X	soil	EPA 7471	total mercury	**0.139**	mg/kg	0.0158
98RTRIS14SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**0.365**	mg/kg	0.168
98RTRIS15SL	in situ confirmation sample	9/15/98		X	soil	EPA 7471	total mercury	**0.320**	mg/kg	0.155
98RTRIS16SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**0.072**	mg/kg	0.0153
98RTRIS17SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**0.222**	mg/kg	0.0164
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**40.600**	mg/kg	1.94
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	aluminum	**25000.000**	mg/kg	585
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 7041	antimony	**0.292**	mg/kg	0.259
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 7060	arsenic	**8.980**	mg/kg	2.59
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	barium	**67.700**	mg/kg	5.71
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 7091	beryllium	**0.332**	mg/kg	0.259
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 7131	cadmium	**0.148**	mg/kg	0.0259
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	calcium	**8280.000**	mg/kg	5,850
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 7191	chromium	**8.810**	mg/kg	2.59
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	cobalt	**13.800**	mg/kg	5.85
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	copper	**30.500**	mg/kg	5.71
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	iron	**37300.000**	mg/kg	28.6

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type PR	Sample Type QC	Matrix	Analytical Method	Analyte	Result	Units	Detection Level
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 7421	lead	**5.180**	mg/kg	2.59
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	magnesium	**6830.000**	mg/kg	57.1
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	manganese	**1120.000**	mg/kg	11.4
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	nickel	**15.100**	mg/kg	11.4
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	potassium	**632.000**	mg/kg	257
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 7740	selenium	**ND**	mg/kg	0.259
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 7761	silver	**ND**	mg/kg	0.0518
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	sodium	**145.000**	mg/kg	57.1
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 7841	thallium	**ND**	mg/kg	0.259
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	vanadium	**70.100**	mg/kg	5.71
98RTRIS18SL	in situ confirmation sample	9/15/98	X		soil	EPA 6010	zinc	**116.000**	mg/kg	11.7
98RTRIS19SL	in situ confirmation sample	9/15/98	X		soil	EPA 7471	total mercury	**3.220**	mg/kg	0.158
98RTRIS20SL	in situ confirmation sample	9/16/98	X		soil	EPA 7471	total mercury	**2.140**	mg/kg	0.167
98RTRIS21SL	in situ confirmation sample	9/16/98	X		soil	EPA 7471	total mercury	**2.000**	mg/kg	0.164
98RTRIS22SL	in situ confirmation sample	9/16/98		X	soil	EPA 7471	total mercury	**1.150**	mg/kg	0.153
98RTRIS23SL	in situ confirmation sample	9/16/98	X		soil	EPA 7471	total mercury	**0.285**	mg/kg	0.16
98RTRIS24SL	in situ confirmation sample	9/16/98	X		soil	EPA 7471	total mercury	**3.150**	mg/kg	0.163
98RTRIS25SL	in situ confirmation sample	9/16/98			soil	EPA 7471	total mercury	**7.470**	mg/kg	0.205
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 6010	aluminum	**31700.000**	mg/kg	575
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 7041	antimony	**0.260**	mg/kg	0.206
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 7060	arsenic	**9.340**	mg/kg	2.06
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 6010	barium	**63.400**	mg/kg	4.94
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 7091	beryllium	**0.540**	mg/kg	0.206
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 7131	cadmium	**0.108**	mg/kg	0.0206
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 6010	calcium	**7350.000**	mg/kg	5,750
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 7191	chromium	**15.900**	mg/kg	2.06
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 6010	cobalt	**19.300**	mg/kg	5.75
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 6010	copper	**20.500**	mg/kg	4.94
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 6010	iron	**33100.000**	mg/kg	24.7
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 7421	lead	**18.800**	mg/kg	2.06
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 6010	magnesium	**5820.000**	mg/kg	49.4
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 6010	manganese	**1310.000**	mg/kg	9.87

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type PR	Sample Type QC	Matrix	Analytical Method	Analyte	Result	Units	Detection Level
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 6010	nickel	**11.600**	mg/kg	9.87
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 6010	potassium	**622.000**	mg/kg	222
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 7740	selenium	**ND**	mg/kg	0.206
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 7761	silver	**ND**	mg/kg	0.0412
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 6010	sodium	**133.000**	mg/kg	49.4
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 7841	thallium	**ND**	mg/kg	0.206
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 6010	vanadium	**65.800**	mg/kg	4.94
98RTRIS25SL	in situ confirmation sample	9/16/98	X		soil	EPA 6010	zinc	**88.700**	mg/kg	11.5
98RTRIS26SL	in situ confirmation sample	9/16/98	X		soil	EPA 7471	total mercury	**0.764**	mg/kg	0.227
98RTRIS27SL	in situ confirmation sample	9/16/98	X		soil	EPA 7471	total mercury	**0.107**	mg/kg	0.0171
98RTRIS28SL	in situ confirmation sample	9/16/98	X		soil	EPA 7471	total mercury	**0.111**	mg/kg	0.0167
In Situ Characterization Sampling										
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 6010	aluminum	**15000.000**	mg/kg	49.1
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 7041	antimony	**0.351**	mg/kg	0.255
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 7060	arsenic	**4.330**	mg/kg	0.255
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 6010	barium	**61.200**	mg/kg	4.91
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 7091	beryllium	**0.602**	mg/kg	0.128
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 7131	cadmium	**0.135**	mg/kg	0.0255
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 6010	calcium	**6220.000**	mg/kg	491
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 7191	chromium	**17.000**	mg/kg	2.55
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 6010	cobalt	**8.640**	mg/kg	4.91
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 6010	copper	**11.600**	mg/kg	4.91
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 6010	iron	**20500.000**	mg/kg	24.5
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 7421	lead	**5.000**	mg/kg	2.55
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 6010	magnesium	**4410.000**	mg/kg	49.1
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 6010	manganese	**419.000**	mg/kg	9.82
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 7471	total mercury	**0.067**	mg/kg	0.0337
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 6010	nickel	**ND**	mg/kg	9.82
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 6010	potassium	**797.000**	mg/kg	221
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 7740	selenium	**ND**	mg/kg	0.255
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 7761	silver	**ND**	mg/kg	0.0511
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 6010	sodium	**633.000**	mg/kg	491

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type PR	Sample Type QC	Matrix	Analytical Method	Analyte	Result	Units	Detection Level
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 7841	thallium	**ND**	mg/kg	0.255
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 6010	vanadium	**51.300**	mg/kg	4.91
98RTRSD1SD	sediment 1 - upstream	9/14/98	X		soil	EPA 6010	zinc	**47.900**	mg/kg	9.82
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 6010	aluminum	**16200.000**	mg/kg	79.1
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 7041	antimony	**ND**	mg/kg	0.431
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 7060	arsenic	**4.860**	mg/kg	0.431
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 6010	barium	**52.000**	mg/kg	7.91
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 7091	beryllium	**0.626**	mg/kg	0.216
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 7131	cadmium	**0.144**	mg/kg	0.0431
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 6010	calcium	**6790.000**	mg/kg	791
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 7191	chromium	**18.700**	mg/kg	4.31
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 6010	cobalt	**9.960**	mg/kg	7.91
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 6010	copper	**13.200**	mg/kg	7.91
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 6010	iron	**23400.000**	mg/kg	39.6
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 7421	lead	**4.490**	mg/kg	4.31
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 6010	magnesium	**4820.000**	mg/kg	79.1
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 6010	manganese	**699.000**	mg/kg	15.8
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 7471	total mercury	**0.197**	mg/kg	0.0375
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 6010	nickel	**ND**	mg/kg	15.8
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 6010	potassium	**1090.000**	mg/kg	356
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 7740	selenium	**ND**	mg/kg	0.431
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 7761	silver	**ND**	mg/kg	0.0863
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 6010	sodium	**ND**	mg/kg	791
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 7841	thallium	**ND**	mg/kg	0.431
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 6010	vanadium	**59.200**	mg/kg	7.91
98RTRSD2SD	sediment 2 - adjacent	9/14/98	X		soil	EPA 6010	zinc	**52.200**	mg/kg	14.7
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 6010	aluminum	**10900.000**	mg/kg	55.7
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 7041	antimony	**ND**	mg/kg	0.366
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 7060	arsenic	**4.570**	mg/kg	0.366
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 6010	barium	**39.000**	mg/kg	5.57
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 7091	beryllium	**0.545**	mg/kg	0.183
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 7131	cadmium	**0.113**	mg/kg	0.0366

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type		Matrix	Analytical Method	Analyte	Result	Units	Detection Level
			PR	QC						
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 6010	calcium	**4530.000**	mg/kg	557
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 7191	chromium	**16.300**	mg/kg	3.66
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 6010	cobalt	**7.590**	mg/kg	5.57
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 6010	copper	**10.700**	mg/kg	5.57
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 6010	iron	**15900.000**	mg/kg	27.9
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 7421	lead	**4.170**	mg/kg	3.66
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 6010	magnesium	**3350.000**	mg/kg	55.7
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 6010	manganese	**495.000**	mg/kg	11.1
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 7471	total mercury	**0.458**	mg/kg	0.0299
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 6010	nickel	**ND**	mg/kg	11.1
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 6010	potassium	**749.000**	mg/kg	251
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 7740	selenium	**ND**	mg/kg	0.366
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 7761	silver	**ND**	mg/kg	0.0732
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 6010	sodium	**ND**	mg/kg	557
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 7841	thallium	**ND**	mg/kg	0.366
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 6010	vanadium	**39.700**	mg/kg	5.57
98RTRSD3SD	sediment 2 - adjacent duplicate	9/14/98		X	soil	EPA 6010	zinc	**49.100**	mg/kg	16
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 6010	aluminum	**30100.000**	mg/kg	2,870
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 7041	antimony	**ND**	mg/kg	0.194
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 7060	arsenic	**6.570**	mg/kg	1.94
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 6010	barium	**31.400**	mg/kg	2.87
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 7091	beryllium	**0.644**	mg/kg	0.097
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 7131	cadmium	**0.134**	mg/kg	0.0194
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 6010	calcium	**7540.000**	mg/kg	2,870
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 7191	chromium	**13.600**	mg/kg	1.94
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 6010	cobalt	**9.810**	mg/kg	2.87
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 6010	copper	**18.300**	mg/kg	2.87
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 6010	iron	**70400.000**	mg/kg	1,430
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 7421	lead	**4.350**	mg/kg	1.94
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 6010	magnesium	**5680.000**	mg/kg	28.7
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 6010	manganese	**2290.000**	mg/kg	57.4
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 7471	total mercury	**0.044**	mg/kg	0.0165

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type PR	Sample Type QC	Matrix	Analytical Method	Analyte	Result	Units	Detection Level
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 6010	nickel	**10.700**	mg/kg	5.74
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 7740	potassium	**476.000**	mg/kg	129
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 7740	selenium	**ND**	mg/kg	0.194
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 7761	silver	**ND**	mg/kg	0.0388
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 6010	sodium	**126.000**	mg/kg	57.4
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 7841	thallium	**ND**	mg/kg	0.194
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 6010	vanadium	**55.400**	mg/kg	2.87
98RTRSD4SD	sediment 3 - downstream 500'	9/14/98	X		soil	EPA 6010	zinc	**56.100**	mg/kg	5.74
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 6010	aluminum	**17800.000**	mg/kg	35.6
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 7041	antimony	**ND**	mg/kg	0.209
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 7060	arsenic	**23.300**	mg/kg	2.09
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 6010	barium	**104.000**	mg/kg	3.56
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 7091	beryllium	**0.711**	mg/kg	0.105
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 7131	cadmium	**0.200**	mg/kg	0.0209
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 6010	calcium	**7300.000**	mg/kg	356
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 7191	chromium	**11.400**	mg/kg	2.09
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 6010	cobalt	**16.400**	mg/kg	3.56
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 6010	copper	**36.200**	mg/kg	3.56
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 6010	iron	**35600.000**	mg/kg	17.8
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 7421	lead	**4.690**	mg/kg	2.09
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 6010	magnesium	**6340.000**	mg/kg	35.6
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 6010	manganese	**2480.000**	mg/kg	7.11
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 7471	total mercury	**0.085**	mg/kg	0.0183
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 6010	nickel	**16.800**	mg/kg	7.11
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 6010	potassium	**1000.000**	mg/kg	160
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 7740	selenium	**ND**	mg/kg	0.209
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 7761	silver	**0.046**	mg/kg	0.0418
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 6010	sodium	**ND**	mg/kg	356
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 7841	thallium	**ND**	mg/kg	0.209
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 6010	vanadium	**64.500**	mg/kg	3.56
98RTRSD5SD	sediment 4 - downstream 1000'	9/14/98	X		soil	EPA 6010	zinc	**78.500**	mg/kg	7.11
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 6010	aluminum	**11300.000**	mg/kg	48.7

Table A-1. Analytical Sample Results

Sample Number	Location	Date	Sample Type		Matrix	Analytical Method	Analyte	Result	Units	Detection Level
			PR	QC						
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 7041	antimony	**ND**	mg/kg	0.205
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 7060	arsenic	**7.570**	mg/kg	2.05
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 6010	barium	**33.000**	mg/kg	4.87
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 7091	beryllium	**0.651**	mg/kg	0.102
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 7131	cadmium	**0.099**	mg/kg	0.0205
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 6010	calcium	**4050.000**	mg/kg	487
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 7191	chromium	**14.300**	mg/kg	2.05
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 6010	cobalt	**6.890**	mg/kg	0.975
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 6010	copper	**22.000**	mg/kg	0.975
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 6010	iron	**30000.000**	mg/kg	2,440
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 7421	lead	**3.360**	mg/kg	2.05
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 6010	magnesium	**5540.000**	mg/kg	48.7
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 6010	manganese	**609.000**	mg/kg	9.75
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 7471	total mercury	**0.125**	mg/kg	0.017
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 6010	nickel	**10.200**	mg/kg	1.95
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 6010	potassium	**517.000**	mg/kg	219
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 7740	selenium	**ND**	mg/kg	0.205
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 7761	silver	**ND**	mg/kg	0.0409
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 6010	sodium	**124.000**	mg/kg	97.5
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 7841	thallium	**ND**	mg/kg	0.0205
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 6010	vanadium	**44.000**	mg/kg	0.975
98RTRSD6SD	sediment 5 - adjacent 108' out	9/14/98	X		soil	EPA 6010	zinc	**62.300**	mg/kg	9.75

mg/kg	milligrams per kilogram
DRO	Diesel-range organics
EPA	Environmental Protection Agency

Table A-2. Waste Characterization Sample Results

Sample Number	Location / Tote Number	Date	Time	Total Mercury (mg/kg)	TCLP Mercury (mg/l)	Composite Sample Number	Total Mercury (mg/kg)	TCLP Mercury (mg/l)
June 1998 - Composite Samples								
98RTR001SL	98RTR001	6/10/98	1300	--	--	**98RTRC01SL**	70.4	0.022
98RTR002SL	98RTR005	6/10/98	1315	--	--			
98RTR003SL	98RTR006	6/10/98	1330	--	--			
98RTR004SL	98RTR007	6/10/98	1345	--	--			
98RTR005SL	98RTR008	6/10/98	1400	--	--			
98RTR006SL	98RTR009	6/10/98	1415	--	--	**98RTRC02SL**	77.6	0.0251
98RTR007SL	98RTR010	6/10/98	1430	--	--			
98RTR008SL	98RTR012	6/10/98	1445	--	--			
98RTR009SL	98RTR013	6/10/98	1530	--	--			
98RTR010SL	98RTR014	6/10/98	1600	--	--			
98RTR011SL	98RTR015	6/10/98	1615	--	--	**98RTRC03SL**	54.8	0.0244
98RTR012SL	98RTR016	6/10/98	1630	--	--			
98RTR013SL	98RTR017	6/10/98	1645	--	--			
98RTR014SL	98RTR018	6/10/98	1700	--	--			
98RTR015SL	98RTR019	6/10/98	1715	--	--			
98RTR016SL	98RTR020	6/10/98	1730	--	--	**98RTRC04SL**	56	ND(0.0200)
98RTR017SL	98RTR021	6/10/98	1745	--	--			
98RTR018SL	98RTR022	6/10/98	1800	--	--			
98RTR019SL	98RTR023	6/10/98	1815	--	--			
98RTR020SL	98RTR024	6/10/98	1830	--	--			
98RTR021SL	98RTR025	6/11/98	830	--	--	**98RTRC05SL**	130	0.031
98RTR023SL	98RTR028	6/11/98	900	--	--			
98RTR024SL	98RTR030	6/11/98	925	--	--			
98RTR025SL	98RTR031	6/11/98	940	--	--			
98RTR026SL	98RTR032	6/11/98	1000	--	--			
98RTR027SL	98RTR033	6/11/98	1015	--	0.0236	**98RTRC06SL**	207	--
98RTR028SL	98RTR034	6/11/98	1030	--	0.0221			
98RTR029SL	98RTR035	6/11/98	1045	--	ND(0.0200)			
98RTR030SL	98RTR036	6/11/98	1115	--	0.0208			
98RTR031SL	98RTR037	6/11/98	1130	--	0.0212			
98RTR032SL	98RTR038	6/11/98	1140	278	ND(0.0200)	**98RTRC07SL**	391	--
98RTR033SL	98RTR039	6/11/98	1200	178	ND(0.0200)			
98RTR034SL	98RTR040	6/11/98	1215	345	0.0264			
98RTR035SL	98RTR041	6/11/98	1230	134	0.0239			
98RTR037SL	98RTR044	6/11/98	1300	84.9	0.0229			
98RTR038SL	98RTR045	6/11/98	1315	--	--	**98RTRC08SL**	89.4	0.0277
98RTR039SL	98RTR046	6/11/98	1330	--	--			
98RTR040SL	98RTR047	6/11/98	1250	--	--			
98RTR041SL	98RTR048	6/11/98	1310	--	--			
98RTR042SL	98RTR049	6/11/98	1320	--	0.0263	**98RTRC09SL**	223	--
98RTR043SL	98RTR050	6/11/98	1335	--	ND(0.0200)			
98RTR044SL	98RTR051	6/11/98	1345	--	0.0255			
98RTR045SL	98RTR052	6/11/98	1350	--	0.03			

Table A-2. Waste Characterization Sample Results

Sample Number	Location / Tote Number	Date	Time	Total Mercury (mg/kg)	TCLP Mercury (mg/l)	Composite Sample Number	Total Mercury (mg/kg)	TCLP Mercury (mg/l)
June 1998 - Individual Samples								
98RTR046SL	98RTR053	6/11/98	1405	188	ND(0.0200)			
98RTR047SL	98RTR054	6/11/98	1420	121	ND(0.0200)			
98RTR048SL	98RTR055	6/11/98	1430	219	0.0221			
98RTR049SL	98RTR056	6/11/98	1445	321	0.0218			
98RTR050SL	98RTR057	6/11/98	1520	195	0.0236			
98RTR051SL	98RTR058	6/11/98	1530	226	0.195			
98RTR052SL	98RTR059	6/11/98	1545	224	0.121			
98RTR053SL	98RTR060	6/11/98	1555	314	ND(0.0200)			
98RTR054SL	98RTR061	6/11/98	1605	70.7	ND(0.0200)			
98RTR055SL	98RTR062	6/11/98	1615	102	0.0211			
98RTR056SL	98RTR063	6/11/98	1625	86.6	0.0201			
98RTR057SL	98RTR064	6/11/98	1640	183	0.0294			
98RTR058SL	98RTR065	6/11/98	1645	72.1	0.0617			
98RTR059SL	98RTR066	6/11/98	1700	120	0.0506			
98RTR060SL	98RTR067	6/11/98	1715	254	0.0492			
98RTR061SL	98RTR068	6/12/98	845	2670	0.388			
98RTR062SL	98RTR069	6/12/98	915	7350	0.467			
98RTR063SL	98RTR070	6/12/98	930	225	0.0328			
98RTR064SL	98RTR071	6/12/98	945	25.5	ND(0.0200)			
98RTR065SL	98RTR072	6/12/98	950	2090	ND(0.0200)			
98RTR066SL	98RTR073	6/12/98	1005	414	0.0215			
98RTR067SL	98RTR074	6/12/98	1015	791	ND(0.0200)			
98RTR068SL	98RTR075	6/12/98	1030	203	ND(0.0200)			
98RTR069SL	98RTR076	6/12/98	1040	1510	0.0012			
98RTR070SL	98RTR078	6/12/98	1050	1210	0.00185			
98RTR071SL	98RTR079	6/12/98	1100	608	0.00615			
98RTR072SL	98RTR081	6/12/98	1110	1230	0.0323			
98RTR073SL	98RTR083	6/12/98	1120	1010	ND(0.0200)			
98RTR074SL	98RTR084	6/12/98	1125	2330	0.0502			
98RTR022SL	98RTR027	6/11/98	845	13800	0.0568			
98RTR036SL	98RTR042	6/11/98	1245	977	0.0216			
September 1998 Sampling								
98RTR075SL	98RTR086	9/1/98	1030	--	0.000253			
98RTR076SL	98RTR087	9/1/98	1035	--	0.000701			
98RTR077SL	98RTR088	9/1/98	1040	--	0.000833			
98RTR078SL	98RTR089	9/1/98	1050	--	ND(0.0002)			
98RTR079SL	98RTR090	9/1/98	1055	--	0.000642			
98RTR080SL	98RTR091	9/1/98	1105	--	ND(0.0002)			
98RTR081SL	98RTR092	9/1/98	1107	--	ND(0.0002)			
98RTR082SL	98RTR093	9/1/98	1110	--	0.000361			
98RTR083SL	98RTR094	9/1/98	1120	--	ND(0.0002)			
98RTR084SL	98RTR095	9/1/98	1125	--	0.00117			
98RTR085SL	98RTR096	9/1/98	1135	--	ND(0.0002)			
98RTR086SL	98RTR097	9/1/98	1140	--	ND(0.0002)			
98RTR087SL	98RTR098	9/1/98	1145	--	ND(0.0002)			
98RTR088SL	98RTR099	9/1/98	1150	--	0.00029			

Table A-2. Waste Characterization Sample Results

Sample Number	Location / Tote Number	Date	Time	Total Mercury (mg/kg)	TCLP Mercury (mg/l)	Composite Sample Number	Total Mercury (mg/kg)	TCLP Mercury (mg/l)
98RTR089SL	98RTR100	9/1/98	1155	--	0.000409			
98RTR090SL	98RTR101	9/1/98	1200	--	0.000437			
98RTR091SL	98RTR005	9/1/98	1205	--	0.0875			
98RTR092SL	98RTR102	9/1/98	1210	--	0.000912			
98RTR093SL	98RTR102	9/1/98	1211	--	0.00292			
98RTR094SL	98RTR103	9/1/98	1215	--	0.000344			
98RTR095SL	98RTR104	9/1/98	1315	--	0.000207			
98RTR096SL	98RTR105	9/1/98	1320	--	0.00266			
98RTR097SL	98RTR106	9/1/98	1325	--	0.000549			
98RTR098SL	98RTR107	9/1/98	1330	--	0.000209			
98RTR099SL	98RTR108	9/1/98	1337	--	0.000756			
98RTR100SL	98RTR109	9/1/98	1445	--	0.00219			
98RTR101SL	98RTR110	9/1/98	1350	--	0.000299			
98RTR102SL	98RTR111	9/1/98	1355	--	0.00203			
98RTR103SL	98RTR112	9/1/98	1405	--	0.000769			
98RTR104SL	98RTR112	9/1/98	1410	--	0.00104			
98RTR105SL	98RTR113	9/1/98	1413	--	0.000945			
98RTR106SL	98RTR114	9/1/98	1420	--	0.000707			
98RTR107SL	98RTR116	9/1/98	1425	--	0.00168			
98RTR108SL	98RTR117	9/1/98	1430	--	0.000891			
98RTR109SL	98RTR117	9/1/98	1435	--	0.000593			
98RTR110SL	98RTR118	9/1/98	1440	--	0.000738			
98RTR111SL	98RTR119	9/1/98	1450	--	0.000277			
98RTR112SL	98RTR119	9/1/98	1455	--	0.000644			
98RTR113SL	98RTR120	9/1/98	1500	--	0.00104			
98RTR114SL	98RTR121	9/1/98	1510	--	0.00082			
98RTR115SL	98RTR122	9/1/98	1515	--	0.00615			
98RTR116SL	98RTR123	9/1/98	1525	--	0.000354			
98RTR117SL	98RTR124	9/1/98	1545	--	0.00118			
98RTR118SL	98RTR124	9/1/98	1550	--	0.000655			
98RTR119SL	98RTR125	9/1/98	1600	--	0.00248			
98RTR120SL	98RTR126	9/1/98	1610	--	0.0277			
98RTR121SL	98RTR127	9/1/98	1620	--	0.0167			
98RTR122SL	98RTR129	9/1/98	1640	--	0.0017			
98RTR123SL	98RTR130	9/1/98	1655	--	0.000505			
98RTR124SL	98RTR131	9/1/98	1710	--	0.000641			
98RTR125SL	98RTR132	9/1/98	1715	--	0.000966			
98RTR126SL	98RTR132	9/1/98	1720	--	0.000549			
98RTR127SL	98RTR133	9/1/98	1730	--	0.000377			
98RTR128SL	98RTR134	9/2/98	850	--	0.00121			
98RTR129SL	98RTR135	9/2/98	855	--	0.00368			
98RTR130SL	98RTR135	9/2/98	900	--	0.00481			
98RTR131SL	98RTR136	9/2/98	905	--	0.0269			
98RTR132SL	98RTR137	9/2/98	910	--	0.00456			
98RTR133SL	98RTR138	9/2/98	920	--	0.0186			
98RTR134SL	98RTR139	9/2/98	925	--	0.00381			
98RTR135SL	98RTR140	9/2/98	930	--	0.0205			

Table A-2. Waste Characterization Sample Results

Sample Number	Location / Tote Number	Date	Time	Total Mercury (mg/kg)	TCLP Mercury (mg/l)	Composite Sample Number	Total Mercury (mg/kg)	TCLP Mercury (mg/l)
98RTR136SL	98RTR141	9/2/98	940	--	0.0296			
98RTR137SL	98RTR142	9/2/98	945	--	0.00219			
98RTR138SL	98RTR143	9/2/98	955	--	0.0229			
98RTR139SL	98RTR144	9/2/98	1000	--	0.00872			
98RTR140SL	98RTR146	9/2/98	1005	--	0.0169			
98RTR141SL	98RTR147	9/2/98	1015	--	0.000806			
98RTR142SL	98RTR147	9/2/98	1018	--	0.0282			
98RTR143SL	98RTR145	9/2/98	1025	--	0.0121			
98RTR144SL	98RTR148	9/2/98	1120	219	0.21			
98RTR145SL	98RTR149	9/2/98	1130	--	0.0519			
98RTR146SL	98RTR150	9/2/98	1132	--	0.0026			
98RTR147SL	98RTR150	9/2/98	1135	--	0.00437			
98RTR148SL	98RTR151	9/2/98	1140	--	0.0177			
98RTR149SL	98RTR152	9/2/98	1145	--	0.000509			
98RTR150SL	98RTR153	9/2/98	1150	--	0.000623			
98RTR151SL	98RTR154	9/2/98	1240	--	0.00215			
98RTR152SL	98RTR156	9/2/98	1245	--	0.0065			
98RTR153SL	98RTR157	9/2/98	1250	--	0.00628			
98RTR154SL	98RTR159	9/2/98	1255	--	0.00742			
98RTR155SL	98RTR160	9/2/98	1300	--	0.0864			
98RTR156SL	98RTR161	9/2/98	1305	--	0.000324			
98RTR157SL	98RTR161	9/2/98	1310	--	0.00141			
98RTR158SL	98RTR162	9/2/98	1315	--	0.0056			
98RTR159SL	98RTR163	9/2/98	1320	--	0.00371			
98RTR160SL	98RTR164	9/2/98	1325	--	0.00625			
98RTR161SL	98RTR165	9/2/98	1335	--	0.000945			
98RTR162SL	98RTR166	9/2/98	1500	--	0.000887			
98RTR163SL	98RTR168	9/2/98	1510	--	0.000537			
98RTR164SL	98RTR168	9/2/98	1515	--	0.0441			
98RTR165SL	98RTR169	9/2/98	1520	--	0.022			
98RTR166SL	98RTR170	9/2/98	1530	--	0.0788			
98RTR167SL	98RTR171	9/2/98	1540	--	0.000788			
98RTR168SL	98RTR172	9/2/98	1545	--	0.000987			
98RTR169SL	98RTR173	9/2/98	1550	--	0.000458			
98RTR170SL	98RTR175	9/2/98	1555	--	0.000372			
98RTR171SL	98RTR176	9/2/98	1557	--	0.00886			
98RTR172SL	98RTR176	9/2/98	1603	--	0.000311			
98RTR173SL	98RTR177	9/2/98	1605	--	0.000676			
98RTR174SL	98RTR178	9/2/98	1610	--	0.000816			

Table A-2. Waste Characterization Sample Results

Sample Number	Location / Tote Number	Date	Time	Total Mercury (mg/kg)	TCLP Mercury (mg/l)	Composite Sample Number	Total Mercury (mg/kg)	TCLP Mercury (mg/l)
98RTRBG1SL	additional ex. bag 1	9/15/98	905	--	ND(0.000200)			
98RTRBG2SL	additional ex. bag 2	9/15/98	1115	--	ND(0.000200)			
98RTRBG3SL	additional ex. bag 3	9/15/98	1300	--	0.000589			
98RTRBG4SL	additional ex. bag 4	9/15/98	1412	--	ND(0.000200)			
98RTRBG5SL	additional ex. bag 5	9/15/98	1505	--	ND(0.000200)			
98RTRBG6SL	additional ex. bag 6	9/15/98	1515	--	ND(0.000200)			
98RTRBG7SL	additional ex. bag 7	9/15/98	1640	--	ND(0.000200)			
98RTRBG8SL	additional ex. bag 8	9/15/98	1650	--	ND(0.000200)			
98RTRBG9SL	additional ex. bag 9	9/15/98	925	--	ND(0.000200)			

mg/kg Milligrams per kilogram
mg/l Milligrams per liter
TCLP Toxicity characteristic leaching procedure

APPENDIX C

WASTE DISPOSAL CERTIFICATES

Oregon Waste Systems, Inc.
Columbia Ridge Landfill & Recycling Center
18177 Cedar Springs Lane
Arlington, Oregon 97812
541/454-2030 • FAX: 541/454-3312

A Waste Management Company

December 14, 1998

Philip Services
1813 E. 1ST. Ave. STE 201
Anchorage, AK. 99501-1833

CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 7, 1998
Manifest #:	RTOP 2
Profiles:	489494
Pounds Disposed:	29700 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

Julie Valdez
Julie Valdez
Special Waste Billing Clerk

Oregon Waste Systems, Inc.
Columbia Ridge Landfill & Recycling Center
18177 Cedar Springs Lane
Arlington, Oregon 97812
541/454-2030 • FAX: 541/454-3312

A Waste Management Company

December 14, 1998

Philip Services
1813 E. 1ST. Ave. STE 201
Anchorage, AK. 99501-1833

CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 8, 1998
Manifest #:	RTOP 3
Profiles:	489494
Pounds Disposed:	27560 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

Julie Valdez
Julie Valdez
Special Waste Billing Clerk

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A Waste Management Company

December 16, 1998

Philip Services
1813 E. 1ST. Ave. STE 201
Anchorage, AK. 99501-1833

CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red Top Retort.

Date of Disposal:	December 15, 1998
Manifest #:	RTOP 4
Profiles:	489494
Pounds Disposed:	30080 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

Julie Valdez
Julie Valdez
Special Waste Billing Clerk

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A Waste Management Company

December 14, 1998

Philip Services
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Anchorage, AK. 99501-1833

CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 9, 1998
Manifest #:	RTOP 5
Profiles:	489494
Pounds Disposed:	27580 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

Julie Valdez
Julie Valdez
Special Waste Billing Clerk

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December 14, 1998

Philip Services
1813 E. 1ST. Ave. STE 201
Anchorage, AK. 99501-1833

CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 4, 1998
Manifest #:	RTOP 6
Profiles:	489494
Pounds Disposed:	27240 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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Julie Valdez
Special Waste Billing Clerk

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A Waste Management Company

December 14, 1998

Philip Services
1813 E. 1ST. Ave. STE 201
Anchorage, AK. 99501-1833

CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 4, 1998
Manifest #:	RTOP 7
Profiles:	489494
Pounds Disposed:	23120 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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Julie Valdez
Special Waste Billing Clerk

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A Waste Management Company

December 14, 1998

Philip Services
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Anchorage, AK. 99501-1833

CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 4, 1998
Manifest #:	RTOP 8
Profiles:	489494
Pounds Disposed:	26880 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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Special Waste Billing Clerk

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December 16, 1998

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CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red Top Retort.

Date of Disposal:	December 15, 1998
Manifest #:	RTPOP 9
Profiles:	489494
Pounds Disposed:	29960 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red Top Retort.

Date of Disposal:	December 11, 1998
Manifest #:	RTP 11
Profiles:	489494
Pounds Disposed:	29720 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 10, 1998
Manifest #:	RTP 12
Profiles:	489494
Pounds Disposed:	27600 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 7, 1998
Manifest #:	RTP 13
Profiles:	489494
Pounds Disposed:	29340 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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Special Waste Billing Clerk

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CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 4, 1998
Manifest #:	RTP 14
Profiles:	489494
Pounds Disposed:	25520 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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Special Waste Billing Clerk

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CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 9, 1998
Manifest #:	RTP 15
Profiles:	489494
Pounds Disposed:	25020 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red Top Retort.

Date of Disposal:	December 14, 1998
Manifest #:	RTP 16
Profiles:	489493
Pounds Disposed:	39180 lbs
Waste Type:	Soil & Debris Cont. With Diesel

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red Top Retort.

Date of Disposal:	December 14, 1998
Manifest #:	RTP 18
Profiles:	489493
Pounds Disposed:	37360 lbs
Waste Type:	Soil & Debris Cont. With Diesel

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 3, 1998
Manifest #:	RTP 20
Profiles:	489494
Pounds Disposed:	26200lbs
Waste Type:	Soil & Debris Cont. With Mercury

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CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 3, 1998
Manifest #:	RTP 21
Profiles:	489494
Pounds Disposed:	25460 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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Julie Valdez
Special Waste Billing Clerk

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December 16, 1998

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CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red Top Retort.

Date of Disposal:	December 15, 1998
Manifest #:	RTP 22
Profiles:	489494
Pounds Disposed:	36820 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 3, 1998
Manifest #:	RTP 23
Profiles:	489494
Pounds Disposed:	31360 lbs
Waste Type:	Soil & Debris Cont. With Mercury

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

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December 14, 1998

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CERTIFICATE OF DISPOSAL

Oregon Waste Systems, Inc. has received NON HAZARDOUS Waste material from Philip Services/Red TopRetort.

Date of Disposal:	December 3, 1998
Manifest #:	RTP 24
Profiles:	489493
Pounds Disposed:	4520 lbs
Waste Type:	Soil & Debris Cont. With Diesel

I certify, on behalf of the above listed facility, that to the best of my knowledge the above described non hazardous waste was managed in compliance with all applicable laws.

Julie Valdez

Julie Valdez
Special Waste Billing Clerk

DISTRIBUTION

Remedial Action Report
Red Top Retort Site
Aleknagik, Alaska

December 31, 1998

1 Copy:	Mr. Wayne Svejnoha U.S. Department of the Interior Bureau of Land Management Alaska State Office 222 West Seventh Avenue, #13 Anchorage, Alaska 99513-7599
10 Copies	Mr. Mike Alcorn U.S. Department of the Interior Bureau of Land Management Anchorage Field Office 6881 Abbott Loop Road Anchorage, Alaska 99507

1 Copy:	Project File
1 Copy:	Bound Report File

Quality Control Reviewer

Paul C. Ramert, P.E.
Civil Engineer - 8489

TE/mm/W0711R

**Harding Lawson Associates/
Wilder Construction Company
Joint Venture**

December 31, 1998

41475

Mr. Mike Alcorn
U.S. Department of the Interior
Bureau of Land Management
Anchorage Field Office
6881 Abbott Loop Road
Anchorage, Alaska 99507

**Remedial Action Report
Contract 1422-N660-C97-3025
Modifications 1, 2 and 3
Delivery Order 11
Red Top Retort Site
Aleknagik, Alaska**

Dear Mr. Alcorn:

Enclosed are 10 copies of Harding Lawson Associates/Wilder Construction Company (HLA/Wilder's) Joint Venture's final report titled *Remedial Action Report, Red Top Retort Site, Aleknagik, Alaska.* Our report includes certificates of disposal for all manifests except RTP10, RTP17, and RTP19. Certificates of disposal for these three manifests will be forwarded to the BLM upon receipt.

Thank you for the opportunity to be of service.

Yours very truly,

HLA/WILDER JV

Michael J. Schmetzer, P.E.
Civil Engineer - 8598

TE/mm/W0711R

Enclosures

cc: Mr. Wayne Svejnoha w/enclosure

Environmental Engineering and
Remedial Services

601 East 57th Place, Anchorage, AK 99518 907/563-8102
Fax 907/561-4574