

April 20, 2000

41475

Mr. Mike Alcorn  
U.S. Department of the Interior  
BUREAU OF LAND MANAGEMENT  
Anchorage Field Office  
6881 Abbott Loop Road  
Anchorage, Alaska 99507

**2000 Data Summary Letter Report  
Contract 1422-N660-C97-3025  
Modification 0005, Delivery Order 0011  
Red Top Retort Site  
Aleknagik, Alaska**

Dear Mr. Alcorn:

The following letter report summarizes analytical data collected by Harding Lawson Associates/Wilder Construction Company Joint Venture (HLA/Wilder), Quest Environmental (Quest), and the U.S. Geological Survey (USGS) at the Red Top Retort site, Aleknagik, Alaska. This letter has been prepared in response to a February 22, 2000, meeting between Mr. Joe McElroy of HLA/Wilder, Mr. Mike Alcorn of the Bureau of Land Management (BLM), and Ms. Eileen Olson of the Alaska Department of Environmental Conservation (ADEC). The BLM assigned this project to HLA/Wilder under Modification 05 to Delivery Order 11 of Contract 1422-N660-C97-3025.

**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 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. Burning wood and bunker C fuel produced heat for the retort process.

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### Quest Data

In June 1994, Quest performed a site assessment at the Red Top Retort site. Laboratory analytical results indicated that 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 heat panels and gaskets) were decommissioned and placed in 1-cubic yard (yd<sup>3</sup>) plastic storage boxes (totes) and stored onsite. Soil suspected of exceeding state and federal regulatory levels for mercury contamination near the former retort building was excavated, placed in totes, and stored onsite. The approximate dimensions of the resulting excavation were 55 feet wide, 75 feet long, and 2 to 3 feet deep. 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.<sup>1</sup> Figure 2 is a site map from the Quest report presenting sample locations and results in tabular form (scale is not representative of actual site conditions and does not match scale for subsequent work performed at the site).

### USGS Data

In 1996, the USGS collected soil samples from the Red Top Retort site and analyzed them for total mercury and mercury speciation. Soil samples from the Red Top area had methylmercury concentrations of 0.466 and 1.483 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ) and soil samples collected in the vicinity of the retort shack had methylmercury concentrations of 2.577 to 6.855  $\mu\text{g}/\text{kg}$ . Associated total mercury concentrations ranged from 0.844 to 1.566 mg/kg (Figure 3).<sup>2</sup>

### HLA/Wilder Data

In August and September 1998, HLA/Wilder sampled, labeled, transported, and disposed of the totes, and stockpiled soil and debris stored onsite from the 1994 Quest activities. HLA/Wilder also excavated additional mercury-contaminated soil and collected additional characterization samples in the area excavated by Quest in 1994.<sup>3</sup> Four of the HLA/Wilder characterization samples exceeded the ADEC mercury cleanup level of 1.4 mg/kg established in Title 18, Alaska Administrative Code, Chapter 75 (18 AAC 75) - Table B1, Migration to Groundwater.<sup>4</sup> The locations and results for these samples are

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<sup>1</sup> Quest. 1995. *Remedial action report, BLM Red Top Retort site, Wood River, Alaska*. January.

<sup>2</sup> USGS. 1996. Bailey, E.A., Hines, M.E., and Gray, J.E., *Mercury speciation in soils and vegetation, southwest Alaska*, Inwenty, R.B., Marsh, S.P., and Gough, L.P., eds., 4<sup>th</sup> International Symposium on Environmental Geochemistry Proceedings: U.S. Geological Survey open-file report 97-496, 100 pages.

<sup>3</sup> HLA/Wilder. 1998. *Remedial Action Report, Red Top Retort site, Aleknagik, Alaska*. December 31.

<sup>4</sup> ADEC. 1999. 18 AAC 75, Oil and hazardous substances pollution control regulations. January 22.

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presented on Figure 4. HLA/Wilder also collected various background, confirmation, sediment, and surface water samples at the Red Top Retort site during 1998 activities. Results of these samples are presented on Figure 4 for reference.

In June 1999, the ADEC, BLM, and HLA/Wilder met to discuss the results of the 1998 activities and any further action necessary at the site. The ADEC suggested the mercury concentrations from the 1998 sampling activities (maximum of 40.6 mg/kg) were acceptable for site closure if institutional controls were placed on the property title, and a limited amount of supplemental site characterization was completed. For additional site characterization, the ADEC requested samples be collected for total mercury analysis from below the 1998 sample location depths, and from selected locations in and outside the 1998 sample grid. In September 1999, six samples were collected at the 1998 sample grid nodes at locations deeper (approximately 3 to 3.5 feet bgs) than the 1998 sample points. Samples were also collected from six new sample grid locations. One sample was taken from just below the bottom of the 1994 excavation (1 to 2 feet bgs) and one from a deeper interval (3 to 3.5 feet bgs) at these locations.<sup>5</sup> The sample results and grid locations for the 1999 sampling event are presented on Figure 4.

Six background soil samples (99RTB1 through 99RTB6) also were collected north of the former retort site from an area considered unaffected by retort activity during the September 1999 sampling event. Two samples were collected at different depths at each of the three locations and analyzed for total mercury. The background sample locations and results are presented on Figure 3. The total mercury concentrations for the background samples ranged from 0.0342 to 0.156 mg/kg.

The mercury concentration in one 1999 sample (99RT10SL at 108 mg/kg) exceeded the highest concentration found in 1998 (40 mg/kg). A statistical analysis of 44 sample results covering approximately 3,800 square feet indicated a 95 percent confidence interval from 10.81 to 0.126 mg/kg.<sup>5</sup> The statistical analysis was based on the method outlined in 18 AAC 75.380 for final compliance with soil cleanup standards. The 1999 methylmercury results ranged from 0.086 to 0.633 µg/kg. USGS background methylmercury data from 1996 ranged from 1.149 to 1.271 µg/kg.

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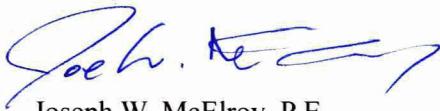
<sup>5</sup> HLA/Wilder. 1999. *Site characterization work plan/ sampling and analysis plan, Red Top Retort site, Aleknagik, Alaska.*

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Thank you for the opportunity to be of service.

Yours very truly,

**HLA/WILDER JV**



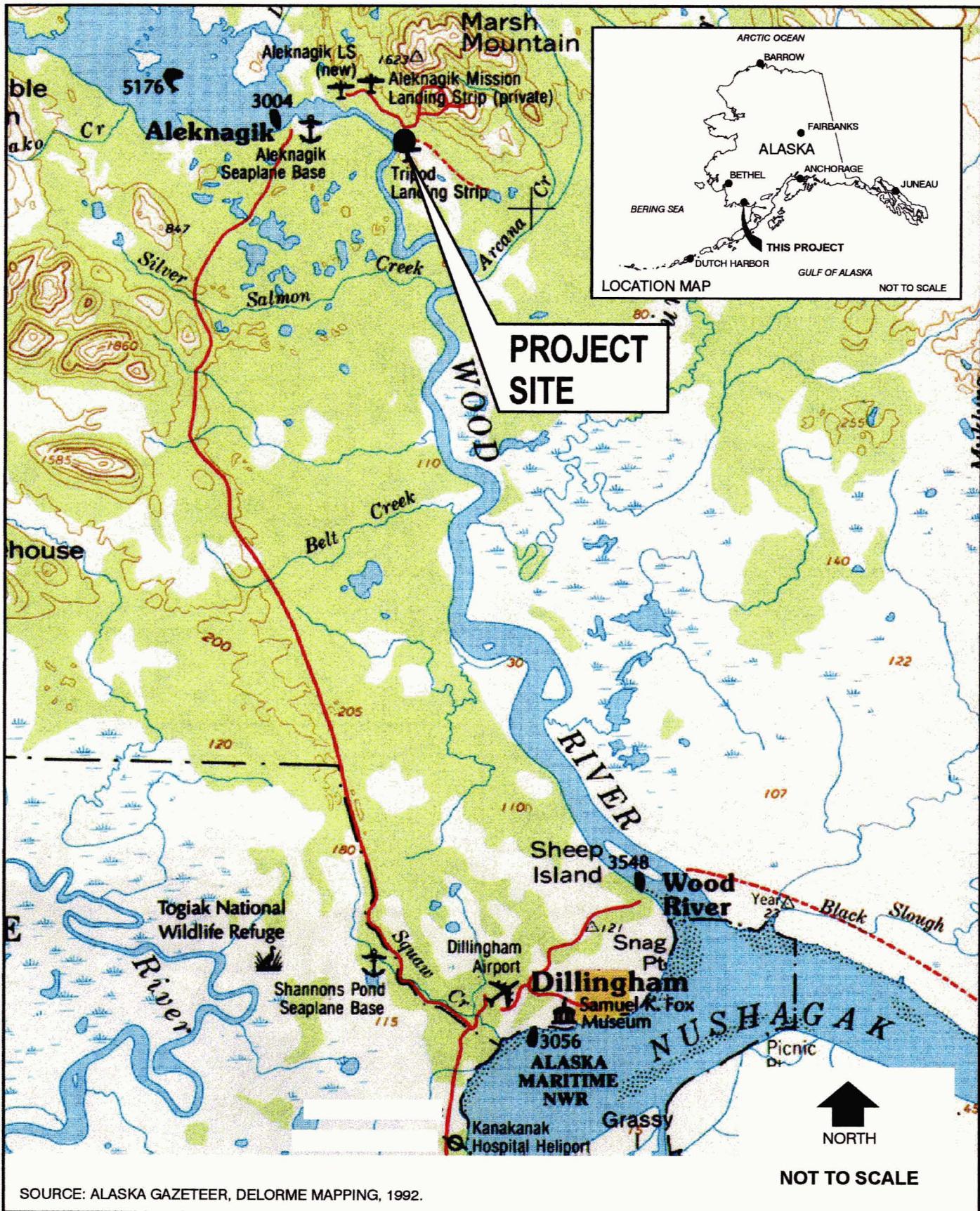
Joseph W. McElroy, P.E.  
Civil Engineer - 9814

  
QC/TE/jm/W2283C

- Figures:
- 1 Location and Vicinity Map
  - 2 Quest Data and Site Map
  - 3 Red Top Retort Site Map with Area HLA/Wilder and USGS Data.
  - 4 Excavation Site HLA/Wilder Sample Results

cc: Mr. Wayne Svejnoha w/attachments

Figure 1



SOURCE: ALASKA GAZETEER, DELORME MAPPING, 1992.



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

**Site Vicinity and Project Location Map**

Red Top Retort Site  
Aleknagik, Alaska

FIGURE

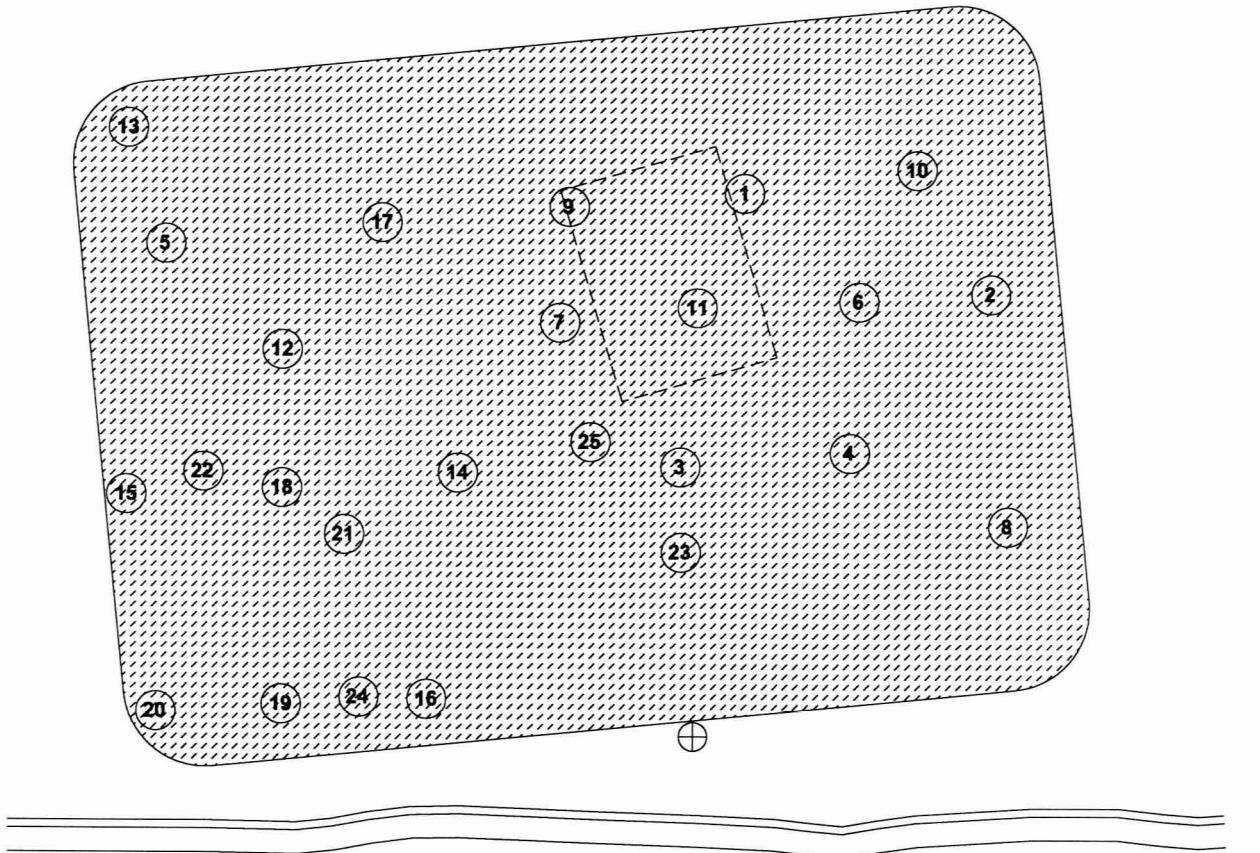
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**Figure 2**

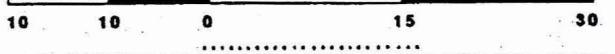
1994 Quest Environmental Confirmation Soil Sample Results					
Sampling Location	Sample Number	Total Mercury (mg/kg)	TPH (mg/kg)	DRO (mg/kg)	RRO (mg/kg)
1	94RTM10-01	0.1	-	-	-
2	94RTM10-02	0.5	-	-	-
3	94RTM10-03	0.5	-	-	-
4	94RTM10-04	0.4	-	-	-
5	94RTM10-05	0.3	-	-	-
6	94RTM10-06	8.7	-	-	-
7	94RTM10-07	53	-	-	-
8	94RTM10-08	97	-	-	-
9	94RTM10-09	23	-	-	-
10	94RTM10-10	18	-	-	-
11	94RTM10-11	5.6	-	-	-
12	94RTM10-12	0.3	-	-	-
13	94RTM10-13	2.5	-	-	-
14	94RTM10-14	30	-	-	-
15	94RTM10-15	2.9	-	-	-
16	94RTM10-16	5.2	-	-	-
17	94RTM10-17	12	-	-	-
18	94RTM10-18	39	-	-	-
19	94RTM10-19	40	-	-	-
20	94RTM10-20	0.2	-	-	-
21	94RTM10-26	-	ND	ND(11)	ND(21)
22	94RTM10-27	-	48	5800	ND(740)
23	94RTM10-28	-	ND	ND(17)	ND(34)
24	94RTM10-29	-	ND	170	390
25	94RTM10-30	-	ND	28	ND(31)

**OVERLAY 2:**  
**LABORATORY SOIL SAMPLING LOCATION POINTS AND ANALYTICAL RESULTS FOR MERCURY & POL'S**



**WOOD RIVER**

**FEET**



**KEY:**

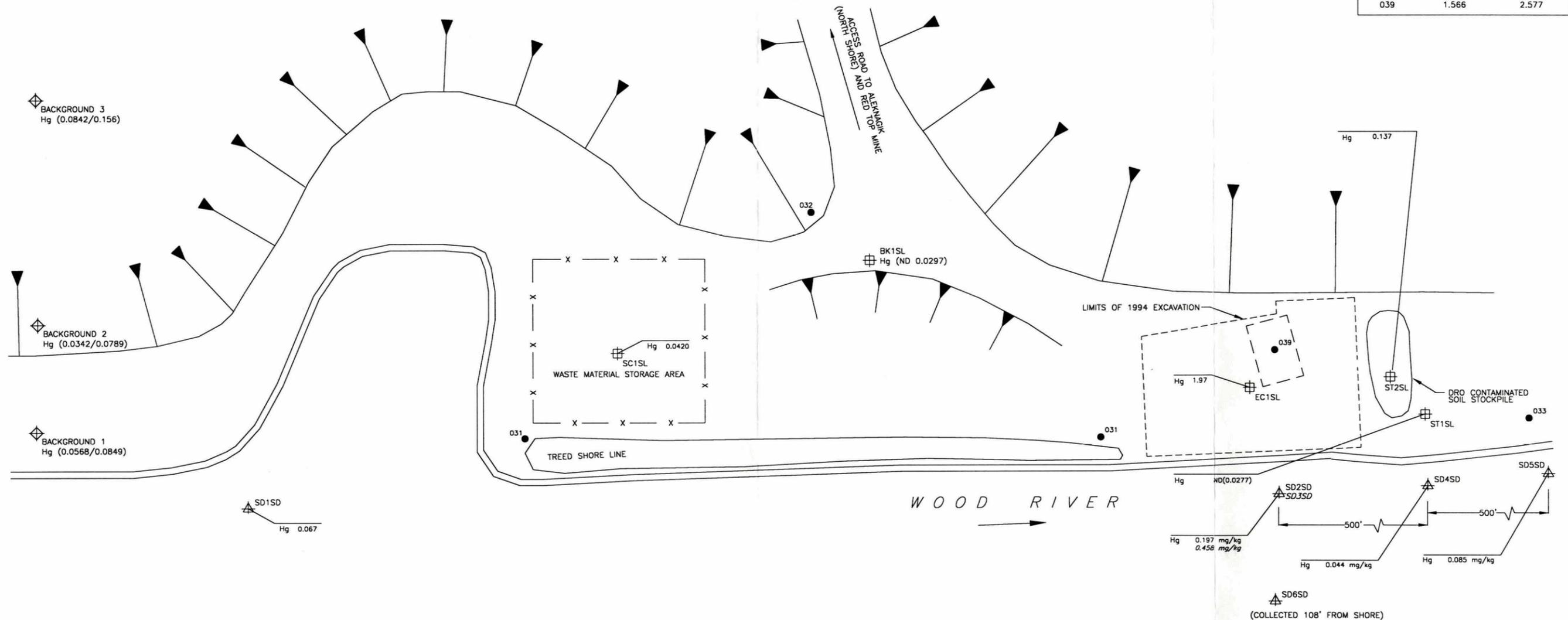
-  FOOTPRINT OF FORMER RETORT SHACK
-  BLM MARKER "BLM2"
-  EXCLUSION ZONE EXCAVATION



Drawn by PJB July, January 1995	Scale: 1" = 15 Feet
<b>Site Map: Exclusion Zone Excavation, Contaminant &amp; Sample Locations</b>	
Quest Environmental	Fig. 2

Figure 3

1996 USGS SAMPLE RESULTS	TOTAL MERCURY (milligrams per kilogram)	METHYLMERCURY (micrograms per kilogram)
030	0.844	1.483
031	1.202	6.855
032	0.287	0.466
033	0.721	0.682
039	1.566	2.577

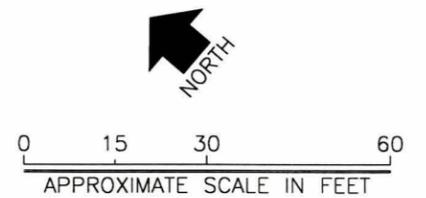


LEGEND:

- APPROXIMATE LOCATION OF 1996 USGS SOIL SAMPLE
- ◇ BACKGROUND SAMPLE LOCATION AND NUMBER APPROXIMATELY 1' TO 3' DEEP (TOTAL MERCURY RESULTS SHOWN IN PARENTHESSES, SHALLOW RESULTS/DEEP RESULTS)
- ⊕ 1988 BACKGROUND SAMPLE LOCATION AND NUMBER APPROXIMATELY 6" DEEP (TOTAL MERCURY RESULTS SHOWN IN PARENTHESIS)
- △ WOOD RIVER SEDIMENT SAMPLE LOCATION
- X — CHAIN LINK FENCE
- Hg MERCURY (TOTAL)

NOTES:

1. SURVEY WAS NOT PERFORMED. ALL SAMPLE LOCATIONS WERE TAPED FROM PROMINENT SITE FEATURES.
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. COMPLETE SEPTEMBER 1998 WOOD RIVER SEDIMENT SAMPLE TARGET ANALYTE LIST (TAL) METALS RESULTS NOT SHOWN FOR CLARITY.
5. 98RTR LEFT OFF BEGINNING OF ALL SAMPLE NUMBERS FOR BREVITY.



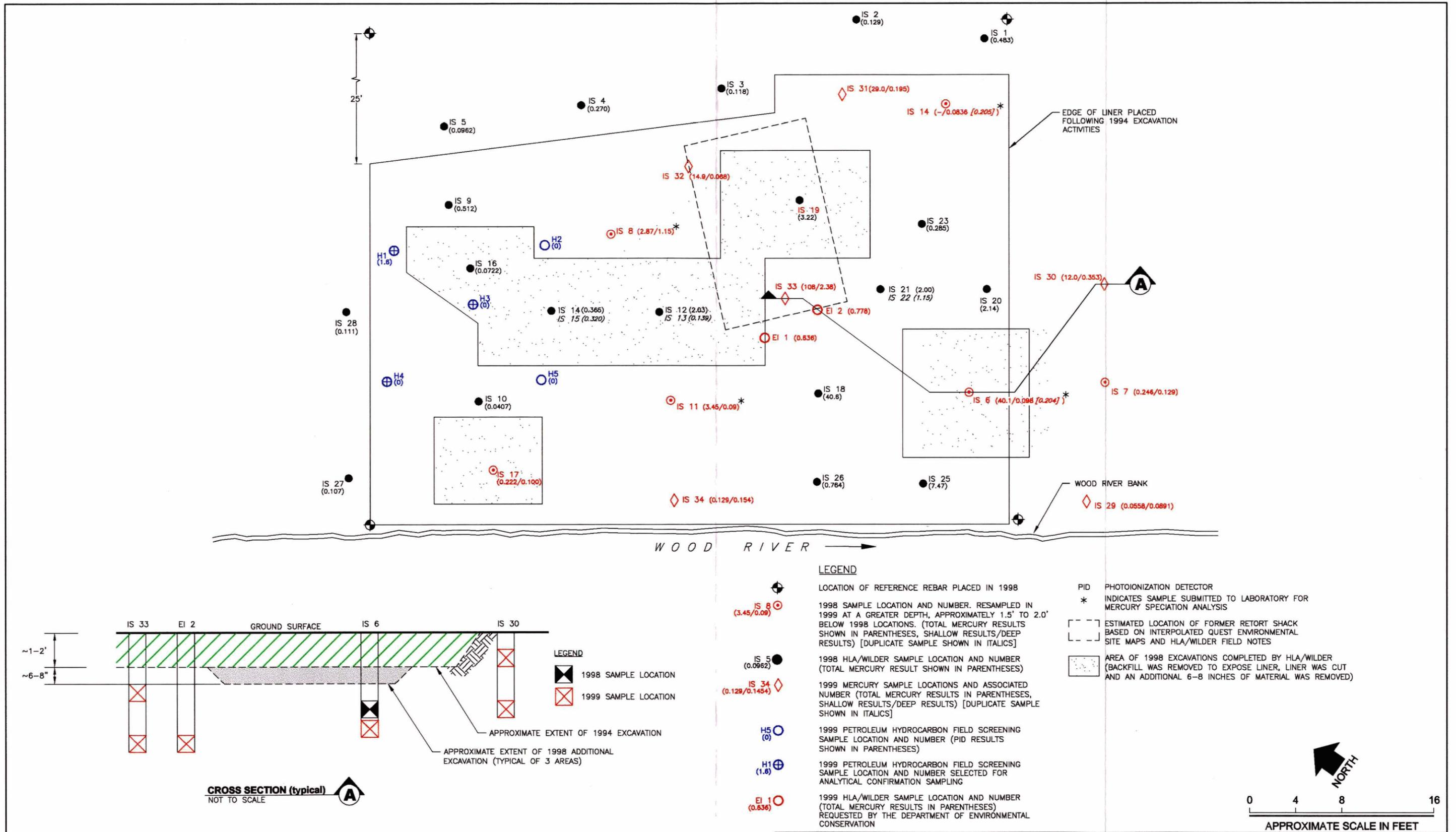
Harding Lawson Associates/  
Wilder Construction Company  
Joint Venture

Site Plan, Sample Locations, and Results **FIGURE 3**

Red Top Retort Size  
Aleknagik, Alaska

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Figure 4



LEGEND

- LOCATION OF REFERENCE REBAR PLACED IN 1998
- 1998 SAMPLE LOCATION AND NUMBER. RESAMPLED IN 1999 AT A GREATER DEPTH, APPROXIMATELY 1.5' TO 2.0' BELOW 1998 LOCATIONS. (TOTAL MERCURY RESULTS SHOWN IN PARENTHESES, SHALLOW RESULTS/DEEP RESULTS) [DUPLICATE SAMPLE SHOWN IN ITALICS]
- 1999 MERCURY SAMPLE LOCATIONS AND ASSOCIATED NUMBER (TOTAL MERCURY RESULTS IN PARENTHESES, SHALLOW RESULTS/DEEP RESULTS) [DUPLICATE SAMPLE SHOWN IN ITALICS]
- 1999 PETROLEUM HYDROCARBON FIELD SCREENING SAMPLE LOCATION AND NUMBER (PID RESULTS SHOWN IN PARENTHESES)
- 1999 PETROLEUM HYDROCARBON FIELD SCREENING SAMPLE LOCATION AND NUMBER SELECTED FOR ANALYTICAL CONFIRMATION SAMPLING
- 1999 HLA/WILDER SAMPLE LOCATION AND NUMBER (TOTAL MERCURY RESULTS IN PARENTHESES) REQUESTED BY THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
- ESTIMATED LOCATION OF FORMER RETORT SHACK BASED ON INTERPOLATED QUEST ENVIRONMENTAL SITE MAPS AND HLA/WILDER FIELD NOTES
- AREA OF 1998 EXCAVATIONS COMPLETED BY HLA/WILDER (BACKFILL WAS REMOVED TO EXPOSE LINER, LINER WAS CUT AND AN ADDITIONAL 6-8 INCHES OF MATERIAL WAS REMOVED)
- PHOTOIONIZATION DETECTOR
- INDICATES SAMPLE SUBMITTED TO LABORATORY FOR MERCURY SPECIATION ANALYSIS

LEGEND

- 1998 SAMPLE LOCATION
- 1999 SAMPLE LOCATION
- APPROXIMATE EXTENT OF 1994 EXCAVATION
- APPROXIMATE EXTENT OF 1998 ADDITIONAL EXCAVATION (TYPICAL OF 3 AREAS)

- NOTES:
- 1) PLASTIC LINER LOCATED AT EXCAVATION LIMITS.
  - 2) ALL RESULTS SHOWN IN PARTS PER MILLION.
  - 3) LOCATIONS SHOWN IN RED AND BLUE SAMPLED DURING 1999 ACTIVITIES.

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

**Excavation Area and In Situ Characterization  
Sample Locations**

Red Top Retort Site  
Aleknagik, Alaska

FIGURE  
**4**

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