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Final Report

Site Inspection

Red Devil Mine

Red Devil
Alaska

June 1989

WESTON
MANAGERS DESIGNERS/CONSULTANTS

RED DEVIL MINE
SITE INSPECTION
FINAL REPORT
RED DEVIL, ALASKA

Prepared for
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Prepared by

Roy F. Weston, Inc.
201 Elliott Ave. W.
Suite 500
Seattle, WA 98119

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SECTION 1
EXECUTIVE SUMMARY

On 8 and 9 September 1988, Roy F. Weston (WESTON) conducted a site investigation (SI) at the Red Devil Mine. The site is located in a remote part of western Alaska, approximately 250 miles west of Anchorage, on the south side of the Kuskokwim River. The mine occupies a US Department of Interior, Bureau of Land Management (BLM) parcel of approximately ten acres. Valid mining claims are in effect over much of the site. Placer, underground, and open pit mining techniques were utilized over the mine's history.

Red Devil Creek separates the main portal and camp buildings from the milling operations area. The distance from the mine along the creek, to its confluence in the Kuskokwim River, is approximately 0.3 miles. The margins of several tailings features are within the creek basin, and most of the mine buildings were built on land leveled with tailings. The strike of the mercury, antimony, and arsenic mineralized zone is intersected by the creek.

The mine operated from 1933 sporadically until 1971. It was allowed to flood in 1981. Over its history, a total of approximately 35,000 flasks of mercury were produced.

Environmental investigations conducted by the US Environmental Protection Agency (EPA), and the Alaska Department of Environmental Conservation (ADEC) established the presence of mercury and arsenic in Red Devil Creek sediments. ADEC recommended that access to the site be restricted, and that the various tailings features be stabilized. Subsequent to these investigations, BLM representatives collected surface water and sediment samples at the site that confirmed the widespread presence of mercury and initiated the effort which led to the characterization of the transformers and on-site chemicals.

The objectives of the site investigation included conducting an evaluation of contaminant migration pathways; characterization of tailings features, transformers, and on-site chemicals; documentation of site conditions in photographs and on an EPA Site Investigation Form; and application of the EPA Hazard Ranking System score to the site. Five tailings features were sampled, three creek surface water samples, and four sediment samples were obtained, and one residential well was sampled. Thirty-one transformers were inventoried, and several hundred drums were inspected.

Creek sediments and tailings features were shown to contain significantly elevated levels of mercury, antimony, and arsenic. Surface water metal analytical results were comparable to background concentrations, suggesting minimal impacts by the heavy metal laden sediments. The residential well sample contained lead (224 ug/L) at a concentration in excess of Federal Drinking Water Standard-Mean Concentration Limits (5.0 ug/L), but

in excess of Federal Drinking Water Standard-Mean Concentration Limits (5.0 ug/L), but is not thought to be related to the site. Twenty transformers contained dielectric fluid, two of which were within the action range of 50 ppm PCBs. These two transformers have been removed from the site by BLM. All but several of the drums at the site were empty and all were thought to have contained either fuel or cutting oil. No evidence for solvent or acid drums were observed. The chemicals stored at the site were identified as potassium carbonate (potash), copper sulfate, and sodium hydroxide.

A BLM designation of Class III has been assigned to the site. The main reason for this classification is due to the direct contact threats posed by the caustic chemicals at the site. If this direct contact threat is removed, this classification could be lowered. An HRS score of 14.95 was assigned. This score is a result of the large volume of tailings present, the high toxicity and persistence of the heavy metals, the proximity of the tailings to Red Devil Creek, and the presumed shallow depth to groundwater. The relatively insoluble form of the metal sulfides is not taken into account in the HRS score.

Stabilization of the various tailings features does not appear to be a sound remedial option at the present time. EPA is currently in the process of developing regulations under the Resource Conservation and Recovery Act (RCRA) that will produce guidance for the management of mining/milling wastes. An effort to stabilize the tailings at the Red Devil Mine would be a significant undertaking. Not only are several tailing features being eroded by or into Red Devil Creek, but the entire mine site is built up on tails that are in contact with the creek. The SI sampling suggests that while creek sediments are high in mercury, antimony, and arsenic, surface water is not being impacted. Rather than conduct remedial efforts at this time, it would be prudent to await EPA guidance. This would ensure any remedial actions would comply with upcoming regulations. BLM should closely monitor this regulatory process. Furthermore, the mining claims in the site vicinity are valid, and the claim holders may consider the tails potential future resources.

The transformers that remain at the site are not regulated by the Toxic Substance Control Act because they have been shown to contain less than 50 ppm. Likewise, requirements for decontaminating PCB spills from a less-than-50-ppm source are not regulated under TSCA (*Federal Register* 40 CFR Part 761 IV C 2-3); however, polychlorinated biphenyls (PCBs) can concentrate in soils well in excess of the original PCB content of the source dielectric fluids. Therefore, BLM is encouraged to prevent dielectric fluid spills at the site. This could be accomplished by either staging the dielectric-fluid-containing transformers in a secure area that would contain any spills or by draining the fluid and appropriately disposing of it. TSCA specifies that transformers containing less than 50 ppm PCBs can be disposed of in a solid waste landfill. The only restriction on the dielectric fluid is that it is not to be used as a sealant, coating, or dust control agent if it contains any detectable PCBs.

The direct contact threat posed by the caustic chemicals that remain on site should be removed, and the site should be continually posted to inform the public of the potential physical and chemical hazards present at the site.

SECTION 2
INTRODUCTION

BLM contracted WESTON to conduct site investigations on 22 sites located throughout EPA Regions VI, VII, IX, and X. All of these sites are considered to be potential hazardous waste sites under CERCLA/SARA. The scope of work involved is identified in BLM's contract with WESTON (No. AA852-CT8-14, dated 12 February 1988) and WESTON's technical proposal (No. P-88-6234, dated 5 January 1988), which is incorporated in BLM's contract.

This work encompasses what the EPA refers to as site inspections or investigations (SI). The work is directed towards classification and ranking of the potential hazardous waste sites, along with recommendations for any further actions needed to remediate public health and environmental threats.

Site investigations will collect the following types of information:

- Information relating to the amount, nature, and toxicity of the hazardous wastes or hazardous substances at each site, including the results of any systematic testing and analysis of the materials.

- Information on the nature and extent of contamination at the site.

- Information on the regional hydrogeology of the site and the location of withdrawal wells and surface water within 1 mile of the site.

- A description of actual or potential pathways by which the hazardous materials could leave the site, including an estimate of the probability that any particular pathway is actually being used.

- The extent and type of injury, destruction, or loss of natural resources caused by the hazardous materials.

- Identification of any sites within 3 miles that might compound any known or potential contamination of the environment for which the BLM site might be or is known to be responsible, at least in part.

- Descriptions of the type or types of actions that might be taken on an interim basis to clean up and/or control the hazardous materials in order to protect the public health and the environment.

- A ranking of each site using EPA's Hazard Ranking System (HRS), with discussion and justification of the basis for the total score and the individual route scores included.

- Completion of an EPA Site Inspection Report (EPA Form 2070-13) in July 1981.

SECTION 3
SITE INFORMATION

On September 8 and 9, 1988, Roy F. Weston, Inc. conducted a site investigation (SI) at the inactive Red Devil Mine, in Red Devil, Alaska. The specific on-site scope of work had been identified under separate cover in a document entitled, Site Work Plan-Site Investigation, Red Devil Mine, Red Devil Alaska, August 1988. The scope of work for the site investigation was determined after a site visit and meeting conducted with BLM state and district personnel. The Work Plan was approved by BLM's Contracting Officer's Representative prior to initiating on-site work. The SI sought to identify, characterize, monitor and sample potential hazards at the site.

3.1 SITE LOCATION

The Red Devil Mine is located in a remote portion of western Alaska, approximately 250 miles west of Anchorage and approximately eight miles west of Sleetmute, on the south side of the Kuskokwim River. The site legal description is Township 19 North, Range 44 West, Southeast quarter Section 6, Seward Meridian (Figure 1).

3.2 SITE DESCRIPTION AND LAYOUT

The Red Devil Mine occupies an approximately ten acre parcel of BLM land. The site is defined as the area bounded on the north by the Kuskokwim River, the south by the southernmost extent of the mine, the east by the milling facilities, and the west by the westernmost extent of the main camp area. A site layout map is shown in Figure 2.

Access to the site is provided by an unimproved road leading from the village of Red Devil. Site access is not restricted; however BLM has posted several signs around the site perimeter warning of potentially hazardous conditions. Red Devil Creek, which flows northeast, bisects the site. There are no permanent residences within the Red Devil Creek drainage basin. The distance from the mine to the confluence of Red Devil Creek and the Kuskokwim River is approximately 0.3 miles. The creek separates the headworks and main camp area from the milling operations area. Mine tailings were used for leveling beneath many of the site buildings. The margins of several tailings features are within the creek basin, and are eroded by the creek. The mineralized zone strikes east-west and is intersected by the creek.

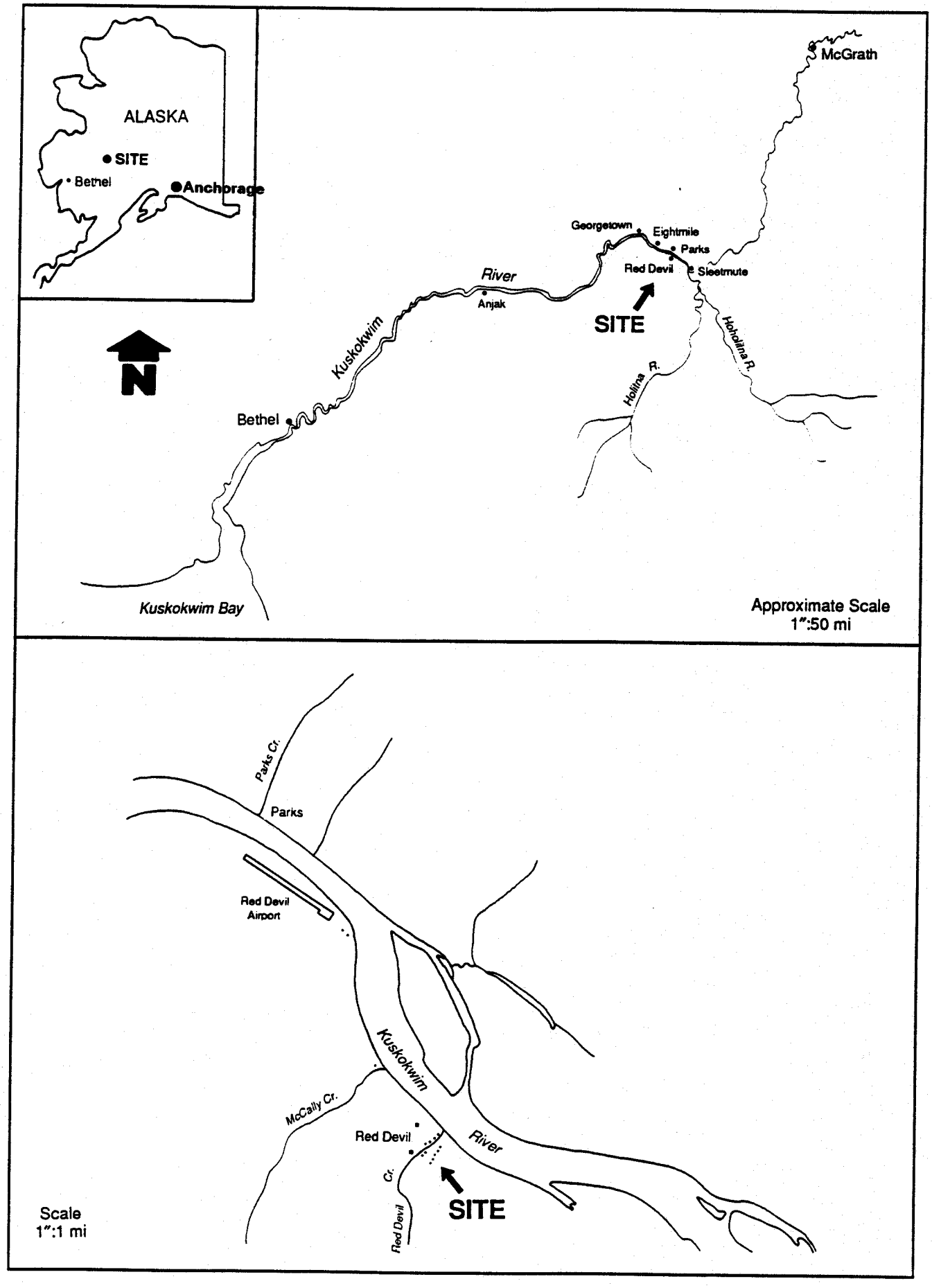

FIGURE 1 SITE VICINITY AND LOCATION

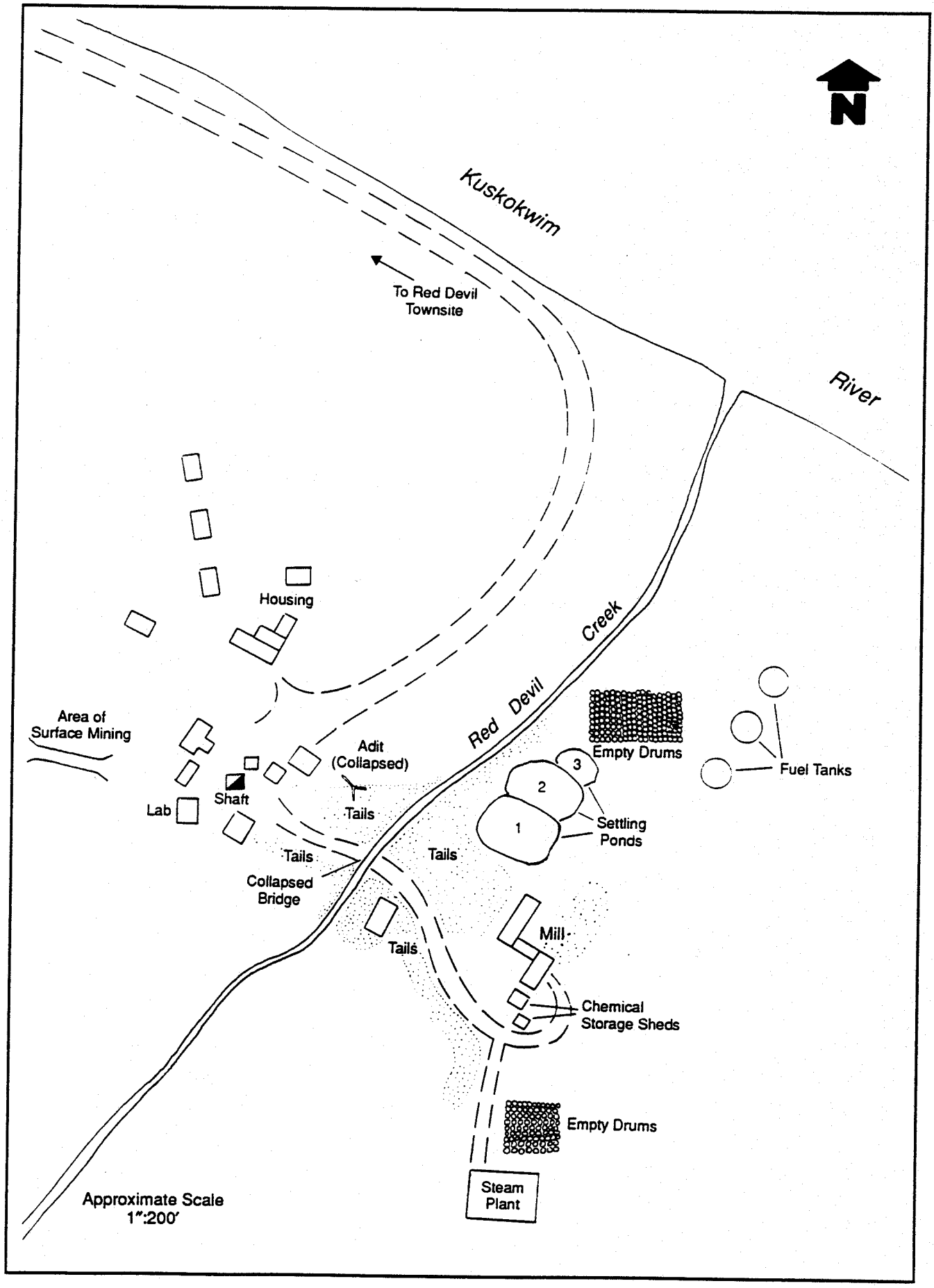

FIGURE 2 SITE PLAN

The milling operations area, located in the eastern half of the site, consists of a ball mill and crusher, retort plant, two chemical storage sheds, a power house, and three settling ponds.

Three large fuel tanks are located on the ridge to the north of the mill. The precise volume capacity of the tanks is not known but each is in excess of 50,000 gallons. These tanks were filled with pumping fuel from ships or barges docked along the Kuskokwim River and are presently empty.

The western portion of the site consists of equipment storage buildings, a metal shop, the foundation of a former laboratory, a large engine shop, a hoist building, headworks and the mine portal. Several housing units are located atop a small bluff northwest of the mine area, over-looking the site. Many of the buildings have been used as a source of construction materials by village residents. The majority of the buildings are old and in disrepair. They contain rusted electrical equipment, fixtures, hardware, motor parts, pipes and other miscellaneous equipment.

Two sheds, located near the mill, contain bagged chemicals such as copper sulfate (5-100 lb. bags), flake caustic soda (15-50 lb. bags) and dense soda ash (175-100 lb. bags). A total of thirty one transformers were identified at various locations on the site. Twenty of the transformers contained oils, the rest were dry or filled with rain water. Several hundred 55-gallon drums are scattered about the site. All but eight are empty. Five drums contain diesel and water, and three drums contain cutting oil.

3.3 BACKGROUND DATA ACQUISITION

Prior to the fieldwork phase of the site investigation, background data pertinent to the Red Devil Mine was acquired. This included conversations with, and a review of, files supplied by BLM personnel. The site file included BLM correspondence, location maps, a Mineral Investigation Report (Bureau of Mines, 1985), and a CERCLA Site Investigation Report (Tryck, Nyman and Hayes, Sept. 1987). A pre-site-investigation meeting was held, a visit to the mine site was taken, and the scope of the site investigation was formally agreed upon by WESTON and BLM.

3.4 SITE HISTORY

Mercury and Antimony were discovered in the Red Devil area in 1933. Eleven flasks (76 pounds per flask) of mercury were produced between 1933 and 1940, under the ownership of the New Idria-Alaska Quicksilver Mining Company (Meyer, 1985). In 1942 the Red Devil Mine property was investigated by Bureau of Mines personnel. Trenching and sampling was conducted. Soil samples contained 2.96 to 32.0 ppm mercury and 0.98 to 26.5 ppm antimony. In June 1944, 1,096 flasks of mercury were recovered (Meyer, 1985). Poor market conditions followed, resulting in reduced mining operations at the site. In 1946 operations were shut down. In 1952 the DeCoursey Mountain Mining Company acquired the lease on the property and mining operations resumed. A fire destroyed the

mine and mill equipment in October 1954. During the same year, a controlling interest in the lease was sold to Brewis and White. They renamed the company the DeCoursey Brewis Co. (Tryck, Nyman and Hayes,1987). The plant was rebuilt in 1955. By 1957, the mine was producing more than 5,000 flasks of mercury and became one of the largest producers in the United States (Meyer, 1985). In 1959, the DeCoursey Mountain Mining Company changed its name to Alaska Mines and Minerals, Inc. These companies produced 27,800 flasks of mercury between 1956 and 1963. Known ore reserves were exhausted by September 1963. Operations were shut down indefinitely. The site remained inactive until 1969. At this time, the price of mercury rose to $780 per flask. The Alaska Mines and Mineral Company defined additional economic ore reserves and began open pit mining. By 1970, the Red Devil Mine was the largest mercury producer in Alaska. The mill operated at maximum capacity until 1971 when the mine was shut down once again due to a drop in the price of mercury (Meyer, 1985). The mine has not operated since, and was allowed to flood in 1981.

3.5 PREVIOUS WORK

The Environmental Protection Agency conducted an inspection at the site in late 1971. Water and sediment samples were collected for mercury and arsenic analyses. Laboratory analysis showed 9,000 ug/l of mercury in a settling pond and 3 ug/l mercury in McCally Creek (located west of the site). Another EPA study, conducted in 1979, collected water samples from five locations at the mine site. All water samples contained less than 0.3 ug/l mercury.

During the Fall of 1985, The Department of Environmental Conservation (DEC) sampled water from two residential wells in the area. Analysis showed both mercury and arsenic below analytical detection limits (Tryck, Nyman and Hayes, September, 1987). The DEC conducted another site inspection in December 1987. Their report recommended that access to the site be restricted and that the various tailings features be stabilized.

In September 1987, Tryck, Nyman and Hayes, a DEC contractor, submitted a Red Devil Mine CERCLA Site Inspection Report. Their report concluded that due to the low population of the area, and the residents' awareness of the presence of mercury at the mine, "potential public health effects due to exposure to mercury and arsenic are low."

In July 1988, a Bureau of Land Management (BLM) representative collected ten soil and six water samples from the mine area. Laboratory analysis showed mercury ranging from 41 mg/kg to 967 mg/kg in soils and from 0.2 ug/l to 5.5 ug/l in surface waters. These results illustrate the dramatic decrease in heavy metal concentrations in surface water after the cessation of mining activities. They also point out the high background concentrations of heavy metals in surface water (Sceva, 1971). This indicates other sources of mercury and arsenic within the Kuskokwim River drainage basin.

At this time, BLM also initiated the effort which led to the characterization of the transformers and on-site chemicals. A summary of the sampling conducted at the site to date is presented in Table 1.

TABLE 1
SUMMARY OF ANALYTICAL RESULTS

Background Samples	Hg	As	Location
Surface Water (ug/l)			
Sceva, 1971	0.3	6	RDC**, above mill
	1.7	56	Kuskokwim River, above RDC
Morris, 1979	0.21	--	RDC, above mill
	0.28	--	Kuskokwim River, above RDC
Wheeler, 1988	0.2	--	RDC, above mill]
	0.2	--	RDC, above mill
Sediments/Soils (mg/kg)			
Wheeler, 1988	0.2	--	RDC, above mill
	6.4	--	Above power plant
	7.8	--	Above Kuskokwim River
	8.0	--	West of mine access road

Settling Ponds	Sb	Hg	As	Location
Surface Water (ug/l)				
Sceva, 1971 (mine in operation)	--	12,850	85,000	Settling Pond #1
Sediments/Soils (mg/kg)				
Morris, 1979	--	216*	--	Settling Pond #1
Wheeler, 1988	--	195	--	Settling Pond #1
Weston, 1988	1,872	395	8,474	Settling Pond #1

* Wet Weight
** Red Devil Creek

TABLE 1
(continued)

Red Devil Creek	Sb	Hg	As	Location
Surface Water (ug/l)				
Brovant, 1971	--	9,000	--	Discharge from Settling Pond #1
Morris, 1979	--	0.14	--	Below third Settling Pond
	--	0.14	--	Mouth of creek
Wheeler, 1988	--	0.2	--	Adit #6
	--	5.5	--	Mouth of creek
	--	0.6	--	Below third Settling Pond
Weston, 1988	--	0.4	--	Above Settling Pond #1
		0.3	--	Southern border
	278	0.4	244	Mouth of creek
Sediments/Soils (mg/kg)				
Wheeler, 1988	--	967	--	Downstream of bridge
	--	41	--	Below adit
	--	136	--	Mouth of creek
	--	68	--	Below third Settling Pond
Weston, 1988	3,450	29	2,449	Above Settling Pond #1
	--	0.6	165	Southern border
	4,015	4,120	3,185	Below Settling Ponds
	3,113	33.3	2,194	Mouth of creek

TABLE 1
(continued)

Tailings/ Piles	Sb	Hg	As	Location
Soils (mg/kg)				
Wheeler, 1988	--	649	--	Pile above Settling Pond #1
Weston, 1988	1,872	295	8,474	From Settling Pond #1
	872	550	8,053	From Settling Pond #2
	664	83	6,498	From Settling Pond #3
	7,074	787	8,024	Pile above Settling Pond #1
	22,737	498	5,851	Pile above Settling Pond #1

Kuskokwim River	Hg	As	Location
Surface Water (ug/l)			
Sceva, 1971	1.0	32	At Red Devil airstrip
Morris, 1979	0.14	--	100' Downstream from mouth of RDC
	0.2	--	100' Downstream from mouth of RDC

SECTION 4
ENVIRONMENTAL MONITORING AND SAMPLING PROGRAM

The objective of the site investigation at the Red Devil Mine was to evaluate the mine as a potential hazardous waste site with the goal of classifying and ranking the degree of hazard to human health and the environment posed by site conditions. The environmental monitoring and sampling program included the following tasks.

- Evaluation of contaminant migration via surface water pathways.
- Characterization of the various types of tailings features.
- Inventorying and characterizing the potentially hazardous materials present including drums, transformers, and stored chemicals.
- Identification of potential direct contact threats.
- Documentation of site conditions through the use of photographs and the EPA Site Investigation form.
- Application of the EPA Hazard Ranking System to the site.

4.1 SITE RECONNAISSANCE

Prior to the fieldwork portion of the SI, a site visit was conducted with a representative from the BLM state office. The concentrations of organic and mercuric vapors in ambient air at the site were measured. A photoionization detector, and mercury vapor analyzer were used. No organic vapor or mercury vapor hazards were identified. Photographs were taken, and a site sketch was made to aid in the generation of the SI workplan.

Prior to initiating the SI fieldwork a site reconnaissance survey was conducted to orient the field team. Sampling points, transformer, drum, and oil stained areas were identified and flagged.

4.2 SITE SAMPLING PROGRAM

The Red Devil SI sampling program focussed on the transformers, oil-stained areas, Red Devil Creek surface water and sediment, and the various tailing features. In addition, a residential well near the mine site was sampled. All sampling locations are shown in Figure 3.

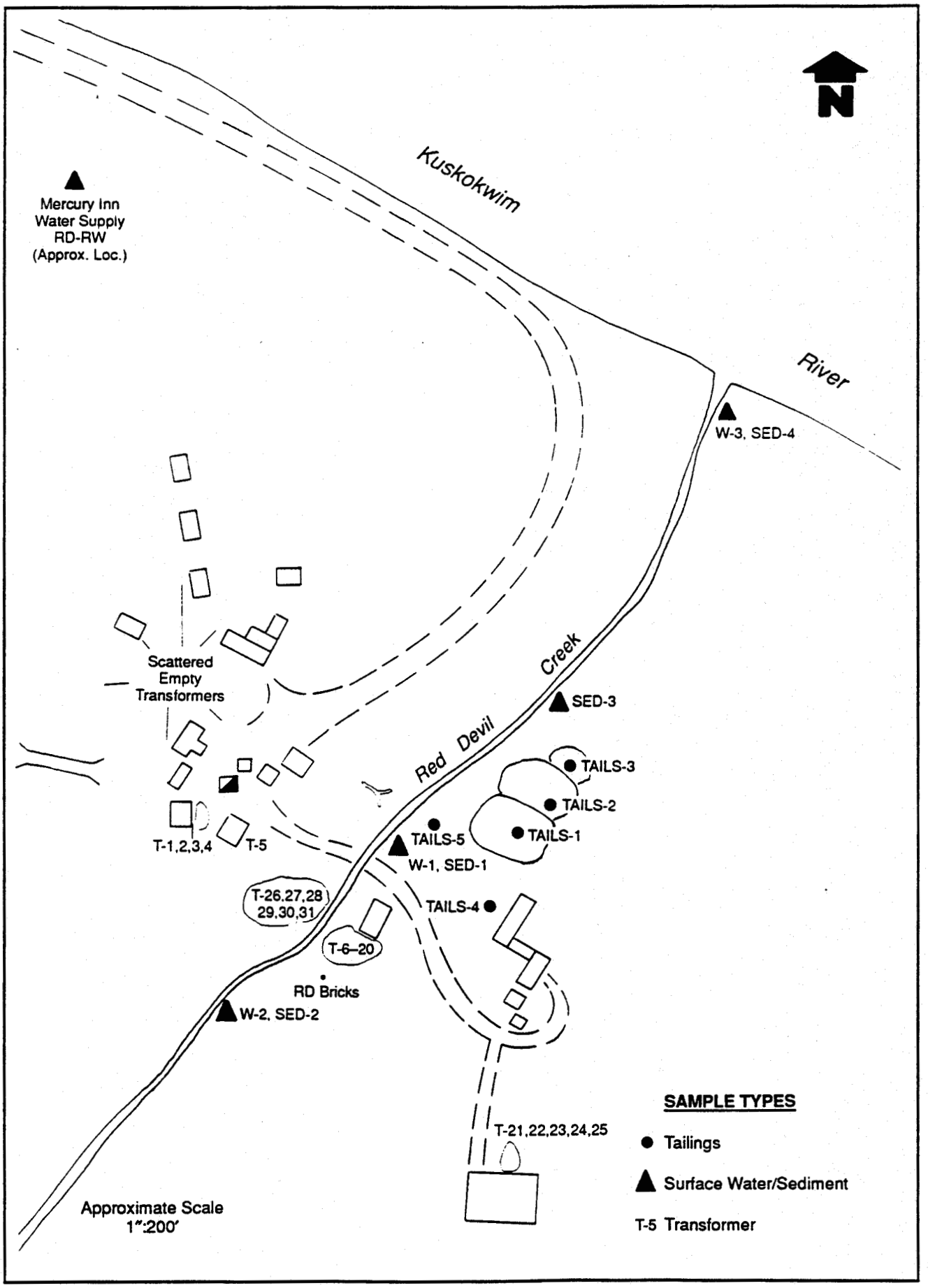

FIGURE 3 SAMPLE LOCATIONS

4.2.1 Transformers

Thirty-one transformers were inventoried during the SI. Twenty of these contained dielectric fluid and were sampled. On-site analyses were done using a McGraw-Edison test kit. These analyses determined whether the dielectric fluids contained PCBs at concentrations above or below 50 PPM.

Groups of transformers are scattered over the site (Figure 3). Each transformer was assigned a number and its characteristics were described and recorded in the site logbook (Appendix E). Samples were obtained using drum thieves (glass tubes). Dielectric fluid was placed into glass jars. Used drum thieves and glass jars were placed into the respective transformers prior to leaving the site.

4.2.2 Oil-Stained Areas

Several oil-stained areas of the site were identified during the initial site visit. Adjacent fuel drums or machinery were deemed to be the likely sources of oil in each case. Two composite soil samples were taken to confirm the stained areas did not contain PCBs.

4.2.3 Red Devil Creek

Surface water and sediment samples were identified at several locations along Red Devil Creek. Some locations coincided with those of past sampling efforts to enable comparison of results. The creek was sampled both above and below the mine site. Sample points between the mine site and the creek delta in the Kuskokwim River were selected to attempt to evaluate the contribution of the various tailings features. Water samples were collected from just below the surface in pre-acidified, laboratory-cleaned containers. Sediment samples were taken from the various depositional environments present at each sampling station. An effort to obtain a representative discrete sample of each environment was made by sampling each available grain size. Discrete samples were taken with a disposable plastic scoop, placed into a plastic bag, homogenized, and placed into a laboratory-cleaned, glass jar.

4.2.4 Mine/Mill Tailings Sampling

A variety of different tailings vintages are present at the site. The episodic mining and milling activity at the site has produced mine tailings of differing composition and textures. Tailings were used to level the site and support the site buildings. Cinnabar and antimony are visible in the surface materials throughout the mine area. The Red Devil mine/mill tailings sampling effort focussed on the tailings piles that are located along the creek. These features pose a potential source of heavy metal contamination to the creek. A visual inspection was made of the various tailings features and sample locations were chosen in what were thought to represent different vintage or types (mine versus mill) of tailings. Sediment from each of the three former settling ponds, and two tailings piles were sampled. One-foot deep, vertical channel samples were obtained in each of the three, dry, former settling ponds. Ten-foot long, six-inch deep channel samples were taken from

the other tailings features. All tailings samples were placed into a plastic bag and homogenized and then put into a laboratory-cleaned sample container.

4.2.5 Miscellaneous Other Sampling

Several hundred kiln bricks are stacked in a storage area of the site. A composite sample of these bricks was taken to determine the amount of heavy metals they had absorbed during milling operations. Several bricks were selected at random, crushed, homogenized, and placed into a sample container.

The water supply at the Vanderpool residence (the Mercury Inn) was also sampled. An outdoor bib was allowed to discharge for ten minutes and then a sample was obtained.

4.3 QUALITY ASSURANCE PROCEDURES

A quality assurance program was used to ensure reliable and representative data was obtained. EPA uniform chain-of-custody procedures, as outlined in NIEC Policies and Procedures Manual (EPA-300/9-78-001-R) for sample handling, were followed. All sample containers were cleaned and prepared in WESTON's EPA-approved laboratory in Stockton, California. All bottles had teflon-lined lids. Prior to sampling, all containers were cleaned and labeled with stick-on labels that identified the

- Site name and location
- Sample date and time
- Sample number
- Analytes requested

Dielectric fluid and oil contaminated soils were screened for PCBs with Dexsil PCB test kits. These kits were designed for utility companies so they could categorize transformers into the Toxic Substance Control Act (TSCA) regulated PCB classifications. These regulations require different handling and disposal for dielectric fluid in concentrations less than 50 PPM, 50 to 500 PPM, and greater than 500 PPM. All PCB analyses conducted during the SI determined whether the PCB concentration was greater or less than 50 PPM. Different kits were used for the soil and oil analyses. The Dexsil test kits detect organic chlorine compounds. All organic chlorine compounds are assumed to be PCBs. Therefore, false positives can result if non-PCB organic chlorinated compounds are present. The kits yield conservative colorometric results, that is, 20 percent higher than actual value. This is to ensure that appropriate PCB handling and disposal requirements are met.

The analytical procedure for soil and transformer oil screening involves weighing out a 10 gram or 5 ml aliquot, respectively, and mixing it with an extraction solvent. The solvent is then tested using metallic sodium to strip the chlorine from the PCB molecule. The chlorine is then transferred to the aqueous phase and measured with a precise amount of mercuric nitrate and indicator solution. If there is no organic chlorine present the mercury turns vivid purple; if there are chlorinated organics present, then the mercury is tied up and no color results.

SECTION 5
SAMPLING RESULTS

At a minimum, all samples were analyzed for mercury, antimony, and arsenic. Select samples were analyzed for the EP Toxicity suite of heavy metals. This suite consists of silver, arsenic, barium, cadmium, chromium, mercury, lead, antimony, and selenium. Lead was included as an analyte for two of the mill tailings samples.

A total of three creek surface water samples, one residential well sample, one kiln brick sample, five tailings samples, and four creek sediment samples were submitted to WESTON's Stockton Laboratory for analysis. Twenty transformer dielectric fluid samples were analyzed in the field. The complete analytical results are included in Appendix A. Analytical results are summarized in the following subsections.

5.1 TRANSFORMER SAMPLING RESULTS

The dielectric fluid from two of the 20 transformer samples approached or exceeded 50 PPM PCBs. Transformers 12 and 17 tested positive with the Dexsil >50 PPM test kits. All other transformers were below 50 PPM. This information was communicated immediately upon returning from the field to State and District BLM personnel. The BLM then arranged for these two transformers to be removed from the site and appropriately disposed.

5.2 MINE/MILL TAILINGS SAMPLING RESULTS

A sediment sample from each of the three former settling ponds revealed that concentrations of mercury (550, 295, 83 PPM), antimony (1872, 872, 664 PPM), and arsenic (8474, 8053, 6498 PPM) decreased from settling pond 1 to 3 as a function of distance from the mill discharge. One of the former settling pond samples was also analyzed for lead. Lead acetate was used at one time in the milling process. Settling pond 1 (nearest the mill) contained 419 PPM lead.

Two tailings piles, (RD-TAILS-4 and RD-TAILS-5) were sampled. These piles are thought to represent different vintages of mill waste. This is based on their visual appearance. Sample 4 was orangish brown and texturally inhomogeneous, ranging in size from two inches in diameter to sand size. Sample 5 was dark gray to black and more texturally uniform (less than one half inch diameter). Sample 4 contained 8024 PPM arsenic, 787 PPM mercury, and 7074 PPM antimony. Sample 5 contained 5851 PPM arsenic, 498 PPM mercury, and 22737 PPM antimony. Sample 5 also contained 1391 PPM lead.

5.3 RED DEVIL CREEK SAMPLING RESULTS

Red Devil Creek sediment was sampled at one location upgradient of the mine and mill, and in three downgradient locations. Creek surface water was sampled upgradient and in two locations downgradient of the mine and mill (Figure 3).

The upgradient sediment sample RD-RDC-SED-2 is considered to represent the background metal concentrations of Red Devil Creek sediment. The background sample and one other sediment sample (RD-RDC-SED-1) were analyzed for the EP Toxicity suite of metals, and the remaining sediment samples for arsenic, mercury, and antimony. The analytical results show elevated levels of arsenic, barium, mercury, and antimony in creek sediments below the mine and mill. Concentrations of up to 19 times the background value for arsenic, 7 times the Barium, 49,000 times the mercury, and 17,000 times the antimony were encountered. Heavy metal sediment concentrations varied at the different downstream sample locations. Mercury was especially high at RD-RDC-SED-3 (4120 PPM), compared with 29 PPM at RD-RDC-SED-1 and 33.3 PPM at RD-RDC-SED-4. Concentrations of arsenic, and antimony were of the same order of magnitude at each location.

Mercury (0.3 to 0.4 ug/L) was detected in the two downgradient surface water samples in Red Devil Creek. However, these concentrations are only slightly greater than the 0.2 ug/L detection limit, and the upgradient sample also contained 0.4 ug/L mercury. Arsenic (244 ug/L) and antimony (278 ug/L) were also detected in sample RD-RDC-W-3 taken near the creek mouth. These concentrations are very near the respective detection limits for these metals (200 ug/L).

5.4 MISCELLANEOUS SAMPLING RESULTS

The kiln brick composite sample contained 1.7 PPM mercury. The Vanderpool domestic well sample contained chromium (15.3 ug/L), mercury (0.3 ug/L) and lead (224 ug/L) above the analytical detection limits. The lead concentration exceeds the Federal Drinking Water Quality Standards--Maximum Concentration Limits (MCLs) of 5.0 ug/l. Lead is not a natural constituent of the Red Devil ore. Therefore, it seems unlikely that the lead encountered in the Vanderpool well is related to past mining activities. A more likely explanation would be lead solder or piping in the well construction. Table 2 lists the MCLs for various elements.

5.5 ANALYTICAL RESULTS SUMMARY

Visible evidence of widespread mercury and antimony sulfide mineralization in tails and creek sediments and the sampling results document elevated heavy metal concentrations in creek sediments and tailings at the site. Mercury, antimony, and arsenic are the contaminants of concern although lead (probably as a result of the use of lead acetate in the milling process) was also elevated in some samples. In addition to the

TABLE 2

SUMMARY OF CONTAMINANT REGULATION

SUBSTANCE	WATER QUALITY		
	AMBIENT	DRINKING	
		HH	FWAL
Mercury	144 ng/l	0.012 ug/l (4-day avg) 2.4 ug/l (1-hour avg)	0.002 mg/l 0.003 mg/l (proposed RMCL)
PCBs	0.079 ng/l	0.001 ug/l	0 mg/l (proposed RMCL)
Arsenic	2.2 ng/l	--	25 ng/l
Antimony	146 ug/l	<9,000 ug/l (acute) <1,600 ug/l (chronic) <610 ug/l (algae)	NA

HH: Criteria for the protection of human health
FWAL: Criteria for the protection of fresh water aquatic life
TWA: Time Weighted Average
C: TWA ceiling limit value
NA: Not available

mineralized zone which intersects Red Devil Creek, the analytical data suggest that the tailings features are all potential sources of heavy metals. Some of these tailings features are being eroded by the creek and are therefore contributing mercury, arsenic, and antimony to the creek sediments. The ratio of mining induced, versus naturally occurring heavy metal volume contribution to the creek sediments, is probably high.

The metal concentrations in the creek sediments are elevated with respect to the background sample. Concentrations are roughly the same order of magnitude for antimony and arsenic between the mine and the Kuskokwim River. Mercury concentrations were also elevated with respect to background samples, and one sample in particular was especially high (RD-RDC-SED-3, 4120 ppm). This is not thought to necessarily represent an area of higher mercury concentration. Because of the scattered presence of cinnabar in the creek sediments, higher concentrations in some samples is predictable. Sediment samples taken from roughly the same location could vary as much as samples taken from different points along the creek between the mine/mill and the river.

The sampling results also suggest that Red Devil Creek surface water, and hence Kuskokwim River surface water, are not being impacted by the heavy-metal-laden sediments and tailings.

SECTION 6
HEALTH AND SAFETY

Prior to initiating the sampling effort, a site reconnaissance survey was conducted during the presite investigation meeting. Calibrated organic vapor and mercury vapor detection instruments were closely monitored during this inspection. The instrument readings were used to ascertain levels of adequacy of the proposed personnel protection. Level D was deemed to be adequate during soil, water and tailings sampling. Level C protective gear was worn during transformer sampling. Level C personal protective gear consists of the following:

- Full-faced air-purifying respirators (MSHA/NIOSH approved)
- Organic vapor/high-efficiency filter combination cartridges
- Tyvek coveralls
- Disposable latex boot covers
- Steel toe/shank boots
- Latex surgical gloves
- Appropriate outer gloves
- Cotton coveralls (inner)

Level D consists of all the safety gear listed above with the exception of respiratory protection.

SECTION 7
WASTE TYPES AND QUANTITY

Mill and mine tailings containing mercury, arsenic, and antimony were the primary waste types generated by the Red Devil Mine. Over 30 transformers were inventoried at the mine and of the 20 that contained dielectric fluid, two had PCB concentrations in the 50 PPM range. These two transformers have been removed from the site as a result of this SI. Chemicals, used in the milling process, remain at the site. These chemicals include copper sulfate, flake caustic soda, and dense soda ash. Several hundred drums were inspected during the SI and all but a few were empty. Nearly all the drums are thought to have contained fuel or cutting oil. No evidence for any solvent or acid drums was observed.

7.1 MILL AND MINE TAILINGS

An estimated 51,600 cubic yards of tailings are present. The amount of tailings was determined by dividing the site into three areas: the entrance area, the mill area and the settling ponds. Approximate waste volumes were calculated for each area. These calculations are shown in the table below.

TAILING VOLUMES

Area	Waste Dimensions (feet)	Total Volume (cubic yards)
1-Site entrance	300 x 100 x 10	11,100
2-Mill	200 x 200 x 25	37,000
3-Settling ponds	150 x 75 x 5	2,100
	100 x 50 x 5	925
	50 x 50 x 5	460

7.2 TRANSFORMERS

Field screening analyses with Dexsil PCB test kits indicated that Transformers T-12, and T-17 contained PCBs in the 50 PPM range. The total volume of dielectric fluid in these transformers was estimated to be 25 gallons. BLM made a decision to remove these two transformers from the site. This has been done.

Two areas of oil stained surface soils were sampled and screened for PCBs during the SI. Field screening with Dexsil test kits showed both areas to contain less than 50 PPM PCBs. Adjacent fuel drums and machinery are the likely sources of the oil stains.

7.3 STORED CHEMICALS

Chemicals used in the milling process were stored in two sheds near the mill. An inventory conducted during the SI identified the following: five 100-pound bags of copper sulfate, 15 50-pound bags of sodium hydroxide, and 175 100-pound bags of dense soda ash. These chemicals are accessible and are exposed to weather, at least in part. The following sections briefly describe chemical characteristics of these materials.

7.3.1 Sodium Hydroxide

Sodium hydroxide is a corrosive irritant to skin, eyes, and mucous membranes. It has a markedly corrosive action upon all body tissue causing burns and frequently deep ulcerations, with ultimate scarring (Sax, 1989). Ingestion causes very serious damage to the mucous membranes or other tissues with which contact is made.

7.3.2 Copper Sulfate

Copper Sulfate is a human poison by ingestion. Symptoms attributed to damage to the nervous system and kidney have been recorded. Copper sulfate is insoluble in water, but tends to oxidize to the cupric form.

7.3.3 Potassium Carbonate

Potassium carbonate, commonly called potash, is a white powdery substance, that is soluble in water. It is poisonous by ingestion. Potassium carbonate is a strong caustic particularly when heated.

7.4 TOXICITY AND PERSISTENCE

7.4.1 Toxicity

The toxicity ratings given in the section below are recognized internationally and accepted and referred to as "Sax Toxicity Ratings" by EPA. A toxicity value of three

(severe toxicity) has been assigned to each of the contaminants of concern -- PCBs, mercury, antimony and arsenic. Chemicals listed under this classification can cause irreversible changes in the human body, severe enough to produce serious physical health impairment or threaten life (Sax, 1989). The various exposure categories for a Sax toxicity rating of three are listed below.

1. Acute Local. Chemicals that on a single exposure covering seconds or minutes can cause injury to the skin, mucous membranes, or eyes of sufficient severity to threaten life or cause permanent physical impairment or disfigurement.

2. Acute Systematic. Chemicals that, on being absorbed into the circulatory system from a single exposure by inhalation, ingestion, or skin contact, cause injury of sufficient severity to threaten life. The exposure may last seconds, minutes, or hours, or may be a single ingestion.

3. Chronic Local. Chemicals that, on continuous or repeated exposures covering days, months, or years can cause injury to the skin, mucous membranes, or eyes of sufficient severity to threaten or produce permanent impairment, disfigurement, or irreversible change.

4. Chronic Systematic. Chemicals that on continuous or repeated exposures by inhalation, ingestion, or dermal contact to small amounts for days, months, or years, can produce death or serious physical or health impairment.

7.4.2 Persistence

Persistence of a hazardous substance is evaluated on its biodegradability as follows:

Substance	Assigned Value
Easily biodegradable compounds	0
Straight chain hydrocarbons	1
Substituted and other ring compounds	2
Metals, polycyclic compounds and halogenated hydrocarbons	3

From U.S. EPA Hazard Ranking System

7.5 PCBs

PCBs are extremely stable compounds, and slow to chemically degrade under environmental conditions (Casserett and Doull, 1980). Microbial degradation of PCB's depends on the degree of chlorination. Chlorination levels of PCB formulations differ markedly (IBID). PCBs have been demonstrated to cause cancer in animals and are suspect human carcinogens. PCBs are easily absorbed through the skin, as well as by breathing PCB-containing vapors. On a scale of zero to three, three being the highest, PCB's have a toxicity rating of three (Sax, 1975). They are classified as "highly toxic" and extremely hazardous to human health.

7.6 MERCURY

Mercury can exist in the environment as a liquid, solid, or gas. Physiochemical and biologic conditions of the soil or water environment, influence its disposition. Mercury binds to both organic and inorganic particles and is very persistent under normal environmental conditions. Mercury is considered to be highly toxic and extremely hazardous to human health and has been assigned a toxicity ranking of 3 (Sax, 1975).

Mercury's major removal system from a natural water system is through adsorption onto the surfaces of particulate phases and subsequent settling to the bed sediment. The overwhelming majority of any dissolved mercury is removed in this manner within a relatively short time, generally in the immediate vicinity of the source. Much smaller portions of the dissolved mercury are ingested by the aquatic biota or transported by current movement and dilution. Resuspension of sediments by turbulence or the activity of benthic organisms can also release these compounds of mercury directly into the water column. The primary sink for mercury released to the environment is thus the sediments (Sax, 1989).

The mercury present at site is in the sulfide mineral cinnabar (HgS). Cinnabar is insoluble in water.

7.7 ANTIMONY

Antimony exists in a variety of chemical forms. In the environment, stibnite (Sb_2S_3) is the most common naturally occurring form of antimony. Antimony is insoluble in water. In reducing environments, a gas called stibine (SbH_3) may be formed. The formation of stibine in bed sediments, may offer a mechanism for mobilization of antimony (Clement Associates, 1985). Antimony has been assigned a persistence rating of two.

Antimony production has been associated with an increase in lung cancer among exposed workers, and some studies suggest antimony might produce lung and liver tumors (IBID). Antimony is considered to be highly toxic and hazardous to human health and, therefore, has been assigned a toxicity value of three (Sax, 1989).

7.8 ARSENIC

Arsenic is a metal that is present in the environment as a constituent of organic and inorganic compounds. Arsenic is generally rather mobile in the natural environment, with the degree of mobility dependant on its chemical form and the properties of the surrounding medium (Clement Associates, 1985). Arsenic sulfide was the dominant form of arsenic observed at the mine site during the SI. Arsenic sulfide minerals (orpiment and realgar) consist of yellow or red crystals and is insoluble in water.

SECTION 8
EFFECTS ON HUMAN HEALTH AND THE ENVIRONMENT

8.1 SITE LAND USE AND DEMOGRAPHICS

The Red Devil Mine lies in a remote part of western Alaska. Fifty people live in scattered residences within a three mile radius of the site. The area is referred to as the Village of Red Devil. The village consists of a public school, post office, and a 4500 foot air strip. The nearest resident lives three quarters of a mile west of the site. The air strip and the Kuskokwim River provide access to the area. The area is used as a stopover point by seasonal sportsmen. Mercury mining dominated the area's economy until the mine closed.

8.2 CLIMATE

The Red Devil area lies in a subarctic transition climatic zone between the continental zone of interior Alaska and the maritime zone of the coastal regions. Precipitation and evapotranspiration data are recorded at the Aniak Airport, 75 miles west of the mine. The mean annual precipitation in the area is nearly 18.5 inches. Mean annual evapotranspiration in Aniak is approximately 17 inches, leaving a net precipitation of just over one inch.

8.3 GEOLOGY

The Red Devil Mine lies on the southwest flank of the Sleetmute Anticline along the Red Devil Fault Zone. The majority of the displacements are right lateral strike slip. The mineralization is hosted in the Cretaceous Kuskokwim Formation, an interbedded graywacke-mudstone-shale sequence. The units trend N38W with a southerly dip of 63 degrees. The Kuskokwim Formation has been intruded by intermediate to mafic dikes and sills. In general the faults parallel bedding. The latest movement along the faults in the mine area is post intrusive and mineralization. However, most of the ore shoots are either along the faults themselves, or at fault-intrusive intersections (Meyer, 1985).

The mineralization consists primarily of mercuric and antimony sulfides, cinnabar and stibnite. Sparse orpiment, and realgar (arsenic sulfides) were also observed during the SI. The ore shoots mined to date were up to one foot wide and 30 feet long. Cinnabar constituted up to 40 percent, stibnite up to 50 percent, and quartz to 10 percent of the ore shoots.

Below the mine area, unconsolidated floodplain deposits overlie bedrock. These unconsolidated deposits of silt, sand, and gravel are typically up to 40 feet thick.

Lode and placer mercury deposits are fairly common within a belt five hundred miles long and two hundred miles wide in western Alaska. This belt extends from the Yukon River to Dillingham. Much of this belt is drained by the Kuskokwim River which ultimately empties into Kuskokwim Bay.

8.4 SURFACE WATER CHARACTERISTICS AND USE

Red Devil Creek flows northerly approximately 600 feet from the mine site to its mouth in the Kuskokwim River. The creek intersects the mineralized zone below the headframe. No surface water uses of the creek are known. Virtually all the surface water runoff in the mine and mill area, and the surrounding slopes flows toward the creek. Intermittent drainage gullies have been cut into many of the tailings features in the mine and mill area. These gullies ultimately intersect the creek channel. Tailings piles, some exceeding 35 feet high, have been deposited into the creek. During periods of high water, the creek undercuts these piles and transports material downstream where it is ultimately deposited in the creek delta in the Kuskokwim River.

Kuskokwim surface water is used for transportation and fishing. The river supports an annual salmon run. Both sport and commercial fishing techniques are used. There are no surface water intakes within three miles downstream of the confluence with Red Devil Creek.

8.5 GROUNDWATER CHARACTERISTICS AND USE

A bedrock aquifer underlies the Red Devil Mine site. The aquifer characteristics have not been determined. The residents of the village rely on groundwater for their domestic supply. Most of the wells in the area are relatively shallow. The Vanderpool well is closest to the site (approximately 1.25 miles northwest) and is less than 40 feet deep. It is reportedly screened in fractured bedrock below the unconsolidated floodplain deposits of the Kuskokwim River, and is constructed with a sand point attached to steel pipe of an unknown diameter (Tryck, Nyman, and Hayes, 1987).

The direction of groundwater flow is not known but commonly in areas adjacent to major rivers such as the Kuskokwim, groundwater parallels or subparallels the direction of surface flow. The Kuskokwim flows to the west.

The mine has probably had little impact to groundwater. Groundwater can be considered to have been impacted by the heavy metal mineralization before any mining occurred in the area. Vadose zone moisture and groundwater are still potentially being impacted by natural mineralization and the tailings piles are not considered to have significantly increased this potential impact.

SECTION 9
RESPONSIBLE PARTY INFORMATION

The Red Devil Mine is on land under BLM authority and for this reason the BLM is a potential responsible party. The mine, mill, and much of the surrounding area is under valid mineral location claims. All past leaseholders and operators are also potential responsible parties. The BLM has compiled a list of valid claims in the vicinity of the site and has attempted to inform the present leaseholders that hazardous wastes might be present at the Red Devil Mine site and that a SI was scheduled. The leaseholders were also notified that the site was going to be posted to alert the public to potential health threats. The present leaseholders include:

Mr. Nick Melleck
General Delivery
Sleetmute, AK 99668

Mr. Andrew Halverson
PO Box 94
Bethel, AK 99559

William Magnuson
PO Box 77054
Eagle River, AK 99577

Off-site contributors to heavy metal contamination to Kuskokwim River and sediment include the many placer and lode mercury deposits within a five-hundred-mile-long belt that extends from the Yukon River to Dillingham. Much of this belt is drained by the Kuskokwim River which ultimately discharges to Kuskokwim Bay.

SECTION 10
SITE CLASSIFICATION AND RANKING

The BLM site classification system divides potential hazardous waste sites into four categories. These categories are listed below.

Class I — There is no significant reason to believe that hazardous wastes or other hazardous substances have been generated, treated, stored, or disposed of on the site, or alternately that hazardous wastes were disposed but in such quantities, forms, or under such conditions, that there is negligible hazard to human health or the environment.

Class II — Hazardous wastes or other hazardous substances are present but there is small risk of on-site contact or release of contaminants to the environment in such form and quantity that would constitute a significant hazard to human health or to the environment.

Class III — Hazardous wastes or other hazardous substances exist on the site in such form and quantity and under such conditions that there is specific reason to believe that a potentially significant hazard to human health or the environment may exist and that further definitive investigations must be undertaken.

Class IV — Hazardous wastes or other hazardous substances exist on the site in such form and in such quantity and under such conditions, including off site considerations, as to constitute an imminent and substantial endangerment to human health or the environment.

The Red Devil Mine contains hazardous substances. The various tailings features and creek sediment contain relatively high concentrations of mercury, antimony, and arsenic. These metals are present mainly as sulfides and are not thought to pose a significant threat to human health or the environment. Surface water sampling in Red Devil Creek suggests that no significant surface water contamination is presently occurring. Based on this information a Class II designation seems justified. However, the accessible chemicals present at the site, and in particular sodium hydroxide, necessitate a Class III designation. The sodium hydroxide poses a human health threat through direct contact. The alleviation of this human health threat would justify lowering the designation to Class II.

An EPA Potential Hazardous Waste Site Inspection Report (EPA Form 2070-13) for the site is included in Appendix 3. The site has also been ranked using the Hazard Ranking System (HRS) according to 40 CFR Part 300. The EPA HRS is used to evaluate

the relative potential of uncontrolled hazardous substance facilities to cause human health or safety problems, or ecological or environmental damage. Uniform application of the HRS can identify potential releases of hazardous substances that pose the greatest hazard to humans or to the environment. The HRS by itself is not intended to establish priorities for the allocation of funds for remedial action. It does not address the feasibility, desirability, or degree of cleanup required.

Samples and analytical data may not be required in all instances to demonstrate the existence of a hazardous substance facility. Hazardous substance facilities can be defined on the basis of substantial historical information drawn from facility records, shipping manifests, witness interviews, operational history, etc. Whenever there are viable alternatives for assigning values to a rating factor, the alternative that results in the highest score is to be used.

The HRS assigns three scores to a hazardous facility or site:

- S_m reflects the potential for harm to humans or the environment from migration of a hazardous substance away from the facility by routes involving groundwater (S_{gw}), surface water (S_w), or air (S_a). It is a composite of separate scores for each of the three routes. It is entirely possible that one route (e.g., groundwater) for a specific site yields a relatively high score and other routes give insignificant minimum scores. Under these circumstances, the low-scored routes would tend to obscure the health and environmental consequences resulting from hazardous substance migration via the high-scored route.

- S_{fe} reflects the potential for harm from substances that can explode or cause fires.

- S_{dc} reflects the potential for harm from direct contact with hazardous substances at the facility (i.e., no migration need be involved).

The score for each hazard mode (migration, fire and explosion, and direct contact) or route is obtained by considering a set of factors that characterize the potential of the facility to cause harm. Each factor is assigned a numerical value (on a scale of two, three, five or eight) according to prescribed guidelines. This value is then multiplied by a weighting factor yielding the factor score. The factor scores are then combined. Scores within a factor category are added, then the total scores for each factor category are multiplied together to develop a score for groundwater, surface water, air, fire and explosion, and direct contact.

In computing S_{fe} or S_{dc}, or an individual migration route score, the product of its factor category scores is divided by the maximum possible score, and the resulting ratio is multiplied by 100. The last step puts all scores on a scale of 0 to 100.

The HRS does not quantify the probability of harm from a facility or the magnitude of the harm that could result, although the factors have been selected in order to approximate both those elements of risk. It is only a procedure for ranking facilities in

terms of the potential threat they pose by describing:

- The manner in which the hazardous substances are contained.
- The route by which they would by released.
- The characteristics and amount of the harmful substance.
- The likely targets of harm.

The multiplicative combination of factor category scores is an approximation of the more rigorous approach in which one would express the hazard posed by a facility as the product of the probability of a harmful occurrence and the magnitude of the potential damage.

The ranking of facilities nationally for remedial action is based primarily on S_m. In accordance with the National Contingency Plan, all non-Federally-owned sites scoring at least 28.5 are eligible for inclusion on the National Priority List (NPL).

S_{fe} and S_{dc} may be used to identify facilities requiring emergency attention. The Red Devil Mine site received the following scores:

S_M = 14.95 (S_{gw}=18.4, S_{sw}18.18, S_a=0)
S_{fe} = 0.0
S_{dc} = 12.6

The S_m (14.95) reflects the scoring of an observed release to surface water, the large volume of tailings present within the Red Devil Creek drainage, the high toxicity and persistence ranking of the metals present, and the presumed shallow depth to groundwater. The historical sampling data do not consistently demonstrate elevated metals levels in Red Devil Creek below the mine site. However, a conservative application of these data suggest that a release is likely. Despite this conservative scoring, the site still does not score high enough for NPL listing.

SECTION 11
CONCLUSIONS

A site investigation conducted at the inactive Red Devil Mine site characterized some of the tailings features, evaluated the site impact on Red Devil Creek, identified the greater than 50 ppm PCB-containing dielectric fluid in on-site transformers, and identified several chemicals that remain stored at the site. Site conditions present during the SI were documented with photographs. An EPA site investigation form was completed, and a HRS score was assigned.

The Red Devil Mine is located in a remote part of western Alaska, with 50 persons residing in a three mile radius of the site. Several other mercury occurrences are in the vicinity of the site on both sides of the Kuskokwim River. Mineral exploration and mining activity is dependent on economic conditions, and in particular metal prices. Future interest in the area by mining companies is likely. Active valid mining claims cover much of the site. The parties holding these claims likely consider the tailings features to represent potential future resources rather than waste.

Approximately 51,600 cubic yards of mine and mill tails are estimated to be present in the immediate vicinity of the mine and mill. An unknown, but significant volume of tails and naturally deposited mineralized sediments are present along Red Devil Creek between the mine and the Kuskokwim River. The naturally deposited mineralized sediments refer to material that has been introduced by erosional processes where the creek intersects the mineralized zone. The trend of the mineralization is roughly perpendicular to the creek and the early mining efforts involved excavation of mercury rich overburden- termed ground sluicing and placer operations. The sources of mercury, antimony, and arsenic in the creek sediments are therefore from both natural and man-made sources. The mine and mill buildings that have been constructed at the site were built upon a pad of tails. Tailings were used to level the area. The creek is actively eroding these tails during high flow periods. The present source of mercury, antimony, and arsenic to the creek sediments is largely due to man-made processes.

The mercury, antimony, and arsenic present in the creek sediments are thought to be in the form of sulfide minerals. The sulfides of these metals are insoluble in water. This is supported by the low concentrations of these metals found in the surface water samples, despite the relatively high concentrations present in creek sediments and tailings features. At present, surface water does not appear to be a significant migration pathway. Sampling conducted by Sceva (1971) indicates that other mineralized areas may be contributing heavy metals to the Kuskokwim drainage basin. A mineralized mercury belt 500 miles long and 200 miles wide is virtually all drained by the Kuskokwim basin.

Groundwater also does not appear to be a significant migration pathway. The amount of mineralization left in the ground is not known, but it is probably extensive given the known and potentially as yet undiscovered occurrences. Under these circumstances, any heavy metal impacts to groundwater are difficult to attribute to the tailings at the site.

In their present form the mercury, antimony, and arsenic at the site do not pose an imminent threat to humans or animals. The tailings and creek sediments are primarily an ingestion threat. Ingestion of these materials is unlikely. A higher potential hazard at the site is represented by the stored chemicals. The copper sulfate poses an ingestion hazard, but the potash (potassium carbonate) and the sodium hydroxide are both strong caustics. These two chemicals pose a direct contact threat.

The transformers regulated under TSCA (greater than 50 ppm PCBs) have been removed from the site. However, PCBs adhere to soil and can accumulate in concentrations well in excess of source dielectric fluid concentrations. TSCA defines soil clean-up goals for PCB spills (from greater-than-50-ppm PCB sources), at 10 ppm for accessible sites, and 25 ppm for inaccessible sites. Yet it is important that spills from the remaining transformers at the site be prevented. Seasonal visits to the area by hunters make the transformers a possible vandalism target.

The site received an Sm score of 14.95. This score is a result of the large volume of tailings present at the site, the high toxicity and persistence ranking of the metals present, the proximity of the tails to Red Devil Creek, and the presumed shallow depth to groundwater. The relatively insoluble form of the metal sulfides is not taken into account in the HRS score.

The site has been designated a Class III site, primarily because of the direct contact threat posed by the caustic chemicals stored at the easily accessed site. These chemicals should be removed from the site. Once the direct contact threat is removed and given the form of the heavy metals present, the site could be reclassified.

SECTION 12
RECOMMENDED ACTIONS

Stabilization of the tailings features along the channel of Red Devil Creek would reduce an active source of heavy metal sulfides from being introduced. Stabilization of the tailings piles to prevent them from reaching the creek would be a major undertaking. This is because not only are individual tailings features present adjacent to the creek, the entire mine site is built up on tails. Both sides of the creek over a distance of approximately 350 feet are in contact with tailings. In their present form the tailings are not thought to pose an imminent threat to human health or the environment. The SI suggests that surface water is not being impacted by the relatively high concentrations of mercury, antimony, and arsenic in the creek sediments or tailings.* The historical sampling data do not consistently support a finding of surface water contamination. BLM may consider implementing an extended monitoring program to develop more conclusive stream contamination levels. Likewise, groundwater is not thought to be threatened by the surficial tailings features any more than by the mineralization that remains in the ground. Any heavy metal impacts to groundwater cannot be attributed to the tailings features because of the known presence of natural mineralization in the area. Additionally, the heavy metal content of the tailings features does not pose a direct contact threat. While the impact to biota within the creek is not known, the value of performing costly tailings feature stabilization is dubious at the present time. Such stabilization efforts are therefore not recommended.

The regulation of mining wastes in the United States is in a dynamic state of change. Revisions to the RCRA Solid Waste Subtitle D regulations to include mining wastes are being considered by EPA. These regulations are not available even in draft form. EPA recognizes the concern over potential mining wastes but also is aware that if hazardous waste management standards are applied universally to mining sites, they are likely to be environmentally unnecessary, technically infeasible, or economically impractical. However, recent CERCLA actions conducted by EPA at the Bunker Hill NPL site in Idaho, the Asarco and Anaconda sites in Montana, and numerous former uranium mines and mills in various western states shows, a willingness of the agency to intercede if severe human health and environmental threats are perceived. With respect to the Red Devil site, we recommend that BLM closely monitor the regulations being developed.

The transformers that remain at the site are not regulated under the Toxic Substance Control Act (TSCA) because they have been shown to contain less than 50 PPM PCBs. However, these transformers remain an issue because of the physiochemical properties of PCBs. Soil accumulations of PCBs can attain concentrations significantly greater than the original PCB content of the source dielectric fluids. PCBs adhere to soil particles, whereas the associated carrier solvents and oils tend to migrate away from spill sites. This can

result in PCBs concentrating in surficial soils. If a spill were to occur from some of the dielectric-fluid-containing transformers that remain on site, the TSCA action levels for soils of 10 ppm (active sites) and 25 ppm (inactive sites) may be exceeded. Therefore, it would be prudent for the BLM to ensure spills do not occur. This could be accomplished by either staging the transformers in a secure area on site or by removing and appropriately disposing of the dielectric fluid. TSCA specifies that less than 50 ppm transformers and dielectrical fluid can be disposed as solid waste.

Other recommended actions include

- Removing or conducting on-site treatment on the caustic materials, potassium carbonate and sodium hydroxide, to remove the direct contact posed at the site.

- Investigating the present claim holder's future intentions for the site and explaining their potential liabilities.

- Investigating the report that transformers are scattered along an old powerline between the site and the village of Red Devil.

- Discouraging access to the site by blocking off the road(s) and continuing to post warning signs that inform the public of the potential physical and chemical hazards present. The current claim holders concurrence may be needed to block off the road.

SECTION 13
REFERENCES

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APPENDIX A

ANALYTICAL RESULTS

WESTON ANALYTICS
METALS ANALYTICAL DATA PACKAGE FOR
BLM - RED DEVIL

DATE RECEIVED: 09/13/88

CLIENT ID	RFW BATCH NUMBER	COLLECTION	EXTR./PREP.	ANALYSIS
RD-RDC-W-1	8809-016-001	09/08/88	NA	NA
RD-RDC-W-1	8809-016-001 DUP	09/08/88	NA	NA
RD-RDC-W-2	8809-016-002	09/08/88	NA	NA
RD-RDC-W-3	8809-016-003	09/08/88	NA	NA
RD-RDC-W-3	8809-016-003 DUP	09/08/88	NA	NA
RD-RDC-W-3	8809-016-003 MS	09/08/88	NA	NA
RD-BRICK	8809-016-004	09/08/88	NA	NA
TB	8809-016-005	09/08/88	NA	NA
RD-TAILS-1	8809-016-006	09/08/88	NA	NA
RD-TAILS-2	8809-016-007	09/08/88	NA	NA
RD-TAILS-2	8809-016-007 DUP	09/08/88	NA	NA
RD-TAILS-3	8809-016-008	09/08/88	NA	NA
RD-TAILS-4	8809-016-009	09/08/88	NA	NA
RD-TAILS-5	8809-016-010	09/08/88	NA	NA
RD-RDC-SED-1	8809-016-011	09/08/88	NA	NA
RD-RDC-SED-2	8809-016-012	09/08/88	NA	NA
RD-RDC-SED-3	8809-016-013	09/08/88	NA	NA
RD-RDC-SED-4	8809-016-014	09/08/88	NA	NA
RD-RW	8809-016-015	09/08/88	NA	NA
LCS1	8809-016-LCS1	NA	NA	NA
LCS2	8809-016-LCS2	NA	NA	NA
LAB QC:				
BLANK	8809-016-0001BL	NA	NA	NA
BLANK	8809-016-0002BL	NA	NA	NA

11/8/88
DATE

WESTON Analytical Laboratories

WESTON ANALYTICS
METALS
INORGANICS DATA SUMMARY REPORT

RFW Batch Number: 8809-016 Client: BLM - RED DEVIL Page:

Sample Information

RFW Batch ID:	8809-016-0001BL	8809-016-0002BL	8809-016-001	8809-016-001 DUP
Customer ID:	BLANK	BLANK	RD-RDC-W-1	RD-RDC-W-1
Matrix:	Water	Soil	Water	Water
Units:	UG/L	MG/KG	UG/L	UG/L

Metals

Silver (Ag), total	10 U	2.0 U	10 U	10 U
Aluminum (Al), total				
Arsenic (As), total	200 U	40 U	200 U	200 U
Barium (Ba), total	200 U	40 U	200 U	200 U
Beryllium (Be), total				
Calcium (Ca), total				
Cadmium (Cd), total	5.0 U	1.0 U	5.0 U	5.0 U
Cobalt (Co), total				
Chromium (Cr), total	10 U	2.0 U	10 U	10 U
Cesium (Cs), total				
Copper (Cu), total				
Iron (Fe), total				
Mercury (Hg), total	0.2 U	0.1 U	0.4	NA
Potassium (K), total				
Lithium (Li), total				
Magnesium (Mg), total				
Manganese (Mn), total				
Molybdenum(Mo), total				
Sodium (Na), total				
Nickel (Ni), total				
Lead (Pb), total	200 U	40 U	200 U	200 U
Antimony (Sb), total	200 U	40 U	200 U	200 U
Selenium (Se), total	200 U	40 U	200 U	200 U
Strontium (Sr), total				
Thallium (Tl), total				
Vanadium (V), total				
Zinc (Zn), total				

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery

WESTON ANALYTICS
METALS
INORGANICS DATA SUMMARY REPORT

RFW Batch Number: 8809-016 Client: BLM - RED DEVIL

Sample Information

RFW Batch ID:	8809-016-002	8809-016-003	8809-016-003 DUP	8809-016-003 MS
Customer ID:	RD-RDC-W-2	RD-RDC-W-3	RD-RDC-W-3	RD-RDC-W-3
Matrix:	Water	Water	Water	Water
Units:	UG/L	UG/L	UG/L	% RECOVERY
Metals				
Silver (Ag), total	10 U	10 U	10 U	0 %
Aluminum (Al), total				
Arsenic (As), total	200 U	244	209	95 %
Barium (Ba), total	200 U	200 U	200 U	100 %
Beryllium (Be), total				
Calcium (Ca), total				
Cadmium (Cd), total	5.0 U	5.0 U	5.0 U	98 %
Cobalt (Co), total				
Chromium (Cr), total	10 U	10 U	10 U	92 %
Cesium (Cs), total				
Copper (Cu), total				
Iron (Fe), total				
Mercury (Hg), total	0.3	0.4	NA	NA
Potassium (K), total				
Lithium (Li), total				
Magnesium (Mg), total				
Manganese (Mn), total				
Molybdenum(Mo), total				
Sodium (Na), total				
Nickel (Ni), total				
Lead (Pb), total	200 U	200 U	200 U	95 %
Antimony (Sb), total	200 U	278	220	99 %
Selenium (Se), total	200 U	200 U	200 U	105 %
Strontium (Sr), total				
Thallium (Tl), total				
Vanadium (V), total				
Zinc (Zn), total				

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery

WESTON ANALYTICS
METALS
INORGANICS DATA SUMMARY REPORT

RFW Batch Number: 8809-016 Client: BLM - RED DEVIL

Sample Information

RFW Batch ID:	8809-016-004	8809-016-005	8809-016-006	8809-016-007
Customer ID:	RD-BRICK	TB	RD-TAILS-1	RD-TAILS-2
Matrix:	Soil	Water	Soil	Soil
Units:	MG/KG	UG/L	MG/KG	MG/KG

Metals

Silver (Ag), total.....		10 U		
Aluminum (Al), total.....				
Arsenic (As), total.....	39.3 U	200 U	8474	8053
Barium (Ba), total.....				
Beryllium (Be), total.....				
Calcium (Ca), total.....				
Cadmium (Cd), total.....				
Cobalt (Co), total.....				
Chromium (Cr), total.....		10 U		
Cesium (Cs), total.....				
Copper (Cu), total.....				
Iron (Fe), total.....				
Mercury (Hg), total.....	1.7	0.4	395	550
Potassium (K), total.....				
Lithium (Li), total.....				
Magnesium (Mg), total.....				
Manganese (Mn), total.....				
Molybdenum(Mo), total.....				
Sodium (Na), total.....				
Nickel (Ni), total.....				
Lead (Pb), total.....		308	418.7	
Antimony (Sb), total.....	39.3 U	200 U	1872	872
Selenium (Se), total.....				
Strontium (Sr), total.....				
Thallium (Tl), total.....				
Vanadium (V), total.....				
Zinc (Zn), total.....				

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery

WESTON ANALYTICS
METALS
INORGANICS DATA SUMMARY REPORT

RFW Batch Number: 8809-016 Client: BLM - RED DEVIL

Sample Information

RFW Batch ID:	8809-016-007 DUP	8809-016-008	8809-016-009	8809-016-010
Customer ID:	RD-TAILS-2	RD-TAILS-3	RD-TAILS-4	RD-TAILS-5
Matrix:	Soil	Soil	Soil	Soil
Units:	MG/KG	MG/KG	MG/KG	MG/KG
Metals				
Silver (Ag), total				
Aluminum (Al), total				
Arsenic (As), total	8418	6498	8024	5851
Barium (Ba), total				
Beryllium (Be), total				
Calcium (Ca), total				
Cadmium (Cd), total				
Cobalt (Co), total				
Chromium (Cr), total				
Cesium (Cs), total				
Copper (Cu), total				
Iron (Fe), total				
Mercury (Hg), total	NA	83	787	498
Potassium (K), total				
Lithium (Li), total				
Magnesium (Mg), total				
Manganese (Mn), total				
Molybdenum(Mo), total				
Sodium (Na), total				
Nickel (Ni), total				
Lead (Pb), total				1391.1
Antimony (Sb), total	785	664	7074	22737
Selenium (Se), total				
Strontium (Sr), total				
Thallium (Tl), total				
Vanadium (V), total				
Zinc (Zn), total				

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery

WESTON ANALYTICS
METALS
INORGANICS DATA SUMMARY REPORT

RFW Batch Number: 8809-016 Client: BLM - RED DEVIL Page:

Sample Information

RFW Batch ID:	8809-016-011	8809-016-012	8809-016-013	8809-016-014
Customer ID:	RD-RDC-SED-1	RD-RDC-SED-2	RD-RDC-SED-3	RD-RDC-SED-4
Matrix:	Soil	Soil	Soil	Soil
Units:	MG/KG	MG/KG	MG/KG	MG/KG

Metals

Silver (Ag), total	0.24 U	0.24 U		
Aluminum (Al), total				
Arsenic (As), total	2449	165	3185	2194
Barium (Ba), total	509	72.2		
Beryllium (Be), total				
Calcium (Ca), total				
Cadmium (Cd), total	2.73	5.00		
Cobalt (Co), total				
Chromium (Cr), total	25.9	17.7		
Cesium (Cs), total				
Copper (Cu), total				
Iron (Fe), total				
Mercury (Hg), total	29	0.6	4120	33.3
Potassium (K), total				
Lithium (Li), total				
Magnesium (Mg), total				
Manganese (Mn), total				
Molybdenum(Mo), total				
Sodium (Na), total				
Nickel (Ni), total				
Lead (Pb), total	480.7	261.7		
Antimony (Sb), total	3450	0.243 U	4015	3113
Selenium (Se), total	89.5	82.1		
Strontium (Sr), total				
Thallium (Tl), total				
Vanadium (V), total				
Zinc (Zn), total				

Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery

WESTON ANALYTICS
METALS
INORGANICS DATA SUMMARY REPORT

RFW Batch Number: 8809-016 Client: BLM - RED DEVIL

Sample Information

RFW Batch ID:	8809-016-015	8809-016-LCS1	8809-016-LCS2
Customer ID:	RD-RW	LCS1	LCS2
Matrix:	Water	Water	Soil
Units:	UG/L	% RECOVERY	% RECOVERY

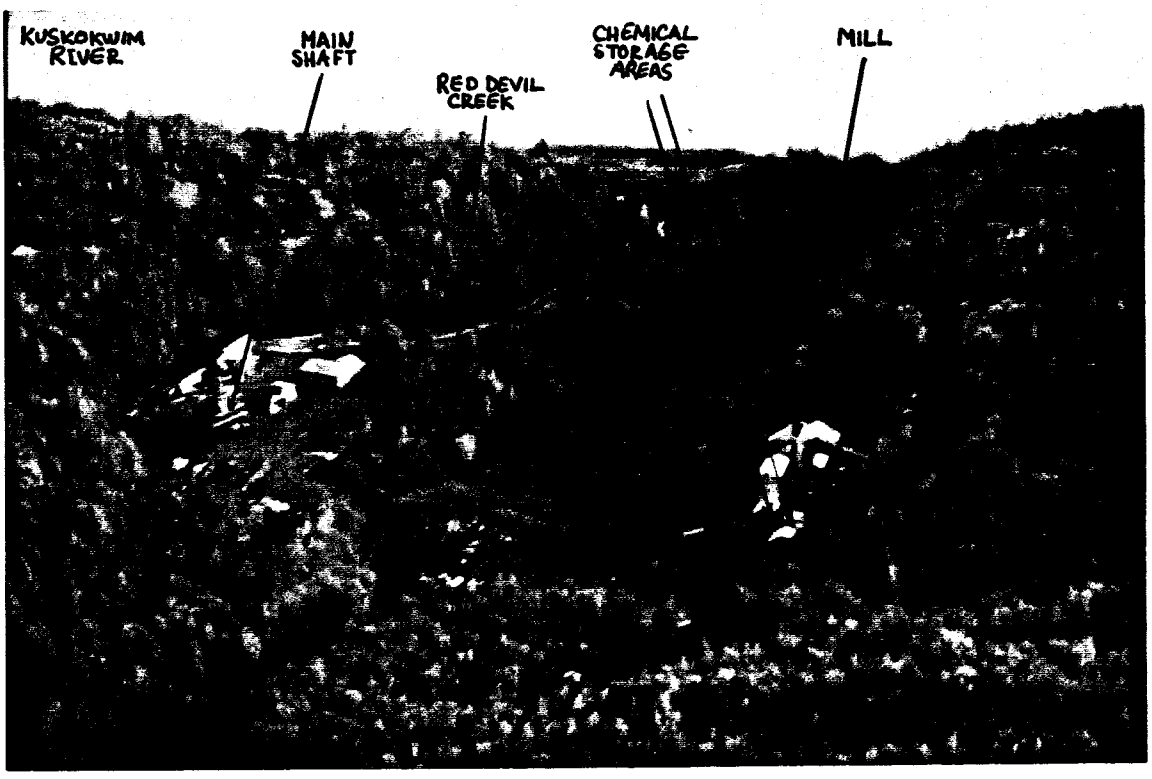
Metals

Silver (Ag), total.....		97 %	100 %
Aluminum (Al), total.....			
Arsenic (As), total.....	200 U	98 %	97 %
Barium (Ba), total.....	200 U	103 %	103 %
Beryllium (Be), total.....			
Calcium (Ca), total.....			
Cadmium (Cd), total.....	5.0 U	97 %	100 %
Cobalt (Co), total.....			
Chromium (Cr), total.....	15.3	105 %	105 %
Cesium (Cs), total.....			
Copper (Cu), total.....			
Iron (Fe), total.....			
Mercury (Hg), total.....	0.3	96 %	128 %
Potassium (K), total.....			
Lithium (Li), total.....			
Magnesium (Mg), total.....			
Manganese (Mn), total.....			
Molybdenum(Mo), total.....			
Sodium (Na), total.....			
Nickel (Ni), total.....			
Lead (Pb), total.....	224	94 %	98 %
Antimony (Sb), total.....	200 U	101 %	103 %
Selenium (Se), total.....	200 U	102 %	100 %
Strontium (Sr), total.....			
Thallium (Tl), total.....			
Vanadium (V), total.....			
Zinc (Zn), total.....			

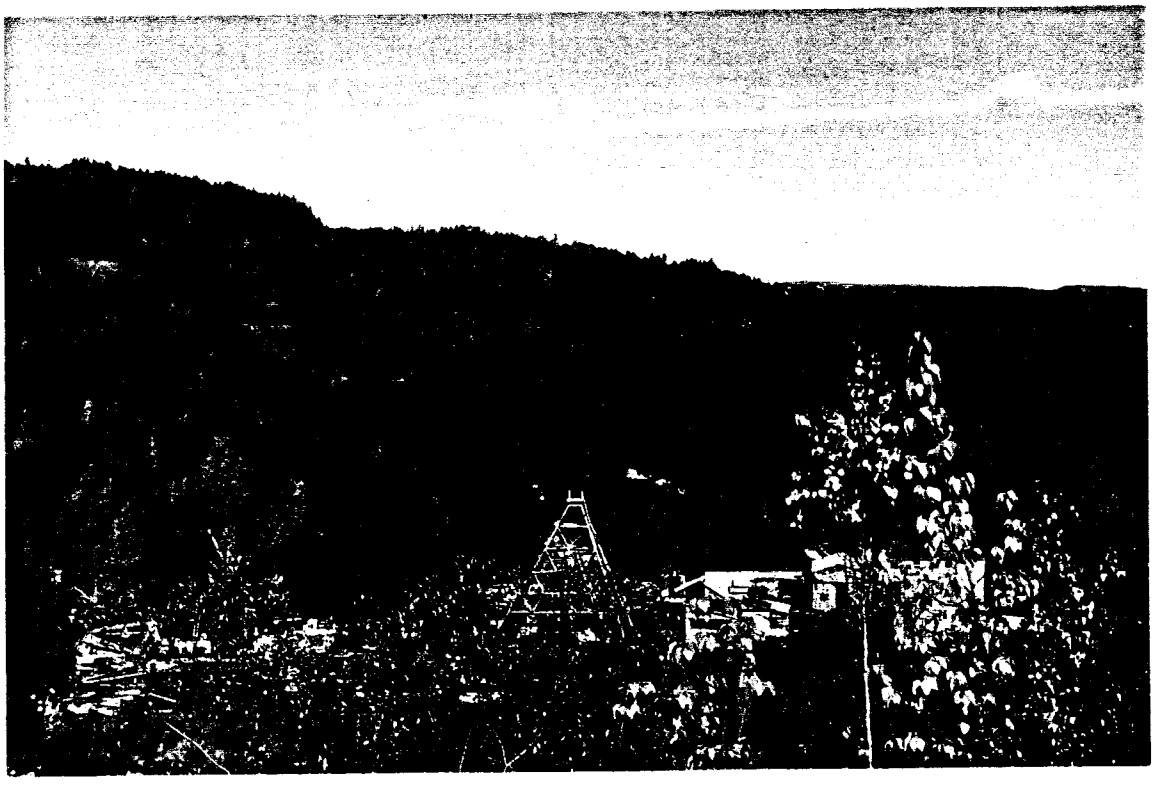
Modifiers: U=Analyzed, not detected. J=Present below detection limit. B=Present in blank. NS=Not spiked. %=Percent recovery

APPENDIX B

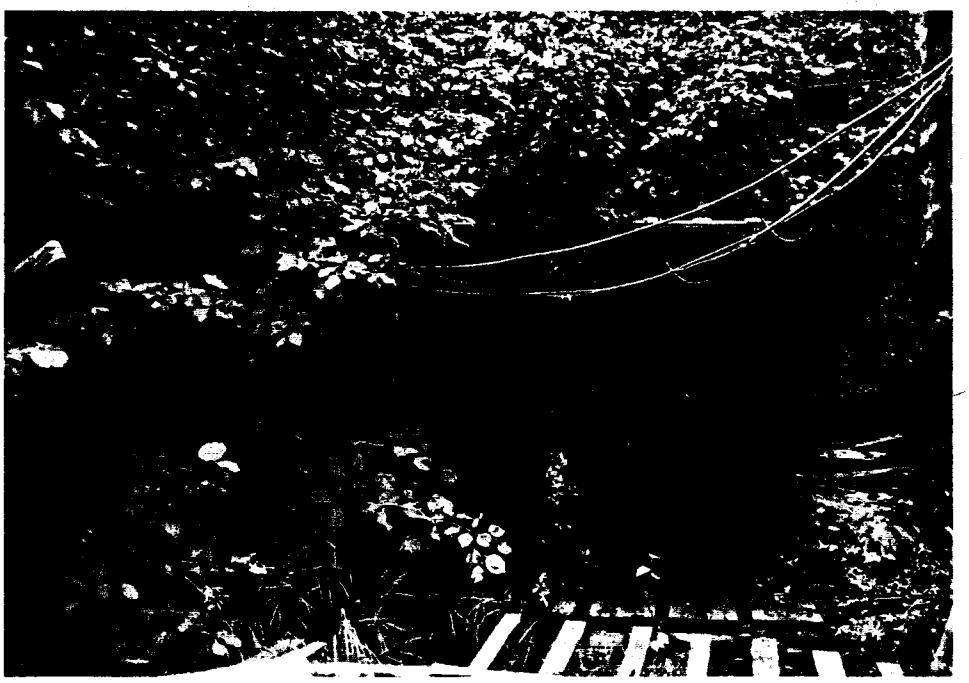
PHOTO DOCUMENTATION



NORTHERLY VIEW OF RED DEVIL MINE SITE



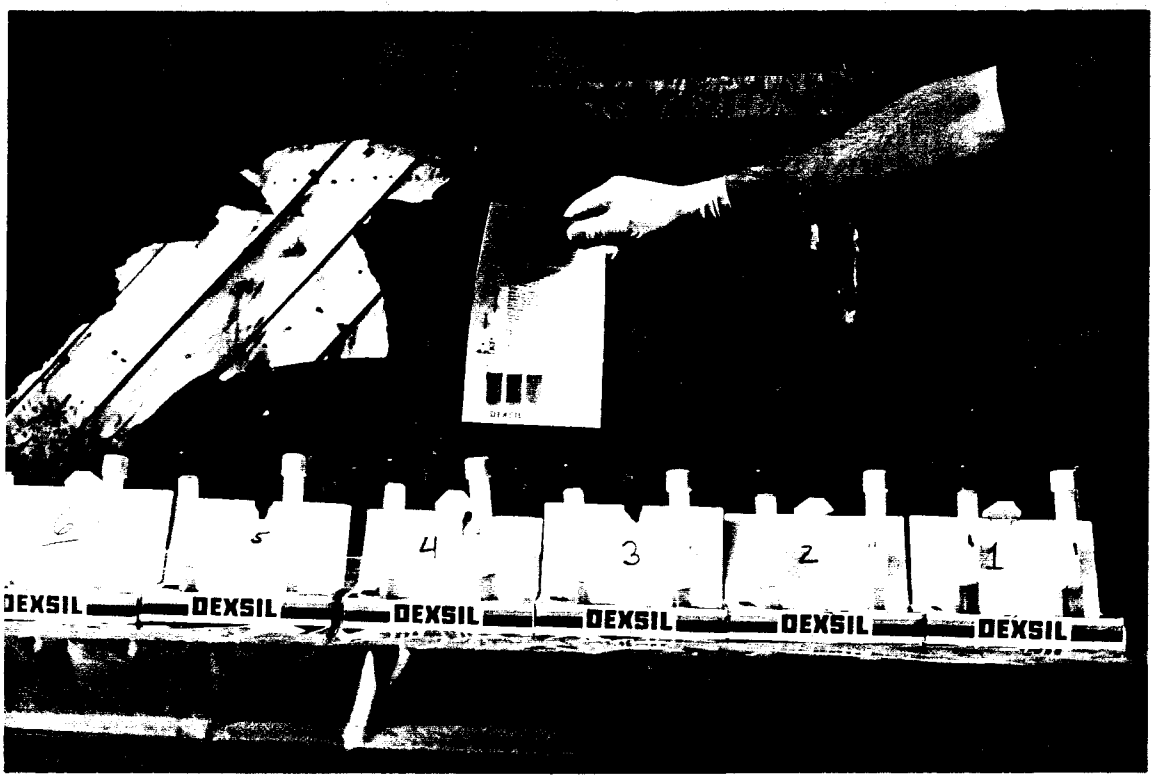
NORTHWESTERLY VIEW OF THE SITE SHOWING MAIN COMPLEX AND EVIDENCE OF MINING ACTIVITY UP THE HILL TO THE WEST



TWO LARGE TRANSFORMERS OUTSIDE POWER/STEAM PLANT

TRANSFORMERS ADJACENT TO THE COLLAPSED MINE LABORATORY

ONSITE PCB SOIL AND TRANSFORMER SCREENING OPERATION



COLOROMETRIC RESULTS OF PCB SCREENING (PHOTOS A - D)
PHOTO A

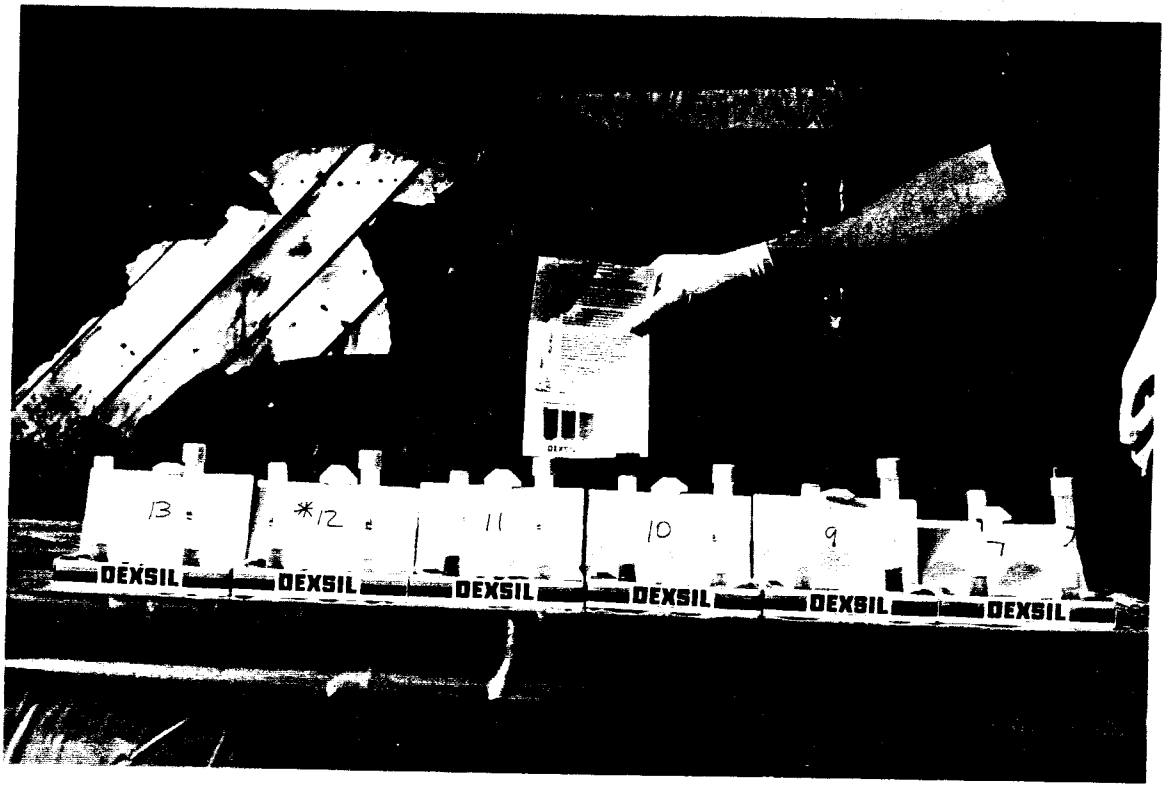


PHOTO B

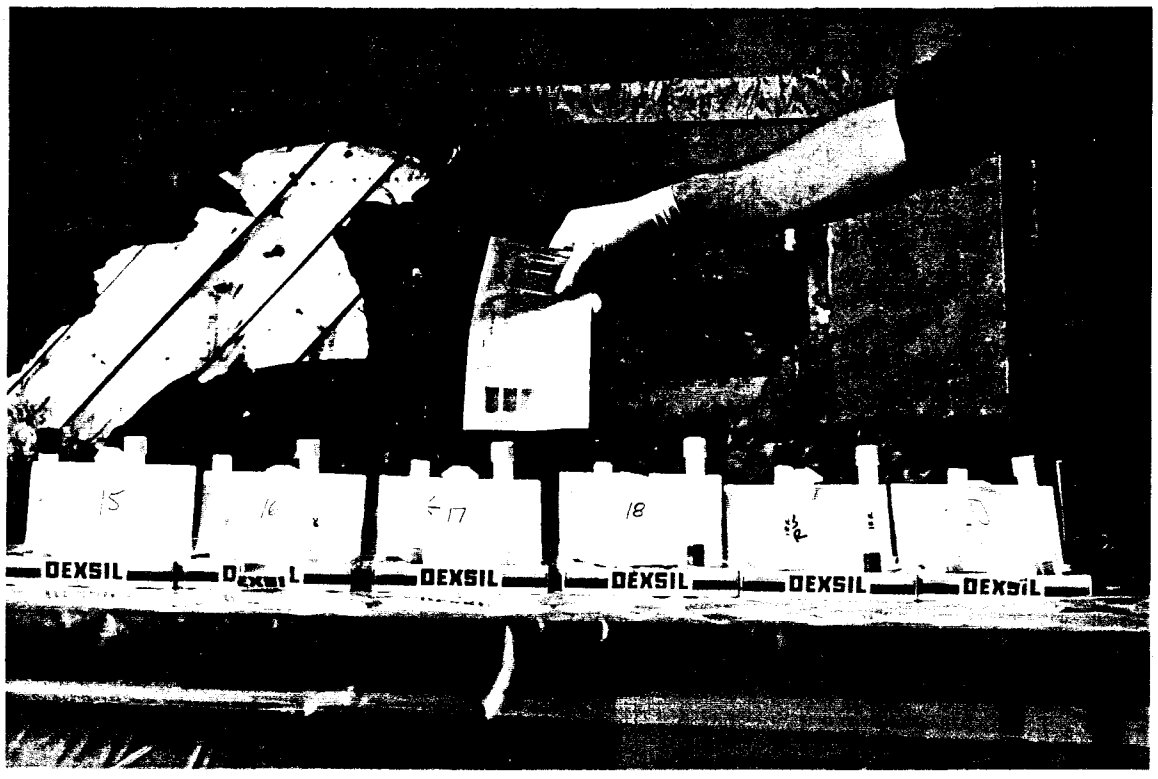


PHOTO C

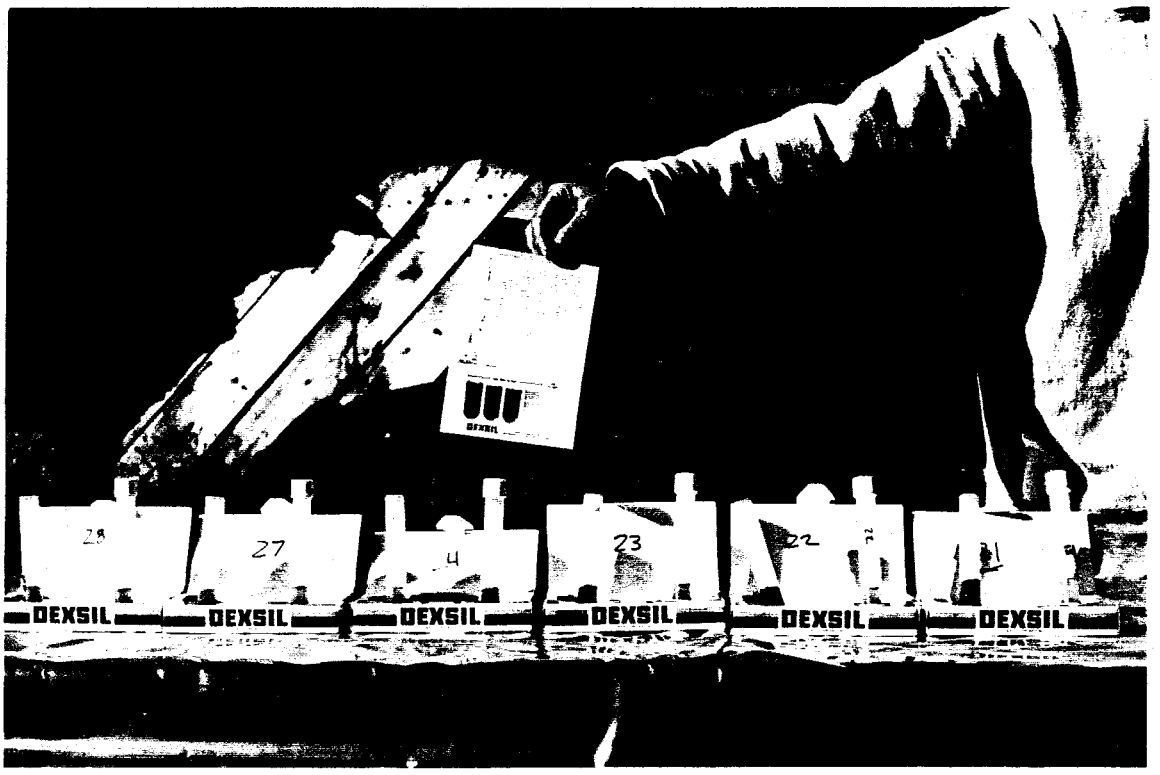
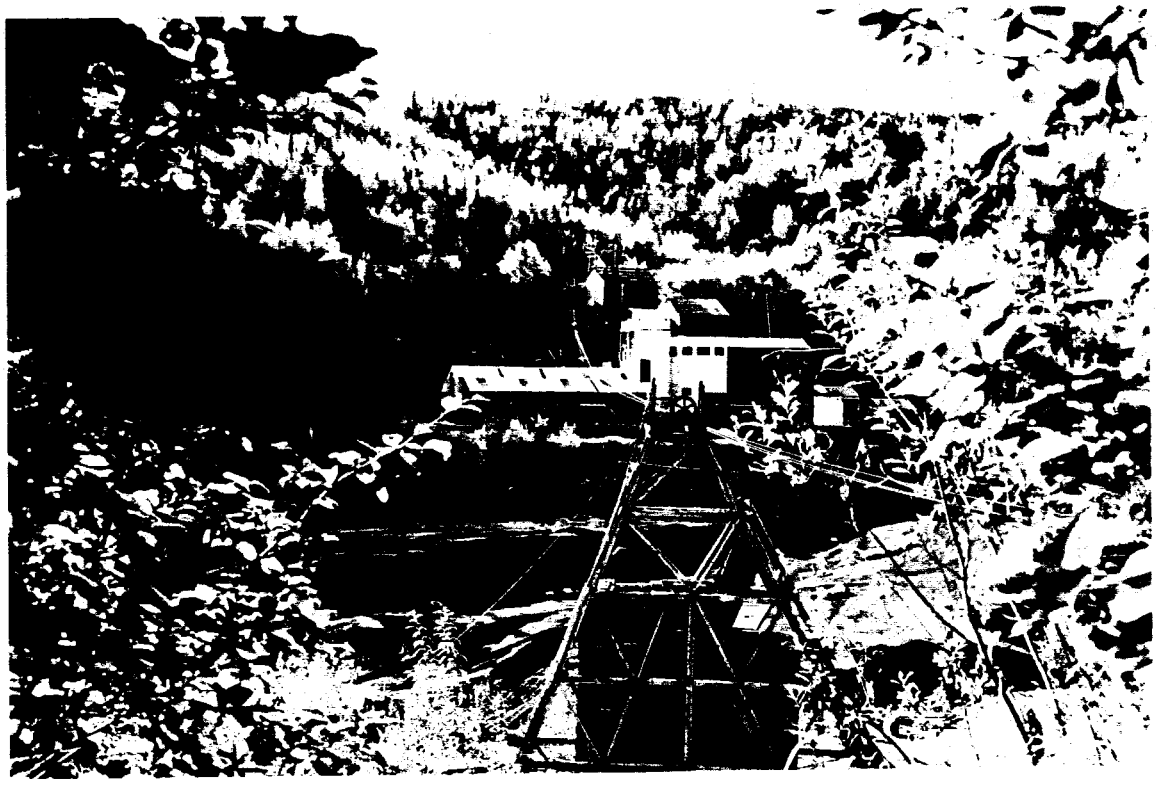
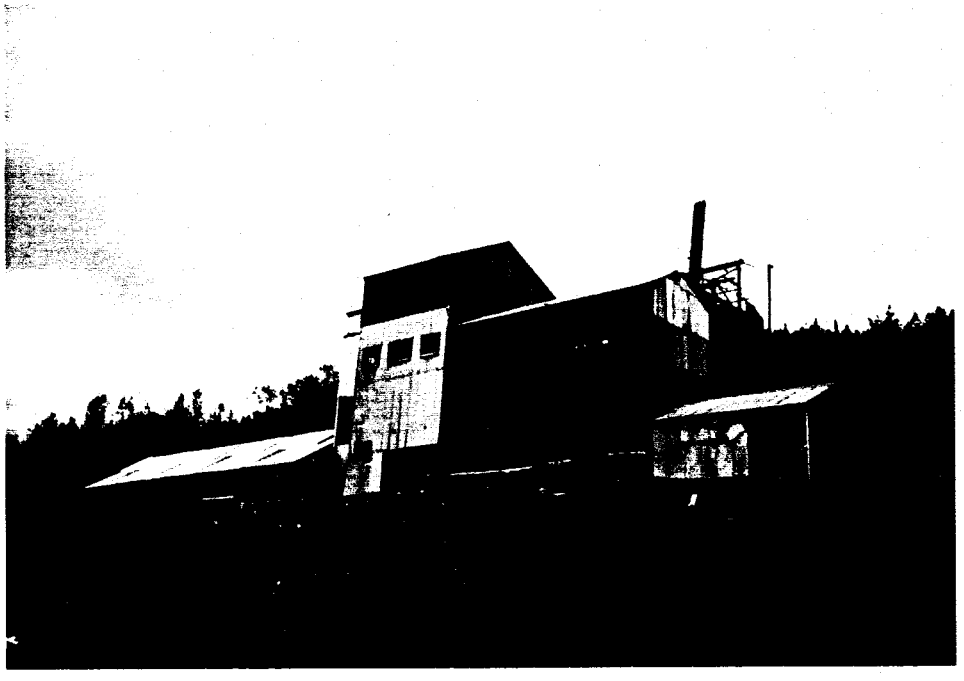


PHOTO D

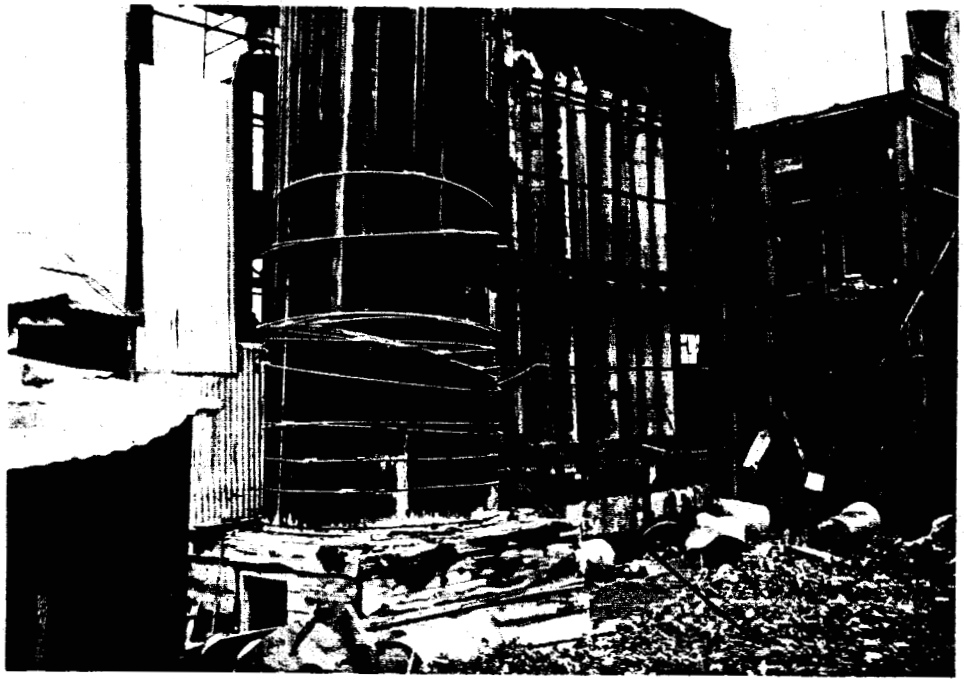
HIGH IRON STAINED WATER FLOWING INTO RED DEVIL CREEK NEAR WHERE A CAVED ADIT IS PRESENT



EASTERLY VIEW OF THE RED DEVIL MINE AND MILL COMPLEX. OVERHEAD CABLES ARE REMNANTS OF A TRAM SYSTEM USED TO TRANSPORT ORE TO THE MILL



EASTERLY VIEW - CLOSE-UP OF THE MILL



NORTHWEST VIEW FROM BEHIND THE MILL. ARROW POINTS TO CONCRETE CHANNEL WHERE CONDENSED LIQUID MERCURY WAS COLLECTED. BEADS OF MERCURY WERE OBSERVED IN THIS CHANNEL DURING THE S.I.

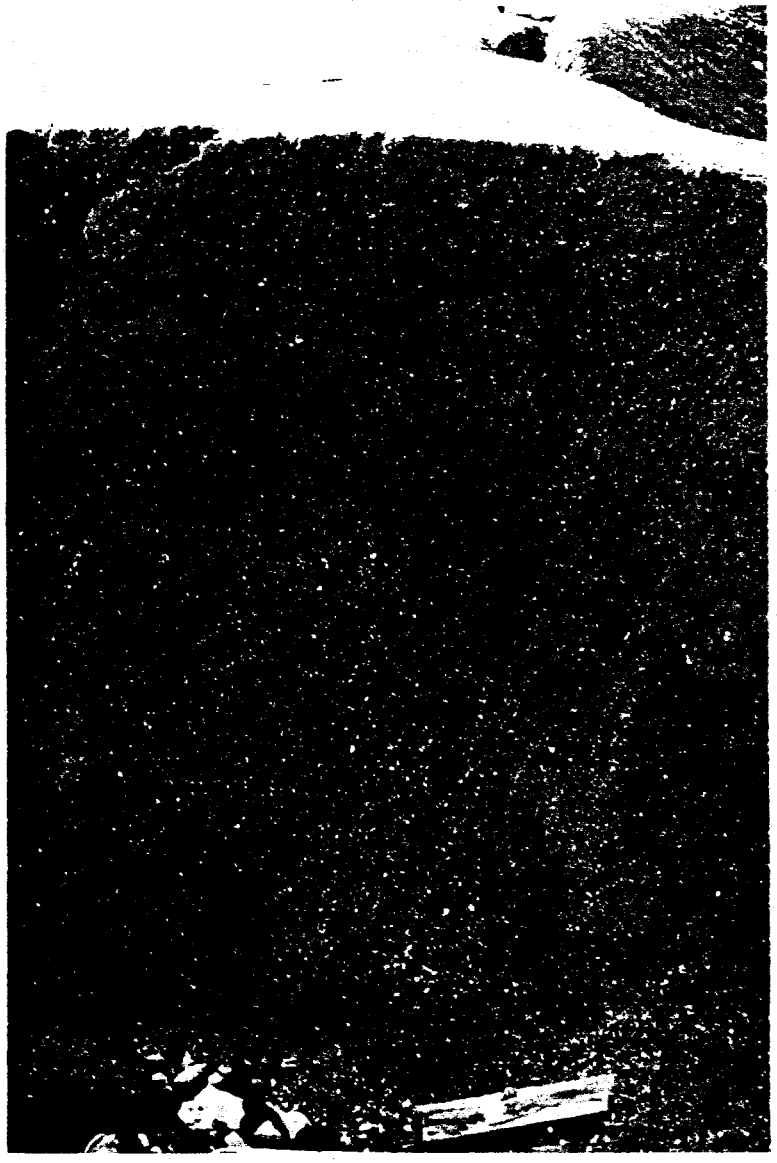
VIEW INTO THE SOUTHERNMOST CHEMICAL STORAGE SHED

VIEW INTO THE NORTHERNMOST CHEMICAL STORAGE SHED

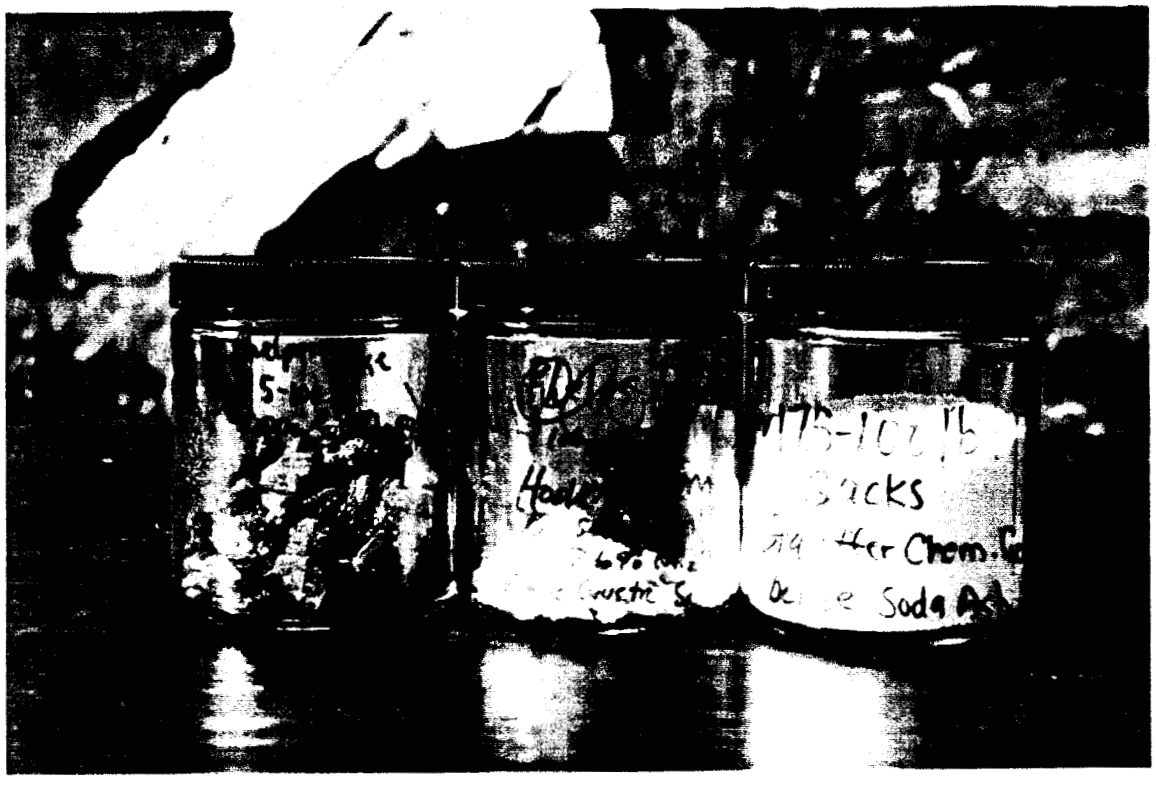
SOUTHERLY VIEW OF THE HEADFRAME ABOVE THE MAIN SHAFT

NORTHERLY VIEW ALONG RED DEVIL CREEK SHOWING TAILING PILES WITHIN THE BASIN

TAILINGS PILE IN RED DEVIL CREEK - APPROXIMATELY 35 FEET HIGH



OIL-STAINED SOIL ADJACENT TO 55-GALLON DRUMS AND TRANSFORMERS



CHEMICALS FOUND IN THE STORAGE SHEDS: COPPER SULFATE ($CuSO_4$), FLAKE CAUSTIC SODA (NaOH), AND DENSE SODA ASH

APPENDIX C

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY HAZARD RANKING SYSTEM SCORES AND DOCUMENTATION

HRS SUMMARY AND SCORESHEETS

Facility name: Red Devil Mine

Location: Red Devil, Alaska

EPA Region:

Person(s) in charge of the facility: Bureau of Land Management (Landowners)

Anchorage District Office

Anchorage, Alaska

Name of Reviewer: Bert Q. Hyde Date: November 28, 1988

General description of the facility:
(For example: landfill, surface impoundment, pile, container: types of hazardous substances: location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

The Red Devil Mine site occupies 10 acres in a remote part of Western Alaska. Mercury mining at the site spanned a 38-year period. Approximately 35,000 flasks of mercury were produced from at least 55,000 tons of ore. An estimated 51,500 cubic yards of mine and mill waste are distributed over the site. Over 30 transformers were observed at the site. Twenty transformers still contain dielectric fluid and were sampled. Two transformers had PCBs in excess of 50 PPM and have been removed from the site. A small amount of chemicals used in the milling process remains in two sheds at the site. These chemicals include 15-50 lb. sacks of sodium hydroxide flake. Red Devil Creek bisects the site and erodes several tailing piles during periods of high flow.

The mineralized lode is also intersected by Red Devil Creek. The heavy metal content of creek sediments and surface water that is man-made has not been distinguished from natural causes.

Scores: S_M= 14.95 (S_{gw} = 18.4 S_{sw} = 18.18 S_a = 0)

S_{FE}= 0

S_{DC}= 12.6

Ground Water Route Work Sheet

Rating Factor	Assigned Value (Circled One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1	0	45	3.1
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 3	2	4	6	
Net Precipitation	0 1 2 3	1	1	3	
Permeability of the Unsaturated Zone	0 1 2 3	1	2	3	
Physical State	0 1 2 3	1	2	3	
Total Route Characteristics Score			9	15	
3 Containment	0 1 2 3	1	3	3	3.3
4 Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	8	8	
Total Waste Characteristics Score			26	26	
5 Targets					4.5
Ground Water Use	0 1 2 3	3	9	9	
Distance to Nearest Well/Population Served	0 4 6 8 10 } 12 16 18 20 } 24 30 32 35 40	1	6	40	
Total Targets Score			15	49	
6 If line 1 is 45, multiply 1 x 4 x 5 / If line 1 is 0, multiply 2 x 3 x 4 x 5			10,530	57,330	
7 Divide line 6 by 57,330 and multiply by 100			S_{gw} = 18.4		

Surface Water Route Work Sheet

Rating Factor	Assigned Value (Circled One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 (45)	1	45	45	4.1
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					4.2
Facility Slope and Intervening Terrain	0 1 2 3	1		3	
1-yr. 24-hr. Rainfall	0 1 2 3	1		3	
Distance to Nearest Surface Water	0 1 2 3	2		6	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
3 Containment	0 1 2 3	1		3	4.3
4 Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 (8)	1	8	8	
Total Waste Characteristics Score			26	26	
5 Targets					4.5
Surface Water Use	0 1 (2) 3	3	6	9	
Distance to a Sensitive Environment	0 1 (2) 3	2	4	6	
Population Served/Distance to Water Intake Downstream	(0) 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	
Total Targets Score			10	55	
6 If line 1 is 45, multiply 1 x 4 x 5 / If line 1 is 0, multiply 2 x 3 x 4 x 5			11700	64,350	
7 Divide line 6 by 64,350 and multiply by 100			S_{sw} = 18.18		

Direct Contact Work Sheet

Rating Factor	Assigned Value (Circled One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Incident	(0) 45	1	0	45	8.1
If line 1 is 45, proceed to line 4. If line 1 is 0, proceed to line 2.					
2 Accessibility	0 1 2 (3)	1	3	3	8.2
3 Containment	0 (15)	1	15	15	8.3
4 Waste Characteristics Toxicity	0 1 2 (3)	5	15	15	8.4
5 Targets					8.5
Population Within a 1-mile Radius	0 (1) 2 3 4 5	4	4	20	
Distance to a Critical Habitat	(0) 1 2 3	4	0	12	
Total Targets Score			4	32	
6 If line 1 is 45, multiply 1 x 4 x 5. If line 1 is 0, multiply 2 x 3 x 4 x 5			2700	21,600	
7 Divide line 6 by 21,600 and multiply by 100			S_{DC}=12.6		

Air Route Work Sheet

Rating Factor	Assigned Value (Circled One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	(0) 45	1		45	5.1
Date and Location:					
Sampling Protocol:					
If line 1 is 0, the $S_a = 0$. Enter on line 5. If line 1 is 45, then proceed to line 2.					
2 Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3 9			
Hazardous Waste Quantity	0 1 2 3 4 5 6 7	8 1		8	
	Total Waste Characteristics Score			20	
3 Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 / 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
	Total Targets Score			39	
4 Multiply 1 x 2 x 3				35,100	
5 Divide line 4 by 35,100 and multiply by 100		S_a = 0			

HRS DOCUMENTATION RECORDS

June 28, 1982

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible, summarize the information you used to assign the score for each factor (e.g. "Waste quantity equals 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document and for a given point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: Red Devil Mine

LOCATION: Red Devil, Alaska

COORDINATES:

Latitude 61° 45' 18".0

Longitude 157° 18' 45".0

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

One groundwater sample was obtained from the Vanderpool residence (Mercury Inn). Mercury (0.3 ug/L) and lead (245 ug/L) were detected. Lead exceeds federal drinking water protection criteria (50 ug/L). Lead acetate was used for a period in the milling process, but can also be introduced to drinking water supply by plumbing. Lead is not a natural constituent of the ore. Mercury occurrences are widespread in the area. Thus the mine cannot be identified as the source of the lead and mercury content of the well.

Rationale for attributing the contaminants to the facility:

The mercury and lead found in the Vanderpool well cannot be attributed to the site.

* * *

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifer(s) of concern:

- Fractured bedrock aquifer
- Aquifer located beneath river deposited sands and silt alluvium.

(From Tryck, Nyman and Hayes, September 1987)

Depth(s) from the ground surface to the highest seasonal level of the saturated zone (water table(s)) of the aquifer of concern:

Approximately 29 feet.

Depth from the ground surface to the lowest point of waste disposal/storage:

A depth of five feet was assumed. This depth was derived from the depth of the mill tailings lagoons. The rest of the mine/mill tails were deposited in piles over the site.

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

18.44"

Mean annual lake or seasonal evaporation (list months for seasonal):

17.17"

Net precipitation (subtract the above figures):

1.24"

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Alluvial soils consist of sand and silts.

Permeability associated soil type:

10^{-3} - 10^{-5} cm/sec

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

Solid, powder, finer and coarser material.

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

No containment was instigated for much of the generated tails. Surface impoundments/settling ponds were used for mill tails over one period of production. "No containment" was used on the HRS.

Method with highest score:

N/A

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

	Toxicity	Persistence	Matrix Value
Mercury	3	3	18
Antimony	3	3	18
Arsenic	3	3	18

Compound with highest score:

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

An estimated 51,600 cubic yds of mine and mill waste are present.

Basis of estimating and/or computing waste quantity:

The amount of tailings was determined by dividing the site into three areas:

Area 1 - Entrance to site - 11,100 cubic yds - 300' x 100' x 10'

Area 2 - Mill area - 37,000 cubic yds - 200' x 200' x 25'

Area 3 - 3 settling ponds (a depth of 5' was assumed for each) -

1: 2,100 cubic yds - 150' x 75' x 5'

2: 925 cubic yds - 100' x 50' x 5'

3: 460 cubic yds - 50' x 50' x 5'

Total = 51,600 cubic yds

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

	Toxicity	Persistence	Matrix Value
Mercury	3	3	18
Antimony	3	3	18
Arsenic	3	3	18

Compound with highest score:

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

An estimated 51,600 cubic yds of mine and mill waste are present.

Basis of estimating and/or computing waste quantity:

The amount of tailings was determined by dividing the site into three areas:

Area 1 - Entrance to site - 11,100 cubic yds - 300' x 100' x 10'

Area 2 - Mill area - 37,000 cubic yds - 200' x 200' x 25'

Area 3 - 3 settling ponds (a depth of 5' was assumed for each) -

1: 2,100 cubic yds - 150' x 75' x 5'

2: 925 cubic yds - 100' x 50' x 5'

3: 460 cubic yds - 50' x 50' x 5'

Total = 51,600 cubic yds

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

0

Total population served by groundwater within a 3-mile radius:

Approx. 50

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

Mercury, antimony, arsenic: however, it is not possible to distinguish between contaminants that are naturally occurring and those that result from the mining/milling operations. Red Devil Creek intersects the mineralized lode.

Rationale for attributing the contaminants to the facility:

Sediments and surface water contamination concentrations in all but one sampling episode were greater downgradient of the site than upgradient of the site. However, the mineralized lode is intersected by Red Devil Creek near the locations where tailings features are in contact with the creek, so natural vs. man-made contamination is difficult to quantify. The HRS assumes that the mine/mill operations have contributed to the contaminants in Red Devil Creek drainage.

2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

7.5% - this is a very arbitrary figure because of the many piles present over the site.

Name/description of nearest downslope surface water:

Red Devil Creek

Average slope of terrain between facility and above-cited surface water body in percent:

Some tails piles are in or immediately adjacent to the creek. The average slope between these piles and the creek is the angle of repose of the piles and in some cases greater than this angle. The piles are actually the "facility" or source of contamination.

Is the facility located either totally or partially in surface water?

Red Devil Creek bisects the site. Mill and mine tailings are partially in the creek.

Is the facility completely surrounded by areas of higher elevation?

Yes, with the exception of Red Devil Creek Drainage that bisects the site.

1-Year 24-Hour Rainfall in Inches

1.64"

Distance to Nearest Downslope Surface Water

Onsite

Physical State of Waste

Mercury - solid, powdered fines
Antimony - solid, powdered fines
Arsenic - solid, powdered fines

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Settling ponds were in use for a period of the mine's life but many mine/mill waste piles are not contained in any way.

Method with highest score:

Non-contained

* * *

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

Mercury, arsenic and antimony each have toxicity and persistence ratings of 3.

Compound with highest score:

All have the same score.

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

51,600 cubic yds of mine/mill waste are estimated to be present.

Basis of estimating and/or computing waste quantity:

Simple volume calculation based on site observations.

* * *

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

1) Recreational fishing in Kuskokwim River - migratory salmon runs
2) Transportation

Is there tidal influence?

No.

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

N/A

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

0.3 miles - The Kuskokwim valley is considered to be a fresh water wetland

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

None within one mile

Population Served by Suface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake

N/A

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

N/A

Total population served:

Name/description of nearest of above water bodies:

Distance to above-cited intakes, measured in stream miles.

AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected:

N/A

Date and location of detection of contaminants:

Methods used to detect the contaminants:

Rationale for attributing the contaminants to the site:

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compounds:

1) Mercury, HgS volatizes at low temperatures and has been shown to volatilize under ambient air conditions in some areas.
2) 15-50 lb bags of Na20 (sodium hydroxide flake) are in a shed onsite.

Most incompatible pair of compounds:

Toxicity

Most toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

* * *

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:
0 to 4 mi 0 to 1 mi 0 to 1/2 mi 0 to 1/4 mi

50

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

Kuskokwim River lies 0.3 miles north of the site.

Distance to critical habitat of an endangered species, if 1 mile or less:

N/A

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Site is an inactive industrial area. No other commercial/industrial land use is within one mile.

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

50 residents live within 3 miles of the site.

Distance to agricultural land in production within past 5 years, if 1 mile or less:

N/A

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

N/A

Is a historic or landmark site (National Register or Historic Places and National Landmarks) within the view of the site?

N/A

FIRE AND EXPLOSION

1 DOCUMENTED THREAT

If either a state or local fire marshal has certified that the facility presents a significant fire or explosion threat to the public or to sensitive environments, document the certificat

Name/affiliation of fire marshal:

N/A

Date of Certification:

Comments:

If there is a demonstrated fire and explosion threat based on field observations, document the threat:

Inspectors reporting the threat:

Date of observations:

Methods used to document the threat:

Comments:

2 CONTAINMENT

Containment

Measure(s) taken to minimize or prevent hazardous substances from catching fire or explo

• • •

3 WASTE CHARACTERISTICS

Direct Evidence

Type of measures taken:

Date and location of positive measurements:

Ignitability

Compound evaluated:

Compound with highest score:

Reactivity

Compounds evaluated:

Compound with highest score:

Incompatibility

Compounds evaluated:

Most incompatible pair of compounds:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

4 TARGETS

Distance to Nearest Population

Distance to Nearest Building

Distance to Nearest Sensitive Environment

Distance to wetlands, if less than 100 feet:

Distance to critical habitat of an endangered species, if greater than 1/2 mile:

Land Use

Distance to commercial industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

Population Within 2-Mile Radius

Number of Buildings Within a 2-Mile Radius

APPENDIX D

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
SITE INVESTIGATION REPORT FORM

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
AK	980495618

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Red Devil Mine	SE ¼ Section 6 T 19N R 44W

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CON. DIST
Red Devil	AK				

09 COORDINATES LATITUDE	LONGITUDE
6 1 4 5 1 8.0	1 5 7 1 8 4 5.0

10 TYPE OF OWNERSHIP (Check one)
☐ A. PRIVATE XX B. FEDERAL BLM ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☐ F. OTHER _____ ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
9 / 8 / 88 (MONTH DAY YEAR)	☐ ACTIVE XX INACTIVE	Approx 1933 / 1981 (BEGINNING YEAR / ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)
☐ A. EPA ☐ B. EPA CONTRACTOR _____ (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR _____ (Name of firm)
☐ E. STATE ☐ F. STATE CONTRACTOR _____ (Name of firm) XX G. OTHER DOI Contractor/R. F. Weston, Inc. (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO
Bert Hyde	Senior Geologist	R.F. Weston	(206)286-6000

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO
Carla Marzicola	Geologist	R.F. Weston	(206)286-6000
Mark Selman	Senior Engineer	R.F. Weston	(206)286-6000
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
			( )
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
X PERMISSION ☐ WARRANT	0900-1800 hours	Clear, cool

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO
Mac Wheeler	BLM/Anchorage District Office	(907) 267-1434

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Bert Hyde		R.F. Weston	(206)286-6000	11 / 28 / 88 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
AK	980495618

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- [X] A. SOLID
- [X] B. POWDER, FINES
- [ ] C. SLUDGE
- [ ] D. OTHER _____ (Specify)
- [ ] E. SLURRY
- [X] F. LIQUID
- [ ] G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS _____

CUBIC YARDS Appx 51,600

NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- [X] A. TOXIC
- [ ] B. CORROSIVE
- [ ] C. RADIOACTIVE
- [X] D. PERSISTENT
- [ ] E. SOLUBLE
- [ ] F. INFECTIOUS
- [ ] G. FLAMMABLE
- [ ] H. IGNITABLE
- [ ] I. HIGHLY VOLATILE
- [ ] J. EXPLOSIVE
- [ ] K. REACTIVE
- [ ] L. INCOMPATIBLE
- [ ] M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			During the SI, an inventory of all
SOL	SOLVENTS			onsite transformers was conducted
PSD	PESTICIDES			All containing dielectric fluid
OCC	OTHER ORGANIC CHEMICALS			were sampled; 2 contained PCB con-
IOC	INORGANIC CHEMICALS			centrations at or over 50 PPM.
ACD	ACIDS			These 2 transformers have since
BAS	BASES			been removed from the site.
MES	HEAVY METALS	51,600	yd^3	Volume calculation used both settli
				pond sediments and mine/mill tails.

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
MES	Mercury	7439-97-6	Settling ponds	83-787	MG/KG
MES	Antimony	7440-36-0	" "	664-22737	MG/KG
MES	Arsenic	7440-38-2	" "	5851-8474	MG/KG
MES	Lead	7439-92-1	" "	418.7-1391.1	MG/KG
	Arsenic		Creek sediments	165-3185	MG/KG
	Lead		" "	261.7-480.7	MG/KG
	Mercury		" "	0.6-33.3	MG/KG
	Antimony		" "	3113-4015	MG/KG
	Chromium	7440-47-3	" "	17.7-25.9	MG/KG
	Cadmium	7440-43-9	" "	2.73-5.00	MG/KG
	Selenium	7782-49-2	" "	82.1-89.5	MG/KG
	Mercury		Creek water	0.4	ug/L
	Arsenic		" "	244	ug/L
	Antimony		" "	278	ug/L

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Tryck, Nyman and Hayes, September 1987

R.F. Weston Site Investigation, September 1988

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
AK	980495618

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [X] A GROUNDWATER CONTAMINATION — 02 [ ] OBSERVED (DATE 9-88) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 50 — 04 NARRATIVE DESCRIPTION

Groundwater was sampled from a residential well (RD-RW) approximately 1 mile west of the site. Analytical results show concentrations of mercury (Hg)(0.3 PPM), chromium (Cr)(15.3 PPM) and lead (Pb)(.224 PPM) present. Due to widespread natural occurring heavy metals and area geohydrologic conditions, this contamination cannot be attributed

01 [X] B SURFACE WATER CONTAMINATION — 02 [ ] OBSERVED (DATE 9-88) [X] POTENTIAL [ ] ALLEGED the s
03 POPULATION POTENTIALLY AFFECTED: 50 — 04 NARRATIVE DESCRIPTION

Red Devil Creek bisects the site, and flows through several tailings piles. Laboratory analysis shows mercury, antimony, and arsenic present in surface waters of Red Devil Creek. The creek also intersects the lode. The natural versus man-made heavy metal contribution to the creek has not been determined.

01 [ ] C CONTAMINATION OF AIR — 02 [ ] OBSERVED (DATE) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

01 [ ] D FIRE/EXPLOSIVE CONDITIONS — 02 [ ] OBSERVED (DATE) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

01 [X] E DIRECT CONTACT — 02 [ ] OBSERVED (DATE 9-88) [X] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 50 — 04 NARRATIVE DESCRIPTION

The tailings do not pose a direct contact threat. 5-100 lb bags of copper sulfate (99%), 75-100 lb bags of dense soda ash, and 15-50 lb bags of Na_2O (76%) are stored in a shed onsite. The sodium hydroxide (Na_2O) poses a direct contact threat.

01 [X] F CONTAMINATION OF SOIL — 02 [ ] OBSERVED (DATE 9-88) [X] POTENTIAL [ ] ALLEGED
03 AREA POTENTIALLY AFFECTED: 50 (Acres) — 04 NARRATIVE DESCRIPTION

01 [XX] G DRINKING WATER CONTAMINATION — 02 [ ] OBSERVED (DATE 9-88) [X] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 50 — 04 NARRATIVE DESCRIPTION

A residential well (Vanderpool's Mercury Inn) 1 mile west of the site was sampled during the SI. Lead concentrations (224 ug/L) in the drinking water exceed federal drinking water maximum concentration limits (50 ug/L). Although lead acetate was used for a short period in the milling process, it is more likely that elevated lead concentrations

01 [ ] H WORKER EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE) [ ] POTENTIAL [ ] ALLEGED
03 WORKERS POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

Mine is inactive and no incidents are documented from operative years.

01 [ ] I POPULATION EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

EPA FORM 2070-13 (7-81)

**are associated with the plumbing. Lead is not a significant constituent of the mineralization in the area.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
AK	980495618

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ K DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

01 ☐ L CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 X M UNSTABLE CONTAINMENT OF WASTES (Spills, Runoff, Standing liquids, Leaking drums) — 02 ☐ OBSERVED (DATE 9-88) XX POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Red Devil Creek flows through several tailings piles. During periods of high water, tailings are eroded away.

01 ☐ N DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ O CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ P ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

A total of 31 transformers were inventoried. Twenty contained dielectric fluid and were sampled. Two of the 20 contained PCBs at 50 PPM or greater and have been removed from the site.

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

The population potentially affected figures listed in this report reflect the total population of the village of Red Devil - 50 persons.

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

R.F. Weston, Inc. Site Investigation, September 1988

Tryck, Nyman, Hayes, September 1957

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
AK	980495618

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES				
☐ B. UIC				
☐ C. AIR				
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify) Mining claims				Available from BLM files
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT	3,485	cubic yds
☐ B. PILES	48,000	cubic yds
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☐ F. LANDFILL		
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)

- ☐ A. INCENERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER (Specify)

None

05 OTHER

☒ A. BUILDINGS ON SITE

Approx. 15

06 AREA OF SITE

Approx. 10 (Acre

07 COMMENTS

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☒ C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC

Red Devil Creek is eroding material from tailing piles.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE ☒ YES ☐ NO

02 COMMENTS

Access is not restricted.

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, records)

R.F. Weston Site Investigation, September 1988

Tryck, Nyman, Hayes, September 1957

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
AK	980495618

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

	SURFACE	WELL
COMMUNITY	A. ☐	B. ☐
NON-COMMUNITY	C. ☐	D. ☒

02 STATUS May be endangered, but attributable to the site.

ENDANGERED	AFFECTED	MONITORED
A. ☐	B. ☐	C. ☐
D. ☐	E. ☐	F. ☐

03 DISTANCE TO SITE

A. _____ (mi)
B. 1.3 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A. ONLY SOURCE FOR DRINKING ☒ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available) ☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER 50

03 DISTANCE TO NEAREST DRINKING WATER WELL 1.3 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
Approx. 29 (ft)	Unknown, but likely subparallel to river (northwest)	Approx. 29 (ft)	Unknown (gpd)	☐ YES ☒ NO

09 DESCRIPTION OF WELLS (Including usage, depth, and location relative to population and buildings)

Construction technique is not known, but total depth is 40 feet.

10 RECHARGE AREA
☐ YES
☐ NO
COMMENTS: Unknown

11 DISCHARGE AREA
☐ YES
☐ NO
COMMENTS: Unknown

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☒ A. RESERVOIR, RECREATION DRINKING WATER SOURCE ☐ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C. COMMERCIAL, INDUSTRIAL ☐ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Red Devil Creek	☒	Onsite (mi)
Kuskokwim River	☐	Less than .25 (mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. _____ NO OF PERSONS	B. _____ NO OF PERSONS	C. 50 NO OF PERSONS

02 DISTANCE TO NEAREST POPULATION 1.3 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE Approx. 45

04 DISTANCE TO NEAREST OFF-SITE BUILDING 1.3 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site (e.g., rural, village, density, suburban, urban area)

A rural village, with an estimated population of 50, lies within a three-mile radius of the site. The closest residence lies approx. one mile west of the mine site, with the majority of the population centered around a school and a nearby air strip two to three miles from the site.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
AK	980495618

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☒ C. $10^{-4} - 10^{-3}$ cm/sec ☐ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☐ A. IMPERMEABLE (Less than 10^{-6} cm sec) ☐ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm sec) ☒ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
0-40 (ft)	(ft)	Unknown

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
1.24 (in)	1.64 (in)	0-5 %	North	7.5 %

09 FLOOD POTENTIAL

SITE IS IN 50 YEAR FLOODPLAIN

10 N/A ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE N/A OTHER

A. _____ (mi) B. _____ (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

N/A _____ (mi)

ENDANGERED SPECIES: _____

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS, NATIONAL STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A 0 (mi)	B 1.0 (mi)	C. _____ (mi)	D. _____ (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

The Red Devil Mine lies in the valley of Red Devil Creek, approximately 0.3 miles from the confluence with the Kuskokwim River. The valley is approximately 300 feet wide at the mine. Red Devil Creek bisects the site and surface runoff trends toward the creek from either side. Mine tails provide a level pad for the site buildings. The surrounding topography is steep, ranging between 5 to 30% slope.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Weather information collected from a station located in Kotzebue, AK, approximately 50 miles southeast of Red Devil.

Tryck, Nyman and Hayes, September 1987

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
AK	980495618

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	1	R.F. Weston Analytical Lab/Stockton, CA	11-88
SURFACE WATER	3	" " "	
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL/sediments	4	" " "	"
VEGETATION			
OTHER Mine/mill tails	5	" " "	"
smelter brick	1	" " "	"

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
Onsite transformer PCB characterization	31 onsite transformers were analyzed for PCBs with Dexsil test kits.
Mercury vapor meter	No readings above background were encountered.

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☐ AERIAL

02 IN CUSTODY OF _____ (Name of organization or individual)

03 MAPS ☒ YES ☐ NO

04 LOCATION OF MAPS: Included in this site investigation report

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

Transformer inventory, transformers were labeled and described.

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

R.F. Weston Site Investigation, September 1988

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
AK	980495618

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
Bureau of Land Management		701 "C" Street		Anchorage	AK	99501
N/A						

PARENT COMPANY (If applicable)

08 NAME	09 D+B NUMBER	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE	12 CITY	13 STATE	14 ZIP CODE
Department of Interior		18th and C Streets N.W.		Washington, D.C.		20240
N/A						

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE

IV. REALTY OWNER(S) (If applicable, list most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
AK	980495618

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER
Inactive	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

III. PREVIOUS OPERATOR(S) (List most recent first. Provide only if different from owner)

01 NAME	02 D+B NUMBER
Alaska Mines and Minerals	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
AK	980495618

II. ON-SITE GENERATOR N/A

01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
AK	980495618

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
AK	980495618

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☒ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

Signs, warning of possible hazards, were posted at the entrance to the site by BLM personnel.

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

R.F. Weston Site Investigation, September 1988

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
AK	980495618

II. ENFORCEMENT INFORMATION N/A

01 PAST REGULATORY ENFORCEMENT ACTION ☐ YES ☐ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

APPENDIX E

TRANSFORMER INVENTORY

ON-SITE TRANSFORMER INVENTORY

Transformer	Manufacturer	KVA	Serial No.	Capacity (gallons)	Contents	Miscellaneous
RD-T-1	General Electric	25	4V35246	23.5	full	--
RD-T-2	No name	--		approx. 40	full	2300 Hi 115/230/460 Low
RD-T-3	Wagner Transformer Henry Edward Boyd	37.5	5K35434	26	full	--
RD-T-4	Wagner Transformer Henry Edward Boyd	--	5K28711	26	full	--
RD-T-5	Westinghouse S. Hipersil	5	5354674	--	2/3 full	--
RD-T-6	Westinghouse Hipersil Transformer	37.5	5359541	--	full	total weight 1715
RD-T-7	No name	--	--	25	full	leaking
RD-T-8	General Electric Spirakool Transformer	15	5K35433	--	dry	--
RD-T-9	Wagner Transformer	37.5	5K35433	--	full	--
RD-T-10	Wagner Transformer	15	M9F1344	14.5	full	water with oils
RD-T-11	Allis-Chalmers Transformer	25	2524235	--	full	water with oils

ON-SITE TRANSFORMER INVENTORY

Transformer	Manufacturer	KVA	Serial No.	Capacity (gallons)	Contents	Miscellaneous
RD-T-12	General Electric	15	6490560	14.5	full	--
RD-T-13	Allis-Chalmers Pittsburgh	--	1818674	15	full	--
RD-T-14	Moloney Electric Co.	25	705571	--	dry	--
RD-T-15	Westinghouse Hipersil Transformer	25	5390771	--	2/3 full	--
RD-T-16	Westinghouse Hipersil Transformer	--	5390768	--	--	120/240 2400/41604
RD-T-17	General Electric Spirakool Transformer	10	6700928	10	full	--
RD-T-18	General Electric	37.5	6959506	--	--	leaking, 90 percent wate
RD-T-19	General Electric	37.5	6486070	--	dry	--
RD-T-20	No Plate	10	--	--	--	--
RD-T-21	Pittsburgh Transformer Co.	150	670659	--	full	--
RD-T-22	Pittsburgh Transformer Co.	150	670661	--	full	--
RD-T-23	Pittsburgh Transformer Co.	150	670660	--	--	Phase I
RD-T-24	Line Material Co.	15	1316458	--	full	--

ON-SITE TRANSFORMER INVENTORY

Transformer	Manufacturer	KVA	Serial No.	Capacity (gallons)	Contents	Miscellaneous
RD-T-25	Line Material Co.	15	289580	--	dry	--
RD-T-26	General Electric	--	--	--	dry	starting compensator DL-4386946
RD-T-27 (on pole)	Wagner	15	A961137	14.2	full	--
RD-T-28 (on pole)	Wagner	5	289510	7	full	--
RD-T-29 (on pole)	Westinghouse	5	5354651	--	dry	--
RD-T-30	General Electric	5	6927154	--	dry	--
RD-T-31	Westinghouse CSP	5	3169896	--	dry	--