RED DEVIL MINE
AKD-980495618
CERCLA Site Inspection Report

Submitted to:

Department of Environmental Conservation
Juneau, Alaska

Submitted by:

Tryck, Nyman & Hayes
Anchorage, Alaska

Shannon & Wilson, Inc.
Anchorage and Fairbanks, Alaska

September, 1987

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EXECUTIVE SUMMARY

Red Devil Mine, located eight miles downriver from Sleetmute on the Kuskokwim River, is a facility on the State of Alaska list of potential hazardous waste sites. A site investigation, including a site visit of June 26, 1986 was conducted to interview residents and gather information for evaluation of the site under EPA's CERCLA or Superfund program.

Mining, milling and mercury recovery operations at Red Devil Mine spanned a period of 38 years. During this period, site operations evolved from a hand mining and retorting operation into a full scale, mechanized mercury mine. Approximately 35,000 flasks (76 lbs. per flask) of mercury were produced. The mine has been inactive since 1971.

Three previous site sampling investigations by other investigators were conducted in March, 1971; May, 1971; and July, 1979. Sufficient analytical data was available from these investigations to evaluate the site. Samples taken contained water and sediment mixed. Test results from these investigations showed mercury in the water/sediment of Red Devil Creek below the mine settling ponds at 0.3 mg/1. The release of metals to the Creek could be attributed to discharges from the mine.

Red Devil Mine is located in a rural area of Alaska. Only 50 persons live within three miles of the site. They use groundwater as a source for drinking water supply. Residents interviewed during a June, 1986 site visit were aware of the mining operations and the presence of mercury at the mine.

PROJECT TEAM

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PROJECT MANAGER

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RED DEVIL MINE

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SUSPECTED UNCONTROLLED HAZARDOUS WASTE SITE INSPECTIONS

RED DEVIL MINE

1.0 INTRODUCTION

1.1 Purpose

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 authorizes the Environmental Protection Agency (EPA) to respond to releases or threats of releases of hazardous substances to the environment which present an imminent or substantial danger to public health, welfare, or the environment. Under the CERCLA or Superfund program, the Alaska Department of Environmental Conservation (DEC) has been authorized by EPA to perform site inspections at sites in the State of Alaska in order to better define the extent of problems where hazardous substances may be present at or may be migrating from the sites. The scope of the Alaska site investigations as developed by Tryck, Nyman and Hayes (TNH) for DEC included a Phase I records search and data synthesis to provide a data base sufficient to apply the EPA Hazard Ranking System (HRS). For sites that required more information, a Phase II on-site inspection was undertaken to fill in persistent data gaps, further document site conditions, and to collect and analyze soil, water, or air samples on- and off-site in order to complete the HRS scoring and to satisfy the overall site investigation and CERCLA objectives. The information gathered may also be used to determine whether further action is warranted.

1.2 Site Identification and Problem Statement

This report summarizes the site investigation activities at the Red Devil Mine, CERCLA No. AKD-980495618, located eight miles down the Kuskokwim River from

Sleetmute, on Red Devil Creek. The mine is currently inactive. A Phase I records review and data analysis was conducted by Tryck, Nyman & Hayes (TNH). The site was visited on June 26 and 27, 1986. The Phase I activity showed that the Red Devil Mine is a source of the mineral cinnabar, elemental mercury and arsenic contamination of surface waters. Further sampling was not required to fulfill the objectives of this study. Available information was used to score the site using the HRS methodology. Phase II activities consisted of further documentation of study findings, the writing of this report and final HRS scoring.

1.3 Report Organization

This report is organized into the following sections: Section 2.0 describes the site and its use, including history and operation. Section 3.0 describes the environmental setting, soils, water use and population information. Section 4.0 describes field procedures conducted in previous years by others as well as TNH's site visit. Section 5.0 presents findings and conclusions. Photographs taken during the site visit and EPA Form 2070-13 are included as appendices. Supporting documentation for the report, the HRS Scoring and the inspection form are on file in DEC's Juneau offices.

2.0 FACILITY DESCRIPTION

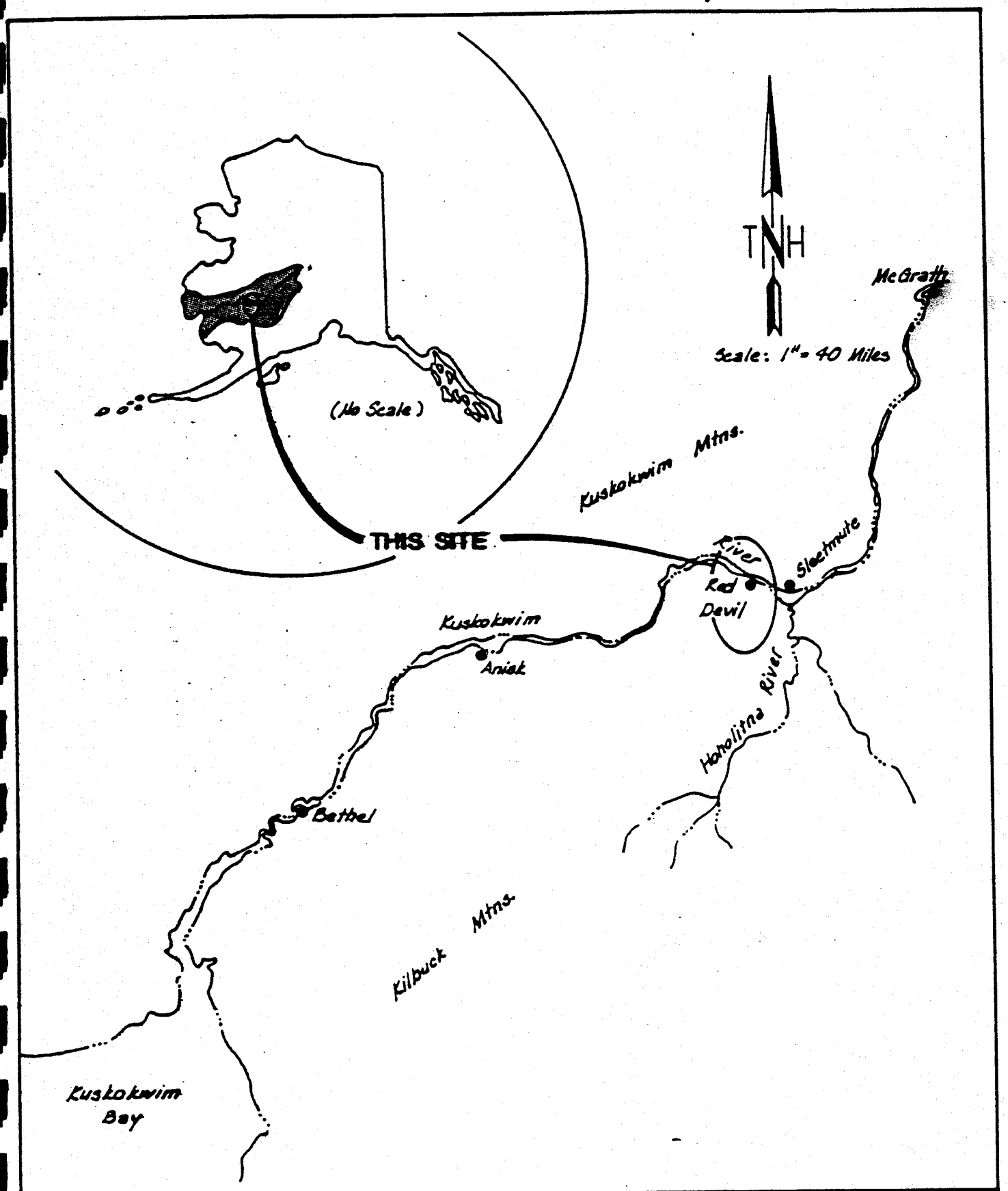
2.1 Location and Surrounding Land Use

The Red Devil Mine is located eight miles down the Kuskokwim River from Sleetmute, on Red Devil Creek 450 feet above its confluence with the Kuskokwim River. The area is in western Alaska, halfway between Denali National Park and Bethel, about one hundred miles downstream from McGrath in T19N, R44W, Section 6, Seward Meridian (Figure 1). The area surrounding the mine is mostly undeveloped land. Fifty people live within three miles of the site, mostly in widely dispersed cabins (Vanderpool, 1986). The closest resident lives three-quarters of a mile down the Kuskokwim River from the mine. Red Devil Village consists of a public school, post office and a 4,500 ft. airstrip located two miles from the mine (Figure 2).

2.2 Site History/Responsible Parties

The information included in this section was obtained from documents and files reviewed while conducting library research and during interviews with agency personnel. Persons who worked at Red Devil Mine, during the time it was operating, were also contacted.

One useful reference to this investigation was written by Mark P. Meyer, Geologist, U.S. Bureau of Mines, Anchorage. His report includes a compendium of historical information, including a site history and a discussion of site ownership. The discussion in this subsection was derived primarily from his report. Additional information was obtained from the original investigations by Burr S. Webber and W.S. Wright, who traced the mine activities from its discovery through 1946. The following text summarizes, to a large extent, the observations, findings and quoted material from these primary sources.



TRYCK NYMAN & HAYES

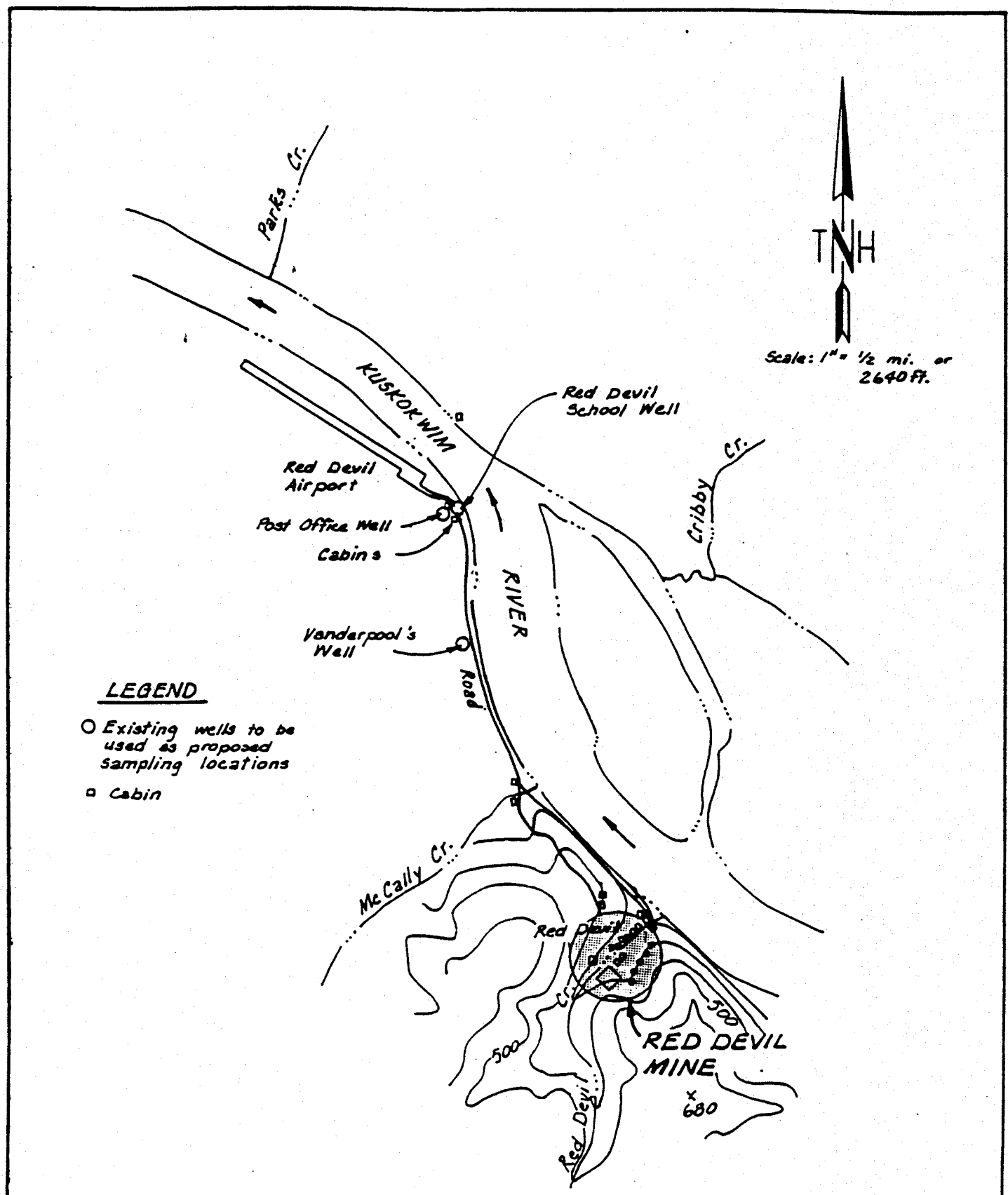
SAIC

ALASKA HAZARDOUS WASTE PROGRAM

RED DEVIL MINE

VICINITY MAP

FIGURE 1



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ALASKA HAZARDOUS WASTE PROGRAM

RED DEVIL MINE

AREA MAP

FIGURE 2

According to Meyer, the Red Devil Mine was the largest hardrock underground mercury mine in Alaska. The mine was discovered in 1933 by Hans Halverson. A few years later, a half interest was acquired by Nick Mellick. Nine unpatented claims comprise the Red Devil property, located within the Georgetown district in the Fourth Judicial Division of Alaska. The mine was in operation for 38 years.

Halverson and Mellick started production of mercury in a small way from creek-bed float and detritus material in the vicinity of the lode. Prior to 1940, eleven flasks (76 lbs. per flask) of mercury were retorted using Johnson-McKay tubes. After the installation of two "D" retorts in 1940, production increased to 158 flasks. An adit was driven and another started in 1941. The ore furnished the production prior to the midseason of 1942. In the fall of that year, Harold Schmidt and C.J. Stampe of Fairbanks, obtained a lease on the property. A new company, the New Idria-Alaska Quicksilver Company, was formed with Harold Schmidt as superintendent.

The new company brought in a 40-ton rotary kiln and condensing system in 1943 and expanded underground mining. Production continued until the spring of 1944, when the depressed mercury market caused the New Idria-Alaska Quicksilver Company to curtail operations and sublease the property to the Kuskokwim Mining Company, consisting of Harold H. Schmidt, Glen Franklin, Earl Ellingen and E.J. Stampe.

The U.S. Bureau of Mines did exploration work near the mine during August of 1942. They open cut trenches for more than 2,000 feet in eleven locations to the northwest and explored underground by drifting 152 feet of tunnel.

Up through July 1943, the total mercury produced from the Lower Kuskokwim area, principally Red Devil Mine, was 800 flasks (76 lbs. per flask). During World War II, the increased demand and high prices offered the incentive to boost production. During 1943-1944, 1096 flasks were recovered from 2,652 tons of ore from Red Devil alone. On June 30, 1944, operations were curtailed due to poor market conditions (Meyer, 1985).

Burr Webber, a mining engineer for U.S. Bureau of Mines, has described site history and production in 1945. Webber reports that in 1945, the mine operated 127 days between April and September. During that period 962 flasks were produced from 1,514 tons of ore by reducing the feed rate to the furnace from the previous 25 tons/day to 6-1/2 tons per day. Mercury recovery increased dramatically from 24 pounds/ton to 66.6 pounds/ton of ore. This increase was not attributed to any change in ore concentration but to removal of the heavy bed of crushed material that was preventing air from freely circulating between ore particles, thus reducing the formation of sulfur dioxide. The conclusion was that only a partial oxidation of the sulfur in the cinnabar (HgS) was occurring (Webber, 1947).

According to Meyer, development work by the Kuskokwim Mining Company continued through the rest of 1945 and 1946, during which time 499 feet of drifting, 155 feet of crosscuts and 112 feet of shafts/winzes were excavated. Operations continued, but by the end of 1946, the company suffered a loss when mercury prices dropped. The mine was shut down. Robert Lyman held a lease on the property and produced about 500 flasks (probably from stockpiled ore).

On January 21, 1947, Harold Schmidt and L.J. Stampe bought all the mining and furnacing equipment. In 1949, Schmidt and Stampe sold all equipment to Robert F. Lyman. They limited their work to annual assessment work through 1951.

The DeCoursey Mountain Mining Company acquired a lease on the property in 1952, aided by a loan from the Defense Minerals Exploration Administration (DMEA). In 1953, DeCoursey dewatered the mine and started up operations again. Between 1953 and 1954, they produced 1,084 flasks from 2,500 tons of ore. In October 1954, a fire destroyed the mine and mill equipment. That same year a controlling interest in the lease was sold to Brewis and White, a Canadian mining company. They renamed the company the DeCoursey Brewis.

DeCoursey Brewis built a mill and furnacing facility in 1955 that could process 35 tons/day. The Dolly series, a group of high grade ore bodies, were discovered in 1957. It was that year that more than 5,000 flasks of mercury were produced, making Red Devil mine one of the largest producers in the United States.

Sometime in 1959, DeCoursey Brewis changed their American name to Alaska Mines and Minerals, Inc. The Canadian DeCoursey Brewis Company changed their name to Consolidated Brewis but continued to own Alaska Mines and Minerals. By 1961, the mine consisted of nine unpatented claims. Five were held by Alaska Mines and Minerals, Inc. and four were held by Halverson and Mellick who leased them to Alaska Mines and Minerals. Robert F. Lyman was named manager, while Robert A. Markle became resident engineer and Gordon Herreid was the geologist.

All known ore was mined and processed by September 1963, at which time the equipment was removed and the mine allowed to flood. By September 19, 1963 water filled the mine, the shaft was sealed and all portals closed.

In October 1963, Don Holloway and Mariano Juancorena obtained a one-year lease. Jack Neubauer joined them and after driving a 100 foot adit in Red Devil Gulch, they were able to find and stockpile 40 tons of high grade ore. By 1964 all new known ore bodies were exhausted. Exploration financed by an Office of Mineral Exploration (OME) loan failed to provide any new ore. Production was limited to that from small lease holders.

Between 1964 and 1969 the mine was inactive. Meanwhile, the price of mercury rallied to $780 per flask in 1966. Alaska Mines and Minerals, Inc., decided to start up operations. Plans were made in 1968 to build a ball mill and flotation unit at a cost of $300,000 with the assistance of the Matanuska Valley Bank. Nissho-Iwai Co. Ltd. and Nomura Mining Co., Ltd., Japanese companies, agreed to add $225,000 for opening and exploration. Agreements were reached for the concentrated cinnabar to be shipped to Japan for processing. The mine began operation in July 1969. Ray Wolfe was the president of Alaska Mines and Minerals at that time (Meyer, 1985).

Bill Mrak arrived in November to take over as manager and helped turn Red Devil mine once again into Alaska's No. 1 producer. About 2,600 tons of ore were mined and processed through the flotation unit from underground and open pit mining in 1970 and 1971. The mill operated for 13 months at almost maximum capacity. A crew of 34 was employed.

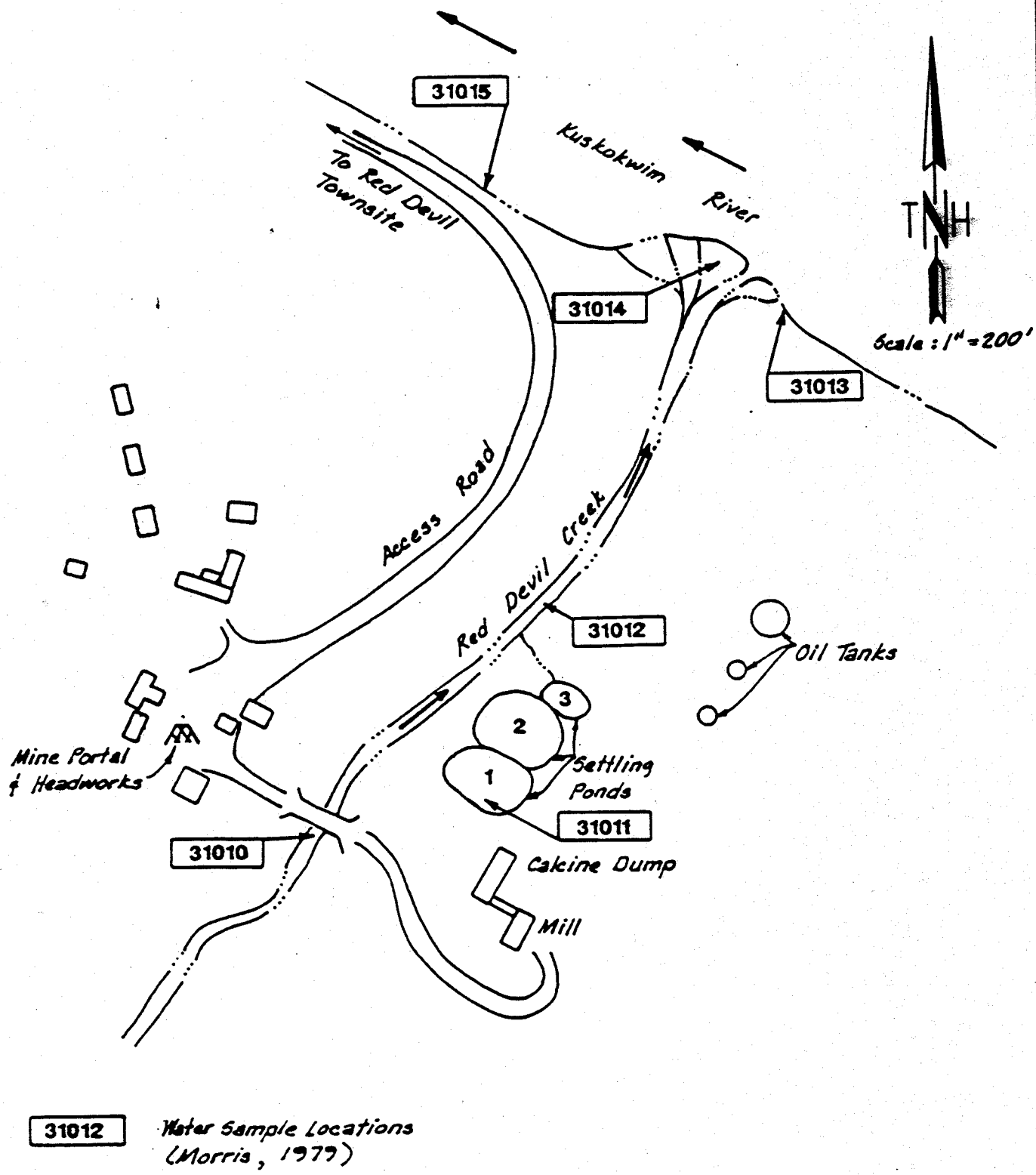
The mine continued to operate until June 1, 1971. Bill Mrak and his wife, Ellie, departed Red Devil on June 6 (Mrak, personal communication, 1987). Ray Wolfe notified the U.S. Environmental Protection Agency that the mine was closed and all operations were terminated (Wolfe, 1971). The fate of Red Devil was sealed by the low price of mercury.

The mine remained closed in 1972, in caretaker status. Lou Tulare (now deceased) resided at the mine to perform maintenance and provide security (Morris, 1979). Following the deaths of Bob Lyman and Hans Halverson, the ownership of their claims reverted to Mrs. Halverson who led an unsuccessful search for possible investors (Halverson, personal communication, 1987). During 1972 the price of mercury dropped to $150 per flask, a twenty year low, making investment unattractive (Meyer, 1985).

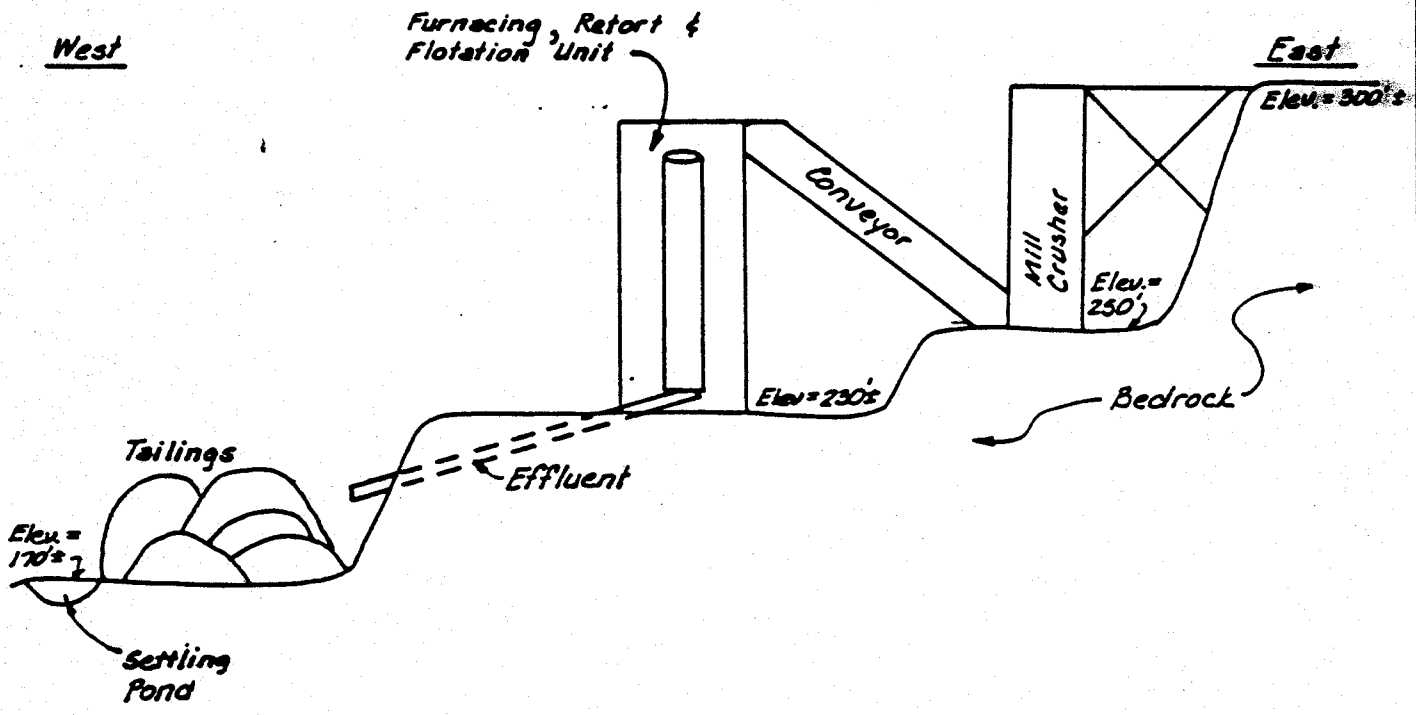
The mine was permanently closed and flooded in 1981 (Meyer, 1985). Records on file with the BLM indicate that the rights are presently held by the Estate of Hans Halverson, c/o Edward Dodd, 615 H Street, Anchorage, Alaska. An attempt was made to contact Mr. Dodd at this address, but the site is now occupied by a Municipal Parking Garage. Land ownership has remained with the Bureau of Land Management throughout the mine's development and operation.

2.3 Site Operations

Mining, milling and mercury recovery operations spanned a period of nearly 38 years. During this time, the site operations evolved from a hand mining and retorting operations into a full scale, mainly mechanized, operation. Much of the waste process information, primarily the air, water and solid waste



TRYCK NYMAN & HAYES SAIC EIII	ALASKA HAZARDOUS WASTE PROGRAM RED DEVIL MINE SITE MAP	FIGURE 3



Red Devil Creek approx. 20' lower than Settling Pond @ 150'±.

Note: Kuskokwim River used as datum base. Set @ elev. = 0.00'
Estimates shown only.

Furnacing and retorting ceased in 1963. A flotation unit for one concentration operated 1970-1971.

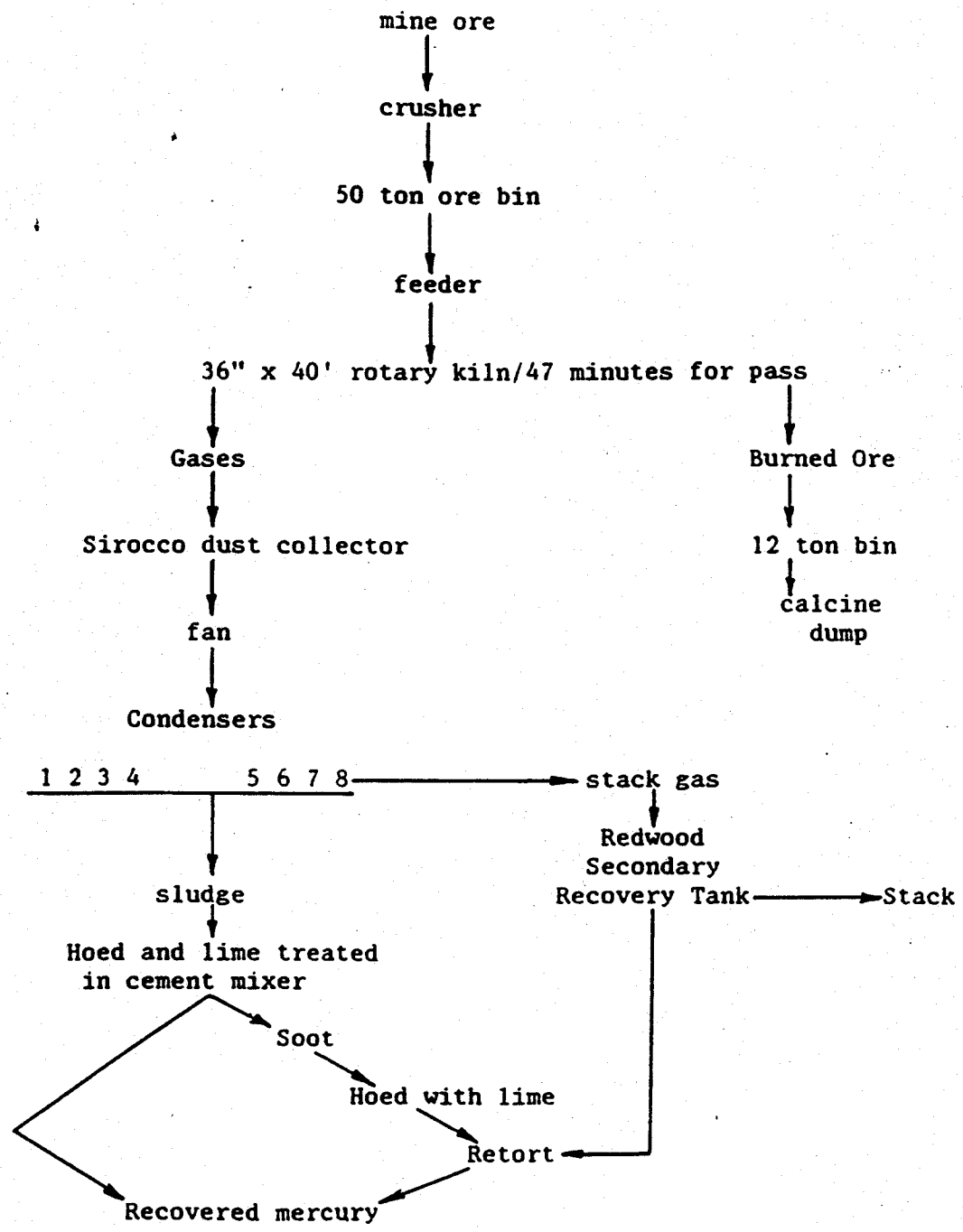
TRYCK NYMAN & HAYES SAIC EIII	ALASKA HAZARDOUS WASTE PROGRAM RED DEVIL MINE MILLING OPERATIONS	FIGURE 4

were not reported. The compendium written by Meyer, however, summarizes the operation from available documents. Burr Webber and Wilford Wright wrote reports in 1947 that discussed the operation up to that time. In addition, first-hand information concerning mercury mine operations in general and Red Devil Mine in particular, was obtained through personal communications with persons who were previously employed at the mine and with individuals who are knowledgeable with mercury mining, milling and recovery operations. The following overview was developed from these sources. Refer to Figures 3 and 4 for a depiction of the site.

According to Meyer, prior to 1942 mining consisted of surface trenching and hydraulic sluicing of the overburden. Ground sluicing continued into the bank until 1942. After 1942, adits were driven from a surface shaft. The early use of Johnson-McKay tubes for recovery was discontinued in 1940, when two "D" type retorts were installed. A "D" retort is a manually charged, cast iron cylinder that is D shaped in cross section. Between 1941 and 1944, mining and furnacing equipment was brought in and a 40-ton/day rotary kiln and a condensing system were installed (Meyer, 1985). The process flow of the furnacing and retort is described in Figure 5 (Webber, 1947). Between 1943 and 1945, fuel for the kiln and retort was seasoned wood. The kiln was converted to fuel oil in 1946 (Wright, 1947).

Stibnite and cinnabar were the only sulfides encountered in the deposit. The antimonial content from stibnite was almost equal to the mercury recovered from the cinnabar. Consequently, it took careful temperature control to keep the antimony out of the mercury. The oxides of antimony precipitate before the dew

Red Devil Mine
Furnace and Retort Steps
Morris, 1979)



Source: Webber, 1947

NOTE: Depicts process prior to 1955.

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ALASKA HAZARDOUS WASTE PROGRAM

RED DEVIL MINE

FURNACE AND RETORT STEPS

FIGURE 5

point of mercury. Antimony oxides passing through the condensing system were eliminated by extra hoeing in the mercury table and by recycle retorting. No attempt was made to recover the antimony concentrate because no profitable market was available.

Mercury flasks were shipped down the Kuskokwim River by river boat to Bethel and then to a market in San Francisco by ocean steamer (Webber, 1947). Between 1943 and 1954, the site operations and recovery process remained essentially unchanged.

Wilford Wright, a mining engineer with the U.S. Bureau of Mines, reported that mined ore was crushed and transported by conveyor to a fine ore bin. A feeder loaded the inclined kiln. A fan kept negative pressure on the kiln. The hot gasses produced by the kiln contained mercury vapor. Mercury vapor passed through eight condensers for cooling. A secondary recovery system that incorporated a redwood water tank was placed in series with the condensers and stack. The tank condensed and captured small amounts of mercury that had passed through the condensers (Wright, 1947).

Marion H. Morris, Field Engineer, Sun Oil Company, recalled from his experience at a mine similar to Red Devil how metallic mercury, accompanied by wood tars, oil and soot was periodically washed down the condenser pipes with water and collected in cast iron pots. The soot/mercury "mud" was emptied onto a sloping mercury table and hoed with unslaked lime. The lime reacted with the water, producing heat. This broke the surface tension of the tars and oils surrounding the mercury particles and allowed them to coalesce. Mercury

drained down to the base of the table and was drained off into 76 pound steel flasks. A similar process may have been used at Red Devil Mine (M.H. Morris, pers. comm., 1987).

Condenser sludge was recycled back through the kiln (Figure 5). The "mud" that remained after hoeing on the mercury table was recycled through a retort as a means to reclaim the traces of mercury that did not coalesce (Webber, 1947; Wright, 1947).

Even with secondary recovery, some mercury was lost with the stack gas emissions and condensing water discharges. Also, small quantities were lost to the atmosphere from the hoeing operation. According to a report by Battelle on the metals mining and milling processes, stack gas from the condensers typically emits about 0.16 Kg/metric ton of mercury vapor and considerable sulfur dioxide, attributed to the buring of ore containing mercuric sulfide (HgS). Water discharged from the condenser cooling and wash-water was cited as a potential source for metallic mercury. No estimate of the mercury concentration in the water was provided (Nerkervis, 1976).

Metallic mercury is practically insoluble in water of neutral pH. Water of acid pH may cause a significant increase in mercury concentrations. Information with regard to mercury releases in the condenser and wash tank waste water streams is not available, nor can mercury levels be predicted based on the operational information available. Mercury levels in the wastewater were probably significantly higher than background levels, but owing to the variables in temperature, instability of mercuric compounds at high temperatures, contact time and dilution, the mercury levels in the discharges cannot be calculated (Pittman, pers. comm., 1987).

"Mud" from the mercury table was recycled through a retort. Mercury losses during the hoeing operation are typically 0.01 Kg/metric ton (Nerkervis, 1976). Burned ore (calcine) was extracted at the low end of the kiln, near the firebox, and was trammed to dump sites and used for fill (Webber, 1947; Wright, 1947).

Sintered tailings (calcine) ranges from light pink to white in coloration. The chemical composition of water percolating through a mercury mine tailing pile processing 200,000 tons of ore per year was reported in part as follows (Nerkervis, 1976):

Boron	3.7 mg/l
Cyanide	0.03 mg/l
Lead	0.000 mg/l
Arsenic	0.000 mg/l
Copper	0.08 mg/l
Mercury	0.02 mg/l
Total Hardness	1950.0
pH	4.8-5.7

Meyer reported that during October 1954 a fire destroyed the mill equipment. When the mill was rebuilt by DeCoursey Brewis in 1955, it was relocated across Red Devil Creek, south of the mine portal and headworks (Figure 3). This facility is still intact and was observed during the TNH site visit in June 1986.

The new mill was designed and built to process 40-tons/day using an oil-fired Herrshoff 6 hearth furnace and a retort. Power was supplied by two 650-kw Ingersoll-Rand Generators.

The major mine workings, between 1942 and 1969, were underground. By 1958, the mine consisted of about 9,600 feet of shafts, adits, crosscuts, drifts, winzes and raises. From the surface, the main shaft is inclined at 63 degrees for a distance of 507 feet. The vertical drop is 143 feet.

It is important to note, that even though the facility was modernized, the process and recovery system was similar in most respects to the operation up to 1954. The new mill remained in operation until the mine closed in September 1963 and the mine allowed to flood (Meyer, 1985).

According to Bill Mrak, the last mine manager, when the mine reopened in 1969, the recovery process did not include furnacing and condensing. Instead, a ball mill was used to pulverize the ore, followed by a flotation unit to concentrate the cinnabar (Mrak, pers. comm., 1987). The process involved passing ore through two tanks (Lund, 1969). The tanks contained water and a foaming agent. At first "Pine Oil" was used and later lead acetate was tried to increase cinnabar recovery rates. When the plant shut down in June 1971, after 13 months of operation, 2,600 tons of ore had been processed through the flotation unit. The recovery rate was about 35 pounds of cinnabar/antimony per ton. The yield was about 60% cinnabar and 40% stibnite. The recovered concentrate was barreled and shipped to Japan for mercury and antimony recovery (Mrak, pers. comm., 1987).

Sand and silt from the flotation unit were released through a chute that drained into three settling ponds (Figure 3). The location of the ponds was immediately adjacent to Red Devil Creek and approximately 450 feet upstream from its confluence with the Kuskokwim River (Terry, 1986). Some cinnabar

probably carried over from the flotation unit (Morris, 1979). Very little water was discharged from the flotation system. The liquid contained flotation additives and was valuable. It was continually recycled (Mrak, pers. comm., 1987). The settling pond dimensions and estimated volume of discharged waste are provided in Table 1.

Between 1969 and 1971, the ore was obtained from both underground and open pit mining. Two surface operations were conducted northwest of the mine, on a slope above the Kuskokwim River (Mrak, pers. comm., 1987).

The first significant mercury production began in 1940 and continued through the fall of 1963 at which time recovery by furnacing and retorting ceased. Mineral cinnabar was concentrated but never furnaced after 1963. Production figures obtained for the period of operations are as follows (Meyer, 1985):

Year	Flasks of Mercury	Tons of Ore	Income from Sale
1933-40	11	---	---
1940	158	---	---
1941	135	---	---
1942	117	---	---
1943-44	1,096	2,652	$ 171,717.70
1945	962	1,514	114,825.49
1946	491	872	40,156.28
1953-54	1,084	2,500	---
1956-60	19,800	47,250	---
1961	3,200 (approx.)	---	---
1962-63	4,800	---	---
1969-71	3,146 (approx.)	---	---
Total:	35,000 (approx.)		

2.4 Site Permit and Regulatory History

A RCRA site inspection was conducted by the EPA in July, 1979. Water samples from Red Devil Creek and the Kuskokwim River were collected and analyzed for elemental mercury. Test results ranged from 0.14 to 0.28 ug/l. Based on these results, the EPA Report concluded that "unless the mine is reactivated, no particular hazard to water quality or persons frequenting the area exists." (EPA, 1979).[4]

There is no record of any application for an NPDES discharge permit nor any record of one being issued. NPDES permits were not required until the passage of the Clean Water Act Amendments of 1972. The mine ceased operations in 1971.

3.0 ENVIRONMENTAL SETTING

3.1 Climate

The Red Devil Mine lies in a subarctic transition area between the Continental Climate Zone of interior Alaska and the Maritime Climate Zone of the coastal regions. Values for precipitation and evapotranspiration are those recorded at Aniak Airport located 75 miles to the west of the Red Devil Mine.

Mean annual precipitation in the form of snow and rain is relatively low in the Aniak area at 18.41 inches per year (AEIDC, 1976). Information on the evaporation rate is scarce. Perhaps the best source is provided by Patric & Black (1968) who studied evapotranspiration at sites throughout Alaska. The value for mean annual evapotranspiration in Aniak is 17.17 inches. Data on lake evaporation needed for the HRS scoring is not available. Using the value of 17.17 inches for evapotranspiration and a precipitation value of 18.41 inches (AEIDC, 1976), the estimated net precipitation is 1.24 inches. Lake evaporation is probably less than evapotranspiration. Therefore, "actual" net precipitation is probably greater than 1.24 inches.

3.2 Topography and Surface Water Characteristics

Topographic and surface water information is useful in assessing the potential for contaminant migration via surface waters. Following is information concerning these characteristics for the Red Devil Mine site.

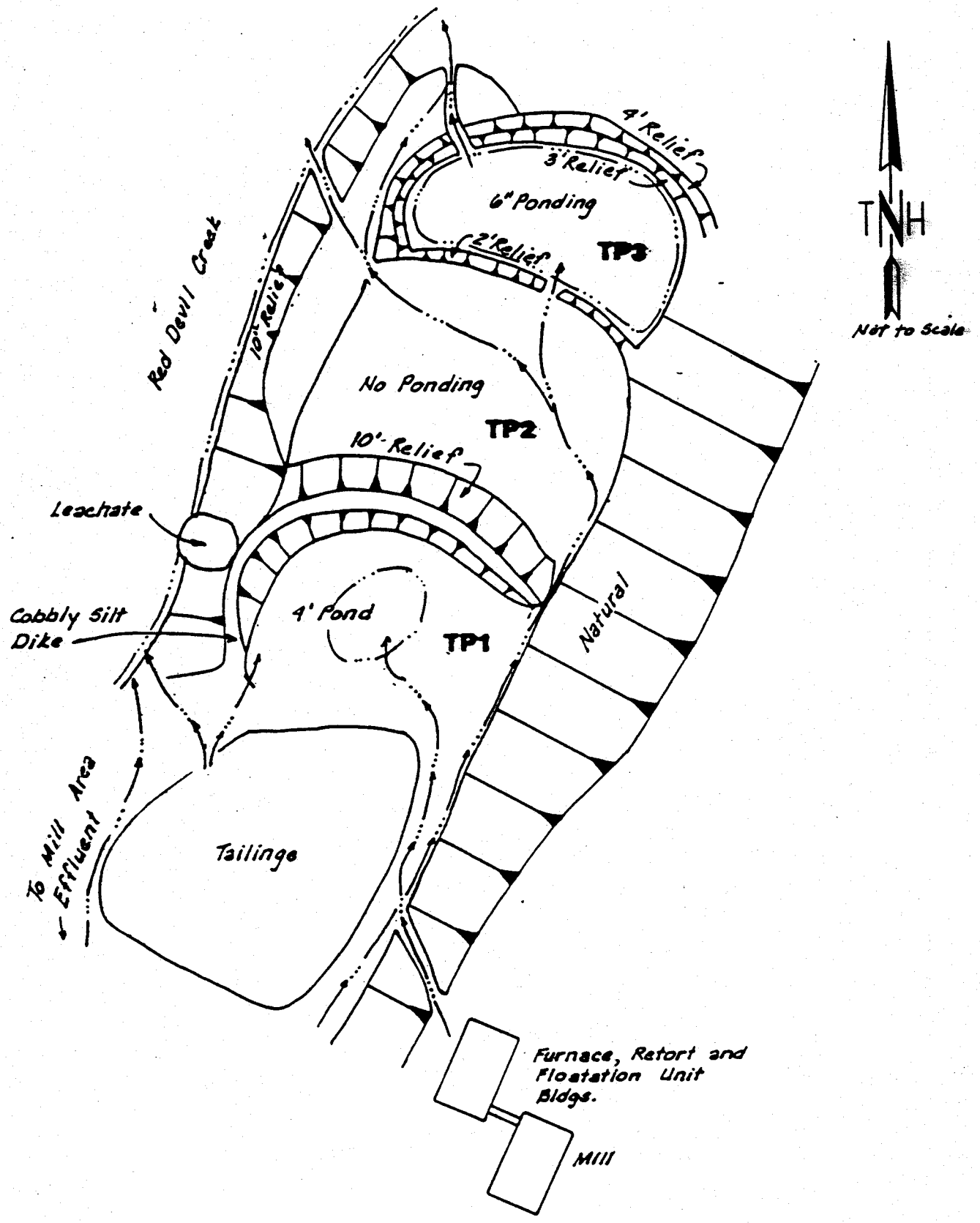
3.2.1 Topography The Red Devil Mine is located on Red Devil Creek, upstream of the Kuskokwim River on rolling terrain. Topography was observed during the site visit of June 1986. Slopes adjacent to the mine

range from five to thirty percent, much of this resulting from on-site cutting and filling. Deposits of ore tailings are distributed around the site. The main camp area is relatively flat with a slope of up to five percent (Figure 4). The slope between the settling ponds and the Kuskokwim River is about 7.5 percent.

Red Devil Creek passes through the mine area and separates the headworks, the mine portal, and the main camp area from the milling operations area. The creek cuts through fill on the southern portion of the property which was probably placed when the new mill was built in 1955 and pads were constructed. A bridge which once connected the two areas is now collapsed and partially retained in the creek bed.

3.2.2 Surface Water Flow Pathway Observations on surface water flow are based on the U.S.G.S. topographic map and personal observations during the site visit in June, 1986.

In mining for mercury, tailings from waste rock were dumped in piles and also used for fill. Tailings produced in the crushing and heating operations were used for site earth work including the construction of three settling ponds (Figure 6). These settling ponds were associated with the operation of the flotation unit during 1970 and 1971. They are currently in place below the tailing stockpiles and the effluent chute originating at the mill and recovery plant (Figure 3). Presently, runoff from the mill area passes through tailing stockpiles by way of a series of one to six foot deep erosional gullies. On the east side of the tailing stockpiles, a six foot deep erosional gully has cut an entry into Settling Pond 1 (TP1). On the west side of the tailing stockpile, erosional gullies



TRYCK NYMAN & HAYES SAIC EIII	ALASKA HAZARDOUS WASTE PROGRAM RED DEVIL MINE SETTLING PONDS	FIGURE 6

approximately one foot in depth drain toward TP1 or toward Red Devil Creek. During periods of high water, Red Devil Creek rises to touch the base of the settling pond dikes. The diking material consists of 6 inch cobbles in a silt matris. The diking unsound, leaking and in danger of collapse.

The settling pond dimensions are shown on Table 1.

There is standing water in TP1. Settled solids are evident over the entire surface of TP1. Some leaching has occurred at the base or toe of the dike. Overflow in TP1 has cut a one to three foot deep erosional gully in the northeast portion of the dike allowing water to flow into TP2.

TP2 no longer contains water. Water flows directly into TP3 from the north side of TP2. Two branches of erosional gullies approximately one foot deep allow water to exit TP2 on the northwest side to a bench approximately six feet below the pond and then directly to Red Devil Creek approximately ten feet further below.

Water in TP3 is approximately six-inches deep. Water exits the TP3 dike on the northwest side, flows onto a bench and thence into Red Devil Creek.

At the headworks, surface water runoff drains either north along the access road or eastward towards Red Devil Creek. The site is unpaved and the fill material is porous. If surface water would leave the site, it would flow into Red Devil Creek, which in turn flows into the Kuskokwim River. The maximum slope of the terrain between the facility and the creek is up to sixteen percent. The settling ponds are located partially in surface water during periods of high water.

A freshwater wetland greater than five acres is within one-quarter mile of the site. The flood plain of Red Devil Creek is considered to be a wetland as is the area immediately adjacent to and within the alluvial floodplain of the Kuskokwim River (Dall, pers. comm. 7-24-86). Tailings are located in the floodplain of Red Devil Creek.

RED DEVIL MINE

TABLE 1

SETTLING POND FILL VOLUME DIMENSIONS

Settling Pond #1 (TP1)	10 feet deep 200 feet wide 200 feet long
Settling Pond #2 (TP2)	10 feet deep 200 feet wide 100 feet long
Settling Pond #3 (TP3)	10 feet deep 100 feet wide 100 feet long

Source: Site Visit, June 1986.

Settling ponds were constructed of tailings deposited at their present location. The ponds were used to settle solids from the flotation process. About 2500 tons of ore were processed while the flotation unit was in operation.

3.2.3 Surface Water Use There are no surface water intakes downstream of the mine. The primary water use is fishing by set nets from the banks of the Kuskokwim River, (site visit, 1986).

3.3 Soils and Geology

The following information on soils and geology is used in the HRS scoring to assess the potential for groundwater contamination.

3.3.1 Soils The tailing ponds at Red Devil Mine are located on the floodplain alluvium of the Kuskokwim River. Alluvial soils consist of sand and silt with permeability of 1 x 10-3 to 1 x 10-5 cm/sec. (Sowers, 1979). Fill material at the site is approximately thirty feet deep at Red Devil Creek where the bridge is washed out. Fill is composed of mine tailings and consists of sandy coarse gravel (broken shale) that has been deposited on the original ground surface, (site visit, 1986).

3.3.2 Geology/Lithology Red Devil Mine is located in a physiographic province termed the Kuskokwim lowland. The present day lowland consists of vegetated floodplains and low beaches. The numerous silt filled swales and oxbow lakes evident throughout this area generally represent former positions of rivers and streams. The thickness of alluvial sands and silt overlying fractured bedrock in the vicinity of the site is 28 to 40 feet (Herman, pers. comm., 6-27-86). Bedrock consists of sandstone interbedded with shale. Bedding is nearly vertical with its strike perpendicular to Red Devil Creek.

Lode and placer mercury deposits are widespread in Alaska with occurrences being most abundant over an area about five hundred miles long and two hundred miles wide, extending from the Yukon River to Dillingham. The area is drained by the Kuskokwim River which empties into Kuskokwim Bay. This area contains many mercury mines and probably has the potential to become a major producing district. Most of the mercury was probably deposited in the Tertiary period about twenty million years ago. Cinnabar, or crystalline mercuric sulfide (HgS), could have been deposited from an alkaline sodium sulfide solution, as mercury vapor, as a supersaturated solution of mercury sulfide, or as an organic complex. It is possible that minor amounts of mercury are now being deposited by hot springs (Maloney, 1971).

The general geology at Red Devil Mine has been described by Wright (1947):

> Underground workings at the Red Devil mine expose alternate layers of blocky graywacke and thin-bedded dark gray shales. The strikes of the sediments throughout most of the mine range from N 32 W to N 40 W; likewise, the dips cover a narrow range of 55 to 62 degrees southwest. In the Red Devil workings, cinnabar and stibnite occur at or near the andesite-graywacke, or andesite-shale contacts. The two metallic minerals occur as nearly massive lenses along the contacts, and as blebs in the andesite and sediments. Surface trenching by the Bureau of Mines and underground mining by the operators have disclosed an ore zone at least 1,050 feet long, trending N60 W and ranging in width from 30 to 100 feet. The intrusive bodies often parallel the bedding, but in many places the andesite ends abruptly and reappears along another bedding plane, or cuts across the sedimentary layers. This tendency of the intrusive bodies to be offset at irregular intervals and the close association of the metallic minerals with the andesite has resulted in the ore lenses being arranged in a somewhat echelon pattern.
>
> Aside from some gangue material found in the drift that undercuts the "T" ore body, little evidence of faulting appears in the underground workings. Graywacke and shale beds in the northwest part of the mine under "F" ore body have irregular strikes and dips, and, in places, show evidence of intense folding.
>
> Development at the Red Devil mine consists of 139 feet of shaft sinking and 2,170 feet of drifting and crosscutting.
>
> The Red Devil stibnite-cinnabar ores occur in 3 separate ore shoots, namely: (1) the "F" orebody, the "72" ore bodies and the southeast ore bodies. Cinnabar and stibnite ore occurs as high grade lenses 4 to 12 inches in width at andesite-shale contacts, and as blebs in andesite and shale. The "72" and southeast ore shoots show definite southeasterly rakes. The lowest level reveals no weakening of mineralization, though some of the lenses are principally stibnite (Wright, 1947).

3.4 Aquifer/Groundwater Data

3.4.1 Aquifer Identification Groundwater for houses located between the mine and the airport is obtained from wells emplaced into a fractured bedrock aquifer at a depth of approximately 28 to 40 feet (Herman, pers. comm., 6-27-86; Vanderpool, pers. comm., 6-26-86). The bedrock aquifer is located beneath river deposited sands and silt overburden.

3.4.2 Uses of Aquifers Homes and businesses near the Red Devil Mine rely on wells for domestic water supply and use septic tanks and drainfields for on-site sewage disposal. Two wells deeper than forty feet (depths unknown) have been emplaced for the school water supply. Most private wells are located about 1.3 miles northwest of the tailing ponds. The wells consist of a sand point attached to a pipe of unknown diameter driven to 28 to 40 feet. Groundwater withdrawn from within three miles of the site supplies drinking water for about fifty people (Vanderpool, pers. comm., 6-26-86). The closest residence using groundwater is the Mercury Inn, located about 1.25 miles northwest of the tailing ponds. The Vanderpools own and live at the Inn.

4.0 FIELD PROGRAM

4.1 Program Summary

The study of the Red Devil mine site included a file search by TNH personnel, the site visit of the mine site by TNH in June, 1986, and interviews with local residents. Information derived from these efforts was used to compute an HRS score. The file search, site visit and interviews completed Phase I activities for the site. Phase II activities consisted of final document review, final HRS scoring and the writing of this report. Two previous field investigations conducted in 1971, one previous field investigation conducted in 1979 and the site visit by Mr. Tim Terry in June, 1986, provided necessary information to substantiate the release of hazardous wastes from Red Devil Mine to the environment. No new samples were collected in the 1986 site visit. The sampling investigation conducted in 1971 by EPA personnel showed the release of mercury and arsenic to Red Devil Creek. This section of the report describes the TNH site visit and the previous sampling investigations.

4.2 Previous Field Investigations

On March 22, 1971, Steve Provant from the EPA, Alaska Operations Office collected water and sediment samples for mercury and arsenic analyses. There was deep snow on the ground at the time of the investigation. Water was observed flowing from the mine entrance. A water sample which also contained an unknown amount of sediment, taken from Red Devil Creek below the discharge from Settling Pond #1 had 9,000 ug/l of mercury. An upstream, background sample could not be taken because a thawed part of the Creek could not be found. A water sample taken from nearby McCally Creek (Figure 2) had 3 ug/l of

mercury. Sediment samples taken from Red Devil and McCally Creeks had "high levels of mercury", but the numerical values were not reported (Provant, 4-21-71).

On May 25, 1971, the site was visited by Jack Sceva, a geologist from the EPA Northwest Regional Office in Portland, Oregon; Steve Provant of EPA; Kyle Cherry from the Alaska Dept. of Environmental Conservation; and Joe Town, General Manager of Alaska Mines and Minerals. Weather conditions at the time of the site visit are unknown. Water samples were collected in Red Devil Creek above and below the mill discharge, and the Kuskokwim River was sampled above and below the mouth of Red Devil Creek. Samples of the mill waste and mine water were also obtained. Sample results are listed in Table 2. The mill and new flotation unit (but not the retort) were in operation and water was flowing from the mine (Sceva, 1971).

Samples were analyzed by EPA's Taft Center Laboratory in Cincinati. The test results indicate the release of mercury to Red Devil Creek. Arsenic in mineral form often occurs in mercury deposits. Red Devil Creek above the mine and mill had mercury and arsenic concentrations of 0.3 and 6 ug/l, respectively. Below Settling Pond #1, the values were 265 and 39,000 ug/l. Because Settling Pond #1 was discharging mercury and arsenic at the time, the release could be attributed to the mine.

The water samples taken from the settling pond and the Creek below the tailing pond contained sediment. According to HRS guidelines, contaminants detected in sediments score the same as contaminants detected in surface waters.

On July 31, 1979, Ray Morris of the EPA, Alaska Operations Office, collected water samples from five locations at the Red Devil Mine. Sample locations are referenced on Figure 3. Sample results are also listed in Table 2. There was no runoff from the mine settling ponds and no water was being pumped from the mine at the time of the Morris visit. Red Devil Mine had been inactive since 1971. All water samples had less than 0.3 ug/l mercury. A soil sample was skimmed from the moist silt in the bottom of TP1. The test results indicated 216 ppm of mercury wet weight. Soil moisture content was not determined on these samples and therefore no conclusions can be reached on the dry weight mercury concentration. Morris did not sample sediments in Red Devil Creek.

4.3 Recent Site Visit A site visit was made by Tim Terry, of the TNH team, on June 26, 1986 as part of this investigation. He visited the mine, settling ponds and tailing piles, and Red Devil Creek and prepared the drawings shown in Figures 5 and 6. He also interviewed local residents including Dan and Elvina Herman, Gail Baird, and Robert and Gail Vanderpool. Information from these interviews has been incorporated into earlier sections of this report. The Hermans reported that a geologist had recently panned elemental mercury from creeks in the Red Devil Village area although not from Red Devil Creek. Mr. Gail Baird said that he obtained his drinking water from McCally Creek and knows that mercury is present in the creek sediments.

The Department of Environmental Conservation tested well water from two residences in the area on October 2, 1985 according to Jim Patterson, DEC employee. The identity of the residents is confidential at their request. The results of the well sampling are provided in Appendix A. Both mercury and arsenic were below detection limits in each sample.

RED DEVIL MINE

TABLE 2

WATER SAMPLE RESULTS*

March 22, 1971(Provant, 1971)

SAMPLE LOCATION	Hg (ug/1)
Red Devil Creek below discharge from TP1	9,000

May 25, 1971 (Sceva, 1971)

SAMPLE LOCATION	Hg (ug/1)	As(ug/1)
1. Red Devil Creek above mine and mill	0.3	6
2. Mill Effluent from Settling Pond #1 (uppermost)	12,850	85,000
3. Red Devil Creek below Settling Pond #1	265	39,000
4. Kuskokwim River above mouth of Red Devil Creek	1.7	56
5. Kuskokwim River at Red Devil Air Strip (below Red Devil Creek)	1.0	32

*Samples contained an unknown amount of sediment.

July 31, 1979 (Morris, 1979)

		Hg (ug/1)
Sample 31010	Red Devil Creek above mine and mill	0.21 ug/1
31011**	Solids from bottom of settling pond #1	216 ug/gm wet wt.
31012	Red Devil Creek below third pond	0.14 ug/1
31013	Fifty feet above Red Devil Creek in Kuskokwim River	0.28 ug/1
31014	Red Devil Creek at mouth	0.14 ug/1
31015	One hundred feet downstream from Red Devil Creek in the Kuskokwim River	0.14 ug/1

** Soil sample.

5.0 FINDINGS AND CONCLUSIONS

As stated in the introduction, the purpose of this investigation was to 1) assess the extent of hazardous waste problems at the Red Devil Mine site, including the potential for off-site migration, and 2) to apply EPA's Hazardous Ranking System (HRS) to the site. In this section, the results of the four site visits conducted since 1971 are evaluated. Conclusions about the site are presented in this section. An HRS score was calculated.

5.1 Investigation Results

The sampling investigation conducted by Provant and Sceva in May, 1971 demonstrates the release of mercury and arsenic to Red Devil Creek. Background levels above the mine were found to be 0.3 ug/l mercury and 6 ug/l arsenic. A discharge to the creek containing mercury and arsenic was observed. High levels of these metals were measured in the mixed water and sediments of the creek downstream of the discharge point. A mercury level of 265 ug/l and an arsenic level of 39,000 ug/l were observed in samples taken from the creek. Based on the results of the Provant and Sceva investigation and data collected as part of this investigation, necessary data needed to score this site appears to be available.

5.2 Conclusions

The following conclusions were reached regarding this site:

- Mercury and arsenic were discharged from the Red Devil Mine to Red Devil Creek as a result of mining operations.
- The mine has been inactive since 1971. Run-off water still flows from the milling area through waste piles and settling ponds and into Red Devil Creek.

- The population density near the mine is very low. Only fifty people live within three miles of the site. Residents interviewed were aware of the mining operation and the presence of mercury at the mine. Due to the low population and residents' awareness of the mine, potential public health effects due to exposure to mercury and arsenic are low. Access to the site is unrestricted. If population increases, or if people who are unaware of the presence of mercury and arsenic visit the site, the potential for adverse public health effects could increase.

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APPENDIX A

LABORATORY DATA SHEETS

CHEMICAL & GEOLOGICAL LABORATORIES OF ALASKA, INC.

TELEPHONE (907) 562-2343 ANCHORAGE INDUSTRIAL CENTER
5633 B Street

ANALYTICAL REPORT

CUSTOMER ADEC-Village Safewater SAMPLE LOCATION: Red Devil, Alaska

DATE COLLECTED 10-2-85 TIME COLLECTED: 10:00 a.m.

SAMPLED BY J. Patterson SOURCE Residence A

REMARKS Extremely high Zinc.

FOR LAB USE ONLY

RECVD. BY GY LAB # 9954-1

DATE RECEIVED 10-2-85

DATE COMPLETED 10-8-85

DATE REPORTED 10-8-85

SIGNED Stephen C. Edie

	mg/l		mg/l		mg/l
( ) ALUMINUM, Al	<0.05	( ) STRONTIUM, Sr	0.10	( ) TOTAL DISSOLVED SOLIDS	
( ) ARSENIC, As	<0.05	( ) TIN, Sn	<0.05	( ) TOTAL VOLATILE SOLIDS	
( ) BARIUM, Ba	0.09	( ) VANADIUM, V	<0.05	( ) SUSPENDED SOLIDS	
( ) BORON, B	<0.05	( ) ZINC, Zn	31	( ) VOLATILE SUSPENDED SOLIDS	
( ) CALCIUM, Ca	18	( ) ZIRCONIUM, Zr	<0.05	( ) HARDNESS AS $CaCO_3$	63
( ) CADMIUM, Cd	<0.01	( )		( ) ALKALINITY AS $CaCO_3$	115
( ) CHROMIUM, Cr	<0.05	( )		( )	
( ) COPPER, Cu	<0.05	( )		( )	
( ) IRON, Fe	0.19	( ) AMMONIA NITROGEN-N		( )	
( ) LEAD, Pb	<0.05	( ) KJELDAHL NITROGEN-N		**********	
( ) MAGNESIUM, Mg	4.3	( ) NITRATE-N	<0.10	( ) COLOR-UNITS	
( ) MANGANESE, Mn	0.07	( ) NITRITE-N		( ) CONDUCTIVITY, umhos/cm	210
( ) MERCURY, Hg	<0.0002	( ) CHLORIDE		( ) LANGLIER INDEX	
( ) NICKEL, Ni	<0.05	( ) CYANIDE		( ) LANGLIER INDEX	
( ) PHOSPHOROUS, P	<0.05	( ) FLUORIDE		( ) pH, UNITS	
( ) POTASSIUM, K	0.68	( ) OIL AND GREASE		( ) TURBIDITY, ntu	1.7
( ) SELENIUM, Se	<0.05	( ) PHENOL		( ) COLIFORM/100ml	
( ) SILICON, Si	8.7	( ) PHOSPHOROUS (ORTHO)-P		( )	
( ) SILVER, Ag	<0.05	( ) SULFATE		( )	
( ) SODIUM, Na	2.8	( ) SULFIDE (H_2S)		( )	

CHEMICAL & GEOLOGICAL LABORATORIES OF ALASKA, INC.

TELEPHONE (907) 562-2343 ANCHORAGE INDUSTRIAL CENTER
5633 B Street

ANALYTICAL REPORT

STOMER ADEC-Village Safewater SAMPLE LOCATION: Red Devil, Alaska

E COLLECTED 10-2-85 TIME COLLECTED: 10:00 a.m.

MPLED BY J. Patterson SOURCE Residence B

ARKS

FOR LAB USE ONLY
RECVD. BY GY LAB # 9954-2
DATE RECEIVED 10-2-85
DATE COMPLETED 10-8-85
DATE REPORTED 10-8-85
SIGNED Stephen C. Ede

mg/l		mg/l		mg/l	
ALUMINUM, Al	<0.05	( ) STRONTIUM, Sr	0.10	( ) TOTAL DISSOLVED SOLIDS	
RSENIC, As	<0.05	( ) TIN, Sn	<0.05	( ) TOTAL VOLATILE SOLIDS	
BARIUM, Ba	0.05	( ) VANADIUM, V	<0.05	( ) SUSPENDED SOLIDS	
BORON, B	<0.05	( ) ZINC, Zn	0.79	( ) VOLATILE SUSPENDED SOLIDS	
ALCIUM, Ca	16	( ) ZIRCONIUM, Zr	<0.05	( ) HARDNESS AS $CaCO_3$	54
CADMIUM, Cd	<0.01	( )		( ) ALKALINITY AS $CaCO_3$	55
HROMIUM, Cr	<0.05	( )		( )	
COPPER, Cu	0.18	( )		( )	
RON, Fe	<0.05	( ) AMMONIA NITROGEN-N		( )	
EAD, Pb	<0.05	( ) KJELDAHL NITROGEN-N		**********	
MAGNESIUM, Mg	3.3	( ) NITRATE-N	0.73	( ) COLOR-UNITS	
ANGANESE, Mn	<0.05	( ) NITRITE-N		( ) CONDUCTIVITY, umhos/cm	110
MERCURY, Hg	<0.0002	( ) CHLORIDE		( ) LANGLIER INDEX	
NICKEL, Ni	<0.05	( ) CYANIDE		( ) LANGLIER INDEX	
HOSPHOROUS, P	<0.05	( ) FLUORIDE		( ) pH, UNITS	
POTASSIUM, K	0.52	( ) OIL AND GREASE		( ) TURBIDITY, ntu	0.54
ELENIUM, Se	<0.05	( ) PHENOL		( ) COLIFORM/100ml	
SILICON, Si	9.0	( ) PHOSPHOROUS (ORTHO)-P		( )	
SILVER, Ag	<0.05	( ) SULFATE		( )	
ODIUM, Na	2.0	( ) SULFIDE (H_2S)		( )	

APPENDIX B

SITE INSPECTION REPORT

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
AK	D980495618

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	On Red Devil Creek

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Red Devil, Alaska	AK	99656			

09 COORDINATES LATITUDE	LONGITUDE	10 TYPE OF OWNERSHIP (Check one)
61 45 18.__	157 18 45.__	☐ A. PRIVATE ☐ B. FEDERAL ____ ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL ☐ F. OTHER ____ ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
6 / 26 / 86 (MONTH DAY YEAR)	☐ ACTIVE ☒ INACTIVE	1944 / 1971 (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) ☐ G. OTHER ____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
TIM TERRY	Proj. Geologist/Hydrologist	Shannon & Wilson	(907) 561-2120

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
			( )
			( )
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
None			( )
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☐ PERMISSION ☐ WARRANT		Partly cloudy to sunny

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency Organization)	03 TELEPHONE NO.
Carl Reller	AK Dept. of Environmental Conservation	(907) 465-2666

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Dan Crevensten	--	TNH	907 279-0543	08 10 86 (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	D980495618

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

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

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

TONS _____

CUBIC YARDS 31,500

NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- XX A. TOXIC
- ☐ B. CORROSIVE
- ☐ C. RADIOACTIVE
- XX 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			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	Unknown - a contaminant of tailings		

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	7439976	Settling Ponds	216	mg/gm*
			Creek Sediment and		
			water	265	ug/l
Mes	Arsenic	7440382	Creek Sediment &		
			water	39000	ug/l
	* Based on soil wet weight				

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)

Sceva, sampling investigation, 1971.
Morris, sampling investigation, 1979.

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
AK	D980495618

II. HAZARDOUS CONDITIONS AND INCIDENTS *(Continued)*

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

None reported. Site is an abandoned mine.

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

None reported.

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

Fishing in Kuskokwim River at mouth of Red Devil Creek and at several areas on the way to Red Devil Village (2 miles). Mercury is known to biomagnify.

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES *(Spills/Runoff/Standing liquids, Leaking drums)* — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Wastes have been contained in three settling ponds that show evidence of erosion. Runoff water does flow through ponds and eventually to Red Devil Creek.

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

Probable deposition of mercury and arsenic containing sediments in Red Devil Creek.

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

None. Site is in a rural area. No storm drains or sewers serve the area.

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

None known.

III. DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

IV. TOTAL POPULATION POTENTIALLY AFFECTED: 50

V. COMMENTS

Red Devil Mine is located approximately 2 miles east of Red Devil Village. Approximately 50 persons reside in the area.

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

On-site Inspection: 6-26/27, 1986.
Conversation with Robert Vanderpool.

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
AK	D980495618

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	NONE. SITE IS A CLOSED MINE. NPDES PERMIT WAS			
☐ E. RCRA INTERIM STATUS	NEVER ISSUED.			
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE	04 TREATMENT (Check all that apply)
☐ A. SURFACE IMPOUNDMENT			☐ A. INCENERATION
☒ B. PILES			☐ B. UNDERGROUND INJECTION
☐ C. DRUMS, ABOVE GROUND			☐ C. CHEMICAL/PHYSICAL
☐ D. TANK, ABOVE GROUND			☐ D. BIOLOGICAL
☐ E. TANK, BELOW GROUND			☐ E. WASTE OIL PROCESSING
☐ F. LANDFILL			☐ F. SOLVENT RECOVERY
☐ G. LANDFARM			☐ G. OTHER RECYCLING/RECOVERY
☐ H. OPEN DUMP			☐ H. OTHER (Specify) None
☐ I. OTHER (Specify)			

05 OTHER

XXXA. BUILDINGS ON SITE

06 AREA OF SITE

10 (Acres)

07 COMMENTS

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

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

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

Diking around the three settling ponds consists of 6"-Ø cobbles in a silt matrix. Pond dikes show erosion ruts that allow runoff water to flow to Red Devil Creek.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☒ YES ☐ NO

02 COMMENTS

Access road leads from Red Devil Mine to Red Devil Village. No fences.

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

File search.
Site visit: 6/86

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
AK	D980495618

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

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

02 STATUS

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

03 DISTANCE TO SITE

A. 2.0 (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
28-40 (ft)	Probably toward NE	28-40 (ft)	unknown (gpd)	☐ YES ☒ NO

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

Wells consist of a sand point attached to pipe of unknown diameter that is driven to ≈ 40 feet.

10 RECHARGE AREA		11 DISCHARGE AREA	
☐ YES ☒ NO	COMMENTS	☐ YES ☒ NO	COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☒ A. RESERVOIR, RECREATION fishing 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
Kuskokwim River	☐	1/8 (mi)
Red Devil Creek	☐	0 (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 3/4 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE ____

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, densely populated urban area)

Population is rural in character. Dwellings are dispersed. Some concentration of houses near the airport. A school has been built near the airport.

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
AK	D980495618

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one) (Sowers, 1979)

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

02 PERMEABILITY OF BEDROCK (Check one) (Sowers, 1979)

☐ 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)	Unknown (ft)	--

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
1.24 (in)	1.5 (in)	0 to 5 %	North	7.5 % (USGS Quad Map)

09 FLOOD POTENTIAL

SITE IS IN 50 yr. YEAR FLOODPLAIN

10 No ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE: A. None (mi)

OTHER: B. 0 (mi) Site is adjacent to wetland.

12 DISTANCE TO CRITICAL HABITAT (of endangered species): None (Ruson) (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. on-site (mi)	B. 1.3 (mi)	C. None (mi)	D. (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Red Devil Mine is situated in a valley above Red Devil Creek at an elevation of approximately 300 feet. The valley floor is approximately 200 feet wide at the mine and slopes downward toward the northeast at an approximate 7.5% grade. Mine tailings have been placed on the valley floor to an estimated height of about 30 feet to provide a level work pad for mine operations. Four of these level pads have been constructed on the east side of the valley at elevations of about 30, 60, 100 and 150 feet above the creek. The upper three pads were excavated into the side hill. On the fill pad at 30 feet above the creek bed tailings, stockpiles have been placed 15 feet high in an area approximately 50 by 200 feet. North of the stockpiles are three settling ponds at heights approximately 15 to 25 feet above the creek. Dikes have been constructed to enclose the settling ponds and provide a barrier to surface water runoff. However, the settling ponds have been filled with silt to elevations ranging from 4 feet below the dike to overtopping the dike.

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

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
AK	D980495618

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER			
SURFACE WATER			
WASTE		NONE TAKEN ON THIS SITE INSPECTION.	
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☐ AERIAL

02 IN CUSTODY OF Alaska Dept. of Environmental Conservation
(Name of organization or individual)

03 MAPS ☐ YES ☒ NO

04 LOCATION OF MAPS

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

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

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
AK	D980495618

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER
US Bureau of Land Management	

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

05 CITY	06 STATE	07 ZIP CODE
Anchorage	AK	99501

01 NAME	02 D+B NUMBER

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

05 CITY	06 STATE	07 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

01 NAME	02 D+B NUMBER

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

05 CITY	06 STATE	07 ZIP CODE

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

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

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

01 NAME	02 D+B NUMBER

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

05 CITY	06 STATE	07 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

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

01 NAME	02 D+B NUMBER

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

05 CITY	06 STATE	07 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

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

The mining claim was never patented. Current lease rights are held by the Estate of Hans Halversen, c/o Edward Dodd. Mr. Dodd's most recent known address is now the site of a parking garage.

Source: BLM records and site investigation.

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
AK	D98045618

II. CURRENT OPERATOR (Provide if different from owner)			OPERATOR'S PARENT COMPANY (If applicable)		
01 NAME: None		02 D+B NUMBER	10 NAME		11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER				

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)			PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)		
01 NAME: Alaska Mines & Minerals		02 D+B NUMBER	10 NAME		11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.): Unknown		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD: Halverson was lease holder				
01 NAME		02 D+B NUMBER	10 NAME		11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD				
01 NAME		02 D+B NUMBER	10 NAME		11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD				

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

Meyer, 1985

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
AK	D98045618

II. ON-SITE GENERATOR

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 FORM 2070-13 (7-81)

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
AK	D98045618

II. PAST RESPONSE ACTIVITIES None known

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	D98045618

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

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

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
AK	D980495618

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☐ NO

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

NONE KNOWN

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

EPA Region X files.

APPENDIX C

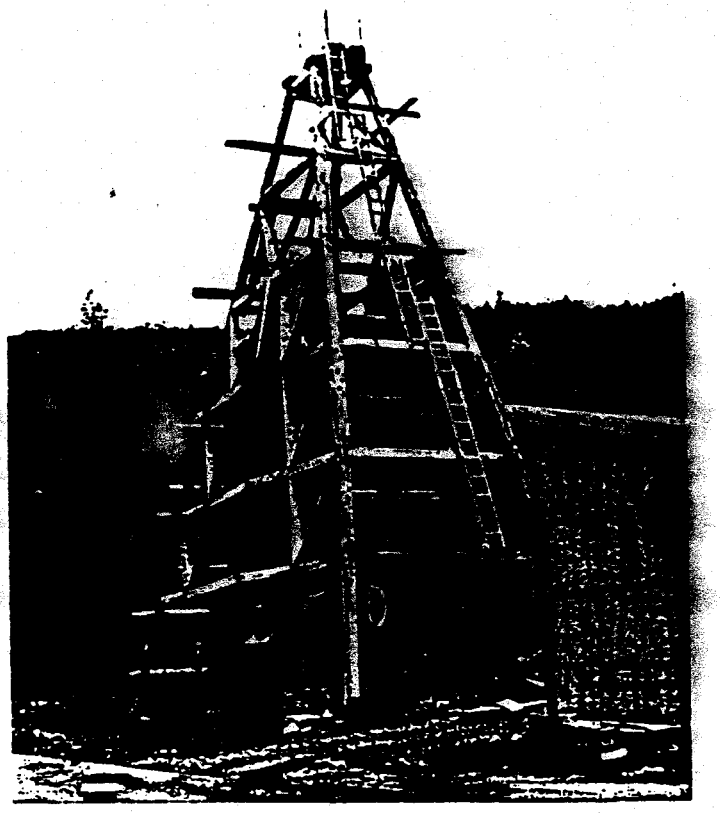
SITE PHOTOS

Looking North at Settling Ponds #2 and #3 (TP2, TP3)

July, 1986

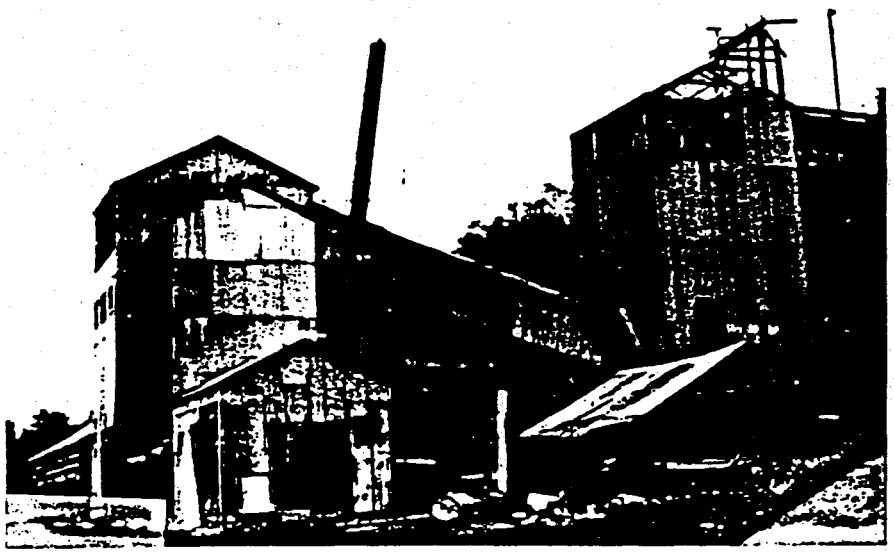
Eroded layers of sand tailings eroded approximately three feet by flood waters.

July, 1986



From South, looking at the mill retort furnace and flotation unit area.

July, 1986



Headworks over shaft.

July, 1986