

RED DEVIL MINE
AKD-980495618
CERCLA Site Inspection Report

Submitted to:

Department of Environmental Conservation
Juneau, Alaska

Submitted by:

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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/l. The release of metals to the Creek could be attributed to discharges from the mine.

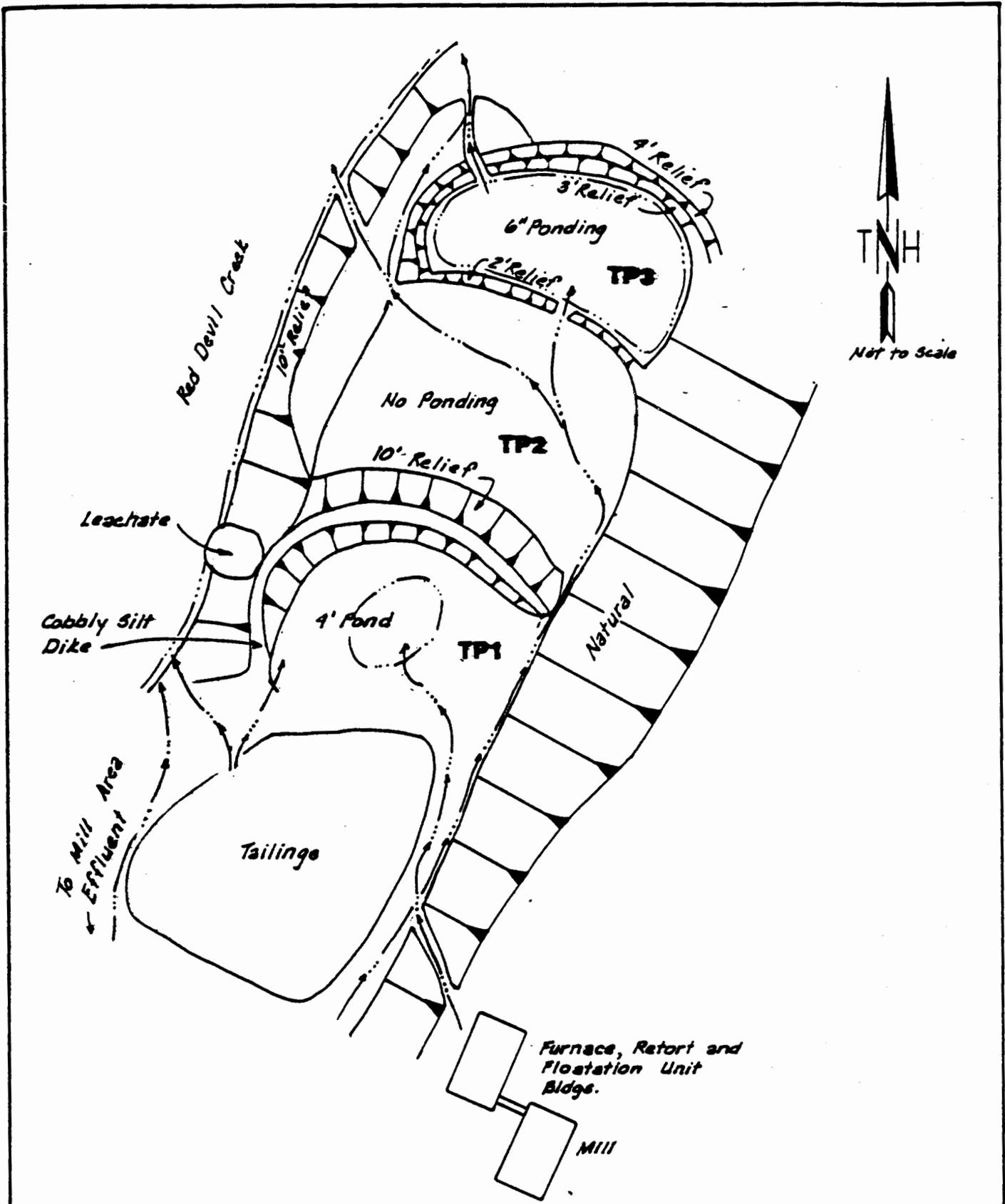
Red Devil Mine is located in a rural area of Alaska. Only 50 persons live within three miles of the site. They use groundwater as a source for drinking water supply. Residents interviewed during a June, 1986 site visit were aware of the mining operations and the presence of mercury at the mine.

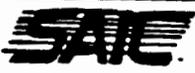
range from five to thirty percent, much of this resulting from on-site cutting and filling. Deposits of ore tailings are distributed around the site. The main camp area is relatively flat with a slope of up to five percent (Figure 4). The slope between the settling ponds and the Kuskokwim River is about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



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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 matrix. The diking is 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.

RED DEVIL MINE

TABLE 2

WATER SAMPLE RESULTS*

March 22, 1971(Provant, 1971)

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

May 25, 1971 (Sceva, 1971)

<u>SAMPLE LOCATION</u>	<u>Hg (ug/1)</u>	<u>As(ug/1)</u>
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)

		<u>Hg (ug/1)</u>
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:

- o Mercury and arsenic were discharged from the Red Devil Mine to Red Devil Creek as a result of mining operations.
- o 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.

- o 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.