

April 21, 1971

**MEMORANDUM**

**TO:** Nelson Grubbe, Director Regulatory Programs  
Portland

**THROUGH:** Director, Alaska Operations Office

**FROM:** Physical Scientist

**SUBJECT:** Mercury Samples from the Kuskokwim River System

During the week of March 22 samples were collected from various locations along the Kuskokwim River System for mercury analysis. Originally, it was planned to obtain samples in the vicinity of four mercury mining operations, three on the Kuskokwim River System and one on the Wood River near Dillingham. However, samples were collected from only one of the mining operations, the Red Devil Mine near Sleetmute, Alaska. This mine was in operation at the time of our trip. The other two mines in the Kuskokwim River System were not in operation and we did not obtain samples from these areas because suitable landing sites were not available. Due to bad weather we did not attempt to visit the Red Top Mine near Dillingham.

The mine located at Red Devil is a fairly large operation and has been active throughout all seasons for the last couple of years. The ore is mined from a shaft, concentrated on-site, then flown out. Water was observed flowing from the mine and a water sample plus sediment from the creek bottom taken near the creek mouth. This was approximately 100 to 150 yards below the mine. The creek carried a high sediment load which on analysis for total mercury gave a value of 9,000 micrograms per liter. The sediment sample also showed on analysis a high concentration of mercury present. An effort was made to obtain a water sample above any mining activities but no running water could be found. Because of the deep snow cover it was difficult to estimate the rate of flow of water from the mine, but it was probably not less than  $\frac{1}{2}$  cubic foot per second and probably not more than five cubic feet per second. McCally Creek located approximately  $\frac{1}{2}$  mile down

stream from Red Devil Creek was also sampled. This creek was not turbid and an analysis for mercury showed the presence of three micrograms per liter. Analysis of a sediment sample from McCally Creek showed high levels of mercury to be present which were comparable with the sediments at Red Devil. A sample collected from the Kuskokwim River near the mouth of McCally Creek and  $\frac{1}{2}$  mile downstream from the mouth of Red Devil Creek showed less than 1 microgram per liter of mercury to be present.

This data indicates that the mining activities at Red Devil are contributing sediments to Red Devil Creek which contain appreciable quantities of mercury. While it was impossible to tell anything about the nature of the sampling site on the Kuskokwim River below Red Devil Creek (because of the snow and ice cover it is not known if the Kuskokwim has more than one channel at that point and perhaps the sample was from a channel not receiving waters from Red Devil Creek) it would appear that the effect of the mercury in the Kuskokwim is negligible. If most of the mercury being discharged into Red Devil Creek is mercuric sulfide, as one would expect, then it is not unreasonable to expect the quantities of mercury present, downstream in the Kuskokwim, to be slight, especially since this compound is extremely insoluble and because of its high density it would rapidly settle to the stream bottom.

The samples are currently being analysed further to determine what proportions of the total mercury concentrations in the sample are due to insoluble mercuric sulfide, soluble inorganic mercury compounds, and/or soluble organic compounds of mercury.

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