

STATE OF ALASKA

FRANK H. MURKOWSKI, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION

DIVISION OF SPILL PREVENTION AND RESPONSE CONTAMINATED SITES PROGRAM

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File No. 2510.38.002

September 21, 2005

Mr. Wayne Svejnoha
US Bureau of Land Management
222 West 7th Avenue, #13
Anchorage, AK 99513

RE: BLM Red Top Mercury Retort Site,
Database Reckey Number: 1992250928601

Dear Mr. Svejnoha:

The Alaska Department of Environmental Conservation (DEC) has reviewed our file for the Red Top Mercury Retort site near Aleknagik, Alaska. A summary of important information about the site and DEC determinations on it follows.

SITE BACKGROUND

The Red Top Mercury Retort site is located on the north bank of the Wood River approximately 18 miles north of Dillingham and 2 miles east-southeast of Aleknagik in Section 29, Township 10S, Range 5SW of the Seward Meridian. The area of contamination encompasses approximately 1/8th acre of a 5-acre mill-site parcel managed by the United States Bureau of Land Management (BLM). Access to the site is possible by boat from Dillingham or Aleknagik, or by an unmaintained dirt road from Aleknagik.

Cinnabar rich in mercury was discovered on Marsh Mountain in 1941. Exploration of six contiguous unpatented mining claims and minor development work occurred from 1943 – 1952. In 1952, the three partners of the Red Top Mining Co. contracted with the Defense Mineral Exploration Administration and received a grant to continue exploration activities; additional grants were obtained in subsequent years. In 1955, Moneta-Porcupine Mines, Ltd. partnered with the Red Top Mining Co. and later joined by the DeCourcy Mountain Mining Co. Mercury concentrations in the cinnabar were estimated to be as high as 28 percent in some high-grade veins, however the Defense Mineral Exploration Administration decided not to fund any additional exploration as the mercury concentrations did not increase with depth. A 1959 visit to the mine documented it to be inactive. According to one partner in the mine, total production by 1959 was 60 flasks (1 flask = 72 pounds), with rich ore stockpiled which was capable of producing another 60 flasks. The stockpiled ore was shipped to Anchorage for retorting. In the 1960s, the claims were leased to another operator who high-graded ore out of

the tailings at the mine site. There was no reported production from these activities and it is likely that the mill-site was not used.

Cinnabar ore was excavated at an elevation of 1050' from the mines on Marsh Mountain where it was crushed by a ball mill and transported down the mountain to the retort facility at the mill-site approximately 30 feet from the Wood River. The ore was heated in a steel cylinder retort chamber measuring 8.5 feet long and 2 feet in diameter. The chamber was housed in a small wooden structure measuring about 12 feet wide by 16 feet long. Mercury was volatilized out of the heated ore, flowed through condensing tubes, and gathered into flasks for storage before being shipped out. Wood and bunker C fuel were used to fuel the retorting process. It is likely that this retort facility was only used from 1952-1955.

In 1985, BLM issued abandoned and void decisions for the mining claims and the mill-site for failure to file assessment work for 1979-1981 and 1984. These decisions were appealed by Clarence Wren, a former partner in the mining company, but the decision on the mining claims was upheld and the decision on the mill-site was reversed; the mill-site reversal was upheld by the U.S. 9th Circuit Court of Appeals. The surrounding land was conveyed to the Aleknagik Natives, Ltd. The mill-site parcel was later surveyed; it is believed that this was excluded from the conveyance however this has not been confirmed by the BLM real estate section. Also unknown are the BLM's future plans for any conveyance.

SITE HISTORY

On October 1, 1992, soil, sediment, and surface water samples were collected at the mill-site by residents of Aleknagik and Greenpeace. On October 15th, Greenpeace provided sample result data to DEC showing mercury concentrations from three (3) soil samples of 18.6 milligrams per kilogram (mg/kg), 26.7 mg/kg, and 51,400 mg/kg, one (1) Wood River sediment sample of 8.4 mg/kg, and four (4) Wood River water samples of non-detect with a detection limit of 0.001 mg/L. Chain-of-custody shows that a request for petroleum hydrocarbon analysis was made, however those results are not found in our files, only analytical results for mercury are present.

In response to the information provided by Greenpeace, DEC staff visited the site on October 26, 1992, accompanied by a resident of Aleknagik who was present when the samples were collected by Greenpeace. DEC staff collected six (6) soil samples from depths of 6-12 inches below ground surface (bgs) in the vicinity of the retort building which showed mercury concentrations of 9.2 mg/kg to 38,000 mg/kg. The sample with the mercury highest concentration was collected from soil beneath a leaking pipe elbow below the mercury condensing tube. Elemental mercury was visible and estimated to be localized in an area of approximately 3 feet in diameter to a depth of 1.5 feet. Approximately 30 feet directly downgradient of the retort building, one (1) sample was collected from the top of the river bank and one from an adjacent location at the base of the river bank; the mercury concentrations in these samples were 2.8 mg/kg and 4.1 mg/kg, respectively. Four (4) sediment samples from the Wood River were collected; one of which contained mercury at a concentration of 0.77 mg/kg and three (3) which were non-detectable at a 0.3 mg/kg detection limit.

Also in October 1992, Greenpeace is said to have collected tissue from five (5) species of fish to be sampled for mercury. Results of these samples are not in the DEC files, and a letter from BLM states that Greenpeace would not release the sample results.

On December 21, 1992, DEC issued a Notice of Violation to the BLM citing high levels of mercury in the soils near the retort building, areas of petroleum hydrocarbon contamination in the soils, and an estimated 1150 gallons of bunker C and diesel in drums on site. DEC requested that site characterization and cleanup occur as well as the removal of the drums in order to prevent a release.

In April 1993, BLM forwarded a site characterization plan to DEC for approval. The workplan was approved by DEC in May 1993, but not implemented.

In October 1993, DEC and BLM staff visited the site to determine an acceptable location for placement of the drums. Seventeen drums were noted to be present, four (4) drums were leaking and one (1) had been shot and the contents leaked to within three (3) feet of the river. Tarps were deployed and the leaking drums secured. DEC collected another soil sample from beneath the retort elbow and BLM collected two (2) samples from an area believed to be outside of the retort facility area of impact. Results of these samples are unknown.

BLM completed a site assessment in August 1994 which showed elevated levels of mercury and diesel-range organics present at the site.

In September 1994, BLM conducted "site remediation and waste storage" activities at the site. A final report was not found in the DEC files, however documentation of the 1994 sample results was found in the 1998 emergency response workplan. In this action, BLM decommissioned the retort building, associated retort equipment and supplies and placed the material into 1-cubic yard (cy) plastic totes on-site. Mercury contaminated soil was excavated 1-3 feet bgs from below and around the retort building and was placed in plastic totes. Approximately 30 cy of petroleum and/or mercury contaminated soil were excavated and stockpiled on-site. Confirmation samples collected from the limits of the retort excavation (~55 feet by 75 feet) contained mercury at concentrations up to 97 mg/kg and diesel-range organics up to 5800 mg/kg. The totes of soil and building debris were stacked and secured within a fenced storage area.

Following the excavation and storage of these materials, BLM began to research the cost and feasibility of various means of treatment or disposal. In March 1995, BLM received a cost estimate of \$8600 to remove the drums of Bunker C, and in May 1995, BLM received a cost estimate of \$1.2 million for transportation and disposal of the mercury contaminated soil and debris at a mercury remediation facility in Ohio. BLM continued to research the possibilities of different portable on-site treatment facilities. Due to the remoteness of the site location, the quantity of contaminated material, and the duration of the proposed treatment times, none of these technologies were found to be more cost-efficient than off-site disposal.

In September 1995, BLM conducted site maintenance activities, including 1) identifying and storing an additional drum and associated petroleum contaminated soil; 2) installing warning

signs on the storage area fence and stockpile; 3) securing totes with rope; 4) stacking drums and covering them with 10-mil visqueen; and 5) covering stockpile with 10-mil visqueen.

In 1996, Clarence Wren of Dillingham, the last surviving partner of Red Top Mining Co., died. BLM placed a lien against his estate to recover past cleanup costs.

Following a joint site visit, in October 1997, DEC sent a second Notice of Violation to BLM for not addressing the soils in a timely manner. BLM stated that delay in disposal/treatment was the result of 1) incomplete plans for waste removal which resulted in inadequate funding available; 2) poor contractor performance; and 3) investigation of Potentially Responsible Party issues with Department of Interior and Department of Justice attorneys. In spring 1998, DEC and BLM met several times to discuss the site and cleanup alternatives.

On May 29, 1998, BLM notified DEC that high water levels of the Wood River had flooded the site. DEC and the United States Environmental Protection Agency (EPA) determined that an Emergency Response action was needed to move the totes. Increasing water levels prevented the relocation of the totes at that time, so sandbags were placed upstream of the totes which were also covered with plastic sheeting. A new cover liner was placed over the diesel-range organics stockpile as well. Characterization samples were collected from 74 totes and from three (3) locations in the stockpile. A total of 178 totes were stored on-site, many of which were partially submerged by the flood waters of the Wood River.

In 1998, BLM conducted two rounds of sampling to determine potential impacts to the Wood River from the contamination at the site. During the July flood-stage of the river, collocated sediment and surface water samples were collected upstream, downstream, and near the tote storage area for and analyzed for total mercury. Mercury analytical results were non-detect for all of the surface water samples and up to 0.650 mg/kg for the sediment samples. Collocated sediment and surface water samples were collected upstream and downstream of the petroleum soil stockpile and analyzed for diesel-range organics, benzene, toluene, ethylbenzene, and xylenes. Analytical results were non-detect for all of the surface water samples with the exception of a slight benzene detection downgradient of the stockpile and a slight xylenes detection in the area of the 1994 excavation; concentrations of diesel-range organics up to 42.6 mg/kg were measured in the sediments. These sediment samples were termed such due to the fact that the river had flooded that area and the soils were in contact with ambient water at that time; however the river is not normally in this area. Comparison of these analytical results to surface water and sediment screening values was appropriate for the time period when the water level was raised, but would be inappropriate for determining current impacts to ecological community in the Wood River.

In September, six (6) additional sediment samples were collected from the Wood River; five (5) were collected by wading in the river and one (1) from in a boat located approximately 108 feet from shore. The analytical results showed mercury at concentrations of 0.067 mg/kg upgradient of the site, 0.197 mg/kg with a 0.458 mg/kg duplicate adjacent to the 1994 excavation area; 0.044 mg/kg approximately 500 feet downstream; and 0.085 mg/kg another 500 feet downstream; and 0.125 at a location 108 feet from shore across from the 1994 excavation area.

BLM also collected one (1) soil samples from an area believed to be unaffected by the mining activities in order to determine site specific background concentrations. The mercury analytical result of this sample was non-detect, with a detection limit of 0.0297 mg/kg.

BLM attempted to reestablish the limits of the previous excavation and determine those sampling locations. The backfill was removed and the liner placed in the bottom of the excavation in 1994 was located. The dimensions of the excavation did not correspond with those documented in the 1995 report, thus the sample locations could not be accurately reestablished. BLM excavated a total of nine (9) cy of mercury contaminated soil from three (3) separate locations and collected 26 characterization and confirmation samples. The excavation was conducted in areas where previous sample results were the highest. Characterization and confirmation sample results showed mercury to be present in concentrations up to 40.6 mg/kg in the excavation area and 0.483 outside the excavation boundaries. These samples were not analyzed for diesel-range organics; however, the area the highest detected contamination from 1994 was excavated. Additional liner was placed in the excavation in areas where the previous liner was damaged and the hole was backfilled with clean fill and regraded. Two confirmation samples collected around the petroleum contaminated soil stockpile contained diesel-range organics up to 26.8 mg/kg.

BLM removed the 178 totes of contaminated soil and disposed of 176 totes at Oregon Waste Systems' Columbia Ridge Solid Waste Landfill in Arlington, Oregon and two (2) totes at Mercury Waste Solutions in Union Grove, Wisconsin. Also sent to the Columbia Ridge Solid Waste Landfill were 69 supersacks of soil contaminated with diesel-range organics and/or mercury.

In 1999, BLM collected soil samples at the site directly under the liner and also slightly deeper at the same location in order to determine the extent of mercury left in place. Samples were also collected outside of the former excavation area. The highest concentrations of mercury found were 108 mg/kg at 2' bgs directly under the liner, 2.4 mg/kg at about 5' bgs, and 12 mg/kg at 1' bgs outside of the former excavation area.

COMPLETED ROUTES OF EXPOSURE

Human Health

Current-Use Exposure Pathways: The remaining mercury-contaminated soil is located approximately 3' bgs and is covered by a liner and clean backfill. Potential current receptors include adult and child recreational users and trespassers. The closest populations are Dillingham (2200 persons) and Aleknagik (250 persons). Due to the presence of the liner and clean backfill covering the contamination at depth, the inhalation, ingestion, and dermal contact exposure pathways are not complete at this time. Groundwater has been found at depths of 1.5-3' bgs and at times is at the ground surface when the river floods. The closest residence to the site is located on a native allotment ½ mile away. There are currently no residences or wells and groundwater is not used for drinking water, thus groundwater ingestion is not currently a completed pathway.

Other human health exposure pathways investigated include mercury migration to the Wood River, direct contact with sediment and surface waters, and consumption of fish containing

elevated levels of mercury. These pathways have been shown not to be complete at this time. The site is located approximately 30' from the Wood River and 3-4' higher in elevation. The Wood River is approximately 500' wide with a flat gradient.

Future-Use Exposure Pathways: Future human health exposure pathways to the site contaminants are the same as the current pathways as long as the liner remains in place and no digging is performed in this area.

Future use and potential ownership of the site are unknown. Institutional controls (land use controls) are needed to help ensure contaminant exposure pathways that are currently incomplete remain so in the future or that additional characterization or cleanup, as appropriate, are undertaken.

Ecological

Current-Use Exposure Pathways: There are no completed exposure pathways for terrestrial receptors as the residual contamination is located at depth below a liner and clean backfill.

The Wood River is a world-class fishery with the largest sockeye salmon run in Alaska and Dillingham has one of the largest fishing fleets in the state. Migration of contamination to the Wood River is not considered a completed pathway based upon an October 1994 study of slimy sculpins. By using minnow traps, 15 sculpin and 2 coho were collected from the Wood River, three (3) sculpin and 3 coho from Arcana Creek near the mine, and 1 sculpin and 3 coho from Squaw Creek in Dillingham (control site). Sculpins are bottom-dwelling insectivores sedentary fish that do not migrate and therefore were considered appropriate for this study. The coho salmon fry had not yet migrated but were less desirable due to the young age and small size of the fish. Mercury concentrations in the sculpins and coho in the Wood River ranged from 0.01-0.12 mg/kg and 0.03-0.08 mg/kg, respectively; and in sculpins and coho in Arcana Creek ranged from 0.02-0.06 mg/kg and 0.06-0.08 mg/kg, respectively. These concentrations are very comparable to those found in sculpins and coho control samples from Squaw Creek, specifically 0.1 mg/kg and 0.03-0.06 mg/kg, respectively. EPA Region 3 has developed a risk-based concentration of mercury for fish ingestion of 0.41 mg/kg.

CLEANUP LEVELS

Soil

Site specific cleanup levels haven't been developed for this site. A preliminary soil removal action objective of 23 mg/kg mercury, based on the US EPA risk-based concentrations, was used in 1994. DEC regulations in 18 AAC 75.341 are a bit more stringent with 1.24 mg/kg for the migration to groundwater pathway and 13 mg/kg for the inhalation pathway for mercury. Sample results from 1999 contained a maximum mercury concentration of 108 mg/kg in a sample collected below the liner. Characterization samples collected outside of the excavation area and liner showed a contained a maximum mercury concentration of 12 mg/kg. A statistical analysis of 44 sample results covering approximately 3800 square feet indicated a 95-percent confidence interval from 0.126 to 10.81 mg/kg.

Sediment

Sediment samples from the Wood River collected in 1998 showed an upgradient concentration of 0.197 mg/kg and a high of 0.458 adjacent to the retort building excavation. DEC has not

promulgated sediment cleanup levels, but uses screening values set by the National Oceanic and Atmospheric Administration (NOAA) or other generally-accepted state or federal screening values. For freshwater sediment, the NOAA Threshold Effects Level (TEL) is set at 0.174 mg/kg and the Probable Effects Level (PEL) is 0.486 mg/kg. The TEL represents a concentration below which adverse effects are rarely expected to occur. The PEL is a level above which adverse effects are frequently expected.

Surface Water

Alaska Water-Quality Standards of 18 AAC 70 include aquatic life criteria for mercury in fresh waters of 0.012 micrograms per liter (ug/L) (chronic) and 2.4 ug/L (acute). Surface water samples were collected from the Wood River in 1998 when it flooded the site. All six (6) samples were non-detect for mercury.

Groundwater

No groundwater characterization has been conducted. Sediment and surface water samples collected from the Wood River, approximately 30 feet down-gradient from the excavation, do not indicate significant subsurface contaminant transport to the river.

CONCLUSIONS

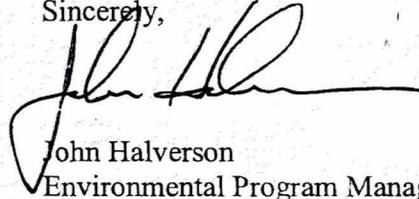
Site specific cleanup levels have not been established for this site. There is a small volume of mercury contaminated soil remaining at ~3' bgs under a liner which was placed at the excavation limits. This mercury contamination exceeds DEC's default cleanup levels for residential use. The site is currently not used for residential or commercial/industrial purposes. The limited site characterization results available at this time indicate remaining contaminants are not adversely affecting nearby surface water, sediments or fish. Therefore, additional cleanup actions do not appear necessary at this time. However, prior to concurring with a conditional closure, DEC requests BLM:

1. Provide for future protection of human health and the environment by establishing institutional controls on this site to: a) document the location and depth of residual contamination and the liner; b) restrict digging in the area of residual contamination; and c) restrict future residential use of the site around the former retort building excavation area where residual contamination exists.
2. Evaluate and provide information on the potential for erosion of the site due to river currents and flooding and, as necessary, include future inspections in the institutional controls noted above.
3. Provide more information to demonstrate whether groundwater contamination has occurred that may pose an unacceptable risk to human health or ecological receptors in Wood River.
4. Provide information on the volume, location and chemical makeup of waste rock and processed ore from the retort operations.
5. Provide clarification on current land ownership, and possible future conveyance, of the site. Any future land transfer should include disclosure of information on environmental contamination, site characterization and cleanup efforts to date, residual contamination and institutional controls as described above.

6. After addressing the items above, provide public notice to interested parties as agreed to in the 2002 BLM and DEC cost recovery settlement agreement for the Red Top Retort site.

We look forward to working with you on these remaining issues in order to achieve conditional closure on this site. Please feel free to contact me at 269-7545 or Anne Marie Palmieri, of my staff, at 766-3184.

Sincerely,



John Halverson
Environmental Program Manager

cc: Anne Marie Palmieri