

Action Memorandum
Case File No. : AA-081686

Applicant: Bureau of Land Management
Anchorage Field Office

**Type of
Action:** Implementation of the Red Devil EE/CA Amendment

Location: Near Red Devil, Alaska, T. 19 N., R. 44 W., SE¼, Section 6, Seward Meridian.

**Prepared
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I. INTRODUCTION

The Red Devil Mine is located approximately 250 miles west of Anchorage, Alaska, eight miles northwest of Sleetmute, and two miles southeast of the community of Red Devil. The site is bisected by Red Devil Creek, which flows about 0.3 miles north to reach the Kuskokwim River.

The Red Devil mercury mine operated sporadically from 1933 until 1971. During its operational life approximately 35,000 flasks of mercury were produced. A flask of mercury weighs 76 pounds (~ two quarts). The site covers about ten acres and consists of surface mining areas, backfilled adits and incline shafts, tailing piles, settling ponds, five large fuel tanks, drum storage areas; the remains of approximately 17 buildings used for housing, laboratory, mill, steam plant, and chemical storage.

Site Investigations were completed in 1989 and 1999. Site sampling in 1999 was completed due to a request from the U.S. Environmental Protection Agency (EPA) to allow them to reevaluate the site according to their Hazards Ranking System. Upon review of the Site Investigation, EPA recognized the high probability that the site would rank high enough to be placed on the National Priorities List (NPL). In response, EPA chose to allow BLM to complete investigations and removal actions under BLM's CERCLA authority to reduce site risks. In 1999, BLM (with its contractors) removed hazardous materials from the site. These materials included: mercury contaminated slag, copper sulfate, sodium hydroxide, potassium carbonate, sodium dichromium dihydrate, 55-gallon drums (contents included used oil, fuel, solvent, grease), and lead-acid batteries. Site soil, water, and sediment were sampled and analyzed according to EPA and Alaska Department of Environmental Conservation (ADEC) guidance.

CY 2000 soil samples showed mercury up to 73,300 mg/kg, arsenic to 10,700 mg/kg, antimony to 13,500 mg/kg, diesel range organic hydrocarbons (DRO) to 22,900 mg/kg, and benzene to 0.095 mg/kg. Groundwater results indicated mercury up to 28.6 ug/L and arsenic to 129 ug/L. Results from 1999 samples indicated the sediments in Red Devil Creek in 1999 were as high as 399 mg/kg mercury, 2,030 mg/kg antimony, and 963 mg/kg arsenic. 1999 soil samples showed lead up to 13,500 mg/kg. For more details on past work and investigations see case file number AA-081686.

The following tasks were completed in 2000 for this project: an Engineering Evaluation/Cost Analysis (EE/CA), to analyze response options for known mercury contamination around the retort building and to analyze additional sampling requirements; additional site characterization: field screened with an X-ray Fluorescence Spectrometer (XRF); sampled and laboratory analyzed samples across the site for metals (mercury, arsenic, antimony, lead) and hydrocarbons. BLM inspected and cleaned the fuel system (pipes and tanks); demolished the contaminated retort building; removed and disposed of waste/contaminant sources. The wastes included: 53,000 pounds of mercury

contaminated slag and debris, which contained visible free mercury; 3,000 pounds of asbestos and used oil/fuel. BLM completed an asbestos and lead survey of all buildings (required to demolish buildings), a site topographic survey, and geotechnical borings needed to design a landfill. For more site characterization information see the 2001 Red Devil Mine Source Area Removal and Investigation report.

A streamlined risk assessment is currently has been completed to analyze and quantify current site risks and risks remaining after implementation of this Proposed Action. The risk assessment indicated the proposed action would reduce site risks. A draft site conceptual solid waste management plan (EE/CA amendment) was completed to document each waste stream and its proposed disposal method. A copy of the conceptual plan is located in the case file. The conceptual plan was sent all interested parties and a comment period was open between May 21 to July 6, 2001. A work plan will be developed for this project, which will incorporate comments received during the comment period.

A. Purpose and Need for the Proposed Action:

The purpose of this Proposed Action is to reduce the risk or hazards that this site poses to human health and the environment. The Proposed Action will help protect the local human, plant, and animal populations, and the Kuskokwim watershed from adverse health effects associated with heavy metals at this site.

B. Conformance With Land Use Plan:

The lands are within the boundary of the Alaska Southwest Planning Area Management Framework Plan (MFP), dated November 1984. The Proposed Action is covered under the Watershed (W-1.1) Activity Objective of the MFP which states that BLM is to "maintain water quality in accordance with the Alaska Water Quality Standards".

C. Relationship to Statutes, Regulations, Policies, Plans, or Other Environmental Analyses (Applicable or Relevant and Appropriate Requirements (ARARs)) :

The Proposed Action is necessary to comply with Federal and State laws regarding the reporting and cleanup of hazardous material releases. Specific laws and requirements include the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the Clean Water Act, State of Alaska regulations, and site specific guidance from EPA and the ADEC. A National Environmental Policy Act (NEPA) Environmental Assessment has been completed for this proposed action.

II. PROPOSED ACTION AND ALTERNATIVES

A. Proposed Action:

The Red Devil Mine is near the community of Red Devil, Alaska, at T. 19 N., R. 44 W., SE¼, Section 6, Seward Meridian. The Proposed Action is to implement the site EE/CA amendment (attached). Most plan tasks are scheduled to occur in 2001. BLM has tasked its Hazardous Materials contractor to develop a detailed formal work plan for the tasks to be completed in 2001. The work plan will be sent to ADEC, EPA, Native Corporations, and be made available to the public for comments. BLM will request plan concurrence from the Alaska Department of Natural Resources (ADNR) for this action according to section 906(k) of the Alaska National Interest Lands Conservation Act (ANILCA). The work plan will be implemented by a hazardous material contractor during the 2001 summer field season. Stream crossing will be coordinated with the Alaska Department of Fish and Game (ADF&G), and the U.S. Army Corps. of Engineers, as appropriate.

The site will be accessed by flying personnel and equipment by charter aircraft to the Red Devil airstrip. All Terrain Vehicles (ATVs) and/or a pickup truck may be used to drive from the airstrip or local lodge to the site. Personnel may hire a small boat and operator to access the site from the lodge.

BLM's contractual Statement of Work requests the following actions for 2001:

1. **Fill data gaps.** Develop a sampling and analysis plan for the items below. The plan may be part of the work plan or a separate document.
 - a. Identify sources of leachable lead in the Mess Hall/Bunkhouse; Houses #1, 3, 4, and warehouse. Review existing Toxicity Characteristic Leaching Procedure (TCLP) results; retest discrete samples to find source. Field screening may be used to narrow sources. A portable XRF may provide sufficient information according to EPA. TCLP lead lab analyses may not be necessary. Scope for ≤ 25 lab samples.
 - b. Analyze retort furnace slag for total mercury, TCLP arsenic and mercury. Scope for ≤ 6 analyses (2 total Hg, 2 TCLP Hg, 2 TCLP As).
 - c. Analyze retort building pad surface soils for total mercury and total arsenic, southwest and northeast of the CY 2000 sample locations, to determine the lateral extent of contamination. Scope for ≤ 20 analyses: 10 total Hg, 10 total As.
 - d. Visually inspect for elemental mercury beneath the retort building concrete foundation. This may be accomplished by using a hand operated coring drill or concrete saw. Use a minimum of three sampling locations.

- e. Collect six soil samples across the site and have them analyzed for metals bioavailability. Analyze each sample for arsenic and mercury; speciate mercury results for cinnabar and elemental mercury. Analysis is available from the University of Colorado, John Drexler, at an estimated cost of \$200/sample. Sample locations include: retort area (2), settling pond, general mine area, housing area, Red Devil Creek sediments.

2. Design and develop a Work Plan to:

- a. Install an impermeable cap over the contaminated tailings/soils on the retort building pad. The cap must include an impermeable landfill grade liner. Up gradient surface drainage will be engineered to flow around the cap, not over it. Estimated cap area is 30,000 sq. ft. (100 ft. x 300 ft.).
- b. Construct a monofill to bury the retort building debris in the retort building area. Follow general requirements in Alaska's 18 AAC 60 regulation. A State permit is not required.
 - i. The construction debris monofill may be constructed over or adjacent to the retort building foundation and contaminated soils. Construction of the monofill over the contaminated soils may simplify the design and construction requirements and reduce costs, by combining the cap and monofill.
 - ii. The monofill will contain at least two cells, one for non-hazardous debris (solid waste/building debris), and one for the retort building debris. It has been proposed in the Red Devil EE/CA Amendment to construct two separate monofills, one in the retort building area, and the other in the general mine area (across the creek from the retort). This is acceptable.
 - iii. The retort building debris cell (hot cell) will be fully lined and sealed with at least a High Density Polyethylene (HDPE) 60 mil liner or equivalent. Debris will be pressure washed (if it was not previously washed) and crushed (run over with trackhoe), and placed in a cell. Void space will be filled with tailings or similar fill material. In addition, EPA recommended a 3% cement mixture to further stabilize the hot cell to achieve 90% contaminant mobility reduction. The contractor may recommend a better alternative to physically and chemically stabilize this cell. A treatability study has been done using MT² proprietary

- chemical stabilizer. The chemical stabilizer may be mixed with the cement to further reduce contaminant mobility.
- iv. One retort building TCLP sample failed for mercury, so suspect hazardous debris must be treated to achieve 90% reduction in contaminant mobility. MT² chemical stabilizer can be sprayed on suspect debris components to immobilize metals. Land Disposal Regulation (LDR) treatment standards may be used. No additional sampling will be done.
 - v. BLM desires to leave the retort building concrete foundation in place, and construct the cap/monofill over it. The hot cell will likely be constructed on the part of the slab that formerly supported the retort chamber, cooling tubes, and decanting vats. Suspect contaminated concrete may be treated with a sprayed application of MT² chemical stabilizer. If inspection beneath the slab (item 1.d.) identifies significant elemental mercury under the slab, the stabilization or disposal of this material is beyond the scope of this task order, and will be addressed under a modification if necessary.
 - vi. The refractory bricks will go into the hot cell. The bricks that came out of the retort chamber will be treated by surface spraying the bricks with MT² chemical stabilizer and/or a mixture of MT² stabilizer and cement.
 - vii. Depending on the slag pile test results, the slag will go into the hot cell or be disposed of off site.
 - viii. Any recoverable elemental mercury will be recycled/disposed off site.
- c. Demolish remaining site buildings and dispose of the debris in an on-site monofill. Eleven buildings were identified to contain non-friable asbestos as part of the structure. Five buildings had lead samples that failed for TCLP lead. Leachable lead components can be treated with a MT² stabilizer. Refer to the March 2001 Red Devil Mine report for the results of the Asbestos and Lead survey. A separate asbestos removal may not be necessary for some or all buildings; they may be demolished as-is, and buried on site in a monofill. Special procedures to eliminate the release of asbestos must be used to avoid the aerial release of asbestos fibers. Otherwise, asbestos may be removed prior to demolition and buried on site or transported to the Anchorage Landfill for disposal. Segregated wood debris from building demolitions may be burned on site.

- d. All wastes removed from the site will be packaged in bulk containers (such as 1 cubic yard EP2 boxes) to take advantage of bulk waste disposal pricing. Variations may be authorized by BLM as necessary.
 - e. Dispose of approximately 35 transformer casings (carcasses) in an on-site monofill. All are drained of oil. Transformers that tested >50 ppm PCBs were disposed of off-site. If past data is not conclusive, additional field screening may be necessary. If data indicates a transformer contained PCBs >50 ppm, proper cleaning will be required.
 - f. Re-grade embankment slopes during the construction of monofills to as close to 3:1 (horizontal:vertical) as possible. Install silt screen when excavating tailings near Red Devil Creek. A culvert washout left 30 foot high walls next to the creek. The material can be used as fill for the cap and monofill(s).
 - g. Survey to insure drainage gradients and for as-built drawings.
3. **Perform/Implement Sampling and Work Plan Tasks** described in items 1 and 2 above.

All plans and actions should comply with Federal and State regulations. Coordinate design, plans, and report specifics with BLM.

BLM plans to implement this interim cleanup measure under its authority under CERCLA. The development of this plan to dispose of the retort building debris in a monofill has been coordinated with EPA managers and Department of Interior Solicitors to comply with EPA's Area of Contamination (AOC) policy. Although no Federal or State permits are required to construct landfills on this CERCLA site, draft and final design plans will be developed to comply with all applicable Federal and State regulations. These plans will be sent to EPA, ADEC, applicable Native corporations, and the public for comments. Qualified local labor will be utilized if available.

Due to a bridge washout on the Red Devil Creek, the eastern portion of the site will be accessed by driving through the Creek via a previously installed crossing. This crossing entails driving through the Creek for about 60 feet, and was approved by ADF&G during the 1999 and 2000 field work. If ADF&G requires a more direct crossing, BLM contractors may have to bulldoze tailing piles to gain access. Although the Creek is not classified by ADF&G as anadromous, special consideration and efforts will be made to minimize disturbance of the creek bed and water.

All work areas in this project are on former mine operation areas which have previously disturbed soils and vegetation. Environmental consultants (contractors) will be hired by BLM to plan and implement the removal and sampling operations at the site according to all Federal and State environmental and safety regulations. Environmental impacts will be reassessed if future work exceeds the scope of this environmental assessment. Additional information regarding this site and plan specifications are available in case file AA-081686.

The current estimated cost for 2001 as described above is \$1,145,000. Remediation of the fuel tanks and contaminated soil are estimated to cost an additional \$175,000.

B. Other Action Alternatives:

The proposed action has evolved from the alternatives analyzed in the EE/CA as additional information was gained from additional site characterization, legal determinations, and regulatory input. The alternatives below were analyzed in the Engineering Evaluation/Cost Analysis (EE/CA) and a supplemental document titled Review and Analysis of Site Investigations and Engineering Evaluation for Determination of a Contaminated Site Cleanup Option for the Red Devil Mercury Mine, Alaska, here on referred to as the EE/CA Analysis. The major difference between the alternatives analyzed in the EE/CA and the proposed action was that the EE/CA focused on the disposal of contaminated soils, while the proposed action focuses on disposal of building debris. This change came about because it was determined that the contaminated soils are exempt under federal law from treatment because they are a mining waste that was generated prior to 1990. The soils will now remain undisturbed, which leaves the building debris as the primary waste requiring disposal. The alternatives and costs developed and analyzed in the EE/CA and EE/CA Analysis are in the table below. See the EE/CA and EE/CA Analysis reports for details.

1 Stabilize surface soil and leave in situ	\$790,000
2 Excavate and dispose in onsite solid waste landfill	\$1,633,000
3 Excavate and dispose in offsite solid waste landfill	\$13,393,000
4 Excavate, stabilize and dispose in onsite solid waste landfill	\$3,463,000
5 Excavate, retort and dispose in onsite solid waste landfill	\$2,933,000
6 Excavate and transport to hazardous waste treatment and disposal facility	\$43,853,000

C. No Action Alternative:

Under the No Action Alternative, BLM will continue to implement current management practices until another Proposed Action is designed.

