

RED DEVIL MINE



2016

The History of the Mine, Its Clean-Up & How GTC Has Been Involved

The document will give an overview of the history of the Red Devil Mine on the Kuskokwim River, the process of cleaning up after the fact and how Georgetown Tribal Council has been involved in this process. The purpose of this document is to serve as an educational guide and also to act as a reference point for future GTC actions.

Red Devil Mine

THE HISTORY OF THE MINE

Location

The Red Devil Mine is located in the Central Kuskokwim region, about 250 miles NW of Anchorage, and just up river of the Native Village of Georgetown.

Historical Production

The Red Devil Mine is the largest Mercury mine in Alaska. Mining took place there originally from 1933 to 1946, again from 1953-1963, and finally from 1969-1971. The largest amount of production occurred there from 1953-1963. Since the closure of the mine in 1971, no production has taken place. The following excerpt from the USGS Mineral Resources On-Line Spatial Database outlines further details of production:

The Red Devil deposit was discovered by an unidentified berry picker and later staked by Hans Halverson in 1933. From 1933 to 1946, activity consisted mainly of surface prospecting and selective mining from both surface and shallow underground workings. In 1952, DeCourcy Mountain Mining Company acquired a lease on the property and obtained a Defense Minerals Exploration Administration (DMEA) loan. The mine achieved its peak productivity from 1953 to 1963 when the deposit was mined from five working levels off the 'Main' and 'Dolly' shafts, which are about 1,000 feet apart.

In 1969 to 1971 Alaska Mines and Minerals Inc. produced cinnabar and stibnite concentrates for shipment to Japan from both open pit and underground workings, and retorted some mercury on the property. The mill operated for most of 1970, but the mine closed in June 1971, due to a sharp drop in the price of both mercury and antimony (Fackler, 1972). There has been no further production.

Over the life of the mine, a total of 36,141 flasks of mercury has been produced from about 75,000 metric tons of ore at an average grade of about 1.5 percent mercury (Bundtzen and Conwell, 1982).

Operations

Several different types of mining operations took place at RDM, which appeared to evolve over time.

At the start, mining was mainly being conducted underground, with access to ore zones through tunnels and shafts on the west side of Red Devil Creek. In the early 40's, a rotary kiln was installed for thermal processing of the mercury ore. After a 1954 fire, a modern mercury furnace was built on the opposite side of the creek. At this time, surface exploration and mining occurred. **Surface mining is a form of mining in which the soil and the rock covering the mercury are removed. It is the opposite of underground mining, in which the overlying rock is left behind, and the mercury is removed via tunnels or shafts.**

In the late 1950's or early 1960's, hydraulic sluicing operations were conducted in the Dolly Sluice and Rice Sluice areas. **In hydraulic mining, water is used to break up material into slurry- the movement of this slurry to extract minerals from it is called sluicing.**

In 1969, operations included both open pit and underground mining. **Open-pit mining is a surface mining technique that was used to extract mercury from the earth by its removal from an open pit.** After 1969, cinnabar and stibnite concentrations were produced using flotation, and there is some indication that mercury was retorted at the mine. **A retort can be used to distill off mercury to separate out a small amount of gold.** The closure of RDM in 1971 was thought to be temporary, but in 1982 the mine was permanently closed and dewatering operations were discontinued.



Images Left to Right: Condensers, Ore Bin & Conveyor belt ramp at RDM; Retort House at RDM; Prospect Trench at RDM

Red Devil Mine

THE ONGOING CLEANUP PROCESS

1987-2009

According to the Bureau of Land Management (BLM), cleanup of RDM began in 1987. Efforts first were made to backfill open mine shafts and also to remove remaining processing chemicals. In 2002, mine buildings were demolished and buried in onsite landfills. From 2003-2006, the focus was on cleaning up aboveground storage tanks that had spilled fuel. The petroleum cleanup continued into 2009-2010 under the American

Recovery & Reinvestment Act (RCRA). Specific activities that occurred during these years were documented by previous GTC Environmental Coordinator, Helen Traylor and are included here:

Specific Activities

1989-1999

- Site investigations were completed in 1989 and 1999.
- Site sampling in 1999 was completed due to a request from the EPA to allow them to reevaluate the site according to their Hazards Ranking System.
- Documentation was completed to cover National Contingency Plan (NCP) requirements for Action Memorandum and Engineering Evaluation/Cost Analysis (EE/CA).
- The [Administrative Record](#) was established as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

2000

- An EE/CA was completed to analyze response options for known mercury contamination around the retort building and to analyze additional sampling requirements.
- Completed additional site characterization: field screened with an XRF (x-ray fluorescence spectrometer); sampled and laboratory analyzed samples across the site for metals (mercury, arsenic, antimony, lead) and hydrocarbons.
- Inspected and cleaned fuel system (pipes and tanks).
- Removed and disposed of waste/contaminant sources. These included 53,000 pounds of mercury contaminated slag and debris which contained visible free mercury and 3,000 pounds of asbestos and used oil/fuel.
- Completed asbestos and lead survey of all buildings (required to demolish buildings).
- Completed site topographic survey and geotechnical borings needed to design landfill.

2001

- Complete draft site conceptual Solid Waste Management Plan (SWMP).
- Seek public comment and regulatory concurrence on conceptual SWMP (EE/CA Amendment).
- Finalize SWMP.
- Prepared statement of work and obligated funds for:
 1. The design and installation of an impermeable cap over the contaminated retort area soils/tailings utilizing the Area of Contamination (AOC) concept.
 2. Developing the design, construction, and implementation of an on-site repository for the Retort building debris.
 3. Hazardous debris/waste to be treated and placed in a fully lined on-site monofill cell;
 4. Non-hazardous debris to be placed in a separate non-hazardous solid waste monofill.

5. Demolition of the remaining site buildings and placing them in an on-site non-hazardous solid waste monofill.
6. Fill data gaps identified in EE/CA Amendment and conduct benchmark treatability tests for chemical stabilization and encapsulation of wastes.

- Completed a risk assessment.

2002

- Conducted community relations activities, including public meetings, public notices, coordination of remedial plans, and maintenance of the Administrative Record.
- Prepared work plan for completion of Interim Removal Project for the contaminated retort area and debris.
- Executed the demolition, treatment, and on-site landfilling (monofill #2) of the retort building, tailings, and other items of contaminated waste in the AOC.
- Demolition and landfilling (monofill #1) of non-hazardous buildings and other on-site debris.

2003

- Conducted community relations activities.
- Demolished five empty 100,000-200,000 gal Aboveground Storage Tanks (ASTs).
- Conducted Site Characterization and Assessment of the ASTs area. The investigation indicates that approximately 2,300 cubic yards of diesel type fuel contaminated soils around the former AST footprint area exceeds ADEC cleanup criteria.
- Demolished the Mill Hopper. Steel debris from the hopper and ASTs was disposed in monofill #3.
- Conducted ground water sampling from the established monitoring wells for change in water quality, i.e. potential increase in target metals. This is year one of a five-year program. No change was noted, and target metals were not found in groundwater.
- Inspected the monofills for signs of settling or erosion.
- Conducted an investigation of the recently identified older retort facility that was apparently destroyed by fire in the mid-1950s. The purpose of this investigation was to fingerprint any contamination on site and see if this can be correlated to historic retorting operations. Results of the investigation indicate that no remedial action will be needed at the site of the "historic" retort facility.

2004

- Inspected the monofills for settling or erosion.

2005

- Developed an ADEC approved Corrective Action Workplan to remediate the petroleum contaminated soils at the former AST area.
- Successfully excavated release areas at the former fuel barge landing and at three of four ASTs where releases were documented in 2003. Approximately 1,400 cubic yards (CY) of petroleum contaminated soils were placed in a containment cell to await remediation.

- Removed some additional non-hazardous solid waste discovered at the mine site during the 2003 field activities.
- Conducted a round of groundwater sampling as part of the five year monitoring plan
- Inspected and repaired minor settling and erosion noted at the monofills.
- Completed US Survey 13450 (21.48 acres) to delineate the site, to allow conveyance of surrounding lands.

2006

- Continued excavation of the final AST release area (AST #5) and stockpiling of petroleum impacted soils from that area.
- The plume under the AST #5 footprint has been partially excavated, however the full vertical and horizontal extent of contamination remains unknown.
- Groundwater sampling needs to be accomplished as the depth of the excavation indicates diesel fuel could have reached groundwater. The existing monitoring wells at the site are up-gradient of the potential fuel plume; additional wells are required to be installed.
- A total of 3,306 cubic yards of diesel fuel contaminated soils from the 2005 and 2006 excavations were placed in two on-site stockpile cells.

2007

- Conducted annual ground water sampling from the five established monitoring wells for change in water quality, i.e. potential increase in target metals.
- Inspected the monofills for signs of settling or erosion

2008

- During early 2008, the BLM was notified that upon request from the Alaska Department of Environmental Conservation (ADEC), the US Environmental Protection Agency (EPA) had reevaluated the Red Devil Mine, determining that the site's Hazard Ranking Score was high enough to make the Red Devil Mine eligible for placement on the National Priorities List.
- Conducted annual ground water sampling from the five established wells, and inspected the condition of the monofills and the diesel fuel contaminated soil stockpiles.
- Hosted a joining BLM, EPA, and ADEC inspection of the site to familiarize regulators with the site.
- Secured funding from the U.S. Department of the Interior to begin a Remedial Investigation/Feasibility Study (RI/FS) to properly address the concerns ADEC and EPA have about the site.

2009

- Made award on September 21, 2009, of a contract to conduct the Remedial Investigation/Feasibility Study (RI/FS).
- The intent of the RI/FS is to determine the nature and extent of contamination, characterize risks to human and ecological receptors, and to gather sufficient information to develop appropriate response actions at the site.
- Began development of the Project Management Plan and initiated other RI/FS scoping actions.

- BLM, ADEC, and EPA (invited), conducted a “Project Kick-Off” meeting at the Anchorage Field Office October 9, 2009.
- On-site investigative work is planned for the 2010 field season.
- Made award on September 22, 2009, of a contract to remediate the diesel fuel contaminated soil stockpiles established during 2005-2006, and investigate the full extent of oil contamination at the former AST #5 location.
- This contract is funded under the American Recovery and Reinvestment Act (ARRA) and is being conducted separately but concurrently with the RI/FS.
- Began development of ADEC Approved work plans, with field work planned for 2010 field season.
- Conducted three rounds of ground water sampling from the five established monitoring wells, sampled surface water in and near the site, and inspected the condition of the monofills and the diesel fuel contaminated soil stockpiles.
- Published an informational flyer announcing the new projects.
- Flyer production was coordinated with ADEC and EPA.
- Flyers were mailed to 35 Alaska tribes, Alaska Native corporations, city governments, and Native and community non-profit organizations within the region.
- The flyer was also emailed to over 30 persons and/or organizations who had previously expressed desire to remain informed about developments at Red Devil Mine.

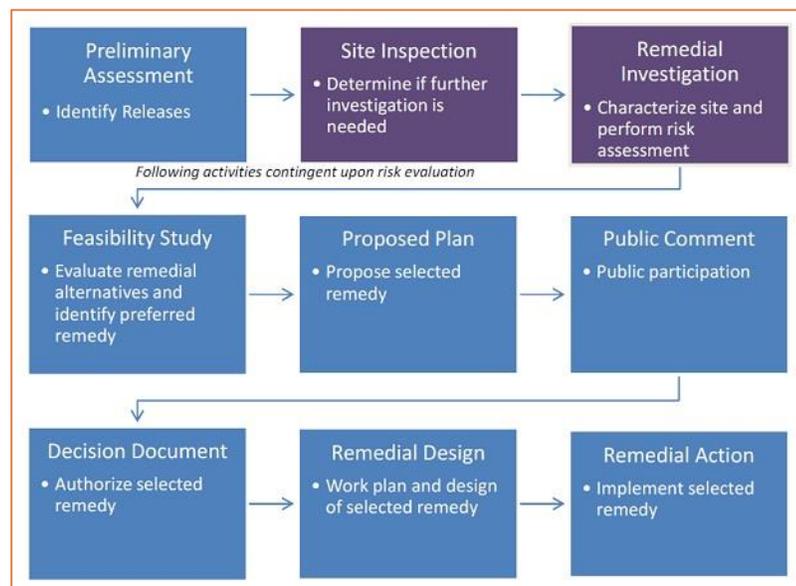
2009 and On

In 2009, a goal was established to better understand contaminants left by past mining operations and how they impact the environment and what risks they have to community members in the area of the mine. The BLM is acting as the lead agency, working also with the Alaska Department of Environmental Conservation (ADEC) and the US Environmental Protection Agency (EPA).

The cleanup at RDM is being conducted under the Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA).

What Are The Steps of the Process Outlined Under CERCLA?

1. A Remedial Investigation (RI) is conducted to outline what is taking place at the site of interest. Studies



are conducted and the problem is identified.

2. Next a Feasibility Study (FS) is done, identifying 4 possible ways to clean up the RDM site

3. Once these are complete, a Proposed Plan is issued to the public, basically describing the RI/FS process and outcomes in an understandable manner.

4. Public comment and community meetings take place following the proposed plan, and once comments are

- taken into consideration along with all of the other findings,
5. A Record of Decision (ROD) is issued with the final decision on how to proceed with cleanup at RDM.

What Has Already Been Completed Under This Process?

The RI/FS has been finalized and a Draft Proposed Plan has been created. In the Feasibility Study, there are 4 different alternatives of dealing with the site as a whole that they will need to decide between:

1. No action
2. Leave tailings where they are, and put up signs and fences around the site, thus reducing the risk of exposure to wildlife and human populations
3. Remove the tailings in and next to creek where water leaches tailings – build a repository up above the creek where there is a flat area, move the tailings there and cover it with something to prevent leaching
4. Excavate the tailings the same as #3 but barge it out instead of moving it to another location on site.

That decision will be made and presented in the Proposed Plan for remediation of the Red Devil Mine. The Draft Proposed Plan is still under review, and the BLM expects to release it in 2017. The BLM will offer a 60-day public comment period and hold public meetings in interested communities along the Kuskokwim River and in Anchorage.

As part of this process, an Engineering Evaluation/Cost Analysis was conducted in 2014 for Early Action to take place at the RDM Site. This Early Action took place in the summer of 2014 and included realigning a portion of Red Devil Creek, moving the largest tailings pile away from the creek, and constructing a retention basin in the creek downstream of the tailings pile to catch future eroded tailings. This action was intended to stabilize the movement of tailings until site-wide action can be performed.

In 2015, the BLM initiated a Supplemental RI to address outstanding questions regarding groundwater and sediment in the Kuskokwim River. A draft of this report was sent to agency review in May 2016, and is still awaiting final comments. Once that is complete, a Supplemental FS will follow that will evaluate remediation alternatives for the groundwater and river sediment concerns.

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GEORGETOWN TRIBAL COUNCIL INVOLVEMENT & PUBLICATIONS

Timeline of Involvement & Publications

2010

- ▶ GTC Environmental Coordinator documents RDM Clean up History in Website Post, information is outlined in this report, above.

2011

- ▶ April 2011: GTC Environmental Coordinator and Tribal Administrator attend BLM Regional Workshop regarding the Red Devil Mine environmental investigation, held April 6, 2011 in the Anchorage field office.
- ▶ May 2011: GTC Blog Article: How Much Pike from the Yukon Delta NWR should women and children eat?
- ▶ June 2011: Mid-Kusko Mercury in Burbot Fact Sheet Issued by the Alaska Department of Health & Social Services Division of Public Health on June 2, 2011 and GTC shares information with Tribal members

2012

- ▶ June 2012: Tribal Administrator and Environmental Coordinator attend presentation given by BLM in Anchorage office.
 - Blog article posted about meeting June 9, 2012.
- ▶ September 2012: Blog Article written about dissatisfaction of RDM Cleanup
- ▶ November 2012: GTC submits letter to EPA Administrator, Lisa Jackson, requesting that the EPA place the 10-acre Red Devil Mine site on the Superfund list of national pollution cleanup priorities.
 - EPA responds, stating that they were working to develop a mutually agreeable document that would clarify responsibilities of all three agencies working on the project (EPA, BLM, ADEC). This agreement would allow cleanup to occur under an alternative process “equivalent to the process that would be used if the site was placed on the National Priorities List”.

2013

- ▶ November 2013: Blog article: Update of RDM Cleanup
- ▶ December 2013: GTC E-newsletter article about RDM

2014

- ▶ January 2014: Blog Article written on Update from BLM about RDM
- ▶ February 2014: GTC hosts BLM at meeting in GTC office in Anchorage mostly regarding EECA that was published about Early Action Cleanup at RDM Site
- ▶ February 2014: Blog article on Early Action/EECA Available for Public comment
- ▶ March 2014: GTC submits comments on early action and passes resolution in support of public comments
 - BLM responds with answers to questions
- ▶ August 2014: E-newsletter article written with photos from BLM of Early Action Cleanup

2015

- ▶ No activity

2016

- ▶ August 2016: Blog article and Annual Meeting presentation by Environmental Coordinator about RDM Cleanup Update