

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street San Francisco, Ca. 94105-3901**

September 30, 1993

MEMORANDUM

TO: Iron Mountain Mine Site File

FROM: Rick Sugarek
Remedial Project Manager



THROUGH: Greg Baker, Section Chief
Northern California Section



Dave Jones, Chief
Remedial Action Branch

SUBJECT: Five-Year Review of the Partial Cap Remedial Action at Iron Mountain Mine

I. BACKGROUND

Iron Mountain Mine is located in the southeastern foothills of the Klamath Mountains, approximately nine miles northwest of the city of Redding, California. Between the 1860's and 1962, Iron Mountain Mine (IMM) was periodically mined for silver, gold, copper, zinc, and pyrite. The mine area includes extensive underground workings, side hill and open pit mining areas, waste rock dumps and tailings piles.

The rugged topography of the area is typical of a mountainous region with steep slopes bisected by streams. Elevations range from 600 feet on the Sacramento River several miles east of the mine property, to 3,800 feet on the top of Iron Mountain. The climate is characterized by warm, dry summers and cool rainy winters.

The environmental problems associated with the Iron Mountain Mine site derive primarily from the discharge of acid mine drainage (AMD) containing extremely high concentrations of toxic heavy metals. The IMM AMD discharges are characterized by the extremely low pH of the mine waters and the runoff from the waste piles. The AMD contains high concentrations of copper, cadmium and zinc which are harmful to aquatic life and pose a potential threat to human health. The IMM AMD discharges to creeks which flow into the Sacramento River. The creeks draining Iron Mountain are essentially lifeless. The IMM AMD discharges have significantly contributed to the decline of the Sacramento River historic level. The Winter Run Chinook Salmon has been federally designated as a threatened species.

On October 3, 1986 EPA signed a Record of Decision (ROD) for an interim remedial action for the IMM site. The selected remedial action included source control components to begin lessening the AMD discharges from the mine workings and waste piles, and water management components to provide for increased control of the continuing AMD discharges.

The 1986 ROD selected "partial capping" of Iron Mountain to reduce rain and groundwater infiltration to the exposed mineralized zones of the mine workings where a significant portion of the AMD is formed. The "Partial Cap" included capping the open pit mine, Brick Flat Pit (BFP), with a synthetic liner, and capping seven collapsed zones above the mine workings with an impermeable soil cap.

II. STATUS OF THE REMEDIAL ACTION

EPA commenced the "Partial Cap" remedial action in the summer of 1988. EPA substantially completed the cap prior to the 1988-89 rainy season, and completed construction in the summer of 1989 after the rains abated.

The caps have been regularly inspected over the past four years to insure that the remedial action has remained effective for the purposes for which it was selected. Normal and expected maintenance actions for minor erosion of the soil cover and clean-out of the storm water ditches has been required and performed. No unexpected maintenance actions have been required.

III. PROTECTIVENESS OF THE REMEDIAL ACTION

The caps appear to be in excellent condition. This confirms that the design and construction activities were well performed.

The caps appear to be performing as anticipated. EPA cannot quantify the overall effectiveness of the remedial action at this time due to a need to evaluate the remedy over a wet weather period. Several years of record are required due to the great variability in AMD discharges with weather variation. The caps are expected to contribute to control of the AMD discharge to a greater extent during periods of high rainfall. Northern California has experienced drought conditions over the past several years and, therefore, several years of wet weather will be required to establish the contribution of the "Partial Cap" to the site remedy.

IV. FUTURE ACTIONS PLANNED

EPA has performed two RI/FS's for two additional Operable Units at IMM subsequent to the 1986 ROD. EPA signed Records of Decision for the Boulder Creek OU on September 30, 1992, and the Old/No. 8 Mine Seep OU on September 24, 1993. The ROD'S selected the collection and treatment of AMD discharges from several mine workings. The IMM treatment plant is currently being designed. Portions of the design have been approved and construction is commencing. Construction of the first phase of construction will enable full treatment of the IMM AMD discharges to begin by March 15, 1994.

As part of the treatment plant, EPA is making engineering improvements to BFP to enable its use as a landfill for disposal of the treatment plant sludges. The modifications include the augmentation of the existing synthetic liner with a second liner and filtration collection system. The previously constructed cap for BFP will become part of the selected treatment remedy. The treatment remedy is compatible with the intent of the initial remedy, to exclude infiltrating waters from reaching the mineralized zones to form AMD.

EPA is currently designing an Enlargement to the Spring Creek Debris Dam (SCDD). This water management component was selected in EPA's 1986 ROD. Implementation of this component was deferred until completion of the source control studies performed above. EPA anticipates that an additional year will be required to complete the design. Construction is anticipated to require three years and be completed by December, 1997.

EPA anticipates that an additional RI/FS will be required to address several waste piles, seeps, contaminated sediments in the creeks, contaminated sediments in the Spring Creek arm of Keswick Reservoir and downstream. Additional studies may be performed to address further remedial actions for the Richmond, Lawson, Old Mine and No. 8 Mine AMD discharges to reduce the long-term dependence on treatment.