



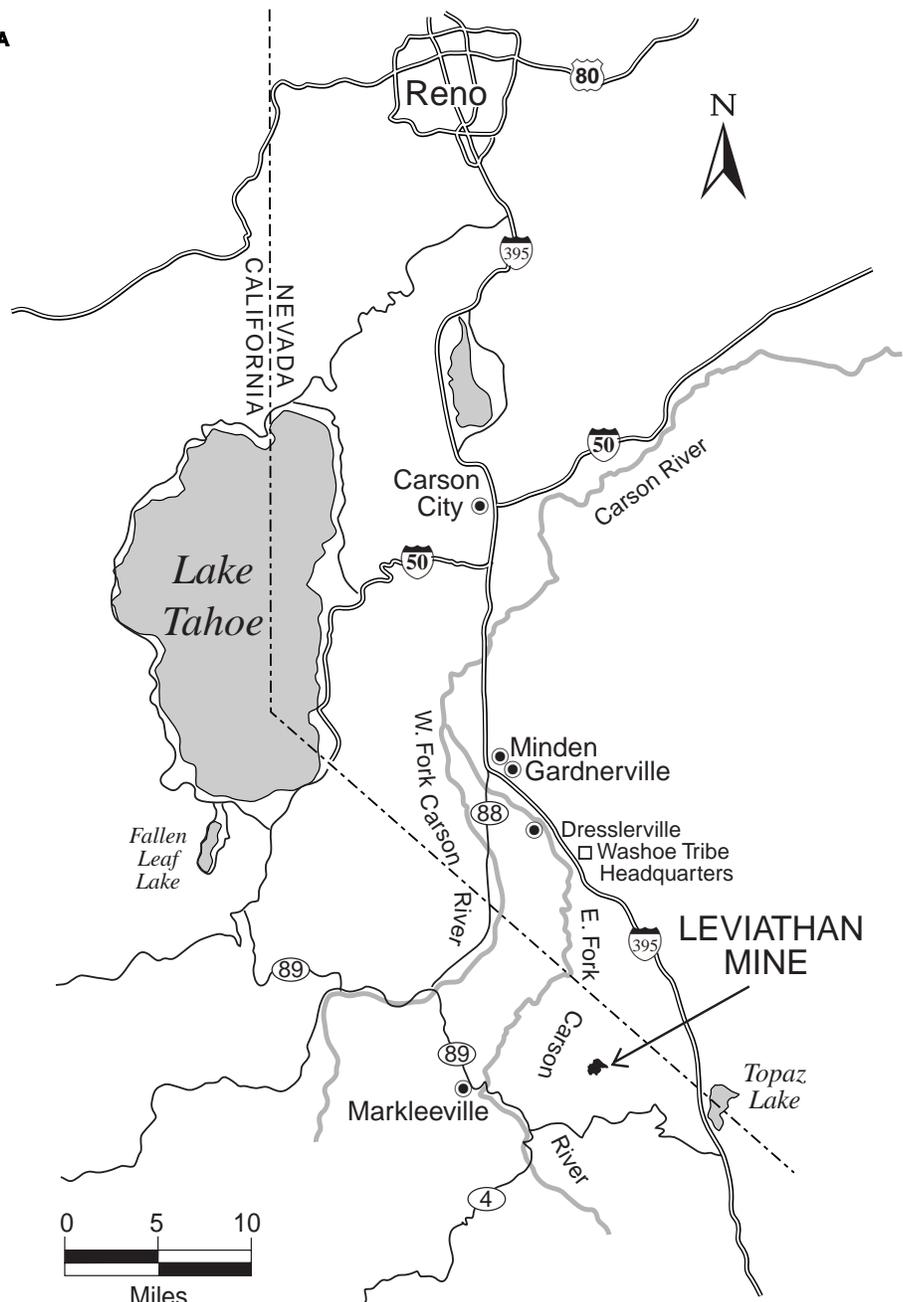
LEVIATHAN MINE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY • REGION IX • SAN FRANCISCO, CA • NOVEMBER 2001

UPDATE ON CLEANUP ACTIVITIES

ALPINE COUNTY, CALIFORNIA

This fact sheet provides information on the most recent cleanup activities at Leviathan Mine, which was made a federal Superfund site in May 2000. By being on the list of the nation's most hazardous waste sites, known as the National Priorities List, the investigation and cleanup of Leviathan Mine benefits from resources that would not otherwise be available. The listing has also helped the U.S. Environmental Protection Agency (EPA) secure continued assistance from the potentially responsible parties, ARCO (the successor to the Anaconda Company, a former owner and operator of the mine) and the State of California (which acquired the property to reduce the pollution). EPA is overseeing efforts to control and treat the harmful acid mine drainage that continues to come out of the mine, affecting land and water bodies downstream. EPA will continue to provide regular updates on Leviathan Mine activities to communities near the mine and other interested parties.



Site map of Leviathan Mine and surrounding areas

Site History

The Leviathan Mine property includes approximately 250 acres of disturbed land located in a remote part of Alpine County, California, approximately six miles east of Markleeville near the California-Nevada border (see map front page). The mine was first developed in 1863 as a source of copper sulfate for processing silver ore at the Comstock Mines in Virginia City. From 1872 to 1935 the mine was inactive, but then it was reopened for development of the sulfur body until it was closed again in 1941. When the Anaconda Company purchased the property in 1951, they decided to extract the sulfur by open-pit methods, generating tens of millions of cubic yards of mine waste.

It was during this period that the first indication of serious pollution problems surfaced. In 1952, a fish kill occurred in the Carson River and Bryant Creek when an old mine shaft was breached and a large quantity of highly acidic and toxic water flowed into Leviathan Creek. Anaconda did not take effective measures to stop the pollution before the company discontinued operations in 1962 and sold the mine to a small local company. This company did not have financial means to prevent pollution problems from increasing over the years.

In the early 1960s, the California Regional Water Quality Control Board, Lahontan Region (Regional Board) became involved at Leviathan Mine and, in the early 1980s, negotiated a settlement with ARCO. (The State of California now owns the Leviathan property.) Following this settlement, the Regional Board began working on actions to minimize the effects of pollution from the mine site including filling and regrading the mine pit and waste rock piles, channelizing Leviathan Creek, attempting to revegetate portions of the site and constructing evaporation ponds to catch a major portion of the acid mine drainage.

EPA became involved in the Leviathan Mine situation following a 1997 request by the Washoe Tribe of Nevada and California. The Tribe was particularly concerned about the effects from the overflow of the evaporation ponds on Washoe tribal land downstream from the mine. Besides concern over potential human health impacts from mine contamination, the Washoe Tribe's desire to protect and restore their cultural and natural resources prompted them to pursue federal assistance.

Prior to Leviathan Mine being made a Superfund site, EPA and the Regional Board continued attempts at controlling the acid mine drainage by increasing the storage capacity of the holding ponds and trying innovative treatment methods to neutralize the contaminated water. These early efforts, though not always successful, provided a strong foundation for the most recent efforts toward a long-term solution described below.

The Problem

Acid mine drainage from Leviathan Mine is extremely harmful to the environment and, potentially, to human beings. It is formed when rain, surface water and groundwater come in contact with sulfur present in the waste rock. Sulfuric acid is formed from this contact and it leaches heavy metals from the waste rock. These dissolved metals – copper, arsenic, iron, nickel and others – drain into creeks and are present in amounts that are particularly damaging to fish and other aquatic life. One obvious problem with acid mine drainage from the site occurs primarily when the evaporation ponds (which can store up to 15 million gallons) overflow during the spring snowmelt and heavy rains, releasing acid solution directly into Leviathan Creek and the Carson River watershed. The Carson River, a major water source, is used for agriculture and recreation and has been habitat for the threatened Lahontan Cutthroat Trout (as are the affected Leviathan and Bryant creeks). Besides the pond overflow, contamination enters the area from other parts of the site, including underground channels and seeps, one of which is known as the Channel Underdrain.

Recent Accomplishments

Significant progress was made at Leviathan Mine this past summer. The Regional Board used a lime neutralization method to successfully treat all four million gallons of highly contaminated water that was stored in 12 acres of evapora-

tion ponds. This water had become very concentrated with contaminants after years of evaporation. The treated water met EPA's preliminary goals and was discharged into Leviathan Creek. In addition, the Regional Board also separately treated approximately one million gallons of mine drainage produced since January 2001 which had not been concentrated. Treating this new, less concentrated water showed this system could operate rapidly and reliably, giving us great hope for future treatment of ongoing mine drainage.

We were able to demonstrate how the contaminated groundwater flowing from the Channel Underdrain can greatly impact the water quality of Leviathan Creek. During the months that ARCO tested a system to capture and treat this source of acid mine drainage, the water quality of Leviathan Creek showed a marked improvement over that measured in previous summers. ARCO succeeded in treating nearly 1.5 million gallons during two months. Where the entire two-mile stretch of the creek below the mine had been bright orange and acidic during previous summers, sections of the stream appeared clear and much cleaner. Although it is too early to understand the long-term effects, trout were observed this summer actively feeding in Bryant Creek immediately downstream from Leviathan Creek. Even the mine waste sediment coating the bottom of the creek appeared to have diminished in comparison to previous summers. ARCO constructed and operated a separate lime neutralization system to treat this pollution from the Channel Underdrain,

producing cleaner water for the two months it was in operation. ARCO will be making modifications to this system that should allow it to operate all year in harsh mountain conditions and with very little human attention required. Weather conditions at the site are extremely variable, and our past experiences at Leviathan Mine have shown us that this has enormous impacts on cleanup success.

Working Toward a Long-Term Solution

What we accomplished and learned from this past summer's activities has given us a clearer picture of what remains to be done before we can propose a long-term cleanup plan for Leviathan Mine. As the water quality improves over the next two years, we will be able to more thoroughly assess the remaining threats to human health and the environment. EPA will oversee a thorough risk assessment of the site that will evaluate potential risks and help us set cleanup levels that will protect people and the environment. Information from the community is essential for developing an accurate picture of possible risks. The more we know about how people actually use the resources that might be affected by the mine, the better we can address concerns. **Therefore, we are asking for input from community members and others who use downstream resources. If you have information that will help EPA with our risk assessment, please feel free to contact either of the EPA staff members listed at the end of this fact sheet.**

We will continue to explore alternative and innovative technologies for the site. The University of Nevada-Reno, ARCO and EPA research scientists are preparing to expand

a biological treatment system that has shown great promise in full-scale tests on another source of acid mine drainage at Leviathan Mine called the Aspen Seep. This system has the potential to run all year with very little operator attention, an extremely important consideration for an area where snow blocks equipment access for as much as nine months out of the year. The biological system has treated over 2.5 million gallons during 2001. Once the most urgent water quality issues are addressed, increased attention will be focused on revegetating the entire 250-acre mine site, and we will build on the Regional Board's years of experimentation and experience in this regard. Other areas that must be better understood in order to arrive at a long-term solution include the effects of contaminated sediment already in the creek and a better knowledge of surface runoff patterns. EPA will rely on both national and local expertise to address these many issues in a final plan to be developed over the next several years.

Technical Assistance Grants

EPA offers Technical Assistance Grants (TAGs) to community groups to promote technical understanding of Superfund site issues. Through this increased technical awareness, citizens may be better able to participate in the Superfund decision-making process. The TAG program provides up to \$50,000 to qualified groups affected by a Superfund site so they may hire a technical advisor to help them understand and comment on site-related information. Only one TAG is available per Superfund site. For more information on the TAG program, please contact Vicki Rosen, Community Involvement Coordinator (see back page).



MAILING LIST COUPON

If you would like to continue receiving information on the Leviathan Mine site or know of others who would be interested in being on our mailing list, please return the coupon to: Vicki Rosen, Community Involvement Coordinator, U.S. EPA, 75 Hawthorne St. (SFD-3), San Francisco, CA 94105.



Name: _____

Mailing Address: _____

City: _____ State: _____ Zip: _____

FOR MORE INFORMATION

If you have questions or concerns about the Leviathan Mine site, please do not hesitate to contact any of the people listed below:

Kevin Mayer
Remedial Project Manager
(SFD-7-2)
(415) 972-3176
mayer.kevin@epa.gov

Vicki Rosen
Community Involvement Coordinator
(SFD-3)
(415) 972-3244
rosen.vicki@epa.gov

U.S. EPA
75 Hawthorne St.
San Francisco, CA 94105

You may also contact the above EPA staff **toll-free at (800) 231-3075**.
Please leave a message, and your call will be returned.

Washoe Tribal Contact:
Rob Greenbaum
Resources Policy Advisor
Washoe Tribe of Nevada and California
919 U.S. 395 South
Gardnerville, NV 89410
(775) 883-1446 ext. 155 or (530) 694-2339 ext. 155
rmg-washoe@saturnnet.com



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75 Hawthorne St.
San Francisco, CA 94105
Attn: Vicki Rosen (SFD-3)

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