

United States Environmental Protection Agency
Region IV
POLLUTION REPORT

Date: Saturday, May 24, 2008

From: Leo Francendese

Subject: Capping/Pit Treatment/ Water Quality Improvements Continue
Barite Hill Nevada Goldfields
McCormick, SC
Latitude: 33.8711000
Longitude: -82.2972000

POLREP No.:	10	Site #:	A4NZ
Reporting Period:	5-3-08 thru 5-24-08	D.O. #:	
Start Date:	10/15/2007	Response Authority:	CERCLA
Mob Date:	10/15/2007	Response Type:	Time-Critical
Demob Date:		NPL Status:	Non NPL
Completion Date:		Incident Category:	Removal Action
CERCLIS ID #:		Contract #	
RCRIS ID #:			

Site Description

The Barite Hill/Nevada Goldfields site is located approximately 3 miles south of McCormick, South Carolina between US 378 and US 221 on the northern side of Road 30 in McCormick County, South Carolina. The mine site is relatively remote; there are no buildings, homes, or commercial buildings within 0.5 miles of the boundary. The site actively mined gold from 1991 to 1995. From 1995 until Nevada Goldfields filed for Chapter 7 Bankruptcy in 1999, the reclamation of the site was being addressed by Nevada Goldfields. On July 7, 1999 Nevada Goldfields handed the facility's keys to SCDHEC and abandoned the site.

The site is located along a topographic high ridge area forming the headwaters of an unnamed tributary to Hawes Creek. The topography of the area consists of rolling hills with ridgelines at an elevation of about 500 feet. Within the site, the ridgeline comprising the site has a high point of about 510 feet and an average elevation of approximately 480 feet.

The permitted mine site totals 795.2 acres. Of this total, 659.7 acres are designated as buffer area (areas not disturbed beyond the pre-mine natural state); therefore the maximum disturbance area is 135.5 acres.

The facility used a cyanide solution in a heap leach process to extract gold from ore. There are 7 processing ponds and 1 sediment pond onsite. Three large, multi-acre waste rock piles exist in varying condition. Each waste rock pile has the potential for producing acid. Storm water run on and runoff are not controlled at the site. The Main Pit ("Acid Pit") from the mining operations remains. The 10 acre Acid Pit contains approximately 60,000,000 gallons of water with an average pH of 2 ~ 2.2 and a high dissolved metal content. Seeps from the Acid Pit containing acidic water with high dissolved metal content are being released to the northern unnamed tributaries of Hawes Creek which borders the pit at a rate of approximately 5 gpm.

As per a referral by the State of South Carolina, the EPA Region 4 Removal Program conducted a Removal Site Evaluation (RSE) according to the National Contingency Plan (NCP). During the RSE of March 2007, the OSC conducted an emergency response whose scope included the demolition of a furnace building and onsite neutralization of over 2000 lbs of varying strength acids and bases. As of 9/19/07, the Agency has approved an Action Memorandum to conduct a removal action. The removal action commenced on 10/15/07 and includes a Bureau of Reclamation designed cap for the 250,000 CYS of acid producing waste rock adjacent to the Acid Pit, Acid Pit neutralization and cyanide deactivation in one of the onsite process ponds.

The project is expected to take about 12 to 16 months to complete and is projected to cost approximately 4,000,000 dollars. Details concerning this action can be found in both the documents section and Pollution Reports (POLREPS) which are updated on a periodic basis.

Current Activities

CONSTRUCTION ACTIVITIES

- Patented carbon loading treatment continued as part of the Acid Pit treatment strategy. An additional load of 24 tons of specifically blended molasses was applied on the 21st (targeted to the deeper layers of the lake) as well as a tanker truck of 23 tons of sodium hydroxide focused on the upper levels of the pit lake.
- Total additions to the Acid Pit include:
 - approximately 400 tons of molasses blends,
 - 21 tons of methanol,
 - 1,300 tons of fresh and aged woodchips,
 - 23 tons of sodium hydroxide,
 - 1,860 tons of carbide lime (hydrated).
- Analytical results (dissolved) from the Acid Pit confirm the following at the 5 foot depth within the lake:
 - Cu reduced from 300 ppm to < 0.02 ppm
 - Al reduced from 260 ppm to ND
 - As reduced from 0.27 ppm to ND
 - Zn reduced from 40 ppm to < 1.0 ppm
 - Fe reduced from 1,150 ppm to < 150 ppm.
- Additionally, the seep water quality from the Acid Pit is improving, particularly for aluminum, copper, and lead. Notably copper has been reduced by 82%, from 66 mg/L to 12.2 mg/L, indicating that removal of soluble copper from the Acid Pit water column has begun to show up as improved down-gradient water quality. Modeling indicates that it is likely that improvements to the seep water quality could lag the improvements in the pit water quality by as much as 100 days due to sorbed contaminants contained in the porosity of the seepage zones.
- The Acid Pit retains ORP conducive to bacterial growth, and exhibits signs of ongoing metabolism as evidenced by visible carbon dioxide bubbling. Analytical results indicate that sufficient concentrations of soluble organic carbon (TOC) has been provided and remains in the water column to drive complete metal reduction of the existing dissolved metals and additionally a significant portion of the reducible sediments (FeOOH). In addition ferric (the acid producing variety of iron) is ND and the remaining iron exists in the ferrous state as bacteria continue to reduce and convert the remaining iron to FeS (iron monosulfide) and FeCO₃ (iron carbonate) which is being formed as a dense, non-reversible sediment at the bottom of the Acid Pit. Caustic soda was added to assist in the maintenance of soluble alkalinity at sufficient concentrations to buffer against minor and declining acid inputs. The pH continues to retain an approx average of 6.0-6.5. Modeling of the potential for remaining acid inputs is being conducted to determine the appropriate level of soluble alkalinity to target in the lake water. Large amounts of insoluble calcium-based alkalinity has been provided as a continual source of alkalinity on the pit lake bottom, which with sufficient soluble sodium-based alkalinity can be re-dissolved from the sediment layer to replenish any consumption of near-surface alkalinity that may occur from transient acid inputs.
- Excavation/transport and grading of site sourced clay to the former north and south waste rock piles continue according to the BOR design.
- As per SCDHEC request, the pyritic cliff face to the north of the constructed spillway has been graded and is being capped. The rock was loose enough to grade without blasting and will be capped with available on-site saprolite, clay and growth media.
- Approximately 1500 tons of rip rap have been delivered to the site for use in cap construction.
- To date, Georgia Pacific delivered approx 1500 CY of donated material to be used as topsoil. GP has agreed to screen the material before further delivery at no cost to the project. Carbon and nitrogen analysis has been completed and amounts of nitrogen fertilizer amendment are being formulated to create a suitable carbon to nitrogen ratio for revegetation requirements.
- SCDHEC is currently working on submitting suitable vegetative alternatives for the cap.

INVESTIGATION/EVALUATION ACTIVITIES IN SUPPORT OF BOR DESIGN

- BOR Spillway design calculations are 90% complete.
- Satellite recorded mini-trolls continue to operate in the Acid Pit at 5' and 40' measuring parameters such as DO, ORP, pH, temperature and turbidity.
- Please see www.isi-data.com for updates 4 times a day. Login:jharrington Pass: jharrington.
- Weather station continues to monitor and record daily work conditions.

MEETINGS/PUBLIC AFFAIRS

- SCDHEC representatives were onsite 5-21-08 to survey the progress. The State continues to be satisfied with the pace, design and success of the project.
- Discussions continue regarding the potential for a US based mining/restoration company to pursue taking on post removal operations and maintenance.

- The EPA R4 HRS Site Assessment coordinator was onsite as well on the 21st conducting a site walk-through.
- On 5-9-08, BOR lead designer and the OSC met in Atlanta with the EPA R4 RPM to coordinate as requested monitoring wells for the cap. The Remedial Program will provide funding for design and installation.
- Several large, museum quality pieces of barite crystal that were unearthed during the grading were donated to the University of South Carolina and the State Museum. Clemson University has also been contacted.

response.epa.gov/baritehillnevadagoldfieldsremoval