NPL Site Narrative for Ely Copper Mine

ELY COPPER MINE
Vershire, Vermont

Conditions at Proposal (June 14, 2001): The Ely Copper Mine is an abandoned copper mine located in a rural setting off Beanville Road in Vershire, Orange County, Vermont. The property encompasses approximately 1,800 acres, about 275-350 acres of which were used for copper mining activities from 1821 to 1920. Since 1920, the mining operation has been inactive, except for the removal of "dump-ore" from the property to South Strafford between 1949 and 1950. Currently, the property is owned by Ely Mine Forest Inc. and Green Crow Corporation. Portions of the property are managed for commercial timberland.

The mining operation extends from Ely Brook and continues up a steep slope towards a ridge. Piles of waste rock, smelter waste, and tailings that were generated from mining processes are located on the property. The smelter waste pile is located along the southern section of the property and covers approximately 4.3 acres. This pile consists of slag that exhibits a metallic luster. The tailings pile is located at the central section of the property and covers approximately 10.8 acres. This pile is comprised of a fine-grained material, reddish-brown in color at the surface. Seeps were noted along the western section of the tailings pile. Two intermittent mine drainage streams drain the property. Mine drainage stream "A" flows adjacent to the west side of the tailings pile. Mine drainage stream "B" flows over the tailings pile. The mine drainage stream beds are stained orange-reddish brown due to surface water runoff from the tailings pile on the property.

Remnants of stone works from past mining operations are located throughout the property. There is minimal vegetation in the areas of the waste rock pile, tailings pile, and the smelter waste pile on the property. Woodlands surround the mine property. Downed trees and areas dammed by beaver activities were evident in the Beaver Pond section of the property. The Ely Copper Mine has no restrictive barriers to pedestrian access. During a November 1999 field event, a gate that previously restricted vehicular entry to the access road was observed to be unlocked, damaged, and in an open position. In addition, several people were noted using the property for various types of recreation (hunting, hiking, recreational vehicle use). A gun club has permission to access the property for hunting.

Past mining operations at the site included cobbing, roasting, and smelting the ore. The ore mined at the site averaged 3.3 percent copper. The ore was fragmented or cobbed to a product containing approximately 7 percent copper. Ultimately the ore was smelted to produce a copper matte, a molten mixture of copper/iron sulfide material. In 1918, a flotation mill was built to extract additional copper from existing waste piles on the property. In 10 months, the extraction operation generated 19,000 tons of waste material averaging 1.34 percent copper. According to the volume calculation by the Bureau of Mines, copper mining production generated approximately 100,000 tons of tailings and slag on the property.

The Ely Copper Mine has been investigated by State and Federal agencies, and private companies. As part of the various studies, a number of samples of the mine tailings, slag, surface water, soil, sediment, and ground water have been collected and analyzed for metals. Analytical results indicate elevated metal concentrations relative to background concentrations. Additionally, the Vermont Department of Environmental Conservation (VT DEC) collected water samples and inventoried fish species in Ely Brook in 1988. Blacknose dace were present downstream of the confluence with the mine drainage stream and

Ely Brook and blacknose and longnose dace, slimy sculpin, brook trout, and rainbow trout were found upstream of the confluence with the mine drainage stream and Ely Brook. VT DEC concluded in 1991 that copper constituents have impacted the macroinvertebrate community of Ely Brook, downstream of the confluence with the mine drainage stream. Furthermore, another macroinvertebrate survey on Ely Brook was conducted by the Bureau of Mines in 1995 to determine the impact of the discharge from the Ely Copper Mine. It was concluded that the mine drainage from Ely Copper Mine has "slightly" impacted the water quality of Ely Brook as noted by physical and biological factors.

The tailings on the property are rich in metals and sulfides. As water passes over and through the tailings, sulfuric acid is produced and the metals within the tailings are dissolved and mobilized. This results in acid mine drainage.

The Bureau of Mines conducted an experimental biological treatment system of the mine drainage at Ely Copper Mine in 1995. A portion of the drainage stream was passively treated with manure, compost, wood chips, and limestone, which served as a bacterial sulfate reduction system to precipitate metals. This treatment system consisted of five 32-gallon barrels in series that intercepted flow in the mine drainage stream. In addition, water samples from the system and two mine drainage streams were collected monthly. In 1995, the treatment system continued to remove metals and sulfate, add alkalinity, and increase the pH of the mine drainage. However, water quality data was inconsistent because of the lack of regular monitoring and maintenance of the system.

Status (September 2001): EPA is considering various alternatives for this site.

For more information about the hazardous substances identified in this narrative summary, including general information regarding the effects of exposure to these substances on human health, please see the Agency for Toxic Substances and Disease Registry (ATSDR) ToxFAQs. ATSDR ToxFAQs can be found on the Internet at ATSDR - ToxFAQs (http://www.atsdr.cdc.gov/toxfaqs/index.asp) or by telephone at 1-888-42-ATSDR or 1-888-422-8737.