

## SELBAIE MINE DEVELOPS ENVIRONMENTAL PROGRAM TO CONTAIN ACIDIC WATERS DURING THE SNOW-MELTING SEASON

*The Selbaie base metals mine, located about 140 kilometres north of La Sarre in Quebec, northern Canada, operated from 1981 to January 2004. The mine site consists of 575 hectares of disturbed area, which includes environmental control systems to manage water impacted by the 33 million tonnes of mineralised waste rock that was created during operations. Concurrent rehabilitation of the waste rock pile and the mine site has been progressing since 2000. In 2003, in an area east of the waste rock pile, water containing dissolved zinc, iron and copper was discovered escaping to a fresh water diversion and to the environment. An action plan has been put in place to fully contain all seepage from the waste rock pile.*



► Waste rock pile at Selbaie Mine with acid collection pond in the foreground. The area of release from ditches is in the top right corner.

### Background

Acid water seepage resulted in the release of poor-quality water outside the containment system. This seepage condition went undetected until a characterisation study of the area was carried out for the reclamation planning. Verbal and written reports were then filed with the Quebec government. The Ministry of Environment issued two notices of infractions: failure to report the spill without delay; and the release of contaminants to the environment. The two notices have not as yet resulted in the laying of formal complaints.

The escape of acid water is believed to have occurred over a number of years during spring snowmelt, when the release was not visible under the snow and ice, and in heavy rainstorms. During the latter years of the operation, there was no monitoring in the area as the ditching systems for the acid waters were considered adequate. Once the site was sampled, the delay in reporting resulted from a lack of understanding of the significance of the data for what was considered a minor stream.

### The action plan for prevention

The area east of the waste rock pile is a flat, 60-hectare tract of peat bog. The objective was to design a system to prevent the further escape of acid water and metals, to clean up the affected area and to provide treatment for acidity that could not be contained.

An action plan was presented to the government and included construction of an expanded acid water collection pond; peat and ice excavation in an affected area to the south; improved pumping and acid water collection; and in situ treatment of the drainage ditch to increase the pH and precipitate metals before the water leaves the mine site.

### Implementation of the plan

The acid spill containment program was successfully completed over winter and in time for the spring melt from March to April. The collection and pumping systems will be able to handle normal flows. A major concern was the ability to contain high flows that will arise during the ten-week warming period and retain solids in the treated water. Additional steps were taken that included in situ treatment of the drainage stream using

sodium hydroxide, addition of ferric sulphate to improve settling of fine particles, and hay bales used as baffles to improve settling of solids. These measures will continue for as long as necessary, even after the permanent collection facilities have been installed.

### Monitoring the recovery

Environmental effects monitoring is needed to understand the effects of the acid release and the recovery of the system. Sampling carried out in July and August on and off site will evaluate the biological effects and recovery of the situation on the land and water surrounding the mine site. Soils, water quality, sediments, fish and macroinvertebrates have been sampled.

The objectives throughout the clean-up project are to maintain good communication and transparency with the government, to take all reasonable measures to contain or treat acidity in the stream and, finally, to study the effects and recovery in the environment.

### New collection system

As part of the long-term site reclamation program, a new acid water collection system is being constructed that will fully contain all seepage from the mine waste pile and replace those measures installed over winter. However, allowance has been made to maintain the current facilities for up to five years as a backup measure.

### Action following site-wide review

As a result of discovering the seepage from the waste rock pile, a site-wide monitoring program to check other areas of the plant site was performed. Sampling in April 2004 identified a new area of concern in the west sector. Acid seepage escaped the west sector containment ditch, resulting in environmental effects beyond the Selbaie boundary, which are currently being investigated. An action program similar to that for the waste rock pile containment system is being established.