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The Manitou-Goldex Project: an MRNF-Agnico-Eagle Mines partnership

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Of all the abandoned mine sites in Québec, the Manitou site, which has an area of nearly 200 hectares, is the one that presents the most significant rehabilitation challenge. Over the years, the dispersion and alteration of tailings that generate acid mine drainage have had a major impact on the local environment, particularly the Bourlamaque River. The government considers that this site is in urgent need of rehabilitation.

Following the bankruptcy of the last mining rights holder in 2003, the Ministère des Ressources naturelles et de la Faune (MRNF) took charge of the Manitou site. Several site rehabilitation scenarios have been studied. Using the mill



waste from Agnico Eagle Mines (AEM) Ltd.'s Goldex mine, located in the western part of Val-d'Or, seems to be a very cost-effective solution for rehabilitating the Manitou site.

The Manitou-Goldex project is a test-case for sustainable development as well as being a cost-effective and innovative project. The MRNF-AEM partnership will make it possible to restore the Manitou site to a satisfactory condition. More specifically, wildlife habitats will be re-created, lost fish habitats in the Rivière Bourlamaque will be counterbalanced by revitalizing this segment of the river and, finally, land-use will be optimized, especially by avoiding the creation of a sizable new tailings impoundment and by reducing the need for using natural resources such as sand, gravel and clay.

In addition, this project will have considerable regional economic impacts, since it will lead to the creation of a significant number of jobs in the Abitibi-Témiscamingue region.

The rehabilitation work began in 2006 and will continue for approximately 12 years, which is the Goldex mine's estimated mine life.

Site description and issue

The Manitou site is located about 15 km southwest of Val-d'Or, in the Abitibi-Témiscamingue region. The mining of a zinc and copper deposit from 1942 to 1979 produced nearly 11 Mt of waste that generates acid mine drainage.



The waste deposited in the tailings impoundment without adequate containment spread out around the deposition zone and along Ruisseau Manitou over a distance of

6.5 km all the way to the Rivière Bourlamaque.

Erosion by wind and water significantly contributed to the dispersion of the tailings and to producing acid mine drainage. An area of 200 hectares is also currently considered to be affected by the presence of mine tailings and various contaminants generated by oxidation of the metallic sulphides present in the Manitou mine's tailings.

An innovative partnership approach

The partnership between the MRNF and AEM for rehabilitation of the Manitou mine site is a fine example of the application of sustainable development principles. There are many advantages to this partnership. It will make it possible to:

- rehabilitate the Manitou site at a lower cost to the government. AEM's financial contribution, which is equivalent to the cost of a new 24 Mt tailings impoundment, represents an estimated savings of \$12 million for the government; the total cost of the project is currently estimated at \$47 million;
- put the Goldex gold mine into production without additional delays or costs;
- reduce to a minimum the amount of natural resources (sand and gravel, clay, etc.) required to rehabilitate the site;
- avoid construction of a sizable new tailings impoundment (more than 24 Mt of mine tailings) by using waste from the Goldex mine to rehabilitate the Manitou site.

Manitou-Goldex Project

The goal of the Manitou-Goldex project is to rehabilitate the Manitou site by using waste from the Goldex mine to cover and neutralize the acid generating tailings of the Manitou mine. The tailings from the Goldex mine are cyanide- and sulphide-free. In addition, the neutralizing potential of the waste will make it possible to neutralize the acidity of interstitial water in the tailings from the Manitou site, leading to an increase in pH and the onsite precipitation of metals dissolved in the interstitial water.

The waste from the Goldex mine will be transported to the Manitou site in the form of thickened pulp, containing about 55% solids, by a 24-km pipeline. The Goldex mine's tailings deposition plan provides for four zones and a polishing basin before the supernatant water is returned to the environment.

Two emergency containment impoundments will be set up to reduce the risks associated with tailings transportation. The first, Goldex South, with a capacity of 5 Mt, is located near the Goldex mill. The second will use areas set up at the East Sullivan site, upstream of the Manitou site, west of the Rivière Bourlamaque.

The work will be spread out over about 12 years, which is the anticipated mine life of the Goldex mine. In addition, site closure plans provide for

revegetation of the site and stabilization of the banks of the Rivière Bourlamaque. Finally, the development of a marsh and the restoration of wildlife habitats, especially fish habitats, will be integrated into the work to rehabilitate the site.

Work completed



During winter 2006-2007, more than 10 km of ditches were dug to divert uncontaminated water from part of the drainage basin, with the goal of reducing the volume of water in contact with the mine tailings, mainly

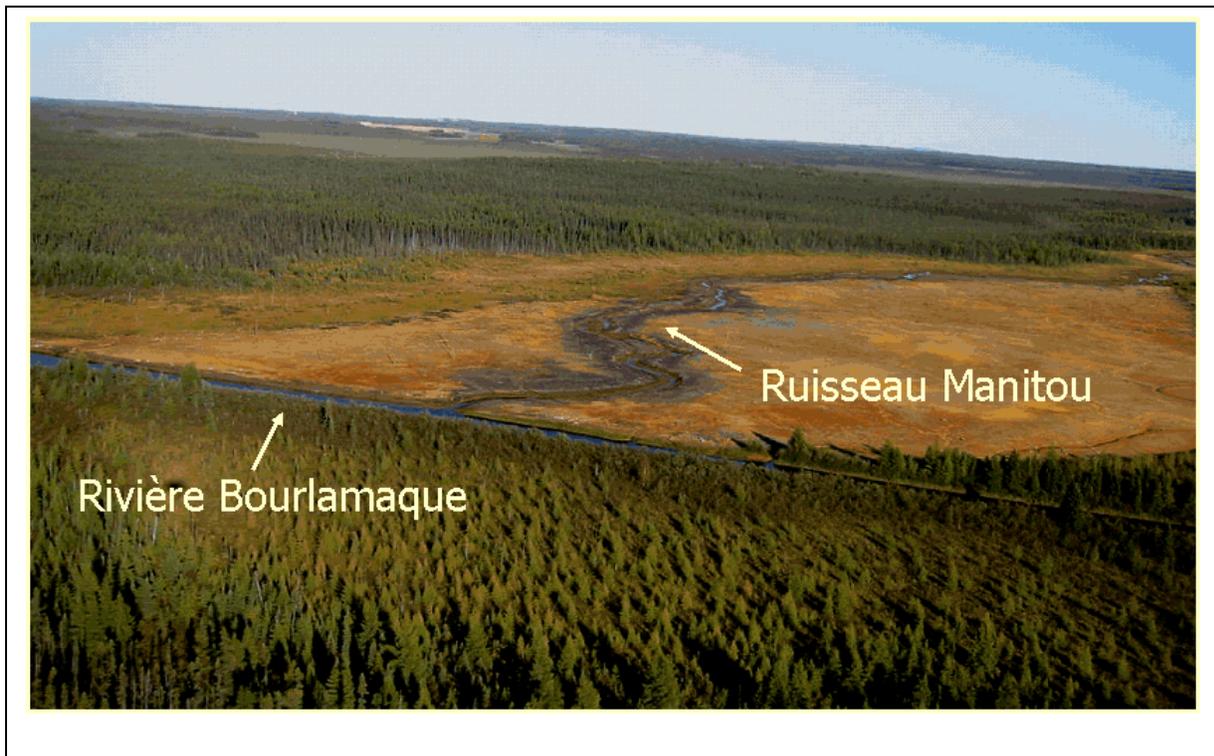
in the discharge zones and in Ruisseau Manitou. The drainage basin, whose initial area was more than 1,700 hectares, was therefore reduced to 690 hectares

In the short term, this work is intended to reduce erosion of the tailings and leaching of contaminants toward the Rivière Bourlamaque. To minimize the impact of the contaminated water flowing from the northern sector toward the drainage basin of the Rivière Colombière, the water was diverted toward Ruisseau Manitou.

The construction of a permanent access road from the entrance to the site to the Rivière Bourlamaque is almost finished. The road will be used for building the pipeline and for monitoring and maintenance throughout the operation.

Upcoming work

The preparation of the Manitou site and construction of the infrastructure for transportation of the tailings will be finished by the end of 2007. The first ore processing tests are planned for early 2008. Therefore, by spring 2008, the first tailings from the Goldex mine could be transported to the Manitou site.



A monitoring program for water quality and cover performance will be implemented once operations begin. The data will be used to measure the degree to which the rehabilitation objectives have been met and to optimize the deposition plan and work methods throughout the project.

Government industry partnership and sustainable development

The discussions initiated in January 2004 led to a framework agreement between the MRNF, the MDDEP and AEM, in November 2006, for the implementation of a government-industry partnership to rehabilitate the Manitou site using tailings from the Goldex mine. A management committee, consisting of representatives from the MRNF, AEM and an independent

expert, is responsible for monitoring the technical and budgetary aspects of the project and for applying the regulations and procedures set out in the framework agreement.

This government-industry partnership in the Manitou-Goldex project is a win-win situation for the partners and is fully consistent with sustainable development.

<http://www.mrnf.gouv.qc.ca/english/mines/quebec-mines/2007-06/manitou.asp>