

INITIATIVES AT NATURAL RESOURCES CANADA TO DEAL WITH ORPHAN AND ABANDONED MINES

Gilles A. Tremblay, P.Eng.

Charlene M. Hogan, M.Sc.

Natural Resources Canada
CANMET-Mining and Mineral Sciences Laboratories
Ottawa, ON K1A 0G1

ABSTRACT

The legacy of orphaned/abandoned mines, with their associated environmental liability, human health concerns and the financial costs of clean up, is a serious issue facing Canada. Canada's long history in mining has resulted in more than 10,000 orphaned or abandoned sites, requiring varying degrees of rehabilitation. Mining regions have become less remote, and are often located close to populated areas, including many Aboriginal communities. A key priority of the federal Department of Natural Resources Canada (NRCan) is to promote the participation of Aboriginal communities in mining activities, including orphan and abandoned mines. Mining is generally regulated at the provincial level, although the federal department of Indian and Northern Affairs Canada maintains most of the responsibility for mines in northern Canada. The National Orphaned/Abandoned Mines Initiative (NOAMI) was established in 2002, in response to the request of the Canadian Mines Ministers that a multi-stakeholder advisory committee be set-up to study various issues and initiatives concerning the development of partnerships in the implementation of remediation programs across Canada. NOAMI is a co-operative Canadian program that is guided by an Advisory Committee consisting of the mining industry, federal/provincial/territorial governments, environmental non-government organizations and Aboriginal Canadians¹. This paper will present an overview of the scope of issues surrounding abandoned mines in Canada, and programs that have been initiated to address the problem.

INTRODUCTION AND SCOPE

Mining has been central to the Canadian economy for over 100 years and Canada is a supplier of mineral commodities worldwide. The long history of mining in Canada has resulted in a large number of abandoned mine sites within all mining jurisdictions. The legacy of orphaned/abandoned mine sites (OAMs), with the associated environmental liability, human health concerns and the financial costs of clean up, is a serious issue facing Canada.

Estimates of abandoned sites (Tremblay and Hogan, 2002) demonstrate the general scope of the problem. Wide variations in the reported numbers are noted:

- Canada - over 10,000 sites (MiningWatch, 2000)
- Ontario - 6,000 historic sites, containing approximately 18,500 individual hazards (Hamblin, 2003)
- Nova Scotia - over 6,000 mine openings
- Québec - 69 tailings sites at an estimated cost of \$67 million (CAN) to rehabilitate.
- British Columbia - 1,898 sites (British Columbia, 2003)
- Manitoba - 290 sites

¹ The term "Aboriginal" refers broadly to First Nations, Métis and Inuit populations in Canada

The problem essentially relates to variations in the way that hazards or features are defined, and what hazards are included in any particular inventory. Improved statistical and technical information is necessary to better quantify the liabilities and would help identify the priorities to which resources are directed in the future.

Mining regions have become less associated with remote areas, and as populations grow, urban sprawl increases, and more people seek a return to rural living opportunities. In other countries, the number of injuries and deaths due to people entering abandoned mines has increased and as a result, public pressure to deal with these abandoned sites has mounted. In Canada, the risk of contact with hazards or environmental impacts associated with abandoned mines is also increasing, and efforts are underway to clean-up many of these sites.

RESPONSE TO THE PROBLEM

In 1999 and 2000, a number of stakeholders put forth requests to the Canadian Mines Ministers to establish a joint industry-government working group, assisted by other stakeholders, to review the issue of orphaned and abandoned mines. The Ministers supported this initiative and requested that a multistakeholder workshop be organized to identify key issues and priorities. In early 2001, a federal-provincial-territorial working group was set up to consider cooperative approaches to dealing with problematic orphaned and abandoned mines in Canada. The working group included several different stakeholders, and was developed to undertake planning for a multi-stakeholder workshop.

The Workshop on Abandoned Mines, held June 2001 in Winnipeg, reviewed the issues for Orphaned and Abandoned Mines (OAMs) and identified processes to move forward. Five major themes were discussed: Building a National Inventory; Community Perspectives; Setting Standards and Rational Expectations; Ownership and Liability Issues; and Identification of Funding Models. The workshop participants developed consensus on guiding principles and specific recommendations. The guiding principles reflected the need for innovative science and technology, cost efficiency, fairness, stakeholder communication, transparency and stewardship, and consisted of the following:

- The remediation of OAMs must be based on concern for public health and safety, respect for ecological integrity, and sustainable development;
- All work currently ongoing with respect to inventory building and site remediation must continue to be based on sound science and good communication among all parties;
- Work toward eliminating future abandonments must continue, including the tightening of regulatory approaches;
- Must implement the "polluter pays" principle;
- Targeted end-use and reclamation standards must be acceptable to local communities;
- Although the objective must be comprehensive reclamation of all sites, the approach must be cost-effective and based on an acceptable method of prioritizing sites;
- Transparency and disclosure must be present in all decision-making processes;
- Encompass the notion of "fairness" in all endeavours.

These guiding principles and recommendations were presented at the Mines Ministers' Conference in September 2001. Ministers agreed on the importance of a large-scale program for the rehabilitation of orphaned and abandoned mines sites, and requested that an Orphaned/Abandoned Mines Advisory

Committee be established to study various issues and initiatives concerning the development of partnerships in the implementation of remediation programs across Canada.

The National Orphaned/Abandoned Mines Initiative (NOAMI) was established in 2002 with a multistakeholder Advisory Committee consisting of members from the mining industry, federal/provincial/territorial governments, environmental non-government organizations and Aboriginal Canadians. In Canada, multistakeholder programs have been set-up to address issues of national importance. The Mine Environment Neutral Drainage (MEND) program, which was the first such partnership program, has served as a model to deal with acidic drainage issues, both in Canada and internationally. NOAMI adopted the MEND framework to develop a policy-based, science-linked program for remediation of orphaned and abandoned mine sites. Natural Resources Canada (NRCan) was designated as the Secretariat for the committee. NRCan also provides the Secretariat for the MEND program, and has strong links to the mining industry, and other provincial/territorial/federal departments. In addition, an NRCan official is a member of the NOAMI Advisory Committee.

Several provinces in Canada have already taken significant steps to address abandoned mines in their respective jurisdictions, and the information garnered from these activities will be invaluable in assisting NOAMI to address these issues on a national and international scale.

For the first two years NOAMI has worked with an annual budget of about \$100K, since raised to about \$300K. These funds are contributed through its federal, provincial and territorial governments and industry partners. The Advisory Committee takes directions from the Mines Ministers and annually reports its activities and recommendations to the Mines Ministers through the Intergovernmental Working Group on the Mineral Industry.

NOAMI has formed Task Groups to address the key program areas.

NOAMI TASK GROUPS

Information Gathering (Towards an Inventory and National Definition)

It is currently difficult to accurately estimate the costs associated with rehabilitating orphaned and abandoned mines across Canada. These sites not well documented with respect to their numbers or their associated physical, health, environmental impacts and liabilities. Further research and compilation of information on abandoned mines is necessary to enable sound decision-making, cost-efficient planning and sustainable rehabilitation. Such information is also necessary to ensure transparency of decision-making and access to information by governments, civil society, industry and other stakeholders.

The problem with the creation of a nation-wide inventory essentially relates to variations in the way that hazards or features are defined, and what hazards are included in any particular inventory. All Canadian provinces with a history of mining, territories and several federal agencies maintain their own inventory of mining and exploration sites that pose a risk to human health and safety or the environment. Many of these inventories only contain the sites that are known to pose a risk and are now the responsibility of the jurisdiction. There is a large discrepancy in the level of detail and

completeness of these inventories from jurisdiction to jurisdiction. The concept of a national database must account for these gaps in coverage, detail and standardization. A system that builds on the strengths of the individual inventories and does not impact their current operational status was recommended.

A principal objective of the Information Gathering Task Group is to develop capacity for a national inventory of orphaned and abandoned mine sites based on compatible inventories from each jurisdiction. A database is essential for comprehensive classification and analyses, but first, a consensus must be reached on the definitions and terminology to be applied to OAMs. This task is being completed in phases.

Phase I was a comprehensive review of Canadian, US and other international efforts to inventory orphaned and abandoned mines. The report “Capacity Building for a National Inventory of Orphaned/Abandoned Mines in Canada” (Cal Data, 2005) is available on the NOAMI web site (www.abandoned-mines.org). The recommendation in Phase I was for a high level inventory that includes all inactive mineral sites, is web-based and has a map interface. A mineral site includes metallic and industrial minerals as well as coal, but excludes granular resource sites. Such a system would act as a portal to the existing inventories maintained within the provinces, territories and federal agencies. Internet links would be utilized to make the investigative experience of the user virtually seamless between the national database and the component databases. The all-inclusive database would provide uniform representation of inactive mineral sites from all jurisdictions regardless of their level of database development. Such systems have been proven operational with existing commercial off the shelf software. The review of existing inventory systems has shown the use of a map interface would allow ease of use without expert knowledge of inventory data systems.

The definition of orphaned and abandoned sites varies among jurisdictions in Canada. The primary object was to provide a set of definitions under which information from all jurisdictions can be defined. The proposed definitions are:

- *Mineral Site*
- *Active Mineral Site*
- *Inactive Mineral Site*
- *Terminated Mineral Site*
- *Neglected Mineral Site*
- *Legacy Mineral Site*
- *Orphaned/Abandoned Mineral Site*

They are designed to avoid most existing inventory definitions, which could be in conflict. They are also to provide the inclusion of all sites with significant surface disturbance that are not actively being operated or maintained. More descriptive definitions become relevant to particular databases and differences in meanings begin to arise.

Phase II determined the most suitable host for the NOAMI Internet map site that would function as a portal to Canada’s inventory of OAMs. Four options for the physical site to host the proposed website were explored. Criteria used to compare the sites were: hardware and software costs, independence, security, application assistance, physical operation, stability, Internet access and awareness of the mining industry.

Based on the above criteria, the Mineral and Mining Statistics Division (NRCan) was selected. NRCan maintains several sites using MapGuide-based technology, which deal with mineral producers and related areas, such as Aboriginal communities (Figure 1). These sites can be visited at:

http://mmsd1.mms.nrcan.gc.ca/maps/intro_e.asp

<http://www.nrcan-mcan.gc.ca/aboriginal/aboriginal-maps-e.htm>

A mandate has been given to NRCan by NOAMI to develop a working model of the database populated with orphan and abandoned mines for several jurisdictions (i.e. Ontario, British Columbia, Manitoba, Yukon and Northwest Territories). Subsequent phases would integrate datasets for the other provinces and territories to produce a nation-wide inventory. A nation-wide inventory would greatly assist in decision-making processes. However, improved statistical and technical information is also necessary to better quantify the liabilities and would help identify the priorities to which resources are directed in the future.



Figure 1. MAP from NRCan site: Mapping Federal-Provincial-Territorial Mining Knowledge

Legislative Barriers to Collaboration

A review was undertaken to examine legislative requirements in Canada, selected other international jurisdictions, on regulatory or institutional barriers, liability disincentives, and collaborative opportunities regarding voluntary abatement, remediation, and reclamation of OAMs. Particular emphasis was placed on four approaches:

- “Good Samaritan” legislation;
- Permit blocking;
- Allocative versus joint and several responsibility; and
- Non-compliance registries.

The final report titled “Barriers to Collaboration: Orphaned/Abandoned Mines in Canada” was completed in 2002 (Castrilli, 2002). The report findings provided background for a multistakeholder workshop “Legal and Institutional Barriers to Collaboration” held in Ottawa, February 2003. The objectives of the workshop were to identify the key barriers that are now inhibiting governments, the private sector and voluntary organizations from effectively financing and administering the remediation of problematic abandoned and orphaned mine sites in Canada, and to begin to develop approaches to overcome these barriers. Presentations were made that detailed experiences (both in Canada and the U.S.) on existing and alternative legal and administrative mechanisms that have been used to address the issue (e.g., “Good Samaritan” legislation, permit blocking, non-compliance registries).

An abbreviated list of the options for removing barriers that were identified includes:

- Amend existing or enact new legislation that encourages volunteers to abate, remediate, and reclaim abandoned mine lands;
- Provide for exemption of volunteers from being “responsible persons” under contaminated site, water pollution, or related laws as a result of carrying out “Good Samaritan” remediation;

- Establish an abandoned mine reclamation “Good Samaritan” permit program which provides for limitation of liability if specified conditions are met;
- Create exemptions from remediation liability at abandoned sites if specified conditions are met and indemnifications provided;
- Create exemptions from remediation liability at “historic mine sites”; and
- Adoption of collaborative opportunities under federal and provincial environmental and mining laws in Canada.

Presentations and workshop recommendations are summarized in the Proceedings, which are posted on the NOAMI website.

Funding Approaches

In 2002, the Funding Approaches Task Group was established to identify funding approaches and document preferred options, which could be adapted to the needs of each jurisdiction to fund the remediation of orphaned/abandoned mine sites across Canada.

A report titled “Potential Funding Approaches for Orphaned/Abandoned Mines in Canada” (Castrilli, 2003) was prepared that outlined a variety of funding approaches that could be considered for the purpose of cleaning up or managing liabilities related to OAMs across Canada, evaluated advantages and disadvantages of each approach, and recommended preferred option(s) for consideration by governments. A summary of the recommendations follows:

1. Governments should amend existing policy and, if necessary, amend existing legislation or enact new legislation to adopt and implement a funding regime for cleanup of orphaned/abandoned mines in their respective jurisdictions.
2. The funding regime should be designed to substantially eliminate the backlog of orphaned/abandoned mines in the jurisdiction.
3. Such funding regimes should be based on a mix of all of the following approaches:
 - Government funding from general revenues should come from a single level of government;
 - Federal-provincial (or federal-territorial) government-funded cost sharing arrangements should be derived from general revenues, where appropriate. This could be kick-started by an immediate contribution of federal funding and matched by provinces and territories as available;
 - Levies on mining industry production;
 - Government-industry partnerships;
 - Government re-direction of a portion of existing mining tax revenue, with a parallel reduction of existing incentives to the mining industry, and application of both funding streams to the cleanup of orphaned/abandoned mines; and
 - The use of fund interest, fines and administrative penalties imposed on the mining industry, donations by individuals or others, etc.

It was concluded that no single funding approach would constitute a complete solution; a combination of a number of approaches would likely be required.

In November 2005, NOAMI hosted a multistakeholder workshop on “Assessing Liabilities and Funding Approaches” in Ottawa. Key themes of technical site assessments, accounting for and

reporting on liabilities, assessing community and health impacts, and funding options were examined through Canadian and international case studies and panel presentations. A rollup discussion summarized the highlights of the discussions on each of the key themes, and identified gaps and future priorities for NOAMI. These recommendations will help to develop terms of reference for the assessment, reporting and funding of liabilities associated with OAMs. Presentations and workshop recommendations are summarized in the Proceedings, which is posted on the NOAMI website.

Community Involvement

The objective of the Community Involvement Task Group was to develop a plan to foster community involvement in decision-making about closure and reclamation, and to ensure that targeted end-use and reclamation options are acceptable to local communities.

In 2002, case studies related to community involvement were completed for three Canadian mine sites (Deloro (ON), Giant Mine (NT) and Mount Washington (BC)), along with experiences at abandoned mines in the United States. The “lessons learned” from these studies were developed into a series of guidelines and published in the pamphlet “Best Practices in Community Involvement” (Figure 2).

The eleven guiding principles listed in the pamphlet are:

- 1) *Communication*: Initial discussions should be held with community members before decisions are made to clarify the type of process to be used, determine what the goals should be, and what the process is capable of accomplishing.
- 2) *Inclusiveness*: Community members easily recognize, and may be critical of public participation mechanisms that leave out the diversity of perspectives brought forward by community members.
- 3) *Representation*: Abandoned and orphaned mines are often subject to uncertain jurisdiction or administrative shortcomings. Where overlap exists, it is important that all jurisdictions be represented. This representation should be seized as an opportunity to create interagency coordination, cooperation and synergy.
- 4) *Fostering Confidence in Decision-Making*: A successful community engagement process hinges on the need for communities of interest to have confidence in both the usefulness of the process and the willingness and ability of decision-makers to act accordingly in a way that addresses community needs and interests.
- 5) *Information Dissemination and Communication*: Where remediation efforts are being undertaken, it is important that meetings and information sessions be held in the actual communities that may be affected by the site(s) in question.
- 6) *Participation and Representation*: Effort should be made to limit, or ensure smooth participant turnover. In particular, governments should have consistent and accountable representation; they should acknowledge and promptly/appropriately respond to the interests and needs of community members. A prerequisite to this is logistical planning in such areas as financial provisions to



Figure 2: Community Involvement Pamphlet

support community involvement. Examples might be provisions for participant transportation, childcare and meeting at mutually convenient times.

- 7) *Resources and Assistance*: Due to the complex nature of issues associated with abandoned mines, where feasible, community members should be provided with resources for assistance to help decipher technical terminology and data in order to make more meaningful contributions during the planning and decision-making process.
- 8) *Facilitation*: The impartial and competent facilitation of meetings is highly advisable, and the establishment of codes of conduct and terms of reference for engagement is crucial to ensure that meetings are respectful and fair.
- 9) *Integration*: Decisions and actions should be designed to address the many varied environmental, health, aesthetic, social and economic issues that can be associated with abandoned and orphaned mines.
- 10) *Consistency of Involvement*: Community involvement should be an integral component of the entire site management process - from problem identification, to discussion of alternatives and management options, to assessment, implementation, follow-up and monitoring.
- 11) *Respecting Local Cultures*: Meetings should be conducted in a manner that respects local cultures and traditions.

These principles were developed for use by governments, industry, local communities and other parties as a template for the development of policy and citizen engagement plans prior to, during and after the rehabilitation of OAMs. The final report and the pamphlet are available on the NOAMI web site (www.abandoned-mines.org).

While this program area has completed its objectives, NOAMI will continue to examine ways to foster meaningful community involvement and engagement in abandoned mine remediation.

Guidelines for Legislative Review

In 2003, it was recommended that NOAMI complete guidelines for jurisdictional legislative reviews with respect to collaboration, liability and funding to ensure that approaches across jurisdictions are consistent, certain, transparent, coordinated and efficient for orphaned and abandoned mines in Canada.

A Task Group was formed to draft the document “Guidelines for Legislative Review” wherein a series of guidelines, and a checklist with associated questions, were developed to facilitate a focused review of the legislative/regulatory/policy frameworks as it applies to OAMs across Canada. These guidelines were intended to provide a consistent approach to the completion of a review of existing legislation (acts and regulations) and related policies and practices (such as permitting, licensing and approval processes) that relate to OAMs as well as contaminated and operating sites if there is demonstrated relevancy to legacy issues.

In May 2005, the review was contracted to Joseph Castrilli, Barrister and Solicitor, in order to provide a consistent approach to the completion of the study. The contractor addressed the framework set out in the “Guidelines to Legislative Review” to provide the level of detail necessary to evaluate the

legislation and policies. The draft report and consultative process with the various jurisdictions has been completed. For this process the identified lead agencies for the provinces, territories and federal jurisdictions were provided with the draft report and requested to determine other appropriate agencies within their respective jurisdictions to review and provide feedback. A synthesis of the jurisdictional analysis, including an assessment of gaps, limitations, barriers and opportunities, along with a summary of observations is underway. The completed review is to be released on CD ROM in 2006.

Current Activities

The Assessing Liabilities and Funding Options Workshop held in November 2005 resulted in recommendations to help with the development of terms of reference for the assessment, reporting and funding of liabilities associated with orphaned/abandoned mines. One recommendation was that a guidance document of funding options be prepared and presented at Mines Ministers' for their consideration. A Task Group was formed to develop a resource document for use by jurisdictions across Canada to help guide the establishment of potential funding options for the rehabilitation of orphaned/abandoned mines. This work will be completed under contract.

In October 2006, NOAMI is hosting a multistakeholder workshop on "Orphaned/Abandoned Mines: A Workshop to Explore Best Practices" to be held in Winnipeg. The premise of the workshop is to explore and understand the best existing, emerging and innovative practices relating to the management of orphaned/abandoned mines. Based on a "lessons learned" approach a number of issues will be examined for prioritizing sites, public engagement, partnership approaches (funding options, regulatory structures, opportunities for collaboration), and development of a plan to integrate the information.

Technology Transfer

Dissemination of information to the partners and the public in a timely manner is an important function for multistakeholder initiatives. Orphaned and abandoned mines are a "hot issue" in Canada, and the public wants to be kept well informed.

NOAMI has been active in its transfer of information and uses a number of routes. Workshops are the preferred vehicle to share information and obtain feedback from the mining community. An abandoned mines Internet site (www.abandoned-mines.org) has been established. The site is regularly updated with information, reports and newsletters. The Secretariat releases communication documents, such as newsletters, on the activities of the orphaned and abandoned mines initiative. These newsletters are posted on the website, as well as electronically distributed to the Secretariat's mailing lists.

INITIATIVES AT NATURAL RESOURCES OF CANADA

Promoting the participation of Aboriginal communities in minerals and metals activities is a key component of *The Minerals and Metals Policy of the Government of Canada* and a priority of NRCan. The Aboriginal Affairs and Sustainable Communities Division (AASCD) of NRCan is working closely with the mining industry, Aboriginal communities and organizations, key federal departments

and provincial/territorial governments, in promoting Aboriginal-industry partnerships and increasing Aboriginal participation in exploration and mining activities.

Since its creation in April 2004, the AASCD has initiated and contributed to various initiatives, generated and disseminated knowledge and information, as tools for capacity-building and sound decision-making in Aboriginal communities. These tools were developed based on the needs expressed by Aboriginal communities and organizations for relevant information on mineral development activities occurring in their territories and elsewhere in Canada. For example, the division has published a series of information bulletins highlighting Aboriginal-industry partnership agreements and providing statistical profiles on Aboriginal participation in mining. These information bulletins can also be viewed at <http://www.nrcan.gc.ca/mms>

In addition, AASCD recently redesigned and launched the on-line Aboriginal Communities and Minerals and Metals Activities Map portal showing the location of Aboriginal communities and producing mines, as well as other related information. The site can be viewed at <http://www.nrcan.gc.ca/aboriginal>

The Division, in collaboration with the Ontario Ministry of Northern Development and Mines (MNDM) have released an information video *Our Community...Our Future: Mining and Aboriginal Communities*. This video was designed to provide First Nations communities in northern Ontario with a better understanding of the mining industry in Ontario. It describes the mining sequence from initial surveying to site rehabilitation for the following modules:

- Government Surveys and Geological Mapping
- Claim Staking, Prospecting and Early Exploration
- Advanced Exploration
- Mine Planning and Construction
- Mineral Extraction and Processing
- Mine Closure and Site Rehabilitation

Filmed in Northern Ontario, the video was produced by NRCan and MNDM with support from a number of First Nations communities and exploration and mining companies that are active in Ontario. The video is available in English and French as well as Cree, Oji-Cree and Ojibwa. This initiative reaffirms the commitment of the governments of Ontario and Canada to work with Aboriginal communities to increase and enhance their participation in the exploration and mining industry. Complimentary copies are available through the MMS website at http://www.nrcan.gc.ca/smm/hm_e.htm

Lastly, AASCD together with the Prospectors and Developers Association of Canada, Indian and Northern Affairs Canada, the Canadian Aboriginal Minerals Association and the Mining Association of Canada are completing the *Mining Information Kit for Aboriginal Communities* that will be released by the end of Summer 2006, and available through the NRCan website. The kit provides information on mining activities and opportunities for Aboriginal peoples and communities across Canada for participation during all stages of the mining cycle.

CONCLUSIONS

Canada is well known for establishing multistakeholder initiatives to address issues of national importance. This model of cooperation among industry, various levels of government, NGOs and Aboriginal Canadians is now being used internationally. The National Orphaned and Abandoned Mines Initiative is a good example of diverse stakeholders coming together to address the legacy of past mining practices and to advance the objectives of sustainable development.

At Natural Resources Canada, the Aboriginal Affairs and Sustainable Communities Division (AASCD) is developing information products aimed at helping Aboriginal peoples increase their understanding of exploration and mining and promoting Aboriginal-industry leading practices, domestically and abroad.

REFERENCES

British Columbia, 2003. Ministry of Energy and Mines, Historic Mine Sites in British Columbia, Open File 2003-3.

Cal Data Ltd. 2005. Capacity Building for a National Inventory of Orphaned/Abandoned Mines in Canada. Final report submitted to the National Orphaned/Abandoned Mines Initiative.

Castrilli, J.F. 2003. Potential Funding Approaches for Orphaned/Abandoned Mines in Canada. Final report submitted to the National Orphaned/Abandoned Mines Initiative.

Castrilli, J.F. 2002. Barriers to Collaboration: Orphaned/Abandoned Mines in Canada. Final report submitted to the National Orphaned/Abandoned Mines Initiative.

Hamblin, C.D. 2003. Ontario Leads the Way in Abandoned Mines Rehabilitation. In, Proceedings of the Sudbury 2003: Mining and the Environment Conference, Sudbury, Ontario, May 25 – 28, 2003.

MiningWatch Canada, 2000. Abandoned Mines in Canada. February.

Tremblay, G. and Hogan, C. The Canadian Orphaned/Abandoned Mines Program. In, Symposium 2002 on Mines and the Environment, Rouyn-Noranda, Québec, November 3-5, 2002