

ABANDONED MINES IN CANADA¹

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ABSTRACT: 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 more than 10,000 orphaned and abandoned mine (OAMs) sites requiring varying degrees of rehabilitation. The legacy of OAMs, with the associated environmental liability, human health concerns and the financial costs of clean up, is a serious issue facing Canada. OAMs exist within all mining jurisdictions in Canada.

The National Orphaned/Abandoned Mines Initiative (NOAMI) was established in 2002 and 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 (NGOs) and Aboriginal Canadians. The advisory committee's role is to assess key issues and put forward recommendations concerning collaborative approaches and partnerships in the implementation of remediation programs across Canada. Five task groups were established to examine key issues. These consist of information gathering (towards an inventory and national definition), funding approaches, and legislative barriers to collaboration, community involvement, and guidelines to legislative and jurisdictional review.

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/or Aboriginal Canadians is now being used internationally. NOAMI 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.

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 addressing these issues on a national scale. This paper presents an overview of the issues surrounding abandoned mines in Canada, and national and provincial programs that have been initiated.

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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. The legacy of orphaned/abandoned mines, with the associated environmental liability, human health concerns and the financial costs of clean up, is a serious issue facing Canada. Abandoned mines exist within all mining jurisdictions in Canada. Mining is generally regulated at the provincial level, although the federal Government maintains most of the responsibility for mines in northern Canada (Yukon, Nunavut and the Northwest Territories).

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. The risk of contact with hazards or environmental impacts associated with abandoned mines has also increased. The number of injuries and deaths due to people entering abandoned mines also has increased and as a result, public pressure to deal with these abandoned sites has mounted. 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 multistakeholder workshop.

The Workshop on Abandoned Mines, held June 2001 in Winnipeg, reviewed the issues for orphaned /abandoned mine sites 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 orphaned/abandoned mine sites 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 endeavors

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/ abandoned mines sites, and requested that an Orphaned/Abandoned Mines Advisory Committee be set-up 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 Aboriginal¹ Canadians. Natural Resources Canada, through CANMET-Mining and Mineral Sciences Laboratories, was designed as the Secretariat for the committee.

NOAMI obtains funding through its federal, provincial and territorial governments and industry partners for support of its projects and work. For the first two years NOAMI has worked with an annual budget of about \$100K, since raised to about \$300K. The Advisory Committee takes directions from the Mines Ministers and annually reports its activities and recommendations to the Mines Ministers.

In Canada, multistakeholder programs were 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 by both Canadian and international programs to deal with issues around mining. MEND is discussed in the paper "The Canadian Mine Environment Neutral Drainage (MEND) Program" also presented in these Proceedings. NOAMI adopted the MEND framework to develop a policy-based, science-linked program for remediation of orphaned and abandoned mine sites.

NOAMI has formed five task groups to address the following program areas:

- Information Gathering (towards an inventory and national definition)
- Funding Approaches
- Legislative Barriers to Collaboration
- Community Involvement
- Guidelines to Legislative and Jurisdictional Review

In addition, 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 addressing these issues on a national scale.

NOAMI Task Groups

Information Gathering

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

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

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 is recommended.

Estimates of abandoned sites demonstrate the general scope of the problem in Canada. Wide variations in the reported numbers are noted:

- Canada - over 10,000 sites (Mining Watch, 2000)
- Ontario - 6,000 historic sites, many in public domain (Hamblin, 2003)
- Nova Scotia - over 6,000 mine openings
- Québec - 100 tailings areas at an estimated cost of \$75 million (CAN) to rehabilitate. Sixteen priority sites alone will require a commitment of \$46 million (L. Bienvenu, personal communication, 2005)
- British Columbia - 1,898 sites (British Columbia, 2003)
- Manitoba - 290 sites

In Ontario, Hamblin (2003) indicates that the number of known abandoned sites is approximately 6,000, containing approximately 18,500 individual hazards. He further states that the cost to rehabilitate all of the abandoned sites in Ontario has been estimated at approximately \$300 million (CAN). The cost to rehabilitate the 30 – 40% of sites that have reverted to the Province has been pegged at approximately \$120 million (CAN).

In October 2002, the Office of the Auditor General of Canada reported the estimated cost of clean up and closure for abandoned mines in northern Canada only (north of 60°) would be \$555 million (CAN). These abandoned mines have historically been the responsibility of the federal government, although in some cases responsibility has been devolved to the provincial and territorial level.

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 province and territory, and including an acceptable system for categorization and priority ranking. 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 orphaned/abandoned mine sites. 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). As a result of this review a database delivery model and high-level definitions were proposed.

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 an index 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. A high level, 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 value of a map interface, especially for users without expert knowledge of the local land designation system and details of the inventory metadata.

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 high-level 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 of this task is to determine the most appropriate situation for the hosting of the NOAMI Internet map site that will function as a portal to Canada's inventory of orphaned and abandoned mines sites. A number of options for the physical site to host the proposed website have been investigated. The examined options included: an existing MapGuide site operated by NRCan, an existing MapGuide site operated by a non-government organization, a commercial full service web hosting company and a "from-scratch" set-up utilizing a co-location site whereby NOAMI would be responsible for the acquisition and maintenance of the complete web mapping system. 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. The project also established which, if any, of the sites were willing to host the NOAMI portal and provide the best operational situation.

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.

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 orphaned/abandoned mines. 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 in Ottawa, 2003 that assessed the key barriers and developed approaches to overcome them. 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 include:

- 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.

The report and the Workshop Proceedings are posted on the NOAMI web site. Activities of the Legislative and Institutional Barriers to Collaboration (LIBC) Task Group are described in the LIBC Newsletter (August 2003), which is also posted on the NOAMI web site.

Funding Approaches

In 2002, the Funding Approaches task group was established by the NOAMI Advisory Committee with the responsibility 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 to be considered for the clean up or management of liabilities related to OAMs. Individuals with expertise in this area were surveyed, and the report incorporated their views as well as those

of the authors. Advantages and disadvantages of each approach were evaluated and preferred options were recommended for consideration by governments.

While the full text of the recommendations appears in the final report, 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.

In establishing a funding regime, the report provided the following guidelines/options for consideration by individual jurisdictions:

1. The funding regime adopted in each jurisdiction should include the establishment of an Orphaned/Abandoned Mine Cleanup Fund (the “Fund”) into which general government revenue, industry levies, and other monies are also deposited on an annual basis.
2. Specification of the minimum annual financial appropriation to be made by the government and the period over which that level of appropriation is to continue.
3. Specification of an annual levy or levy range to be imposed on each mining company, mining industry sector, or classes within a sector as a cost attributable to its activities in the jurisdiction and the period over which that level of contribution is to continue.
4. Specification of the basis for government-industry partnerships and what effect, if any, they will have on an annual levy noted in (3) and tax and incentive measures noted in (5).
5. Amendment of federal and provincial tax laws to specifically identify (1) the annual value of mining tax revenue being re-directed to the Fund, and (2) the annual value reduction of existing incentives to the mining industry being re-directed to the Fund.
6. Specific legislation enacted to facilitate remediation of orphaned/abandoned mines should clearly:

- Articulate purposes of established funding regimes;
 - Specify the lands and water eligible for cleanup;
 - Identify the administering entity for the funding regime (the authors recommended that this entity be either a department of government or special government agency created by the legislation establishing the funding regime);
 - Authorize promulgation of rules and regulations addressing matters pertaining to administration of the funding regime;
 - Specify priorities under which the funding regime will operate.
7. In conjunction with the establishment of a funding regime, the process of cleanup of orphaned/abandoned mines should be facilitated through measures designed to eliminate barriers and to facilitate community involvement.

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 is hosting a multistakeholder workshop on “Assessing Liabilities and Funding Approaches” to be held in Ottawa. The workshop will focus on technical standards for assessing liability, accounting for and reporting on liability, assessing community and health impacts, and funding options. The target audience is government officials from mines and environment, and provincial auditors and finance departments, with the objective of providing terms of reference for the assessment, reporting and funding of liabilities associated with orphaned/abandoned mines.

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 standards are acceptable to local communities.

In 2002, case studies related to community involvement were completed for three Canadian mine sites, along with experiences in community involvement 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”. The eleven guiding principles detailed in the pamphlet, which is available from the NOAMI web site, are:

1. *Communication*
2. *Inclusiveness*
3. *Representation.*
4. *Fostering Confidence in Decision-Making*
5. *Information Dissemination and Communication*
6. *Participation and Representation*
7. *Resources and Assistance*
8. *Facilitation*
9. *Integration*
10. *Consistency of Involvement.*
11. *Respecting Local Cultures*

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 problematic sites. 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 the 2003 annual meeting in Halifax, 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.

The Guidelines for Legislative Review Task Group developed a series of guidelines to facilitate a focused review of the legislative/regulatory/policy frameworks as it applies to orphaned/abandoned mines 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 orphaned and abandoned mine sites as well as contaminated and operating sites if there is demonstrated relevancy to legacy issues. In addition, guidelines or policies on First Nations consultations that apply to orphaned/abandoned mines, and amendments and draft legislation (if available) were examined. The guidelines were set up in the form of a checklist with associated questions, which will be completed during the study.

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 series of general questions developed in the Guidelines to Legislative Review to provide the level of detail necessary to evaluate the legislation and policies. The draft legislative review for the provincial, territorial and federal jurisdictions has been completed. The consultative process with the various jurisdictions is now underway wherein the identified lead agencies were provided with the draft report and requested to determine other appropriate agencies within their respective jurisdictions to review and provide feedback on the report. The final phase of the review will be a synthesis of the jurisdictional analysis, including an assessment of gaps, limitations, barriers and opportunities, along with a summary of observations

Technology Transfer

Dissemination of information to the partners and the public in a timely manner is an important function for multistakeholder programs. Orphaned and abandoned mines are a “hot issue” in Canada, and the Public want to be kept well informed.

NOAMI has been active in its transfer of information and uses a number of routes. 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.

In 2004, the NOAMI Secretariat was requested to speak at the workshop on Environmental Mining Liabilities in Chile, hosted by UN-Economic Commission for Latin

America and the Caribbean (UN-ECLAC) in order to share Canadian expertise, knowledge, and approaches to orphaned and abandoned mines.

Other Initiatives

Federal

The federal government has taken action on orphaned and abandoned mine sites for which it is responsible. The 2003 federal budget identified \$175 million (all dollars in Canadian dollars) over two years for action on 57 federal contaminated sites, some of which are abandoned mines in northern Canada (i.e. Faro Mine in Yukon, Colomac and Giant Mine in the Northern Territories).

Budget 2004 reaffirmed the government's fiscal commitment to cleaning up contaminated sites by increasing spending to \$3.5 billion Canadian over a 10-year period to cleanup contamination on federal lands. The government also committed an additional \$500 million over the same period to cleanup sites that do not completely fall under federal jurisdiction, such as the Sydney Tar Ponds in Nova Scotia. In May 2004, the governments of Canada and Nova Scotia announced up to \$400 million in funding for the cleanup of Sydney, with the Federal government providing up to \$280 million of the funding.

In August 2005 the federal government announced that \$153 million would be invested to clean up 97 priority sites across Canada for which it is responsible and to conduct site assessments for a further 500 sites. Many of these priority sites included abandoned mines in the North.

Provincial

Some of the provinces in Canada already have programs underway to deal with abandoned mines in their particular jurisdictions. Manitoba has dedicated \$2 million (all funds in Canadian dollars) to the problem, while Quebec completed a \$20 million program covering the years 1987 – 2002, and announced another \$47 million in funding for the period of 2003 – 2008. In Ontario, \$10 million was allocated for the period from 1991 – 1994, a further \$48 million from 1999 – 2007. Many of the other provinces (e.g. Saskatchewan, Nova Scotia, New Brunswick) have spent about \$100K inventorying their sites. A small amount of reclamation work is carried out in most jurisdictions each year.

Provincial Internet sites for Ontario, Québec and British Columbia can be consulted for more detailed information.

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 First Nations 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.

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 addressing these issues on a national and international scale. In making ongoing resources available through the Federal Contaminated Sites Accelerated Action Plan, the Government of Canada is demonstrating that human health and environmental protection

are priorities and that they are taking action for the common good and the quality of life of all Canadians.

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