

NOAMI AND PARTNERS – A SIX-YEAR RETROSPECTIVE

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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. The National Orphaned/Abandoned Mines Initiative (NOAMI) is a unique Canadian co-operative program that was established in 2002 in response to the request of the Canadian Mines Ministers. NOAMI and its Canadian partners are addressing the environmental and social challenges of decommissioning abandoned mines. An overview of NOAMI's activities during the last six years and examples of rehabilitation of orphaned/abandoned sites will be explored.

THE ISSUE

Canada's long history in mining has resulted in more than 10,000 orphaned or abandoned sites, with different levels of risk and requiring varying degrees of rehabilitation. This legacy of orphaned/abandoned mines (OAMs), with the associated environmental liability, human health concerns and the financial costs of clean-up, continues to be a serious issue facing Canada.

The most serious environmental issues for abandoned mines are acidic drainage and metal leaching. Sources include, underground workings, open pit mine faces and workings, waste rock dumps, and tailing deposits. Public health and safety hazards result from mine openings, mine wastes, abandoned infrastructure and subsidence. Policy implications concern standards, fiscal responsibility and funding models, jurisdictional liabilities and possible re-use of the land (future mining, recreational activities, etc).

STRUCTURE AND BUDGET

In 1999, a number of organizations raised concerns on the legacy of orphaned and abandoned mines in Canada, in regard to the environmental liability, public health and safety, and the financial costs of remediation. They 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 abandoned mines. The Ministers supported this initiative, and in 2000 requested that a multistakeholder workshop be organized to identify key issues and priorities.

Participants at the "Orphaned/Abandoned Mines in Canada Workshop" held in 2001 developed guiding principles and identified strategies to address rehabilitation across a number of fronts, and adapted to the need of each jurisdiction. 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. A key message from the workshop was that with adequate resources and resolve the opportunity exists to make significant progress in the clean up of many orphaned and abandoned mine sites within ten years.

Recommendations to address the issues at a broad national scale were presented at the Mines Ministers' Conference, September 2001. Ministers agreed on the importance of a large-scale program for the rehabilitation of orphaned/abandoned mines sites, and requested that a multistakeholder advisory committee be established to study various issues and initiatives relating to the development of partnerships in the implementation of remediation programs across Canada.

The National Orphaned/Abandoned Mines Initiative (NOAMI) was launched in 2002, with advisory committee members from the federal, provincial and territorial governments, the Canadian mining industry, First Nations, and environmental non-governmental organizations. NOAMI adopted the MEND framework of multistakeholder co-operation to develop a multi-year policy-based program for remediation of orphaned and abandoned mine sites in Canada (Tremblay and Hogan, 2007). The Advisory Committee takes direction from the Mines Ministers, and reports back annually at the Mines Minister Conference. An annual workplan is developed by the committee and presented for approval at the Mines Ministers Conference. Activities are jointly funded by the F/P/T governments and the mining organizations, and the program is administrated by the Secretariat at CANMET-MMSL. Funding for NOAMI was about \$100 K/year in the first few years, but later increased to \$330 K/per year as the program was expanded.

NOAMI TASK GROUPS

Once the workplan was approved, task groups were formed to address the priority areas. These groups focussed on: information gathering towards a building a national inventory; community involvement; funding options and approaches; legislative and institutional barriers to collaboration; and most recently; a jurisdictional legislative review. In the past six years NOAMI has made good progress in seeking solutions to the legacy of orphaned/abandoned mines in Canada in these areas, and summaries for these task groups are provided below.

Information Gathering Towards a National Inventory

Mining has been central to the Canadian economy for over 100 years and Canada is a supplier of mineral commodities worldwide. Abandoned mines exist within all mining jurisdictions in Canada. Costs associated with rehabilitating abandoned mines across Canada are difficult to accurately estimate as these sites are 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.

A principal objective of NOAMI was to develop capacity for a national inventory of orphaned and abandoned mine sites based on compatible inventories from each province and territory. There is a strong need for a central clearing house of information on abandoned mines. A database was essential for comprehensive classification and analyses. All Canadian provinces, territories and several federal agencies with a history of mining, 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 the responsibility of the jurisdiction. An added problem relates to variations in the way that hazards or features are defined or categorized, and what hazards are included in any particular inventory. 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 allow for these gaps in coverage, detail and standardization, but permit inclusion of further information down the line.

However, the first step towards building the inventory was to reach consensus on the definitions and terminology to be applied to orphaned/abandoned mine sites. The definition of orphaned and abandoned sites varies among jurisdictions in Canada. A primary criterion for the inventory was to develop a set of definitions under which information from all jurisdictions can be defined, and to avoid most existing inventory definitions, which could be in conflict. A comprehensive review of Canadian and international efforts to inventory OAMs, along with high level definitions were documented in “Capacity Building for a National Inventory of Orphaned/Abandoned Mines in Canada” (Cal Data, 2005). The proposed definitions were designed to be independent of most existing definitions and would provide a framework in which the existing definitions could be linked.

The Cal Data report recommended a high level inventory that included all inactive mineral sites, was web-based and had a map interface. Such a system acts as a portal, to the existing inventories maintained within the provinces, territories and federal agencies. Internet links are 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. 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.

Various options were explored to determine the most suitable host for the NOAMI Internet map site. Based on criteria such as costs, security, knowledge of industry, the Mineral and Mining Statistics Division (MMSD) of Natural Resources Canada (NRCan) was selected to host the portal. NRCan maintains several sites using MapGuide-based technology, which deal with mineral producers and related areas, such as Aboriginal communities http://mmsd1.mms.nrcan.gc.ca/maps/intro_e.asp. An important element of the inventory was federal, provincial and territorial participation, which was facilitated through existing data sharing agreements with NRCan. Some additional requirements included that NRCan would be provided access and use of the jurisdictional OAM site data, consent for the data to be publicly accessible, and that access and use of the data would be provided on a long-term basis to ensure maintenance. A key consideration to obtain jurisdiction consent was the system does not impact their current operational status.

Population of the national inventory with jurisdictional datasets is now well underway and most jurisdictions have finalized their agreements to integrate their datasets. NOAMI has developed an interactive map displaying the OAMs across Canada. The map also includes satellite imagery and details displaying infrastructure at the regional and national level. Some refinement is needed in the approach for site classification to place more emphasis on the physical attributes of the sites. Additional work is to be completed to expand the jurisdictional definitions to encompass various physical categories. A mandate was recently given to Cal Data to review the databases, and determine if and how the present information can be re-aligned to capture these physical

characteristics. NOAMI in collaboration with NRCan and the provinces and territories are working together to accomplish this important task.

Community Involvement

Approaches are needed that will foster community involvement in decision-making on closure and rehabilitation, and ensure that targeted end-use and rehabilitation standards are acceptable to local communities. In 2002, case studies related to community involvement were completed for three abandoned Canadian mine sites (Giant Mine – NT, Deloro Mine – ON, Mount Washington Mine – BC), along with experiences in community involvement at abandoned mines in the United States (NOAMI, 2003a). Report findings were based on personal interviews with key contacts in the community to reflect a diversity of perspectives. These case studies contain more complicated issues than many abandoned properties and they illustrate the importance of effective community involvement in decision-making from the onset for OAMs. The “lessons learned” from these studies were developed into a series of guidelines and published in the pamphlet “Best Practices in Community Involvement” (Figure 1).

The eleven guiding principles for Community Involvement Policy Development, Site Management and Process Administration presented in the pamphlet are:

- Communication
- Inclusiveness
- Representation
- Fostering Confidence in Decision-Making
- Information Dissemination and Communication
- Participation and Representation
- Resources and Assistance
- Facilitation
- Integration
- Consistency of Involvement
- Respecting Local Cultures



Figure 1. Best Practices Pamphlet (NOAMI, 2003b)

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). After completion of this project the NOAMI Advisory Committee continued to examine ways to foster community involvement and engagement in abandoned mine remediation through other projects and workshops, in particular the 2006 multi-stakeholder workshop “Orphaned/Abandoned Mines: A Workshop to Explore Best Practices”.

One recommendation from this workshop was for NOAMI to support a community based pilot project on “Building the Capacity of Local Communities to Understand Abandoned Mines”. The objective is to build capacity, via a modular tool-kit, in areas such as environmental/chemical concerns, options for remediation, decision-making processes and information on the mining process. Three diverse communities (Ymir-BC (near Yankee Girl), Chibougamau-QC and Virginiatown-ON (near Kerr-Addison Mine)) will be visited and engaged in workshops and focal groups to assess, build upon, and

adapt the ability of the toolkit to increase capacity of local people to understand and deal with these issues.

Legislative Barriers to Collaboration

A background study “Barriers to Collaboration: Orphaned/Abandoned Mines in Canada” was undertaken to examine existing legislative requirements in Canada, and selected international jurisdictions, on regulatory or institutional barriers, liability disincentives, and collaborative opportunities regarding voluntary abatement, remediation, and rehabilitation of OAMs (Castrilli, 2002). Particular emphasis was placed on four approaches: 'Good Samaritan' legislation; permit blocking; allocative versus joint and several responsibility; and non-compliance registries. The report findings provided background for a multistakeholder workshop “Legal and Institutional Barriers to Collaboration” in Ottawa, 2003 that assessed the key barriers and developed approaches to overcome them. These recommendations were further integrated into a report on the Jurisdictional Legislative Review (Castrilli, 2007). The reports and the Workshop Proceedings are posted on the NOAMI web site.

Guidelines for Jurisdictional Legislative Reviews

In 2003, the Mines Ministers asked NOAMI to 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. A series of guidelines (NOAMI, 2004) was developed to facilitate a focused review of legislative/regulatory/policy frameworks as they apply to OAMs across Canada. A report on all legislation relevant to the remediation of orphaned/abandoned mine sites “Report on the Legislative, Regulatory, and Policy Framework Respecting Collaboration, Liability, and Funding Measures in relation to Orphaned/Abandoned, Contaminated and Operating Mines in Canada” was released on CD-ROM in 2007. It contains a synthesis of the jurisdictional analyses, including an assessment of gaps, limitations, barriers and opportunities to remediation, along with a summary of observations. Legislative/policy/program matrixes are presented that allows a comparison by jurisdiction with respect to mining and environmental regulations and policies. A toolkit of policy/legislative approaches outlining a number of options to assist jurisdictions towards implementation of legislative change is part of the workplan for 2008/2009.

Funding Approaches

The task group was to identify funding approaches and preferred options for the remediation of OAMs across Canada that could be adapted to the needs of each jurisdiction. 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. Advantages and disadvantages of each approach were evaluated and preferred options were recommended for consideration by governments. It was concluded that no single funding approach would constitute a complete solution; a combination of a number of approaches would likely be required.

A multistakeholder workshop on “Assessing Liabilities and Funding Options” was held in Ottawa in 2005 that further developed funding approaches and related issues for OAMs. A roll-up discussion identified gaps and future priorities for NOAMI. One recommendation was for a “toolkit” of funding options, outlining a series of options and illustrated with case studies. This would be a resource

document for use by jurisdictions across Canada to help guide the establishment of potential funding options for the remediation of OAMs. The report “Rehabilitating Abandoned Mines in Canada: A Toolkit of Funding Options” (Cowan Minerals, 2006) was completed and is posted on the website, along with the above stated Proceedings and report.

TECHNOLOGY TRANSFER

Orphaned and abandoned mines are a “hot issue” in Canada and the public wants to be kept well informed. Efficient and timely sharing of information to the mining community and the public is an important function of NOAMI and other multistakeholder initiatives. NOAMI uses a number of routes to transfer information. The Secretariat distributes documents, such as the NOAMI Newsletter, and other bulletins, to a huge mailing list. The NOAMI web site (www.abandoned-mines.org) was recently redesigned and streamlined to improve visibility and access to the program’s activities and publications. The site is regularly updated with information, such as NOAMI reports, workshop proceedings, pamphlets, announcements and newsletters.

The priority issues identified by NOAMI, and the multi-year action plan and activities to address these areas, has generated much interest both domestically and internationally. NOAMI has collaborated with other initiatives to share this information, and has presented findings at many international forums. Earlier this year, members of the NOAMI Advisory Committee were invited to the International Roundtable on the Restoration on Mining Legacy Sites (jointly run by the World Conservation Union, the International Council on Mining and Metals, and the Post-Mining Alliance) to discuss challenges in OAMs and present on Canada’s work. Information from these discussions is available from www.postmining.org.

Workshops are the preferred vehicle to share information and obtain feedback from the mining community. Several NOAMI workshops were held and were previously discussed above (i.e. Legal and Institutional Barriers to Collaboration, Assessing Liabilities and Funding Options, Best Practices). An upcoming workshop planned for November 2008 will explore the different perspectives related to the risk assessment process at OAMs, with presentations and discussions clustered around the themes of human health risk assessment, ecological risk assessment and geotechnical risk assessment. In addition, a case study session will allow for more focused discussion of specific risk assessment studies. The Proceedings and Presentations for all the NOAMI workshops are posted on the website www.abandoned-mines.org.

At present the NOAMI Advisory Committee is preparing a communication strategy to heighten awareness of the issues of OAMs, the works completed by NOAMI, and the initiatives undertaken by F/P/T jurisdictions in addressing this issue. One component of this strategy is the production of a NOAMI Five-Year Performance Report (2002-2007), which is currently underway. The report outlines the impacts and benefits of NOAMI, the accomplishments of the jurisdictional partners, and the remaining challenges. The document is aimed at a general audience, and will be published in both official languages, as a brochure and on CD-ROM.

JURISDICTIONAL PARTNERSHIPS

Provinces and territories in Canada have made significant progress in the remediation of abandoned mines in their jurisdictions. Various partnership and collaborative approaches have been used, and this information is invaluable in development of toolkits that can be applied on a national basis. Although a number of partnerships have been formed to remediate OAMs in Canada, this paper will refer to several that are relevant to NOAMI's mandate for the development collaborative partnerships in the implementation of remedial programs. Additional information on jurisdictional activities and partnerships will be found in the Five-Year Performance Report.

Quebec

The Québec Ministère des Ressources naturelles et de la Faune (MRNF) developed several partnership approaches to address contaminated sites. Although application of these partnerships may be limited in scope, the key messages are that they provide an opportunity wherein both parties benefit and that both parties were willing to consider some innovative approaches. Five different types of partnerships were used for rehabilitation of closed sites:

- Partnerships between Ministries. MRNF and MDDEP (Ministère de du Développement durable, de l'Environnement et Parcs) signed a cooperative agreement to facilitate rehabilitation and permitting for the Sullivan Mine.
- Partnerships with Mining Industry.
 - In 1996, Les Terrains Aurifères site (Barrick Gold) utilized alkaline tailings from the government-owned Malartic Goldfield Mine as a component in the multi-layer dry cover placed over their acid-generating tailings. The arrangement saved the government \$500,000 (MEND 2.22.4, 1999).
 - More recently, non-acid generating tailings from the Agnico-Eagle Mines Goldex mine are used to rehabilitate the acid-generating tailings on the Manitou abandoned mine site. The tailings are deposited on the old Manitou tailings, and will raise the water level, which will result in an elevated water table thus saturating the acid generating tailings. Over the 12 year life of the mine, the estimated savings are \$12 million for the Québec government.
- Partnerships with Forest Industry. The rehabilitation plan for East Sullivan included the placement of a cover over the acid-generating tailings. Coincidentally, the forest industry needed a place to store its wood waste products. Wood waste proved to be an adequate cover, and 2-metre of waste was placed over the tailings. This win-win partnership cost the government \$9.5 million, instead of \$30 million.
- Partnerships with Local Organizations. The Eustis mine complex near Capelton in the Eastern Township is owned by a non-profit organization that wanted to develop the site as a historic and recreational area. The owners do not have the necessary funds to complete the rehabilitation of many of the acid-generating sites located on their land, which included the Albert Mine. A partnership was formed among the organization, the government and the local paper industry, which needed a place to store their wastes. De-inking sludge produced from the paper industry was used as a cover for the 4.5 ha Albert Mine site. This material in combination with a compost

layer was found to be an excellent growth media. This partnership saved the government \$850,000 in remedial costs.

- Partnerships with Aboriginal Peoples. The Fonds Restor-Action Nunavik, signed in 2007, brings together the provincial and local governments, the local communities and a group of exploration companies to rehabilitate a total of 18 sites located in Nunavik (north of Québec). More than \$4 Million has been raised to rehabilitate these 18 sites, and the work is expected to be completed by the end of 2012, saving more than 1.5 M\$ to the government.

Ontario

Ontario Ministry of Northern Development and Mines (MNDM) has two partnership agreements in place for mine rehabilitation projects.

MNDM and Porcupine Joint Venture have a cost sharing agreement to address mine subsidence related issues in and around the former Hollinger and McIntyre Mine sites in Timmins, ON. Subsidence has become more serious since dewatering of the mines ceased, and it is believed that the sand backfill has flowed and left voids in the upper workings. A major part of the problem is that the surface rights for the mine were severed and sold to private individuals, so that many of these events occur right in the community. This partnership, along with several others, is detailed in the NOAMI report “Rehabilitating Abandoned Mines in Canada: A Toolkit of Funding Options” (Cowan Minerals Ltd, 2006).

MNDM and Ontario Mining Association (OMA) have cost sharing agreements in place in which funds acquired by OMA are matched by MNDM to work on OAMs of mutual interest. Since 2002, two remedial projects have been undertaken at the Kam Kotia Mine site under this agreement.

CONCLUSIONS

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. Since its creation in 2002, NOAMI has addressed the problem across a number of fronts. Although much progress has been made, many challenges and opportunities exist for rehabilitation of orphaned/abandoned mines. NOAMI members are committed to working together to seek solutions to these issues.

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