

# International Scene

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Natural Resources Canada (NRCan) has a legislated mandate to promote the sustainable development of minerals and metals internationally. During 2002, international activities, programs, trade and investment missions, and partnerships were maintained, or newly created, and provided the framework by which the Minerals and Metals Sector was able to demonstrate the innovation, technologies and leadership of Canada's mining, minerals and metals sector on a global scale.

## **INTERNATIONAL BUSINESS DEVELOPMENT AND TRADE MISSIONS**

### **EXPOMIN 2002, Santiago, Chile**

Held in May 2002, EXPOMIN 2002 provided an excellent opportunity to promote Canada as a world leader in the minerals and metals sector and to develop partnerships that will continue to have a significant contribution to strengthening the mining industry throughout the world. A total of 105 Canadian companies were represented with participation in 60 booths. EXPOMIN is a biennial international trade show that is rated, in terms of participation, as the world's second largest mining trade show after MINEXPO in Las Vegas, Nevada. EXPOMIN covers a wide spectrum of products and services for the mining industry and brings together more than 2300 exhibitors from 36 countries, drawing about 43 000 visitors.

At EXPOMIN 2002, NRCan developed collaborative partnerships with other government departments and organizations in order to showcase Canada's mining expertise and cutting-edge technology, as well as Canada's commitment to the sustainable development of its natural resources. The partnership consisted of the Canadian Embassy in Chile, the Department of Foreign Affairs and International Trade (DFAIT), the Canadian Association of Mining Equipment and Services for Export (CAMESE), Export

Development Canada, the Canadian Commercial Corporation, and the provincial governments of Ontario and Quebec. NRCan received financial assistance from DFAIT, under the Team Canada Inc.'s Brand Canada Program, to promote the image and visibility of Canada at EXPOMIN 2002.

As part of the cultural activities of the Brand Canada Program, an Inuit stone carver, Henry Kudluk, showcased stone-carving techniques for visitors to the Canadian Pavilion, and catering services were provided by a Cree chef from northern Saskatchewan, Arnold Olson. Mr. Olson has won numerous culinary awards, including the Gold Aboriginal Team Award at the World Culinary Olympics in Germany. The participation of Mr. Kudluk and Chef Olson at this trade fair provided an opportunity to enhance and build partnerships with Canadian Aboriginal businesses and to continue collaborating in joint business development initiatives.

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### **Naturallia 2002 - International Business Forum, Rouyn-Noranda, Quebec**

As part of a continuing effort to develop new ways to help Canadian small and medium-sized enterprises (SMEs) access new markets, the Minerals and Metals Sector of NRCan joined other federal, provincial, municipal and industry partners in supporting Naturallia 2002. Held October 29-31, 2002, this was the first international natural resources business development forum organized in the northern regions of Quebec and Ontario. Specializing in the mining and forestry sectors, this business development forum is aimed at building international business partnerships and alliances. Government sponsors at the federal level included NRCan, FedNor (Federal Economic Development Initiative for Northern Ontario), and Canada Economic Development for Quebec Regions. The governments of Quebec and Ontario were also involved. The main corporate sponsors were 48<sup>e</sup> Nord International, Noranda Inc., and Tembec Inc.

The business development program comprised three sessions of four 30-minute match-making meetings. In total, there were approximately 500 match-making meetings arranged for participants. This format offered an opportunity to briefly discuss potential business prospects among the 135 participants from Argentina, Australia, Brazil, Canada, Chile, Peru, South Africa, the United Kingdom, and the United States. Many of the participants visited CANMET's Mining and Mineral Sciences Laboratories booth in the Village des Experts, as well as the Government of Canada booth. In addition to the match-making sessions, the program also included industrial visits in both Quebec and Ontario, social networking events, and an on-site exhibition to exchange information and expert knowledge.

The next NATURALLIA Business Development Forum is planned for northern Ontario in 2004.

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## **ELECTRA MINING 2002, Johannesburg, South Africa**

Held every two years, ELECTRA MINING is the premier mining event in Africa and the only trade show that offers Canadian suppliers of equipment and services an opening to this large, regional mining market. Since its inception 30 years ago, ELECTRA MINING has grown to become the largest specialized industrial exhibition in Africa and ranks among the three largest mining shows in the world.

There were about 35 000 visitors and over 600 exhibitors participating in ELECTRA MINING 2002 from Canada, China, Germany, India, Poland, Russia, South Africa, the United Kingdom, and the United States. Approximately 60 Canadian companies were represented in 14 booths (indirect participation was through posters and the distribution of literature), including 23 companies attending on-site. As a result of the promotional efforts of NRCAN and CAMESE, under the Brand Canada Program, Canadian company direct participation increased from 4 companies in 2000 to 23 companies in 2002. The companies came from British Columbia, Ontario and Quebec.

The program included: industrial visits to South African manufacturers of equipment, a diamond-cutting plant, and the South Deep mine owned by Placer Dome Inc.; seminars on current trends and how to penetrate the African market in areas such as equipment selection, blasting techniques, mine planning and grade control, rock

mechanics, outsourcing and information technology, operational issues, environmental issues, and health and safety; a regional debrief from the Trade Office of the Canadian High Commission; and a networking reception.

Canada's participation in ELECTRA MINING 2002 provided many opportunities to showcase our innovative approaches and expertise in mining and technology and to establish and develop contacts with key African decision-makers.

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## **Team Canada Inc. Mission to Russia**

The Prime Minister of Canada, the Right Honourable Jean Chrétien, led a Team Canada mission to Russia and Germany in February 2002. He was accompanied by eight provincial premiers, three territorial leaders and more than 200 representatives from Canadian companies. Team Canada's main objectives in Russia were to alert Canadian businesses to the promising re-emergence of the Russian marketplace and to help them, as individual companies, make informed and timely decisions about initiating new, or pursuing existing, opportunities under the aegis of Team Canada.

Team Canada's business program in Russia comprised 285 delegates representing 219 private and public sector organizations; 11 of these were from the mining sector and 21 were from the oil and gas sector. The actual business deals concluded during Team Canada's visit to Moscow comprised 77 agreements valued at \$337 million; there were 25 contracts amounting to \$148 million, mainly in the areas of information and communication technologies, construction and building materials, oil and gas equipment, educational services, and agrifood and agriculture. There were also 52 memoranda of understanding and letters of intent signed, totalling an estimated \$189 million, mainly in construction and education.

The plenary session, with its macro perspective, was followed by seven concurrent seminars designed to provide Canadian delegates with more detailed information on the challenges and opportunities awaiting Canadian business in Russia. Six of the seminars had a sectoral focus, including agrifood and agriculture, educational services, information and communication technologies, oil and gas, residential construction and building materials, and mining. The seventh seminar addressed generic issues under the heading "Doing Business in Russia."

The mining seminar was titled "Russia's Minerals and Metals Sector - Business Opportunities for Canadian Companies," and was chaired by a representative of the

Minerals and Metals Sector of NRCan. Participants in the seminar included representatives from Canadian and Russian mining companies, the Russian State Duma, and the Canadian and Russian governments. The Minerals and Metals Sector has been playing a leading role in the Mining Working Group of the Canada-Russia Intergovernmental Economic Commission since it was created in 1998. The working group was successful in raising the concerns of Canadian mining companies with Russian governments, in holding a number of investment seminars, and in facilitating the negotiation of bilateral agreements regarding investment and geoscience collaboration.

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### **Trade Mission to South Africa**

In February 2002, the Minister of Natural Resources Canada, Herb Dhaliwal, led a trade mission to South Africa. Some members of the mission also visited a capacity-building project in Zambia funded by the Canadian International Development Agency (CIDA) for which CANMET is the executing agency. The Zambia project addresses governance issues in relation to environmental management and mining activities. The same members of the delegation also accompanied Placer Dome officials on a tour of a CARE project that helps retrenched workers reintegrate into the labour force.

The objectives of the mission included: coordinating a full-day training session for African-based Canadian Trade Commissioners on Canada's minerals and metals sector; attending the Indaba Conference, Investing in African Mining to gather regional market intelligence, promote the use of Canadian mining-related equipment and service providers, and the adoption/maintenance of fair and transparent mineral regimes for Canadian companies operating in the region; promoting market access and sustainable development principles in the region; and exploring options to promote the development of the Africa Mining Partnership as part of the New Partnership for African Development. With respect to the last objective, NRCan held productive meetings with representatives from the governments of Botswana, Cameroon, Ivory Coast, Ethiopia, Gabon, Ghana, Malawi, South Africa, Tanzania, and Zambia.

Meetings between NRCan officials and Canadian mining companies operating in South Africa focused on the implications of South Africa's proposed Mineral Development Law for Canadian companies. Concerns were raised by Canadian companies with respect to the extent of ministerial discretion in the proposed legislation. Canadian com-

panies will be asking The Mining Association of Canada and the Prospectors & Developers Association of Canada to make formal submissions to the South African government on their behalf.

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### **Trade Mission to India**

In November 2002, the Minister of Natural Resources Canada, Herb Dhaliwal, led a successful business development mission to India. The Minister was accompanied by representatives from 45 companies within the natural resources sector and allied industries. In addition to NRCan, there was official representation from Export Development Canada, the Canadian Commercial Corporation, Industry Canada, and Alberta Economic Development.

As part of his efforts to increase Canada's trade with and investment in India, Minister Dhaliwal met with his counterpart at the Ministry of Coal and Mines and actively supported the many networking events in each of the cities visited. As part of this mission, NRCan organized seminars in New Delhi, Hyderabad and Calcutta to promote Canadian suppliers of equipment and services in mining, geoscience and geomatics.

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## **INTERNATIONAL PARTNERSHIPS**

### **World Summit on Sustainable Development (WSSD)**

The WSSD, held in Johannesburg, South Africa, between August 26 and September 4, 2002, marked the 10<sup>th</sup> anniversary of the United Nations Conference on Environment and Development (UNCED). The interest shown in the preparatory regional intergovernmental meetings on the management of natural resources, including mineral resources, allowed Canada and other countries to succeed in bringing the topic of mining, minerals and metals into the world summit work program.

Canada chaired an informal negotiating group on mining, minerals and metals that succeeded in putting together a text that was accepted as paragraph 46 of the Summit's Plan of Implementation, which recognizes the positive

economic and social contributions of mining in the context of sustainable development.

Paragraph 46 served as a backdrop for Canada and South Africa to announce at the Summit the creation of a partnership called The Global Dialogue of Governments on Mining/Metals and Sustainable Development. The partnership was formally announced in the course of the Summit at a press conference hosted by Canada. It is recognized as a Type 2 Partnership, i.e., it is formally recognized by the United Nations as supportive of the Summit Plan of Implementation.

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### **The Global Dialogue of Governments on Mining/Metals and Sustainable Development**

Having raised the issue of mining and the challenges it faces in the global context at the World Summit on Sustainable Development, Canada recognized the need for a global forum in which interested governments could meet on an ongoing basis to address mining and metal issues from a government and integrated perspective in the context of sustainable development. While a number of regional and sector-specific fora exist, there is currently no active global forum that brings together governments to address these important policy issues. Together with South Africa, Canada proposed the creation of a global mechanism tied to the outcomes of the World Summit, "The Global Dialogue of Governments on Mining/Metals and Sustainable Development."

The Global Dialogue is being designed to bring together high-level officials with a responsibility for mining and metals policy in a forum where the member governments can exchange information and discuss issues, policies and regulatory approaches in the context of the contribution that the non-energy minerals and metals sector makes to sustainable development.

Reference to sustainable development will allow the forum to address the widest possible range of issues. The forum will not have any authority to develop and implement international rules, standards or conventions; however, it is expected that the forum could make recommendations or suggestions to intergovernmental bodies, individual governments or other stakeholders associated with the minerals and metals sector. As such, the national sovereignty of the member governments will be respected.

By the end of 2002, some 35 countries from around the world with an interest in mining and metals had signaled their interest in starting the process to establish a Global Dialogue that will create an international government-led

forum focusing on minerals and metals issues. Work continues to encourage countries to participate in the process of formulating the program of work, terms of reference, rules of procedure, and other aspects necessary for the operation of the forum. A preparatory meeting is being planned for the fall of 2003 with the inaugural meeting scheduled in early 2004.

The Global Dialogue represents a unique opportunity for governments and their delegations to make an important contribution to policy discussions aimed at improving the minerals and metals sector's contribution to sustainable development and enhancing its reputation worldwide. The potential benefits of the forum are clear, but their realization depends upon the active support of all with an interest in the sector. Additional information on the Global Dialogue is available on the Internet at [www.globaldialogue.info](http://www.globaldialogue.info).

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### **World Mines Ministries Forum 2002**

The second World Mines Ministries Forum (WMMF 2002) took place in Toronto, March 13-15, 2002, immediately following the annual convention and trade show of the Prospectors & Developers Association of Canada (PDAC). WMMF 2002 was co-chaired by the Government of Ontario and the World Bank and was attended by more than 350 representatives from governments, industry, non-governmental organizations, Aboriginal groups, and international organizations.

NRCan officials played a prominent role at WMMF 2002, including organizing two of the six workshops (Sustainable Development: the Road to Johannesburg Summit 2002, and The Role of Geoscience in Attracting Investment) and acting as a facilitator in the workshop on Creating a Positive Investment Climate. The other themes addressed at WMMF 2002 were Governance Issues in the Mining Sector, Mining and People, and Dealing with Voluntary Codes of Conduct.

Participants in the geoscience workshop concluded that geoscience knowledge does indeed attract investment and that this knowledge should be promoted to exploration companies rather than to investors. There was unanimous agreement that resource development can go a long way to alleviate poverty in developing countries and that the poorest countries should be aided in the establishment of geoscience knowledge bases to help attract investment. Three of the panel members volunteered to assist in making this happen.

The Road to Johannesburg workshop included regional perspectives on mining and sustainable development from

South Africa, Latin America and the Philippines. Discussion focussed on evolving models for corporate responsibility, links between mining and poverty alleviation, links between mining and sustainable development, using mining as a platform for economic development, national governments and governance issues, capacity building, abandoned mines, and artisanal and small-scale mining.

The WMMF 2002 was also the occasion for the launching of the International Cyanide Management Code for the Gold Mining Industry. The code was developed through a multi-stakeholder process under the auspices of the United Nations Environment Programme (UNEP) and the former International Council on Metals and the Environment (ICME), now the International Council on Metals and Mining (ICMM).

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## REGIONAL PARTNERSHIPS

The economies of APEC (Asia-Pacific Economic Cooperation) include not only major producers of minerals and metals, but also major consumers of metals and mineral products. Many economies, as a result, have a direct interest in the long-term viability of the minerals and metals sector. GEMEED, which is part of the APEC Energy Working Group (EWG), was formed in 1995. It remains the only forum for governments to discuss minerals and metals issues in the APEC region. Its objectives are:

- to work to enhance the contribution of mineral and energy resources to sustainable development, through environmentally and socially acceptable practices in exploration and development; and
- to identify, develop and promote synergies in the area of mineral and energy exploration and development with other national, regional and multilateral organizations.

## APEC-Expert Group on Mineral and Energy Exploration and Development (GEMEED)

In April 2002, APEC-GEMEED supported an international workshop on life-cycle assessment (LCA) and metals. The workshop, which took place in Montréal, Quebec, was organized by NRCan, the United Nations Environment Programme (UNEP)/Society of Environmental Toxicology and Chemistry (SETAC), and the International Council on Metals and Mining (ICMM).

The workshop was successful in building bridges between the LCA community and interested scientists by considering environmental issues related to metals and identifying areas for future research. The workshop papers and conclusions will be available in 2004 from SETAC. Abstracts and presentations are available on the Internet at [www.nrcan.gc.ca/mms/canmet-mtb/mmsl-lmsm/enviro/lifecycle/default.htm](http://www.nrcan.gc.ca/mms/canmet-mtb/mmsl-lmsm/enviro/lifecycle/default.htm).

In May 2002, the United States hosted an Environmental Cooperation Workshop on indigenous peoples and mining. The workshop covered a number of topics related to exploration, mining and mine closure, including:

- the involvement of native peoples in exploration and mining, with emphasis on the Northern Alaska Native Association (NANA) and Teck Cominco Limited's Red Dog mine in Alaska, as well as the Navajo and Hopi tribes and Peabody's Black Mesa mine in Arizona;
- international practices for community involvement and their relevance to mining projects; and
- community activities by mining companies such as Placer Dome/NovaGold Resources Inc. in Alaska and Minera Escondida Limitada in Chile.

In October 2002, China hosted APEC-GEMEED's 7th Plenary Meeting in Chongqing. The principal activities and achievements of APEC-GEMEED were:

- completion of a Chilean-led project on a Survey of Factors Influencing Demand for Metals and Minerals (principally copper, zinc, lead, nickel and iron);
- an agreement by members to hold a meeting of APEC Mines Ministers in Chile during 2004; and
- forging closer ties with international financial organizations, such as The World Bank Group.

China Mining 2002, held in conjunction with the APEC-GEMEED meeting, offered an excellent opportunity to

understand first-hand the difficulties faced by foreign mining companies operating in China and to hear how China is trying to address these issues by reforming its investment climate for mining. NRCan officials gave presentations at China Mining 2002 on Public Geoscience as a Foundation for Resource Exploration: the Canadian Experience (by the Earth Science Sector) and Sustainable Development and Minerals and Metals: Governments and International Agendas (by the Minerals and Metals Sector).

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### **Annual Mines Ministries of the Americas Conference (CAMMA)**

As an advisor to CAMMA's Executive Secretariat, NRCan's Minerals and Metals Sector was instrumental in obtaining accreditation for CAMMA as an intergovernmental organization with observer status at the 2002 World Summit on Sustainable Development in Johannesburg, South Africa. The international delegation consisted of a representative of CAMMA's Executive Secretariat, Victor Silva (Secretary of State of Industry and Commerce, Dominican Republic); the two international advisors to the Executive Secretariat, Roberto Sarudiansky (Ministry of Industry, Commerce and Mining, Argentina) and Kim Stirling (Minerals and Metals Sector, Natural Resources Canada); and Dr. Laura María Barreto (Centro de Tecnologia Mineral [CETEM], Brazil).

On behalf of CAMMA's 23 member governments, the Executive Secretariat delivered a statement during the plenary session. It emphasized the recognition of Heads of Government and State from the Americas and Caribbean for the economic and social contribution of mining, enunciated in the 3<sup>rd</sup> Quebec Summit of the Americas Action Plan. The statement also reaffirmed CAMMA's commitment to support and promote the implementation of policies that take into account environmental, social and economic considerations in government decision-making supported by science-based knowledge and to foster the development, promotion and safe use of minerals and metals.

CAMMA delegates at the World Summit also met with representatives from the Council for Mineral Technology (Mintek), the South African Department of Minerals and Energy, the South African Mining Chamber, and MEPC (a minerals and energy policy and research organization) in an effort to identify areas of common interest and possible future collaboration. The development of inter-continental relationships between members of CAMMA and member governments of the newly formed Africa Mining Partnership is reflective of CAMMA's commitment to discuss and exchange information about sustainable development policy initiatives within other mining policy fora, thereby

contributing to sustainable development policy at a global level.

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### **BILATERAL PARTNERSHIPS**

#### **Korea Resources Corporation (KORES) Opens an Office in Toronto**

Since the early 1990s, NRCan's Minerals and Metals Sector, in conjunction with the Canadian Embassy in Seoul, has actively encouraged KORES to open an office in Canada. KORES is a state-owned company with a mandate that includes supporting overseas mineral resource development. The official opening of the office occurred on March 12, 2002, the second day of the annual PDAC convention. Key mining executives and senior government officials attended the event, which featured both Mr. Chun Taek Park, President of KORES, and Mr. Benoît Serré, Parliamentary Secretary, Natural Resources Canada. The KORES Toronto office is the organization's third regional office; the other two offices are located in Beijing, China, and Sydney, Australia. In support of the KORES Toronto opening, the Minerals and Metals Sector coordinated an extensive orientation program in Toronto, Ottawa, Timmins, Sudbury and Vancouver for KORES's new Chief Executive Officer.

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#### **Saudi Arabia-Canada Joint Economic Commission (JEC) Meeting**

On June 13 and 14, 2002, committee meetings took place in Ottawa on Saudi Arabian mineral development and the role of Canadian companies.

Early indications are that a new Saudi mining code will be in force at the end of 2002, followed by the attendance of Saudi teams at such events as the PDAC convention in March 2003 in order to address investors and Canadian mining companies. In this context, the joint future activities of the Canadian and Saudi partners under the JEC will involve a seminar in Toronto with participation by Canadian and Saudi governments and companies involved in exploration, mining, and equipment and services. The purpose of the seminar would be to discuss future plans and activities that could lead to reciprocal increased trade

and investment between Canada and Saudi Arabia. Another action plan will likely be the Saudi purchase of Canadian expertise in a number of areas, including environmental protection, geomatics and remote sensing.

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## PARTNERSHIPS IN SCIENCE AND TECHNOLOGY

### Global Mining Research Alliance

In June 2002 the government-funded mining research laboratories of Canada, Australia, South Africa and the United States established the Global Mining Research Alliance (GMRA). The partners in the GMRA are:

- **CANMET Mining and Mineral Sciences Laboratories:** CANMET-MMSL has almost 100 years' experience in working to support the Canadian and global mining and mineral processing industries. It is especially recognized for its expertise in technologies related to mine engineering, advanced mineralogy, and mine-related environmental sciences. CANMET-MMSL also brings to the table the expertise of the Geological Survey of Canada and the Mineral and Metal Policy Branch of NRCan's Minerals and Metals Sector. CANMET-MMSL is fully accredited under ISO 9001-2001.
- **CSIR Mining Technology** has facilities in Johannesburg and Pretoria, South Africa. Miningtek is recognized for its expertise in mine engineering and leading technical research. Miningtek provides a wide range of technical services to the South African mining industry ranging from mine design and planning to mineral resource management, mine worker safety training, and STD/HIV/AIDS programs for the minerals industry.
- **The CSIRO Division of Exploration and Mining** has laboratories in Perth, Melbourne, Sydney and Brisbane, Australia. CSIRO scientists and technicians are recognized for their research and expertise in mineral exploration geophysics and advanced mineral mapping technologies, as well as mineral database management and geochemistry. CSIRO researchers are also very active in advanced mining techniques, including automation. CSIRO's Division of Land and Water has expertise in the remediation of contaminated environments, catchment and groundwater management, and agricultural land-use management.
- **The Mine Safety Laboratories of NIOSH** (The National Institute of Occupational Safety and Health), as part of the Centers for Disease Control: NIOSH has

mine safety research laboratories in Pittsburgh, Pennsylvania, and Spokane, Washington. NIOSH's mandate is to invest in research that benefits mine worker health and safety, and this includes expertise in the disciplines of ground control and mine subsidence, safety, and occupational disease.

Several factors contributed to the establishment of the GMRA. Mining is increasingly a global activity with a number of large multi-national corporations controlling an ever-increasing share of the industry's companies. The GMRA, with its global experience and capabilities, is in a better position to serve the global industry while at the same time fostering the national interest of the partner countries. In addition, mining faces increasingly stringent technical challenges. These arise from such factors as mining deeper, mining less attractive orebodies, mining in remote regions, mining with increasingly strict control and standards of environmental performance, and mining with much attention being paid to the social implications of mine projects. Paradoxically, economic pressures on the industry, together with corporate amalgamation, are drastically reducing the industry's in-house R&D capacity; university research is also suffering from low enrolment in mining schools. The GMRA brings together the already substantial R&D capacity of the four diverse organizations and thus greatly strengthens the overall global research capability.

The GMRA allows the partners to reduce their respective expenses by combining capacity to bring in funds from the private sector. Partners can focus individually on aspects they do best while turning to their partners for support in other areas. As a not-for-profit unincorporated joint venture, the GMRA recovers only the fully loaded costs of carrying out its research. Members of the Board of Directors are the four heads of the partner organizations with Canada currently in the chair from July 1, 2002 to June 30, 2004.

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### Environmental Management of the Mining Sector in Zambia (EMMS)

CANMET-MMSL is the executing agency for the four-year CIDA-funded project on Environmental Management in the Mining Sector (EMMS) in Zambia. The goal of the EMMS project is to improve environmental management practices in the mining sector in Zambia, principally by strengthening the institutional capacity of the Mines Safety Department (MSD) of the Ministry of Mines and Minerals Development (MMMD) and other designated institutions to regulate and monitor environmental management, while at the same time building knowledge of environmental management among Zambian mining companies. The

project works with other key mining sector institutions such as the Environmental Council of Zambia (ECZ), ZCCM Investment Holding Plc, the University of Zambia, Copperbelt University, and the mining industry.

In this the second year of the project, a Steering Committee meeting was held in June 2002 at which CIDA expressed concern regarding the lack of funding being allocated to the MSD by the Government of the Republic of Zambia (GRZ). While it was planned that emphasis would begin to shift from project establishment and relationship-building toward a longer-term technical training program in year two, CIDA requested that no further training take place until the funding issue was addressed by the GRZ. In order to help address the funding issue, CANMET-MMSL focused mainly on completing a Resource and Revenue Assessment of the Mines Safety Department (MSD). Senes Consultants Ltd. were hired to undertake the assessment, which consisted of a series of consultative meetings and workshops with a wide variety of stakeholders to gather information related to defining appropriate core activities of the MSD, staffing levels and salary requirements (to mitigate staff losses to other organizations), organizational structure, and funding mechanisms. A draft report containing recommendations was completed in December 2002 and will be further discussed at a series of consultative meetings in early 2003.

In anticipation that the funding issue for the MSD would be resolved, CANMET-MMSL initiated a competitive process for a series of standing offers with Canadian consultants to assist in the development and delivery of a technical training program. The tender was advertised in December 2002 and it is expected that the successful consultants will be notified in early 2003.

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### Mine Rehabilitation Project in Brazil

Since 1998, CANMET-MMSL has been the delivery agent of a CIDA-funded project in Brazil on mine rehabilitation. Through this project, CANMET-MMSL has managed the transfer of expertise to a Brazilian government laboratory, Centro de Tecnologia Mineral (CETEM), to assist the lab in implementing the application of mined land reclamation by the Brazilian mining industry.

In 2002, discussion, planning and preparations were under way for a conference in Florianopolis, Brazil, in 2003 in order to share the lessons learned from the project with interested stakeholders. The conference will include representatives from CETEM, the Brazilian mining sector and CANMET-MMSL, and will feature a variety of presentations on both regulatory issues and technical reclamation projects. The conference will also be an opportunity to showcase both the cooperative relationships between

industry and regulators that have developed during the project and the scientific expertise that has developed in Brazil as a result of project activities. Based on the positive results obtained from this project, preliminary discussions are under way for the possible development of a CIDA-funded trilateral project between Canada, Brazil and a third South American country (possibly Bolivia).

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### Guyana Environmental Capacity Development Project (GENCAPD)

The GENCAPD project is designed to develop environmental expertise in several of the key institutions involved with the mining sector in Guyana, and to develop a regulatory framework that will promote the sustainable development of Guyana's mineral resources.

This project, initiated in 1998, has been extended to 2004 by the Canadian International Development Agency (CIDA). This was done in order to ensure the industry would participate more actively in the implementation of the mining-related environmental regulations. The industry requested that the government provide more direct hands-on participation at the mining sites (i.e., located in the jungle) by the key mining sector institutions of Guyana, including the Guyana Geology and Mines Commission (GGMC), the Environmental Protection Agency (EPA), the University of Guyana, and the Ministry of Health.

During 2002, the project focused on the following areas:

- Policy and Regulation:** To support legislation, the project completed the field work and analysis concerning mercury related to gold amalgamation, with the support of the above-mentioned institutions, and concluded that mercury was naturally occurring in soils. Hydraulic mining, rather than amalgamation, was responsible for the methylation of mercury at downstream mining sites. In this order, providing economical dry mining techniques assured solutions to two major environmental issues: the mobilization of mercury and the constriction of turbidity plumes. The Guyana Ministry of Health participated in the project and demonstrated that community intoxication by mercury was not related to the amalgamation technique. These results were presented during the GGMC Mining Week.
- Industry Practice:** Although mercury is naturally occurring in the clays of the Guyana Shield, the burning of amalgam is a health hazard during the refinery process. The project designed an affordable retort based on research done by the GGMC and the University of Guyana. Local enterprise provided enough retorts for the Guyana Gold and Diamonds Miners



Association (GGDMA) to distribute to its members, with the appropriate training on how to use the retorts. Amerindian community miners were supplied with the retorts by the GGMC. Finally, training of the mines inspectors was provided by CANMET, and Amerindian rangers were trained as mines inspectors.

- **Institutional Development:** The Institute of Applied Sciences and Technology of the University of Guyana was audited by the project for quality assurance of its analysis. Manuals and protocols were written accordingly. The project provided the GGMC with the hardware support for data analysis and communication, through the Internet, with the mining industry's scientific community. Finally, the GGDMA has included, as part of its staff, an environmental officer who reports directly to the permanent secretary of the association.

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## International Workshop on Life-Cycle Assessment and Metals

Should the attributes of a "green product" containing metals be based on the recycled metal content or on its recyclability? Future metal scarcity is an important issue among environmentalists, but is it a concern for the specialist in the field of mineral economics? Do you think that throwing a nickel into the Rhine River has the same potential risk to the aquatic ecosystem as 15 tonnes of 1,4 dichlorobenzene, the white puck used in urinals? Because of the international context, assessment outcomes may have an impact on the ability of metal products to access foreign markets.

In order to create a bridge between the life-cycle assessment (LCA) experts and various scientific and technology experts interested in metals, NRCAN organized a workshop on LCA and metals. The workshop was sponsored by the United Nations Environment Programme (UNEP), the Society of Environmental Toxicology and Chemistry (SETAC), the Asia-Pacific Economic Cooperation-Expert Group on Minerals and Energy Exploration and Development (APEC-GEMEED), and the International Council on Mining and Metals (ICMM). There was also participation from the steel and aluminum sectors. The workshop was held in Montréal from April 15 to 17, 2002, and 60 experts from 17 countries participated.

The workshop was an opportunity to present and review the information that has been obtained on the mining, production, use and disposal of base metals, and to compare it with existing LCA methodologies in order to evaluate gaps and enhance relevancy. A short list of the recommendations of the workshop are captured under three themes: life-cycle inventory, metal mining, and human and environmental toxicity of metals.

In conclusion, new relations have been established and some of the recommendations are incorporated into the UNEP/SETAC Life-Cycle Initiative.

The proceedings will be published by SETAC in 2004. Abstracts and presentations are available on the Internet at [www.nrca.gc.ca/mms/canmet-mtb/mmsl-lmsm/enviro/lifecycle/default.htm](http://www.nrca.gc.ca/mms/canmet-mtb/mmsl-lmsm/enviro/lifecycle/default.htm).

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## Microseismic Monitoring Associated with a Tunnel Excavation in a Clayey Formation (France and Canada)

In France, the safety of operations related to the storage of nuclear waste is part of the expertise of the Institut de Radioprotection et de Sûreté Nucléaire (IRSN) under the auspices of the Autorité de Sûreté Nucléaire (ASN). Clayey formations are considered to be potential geological barriers for the deep storage of nuclear waste because of such characteristics as low permeability and retention of radioelements. Consequently, the application of geophysical methods (non-destructive methods for the analysis of disturbances induced by excavation in clayey formations) will be unavoidable for analysis (and quantification) of in situ damage.

Since October 2002, the IRSN and CANMET-MMSL have been working together to install and operate a network of microseismic sensors for a seismic survey of a rock mass disturbed by the excavation of a tunnel. Hence, this work will make it possible to evaluate the capabilities of seismic methods to analyze the damage caused by such an excavation.

Microseismic monitoring of a tunnel excavation at the Tournemire site will make it possible to locate with precision the acoustic emissions produced by local readjustment of the stress field. This monitoring, completed with seismic surveys at time intervals of a few months, will allow the thickness of the zone mechanically damaged and its spatial and temporal evolution to be quantified. In addition, analysis of the source of these acoustic emissions will make it possible to identify the types of movement along the discontinuities.

The IRSN selected CANMET-MMSL on the one hand because of the expertise it has developed over the years in evaluating, in collaboration with Atomic Energy of Canada Limited, damage to underground excavations at its Underground Research Laboratory (URL) in Pinawa, Manitoba, and, on the other hand, because of its experience related to microseismicity in clayey formations, acquired during microseismic monitoring of oil sand reservoirs. CANMET-MMSL's involvement centres on the

design of the microseismic network, the installation of special amplifiers and acquisition systems, the installation of the microseismic network at the Tournemire site, and technical and scientific assistance with microseismic data recorded during this project.

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Notes: (1) Information in this review was current as of December 31, 2003. (2) This and other reviews, including previous editions, are available on the Internet at [www.nrcan.gc.ca/mms/cmy/2002CMY\\_e.html](http://www.nrcan.gc.ca/mms/cmy/2002CMY_e.html).

#### NOTE TO READERS

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