

MINERALS AND METALS

Towards a Sustainable Future

*A Canadian contribution to the land use dialogue at
the Eighth Session of the United Nations Commission
on Sustainable Development, April 24 to May 5, 2000*

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Preface

At its eighth session in the spring of 2000, the United Nations Commission on Sustainable Development (CSD) will be reviewing global progress made with respect to Chapter 10 of Agenda 21, “Integrated Approach to the Planning and Management of Land Resources”. For Canada — the world’s second largest country in land mass — the issues associated with the sustainable development of land resources are intimately entwined with Canadian history, in addition to being pivotal to its future well-being. As a contribution to the land use dialogue, Canada has prepared a series of six monographs describing its experience and the challenges that remain in the integration of sustainable development.

Agriculture and forests will be particular themes at CSD 8. Canada is world famous for its prairie wheat, and sustainable agricultural practices, both within Canada and internationally, have global implications. Canada presents its experiences in its first monograph on sustainable agriculture. As with the prairies, images of vast Canadian forests and the rugged Canadian Shield rich in minerals are familiar Canadian icons. For this session of the CSD, Canada has updated monographs on forests and on minerals and metals originally prepared for the five-year review of Agenda 21 in 1997.

Canada, along with its circumpolar neighbours, faces extraordinary challenges in the sustainable development of its Arctic regions and is working to this end directly with Indigenous peoples and territorial governments, including the newest territory, Nunavut, which came into being on April 1, 1999. Along with fellow members of the Arctic Council, Canada is looking for means to ensure that the world has a better understanding of the impact of southern activities on the vulnerable Arctic environment. In this regard, a monograph addressing sustainable development and Indigenous peoples in the Canadian Arctic has been prepared.

Key to successfully implementing sustainable development policy is a clear understanding of the issues to be addressed. The role of science cannot be underestimated in this search for understanding. In this regard, Canada has developed two additional monographs. One provides an overview of the applications of earth sciences to the gathering and interpretation of scientific information to contribute to policy development. In the other, Canada concludes its monograph series for CSD 8 with a review of its experiences of an ecosystem approach to the development of sustainable development principles.

This monograph highlights some of the major economic, environmental, and social issues confronting the minerals and metals sector globally. It also reviews recent federal government and industry initiatives and the various international organizations whose

programs provide opportunities for countries to work together toward the sustainable development of minerals and metals. It updates the earlier monograph on minerals and metals, prepared for the 1997 review of Agenda 21, to reflect experience and the evolution in thinking since the release of the *Minerals and Metals Policy of the Government of Canada: Partnerships for Sustainable Development* in 1996.

For Canada, sustainable development is best represented as a journey, not a destination. The monographs described above, as well as the other monographs in the Sustainable Development in Canada Monograph Series, are milestones on this journey, and we invite you to join us and share our experiences.

MINERALS AND METALS

Towards a Sustainable Future

INTRODUCTION

It is almost impossible to imagine life without minerals and metals and metal compounds. Of the 92 naturally occurring elements, 70 are metals; many are essential to plant, animal, and human life. These substances have been part of human activity since bits of copper were first hammered into simple tools about 6000 B.C.

Today, society needs minerals and metals for ever-widening purposes. Industrial minerals such as mica are essential components of advanced industrial materials. Agriculture needs mineral-based fertilizers. Industries depend on metals for machinery and concrete for the manufacturing plants necessary for industrialization. No aircraft, automobile, computer, or electrical appliance can function without metals. Electrical power supply depends on copper and aluminum. Titanium is critical for aircraft engines. A world without the silicon chip is now unimaginable. Metals will continue to contribute to the needs of future generations through new applications in the electronics, telecommunications and aerospace industries.

THE CANADIAN CONTEXT

In Canada, the concept of sustainable development is being integrated into federal government policies, programs, and legislation. *The Minerals and Metals Policy of the Government of Canada: Partnerships for Sustainable Development* recognizes that the continued use of Canada's mineral resource endowment must proceed within a sustainable development framework.

Canada's federal, provincial, and territorial governments play complementary roles in the mining sector. The federal government is responsible for nuclear energy, including uranium mining, and the regulation of all mining activities in the Northwest Territories, Yukon, and Nunavut. The provincial governments own the natural resources within their jurisdiction and are responsible for policies and regulations covering all aspects of exploration, development, and extraction of

mineral resources, as well as the construction, management, reclamation, and close-out of mine sites in their jurisdiction.

Responsibility for environmental protection and conservation is shared between both levels of government. As such, the federal, provincial, and territorial governments are key partners in the sustainable development of minerals and metals.

Economic and Social Benefits

As one of the world's largest mining nations, Canada produces more than 60 minerals and metals. Figures for 1998 rank Canada first in world production of uranium; second in cadmium, magnesium, nickel, and zinc; third in aluminum, cobalt, and platinum-group metals; fourth in copper and gold; and fifth in molybdenum. Figures for production of nonmetallic mineral commodities in 1997 ranked Canada first in potash, second in asbestos and sulfur, and fourth in gypsum. Canada is also now a diamond producer and a major recycler of steel, copper, and precious metals, among others.

The minerals industry has been an important feature of the Canadian economy for more than 150 years. As of 1998, this multimillion-dollar sector accounted for more than 15 percent of Canada's exports, provided highly paid and skilled jobs to 367 000 Canadians, and sustained more than 100 communities as the core industry and main source of income and social benefits for many in rural and remote parts of Canada.

Mining provides one of the highest returns, in terms of average weekly earnings, of any industry in Canada. Labour productivity has increased by 22 percent in mining and by 37 percent in smelting and refining operations over the last decade. Canada's mining industry spends approximately \$100 million annually on research and development and is a world leader in environmentally safe and sustainable mining practices.

Canadian companies also make a major contribution internationally, having increased their investments in properties in other countries over the last decade. Eighty percent of the minerals produced in Canada are exported as minerals or metal products. Canada is also the largest centre for mining equity financing, providing more than 60 percent of the funds needed for mineral exploration and mine development globally.

Canada's mining industry is strongly committed to improving the environmental performance of its operations, as evidenced by its



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participation in a wide range of voluntary initiatives aimed at pollution prevention, emission reduction, and energy efficiency.

Canada's Minerals and Metals Policy

Canada's policy on the sustainable development of minerals and metals was adopted in 1996. Underlying the policy is recognition that the economic and social benefits generated through mineral development are not all consumed by the current generation. Because of the longevity of mining projects and the ability of many minerals and metals to retain their physical properties through repeated use, current investments in human and physical capital benefit future as well as present generations.

Five main principles provide the basis for Canada's minerals and metals policy: life-cycle management, risk assessment and risk management, safe use, science and technology, and recycling.

Sustainable Development of Minerals and Metals

Sustainable development in the context of minerals and metals is considered to incorporate the following elements:

- finding, extracting, producing, adding value to, using, re-using, recycling, and, when necessary, disposing of mineral and metal products in the most efficient, competitive, and environmentally responsible manner possible, using best practices
- respecting the needs and values of all resource users and considering those needs and values in government decision making
- maintaining or enhancing the quality of life and the environment for present and future generations
- securing the involvement and participation of stakeholders, individuals, and communities in decision making.

Life-Cycle Management

Life-cycle management is an essential part of environmental stewardship. It provides the overarching framework for realization of the other aspects of the policy and is closely linked to risk assessment and the principle of safe use. In managing minerals- and metals-related health and environmental issues, the principle of life-cycle management, for both process and product life cycles, plays an essential role.

Process life-cycle management applies to specific operations and their associated risks in relation to the production of minerals and metals, such as exploration, extraction, processing, smelting, and refining. It includes waste management, decommissioning, and site rehabilitation.

Product life-cycle management applies to specific elements, substances, or products and their associated risks based on assessments of all stages in the cycle of manufacturing, use, re-use, recycling, and disposal of that particular element, substance, or product.

Risk Assessment and Risk Management

The application of risk assessment and risk management approaches is inherent in the life-cycle management of minerals and metals. Risk assessment estimates the degree and likelihood of adverse effects resulting from exposure to a substance from a process or product. Risk management is the process of deciding what to do about an assessed risk, taking into account the results of the assessment and the economic, social, and legal factors.

Safe Use

The Safe Use Principle calls for the responsible use and management of environmental and human health factors associated with the production, use, re-use, recycling, and disposal of minerals and metals and is closely linked to the application of life-cycle, risk assessment, and management principles.

Safe use is also based on two premises contained in Canada's Toxic Substances Management Policy (1995): recognition that, as naturally occurring substances, minerals and metals cannot be virtually eliminated from the environment, and that some products containing minerals and metals, or their uses, pose risks that cannot be managed and may, therefore, be candidates for phaseout, bans, or virtual elimination of releases from specific anthropogenic sources.

The Safe Use Principle guides development of regulatory or nonregulatory strategies to manage risk based on the results of the risk assessment for a particular product during production, use, re-use, recycling, and return to the environment. By adhering to the Safe Use Principle, governments will ensure that society continues to benefit from minerals- and metals-related products while protecting human health and the environment in a manner consistent with sustainable development.

Science and Technology

Canada's minerals and metals policy recognizes the important role of science and technology in the achievement of sustainable development.

The Government of Canada is committed to fostering science and technology, both through its own activities and by encouraging the exchange of information and best practices, as well as by establishing partnerships and international collaboration and cooperation. It promotes partnerships and networking among stakeholders and builds knowledge bases, especially in the earth sciences. (The contribution of earth sciences to sustainable land management is described in *The Contribution of Earth Sciences to Sustainable Land and Resource Management*, monograph no. 12 in this series.)

Canada's minerals and metals policy promotes technological innovation in mining, processing, recycling, and all other aspects of mineral and metal use, from extraction to disposal. It also commits the government to enhancing the health and safety of Canadians, the quality of Canada's environment, and the competitiveness of its minerals and metals sector. Development of innovative materials and processes that respond to evolving environmental and societal concerns adds value to the natural resources and enhances industry competitiveness and productivity.

These commitments are addressed through the Canada Centre for Mineral and Energy Technology (CANMET) in partnership with industry, governments, universities, and other stakeholders. CANMET provides a wide range of science and technology programs, a key source of expertise, and unique facilities to house research.

Some examples of work undertaken by CANMET on mining-related environment, health, and safety issues include research on the following:

- lightweight materials for vehicles, which help reduce fuel consumption and carbon dioxide production
- enhanced mine air quality to develop automated, energy-efficient, mine-wide underground ventilation systems
- new and critically low threshold diesel emission levels to reduce underground exposure to diesel exhaust pollutants and oil mists
- rock behaviour processes at great depth to develop tools to optimize the safety and viability of deep mining operations.

CANMET also works closely with the Canadian International Development Agency (CIDA) on a variety of international projects both to transfer Canadian expertise and to learn from other countries. Collaborative projects with CIDA have focused on such issues as strengthening technical and managerial environmental capacities and transferring technologies and know-how on mine closure.

CANMET, in partnership with the Canadian mining industry, also develops cost-effective technologies to reduce the potential negative impact of mine waste, effluent treatment, and waste management on the environment. Two CANMET programs on effluents and tailings and on waste rock are other examples of successful research, focusing on options and solutions to environmental challenges facing the mining industry for mine operation and closure.

Recycling

Because of their value, consistent performance characteristics, durability, chemical properties, and versatility, many mineral products and essentially all metal products can be re-used almost without limit. Recycling is a key component of the sustainable development of minerals and metals, offering environmental as well as economic benefits. It adds to the efficient use of minerals and metals, reduces pressures on landfills, saves energy relative to that consumed in producing metals from primary sources, and offers the potential for recovery and access to mineral resources for future generations.

In order to achieve the full potential of recycling, it will be important to review existing domestic and international regulations and remove impediments that may unduly restrict the movements of legitimate and essential raw materials, particularly in instances where movement controls may not be commensurate with the risks posed by the individual recyclable material.

An additional barrier to recycling occurs when materials destined for recycling are defined and regulated as wastes destined for disposal, as under the Basel Convention. It is important to clearly differentiate between recyclable materials destined for legitimate recovery operations and wastes destined for disposal, and to apply appropriate risk management controls in each case.

Other steps to encourage recycling may include promoting improved collection programs, supporting technical improvements in separating and recovering minerals and metals, encouraging the development of products that use recycled minerals and metals, and distinguishing between recyclable materials and materials bound for final disposal.

Canada's Response to Acidic Mine Drainage

Begun in 1989, the Canadian Mine Environment Neutral Drainage (MEND) Program was a voluntary program to develop technology to prevent or reduce acidic mine drainage, which reduced liability by at least \$400 million. MEND 2000 is a new three-year initiative, focusing on technology transfer and the dissemination of up-to-date information on acidic drainage via workshops, reports, and on-line services. See <http://www.nrcan.gc.ca/mets/mend> for more details.

Industry Commitment

Canada's mining industry is committed to enhancing environmental performance and supports research and partnerships to improve understanding of the potential health and environmental effects of minerals and metals.

The Metals in the Environment (MITE) Research Network is an example of a partnership approach to scientific research by the public and private sectors. Formed in 1998 to improve Canada's understanding of the sources, pathways, fate, and environmental and health effects of metals in the environment, MITE is supported by the Mining Association of Canada, Ontario Hydro, and the federal government.

Members of the Mining Association of Canada and other industry organizations are also involved in many voluntary initiatives that support sustainable development. From 1992 to 1995, the association cosponsored, with federal and provincial mining ministries, the Whitehorse Mining Initiative (WMI), an extensive multistakeholder process to develop a strategic vision for sustainable mining. Land access and use, specifically protected spaces, mineral tenure, and land use planning processes, formed one of the major elements of the WMI process and underscored the importance of stakeholder involvement in subsequent policy development and corporate decision making.

The Accelerated Reduction/Elimination of Toxics (ARET) program is an example of a successful voluntary initiative. The program was established as a consensus-based, multistakeholder group with the aim of achieving a 50 percent reduction in emissions for target substances, using good science. By 1996, five years ahead of time, 31 Canadian mining companies had achieved a 68 percent reduction in releases from all sources, using 1988 as the base year. A further 19 percent reduction was targeted for 2000. In addition, the original goal of 50 percent reduction for most of the more than 100 target substances included under ARET has been met or exceeded.

In 1998, the Mining Association of Canada published *A Guide to the Management of Tailings Facilities*, which encourages environmentally responsible management of tailings facilities through the development of customized, site-specific management systems.

Other voluntary initiatives include industry support for Canada's Aquatic Effects Technology Evaluation Program, revision of the Metal Mining Liquid Effluents Regulations and ongoing participation in the Mine Environment Neutral Drainage (MEND) Program and its successor program, MEND 2000.

Canada's mineral and metals sector also supports product stewardship through commodity associations such as the International Lead Management Centre, which was formed to work with national governments, industries, and the international community to manage the risk of lead exposure.

Local Communities and Sustainable Development

Responsibly managed, mineral development activities make a valuable contribution to the social and economic well-being of local communities, particularly those in remote areas.

Sustainable development acknowledges the need to work with all stakeholders to address issues related to land and resource use, to increase their participation in economic activity, and to ensure that the benefits of natural resource development are shared equitably.

Aboriginal people have a particular interest in these issues because they often live in areas where mineral development takes place. Canada, through its minerals and metals policy, encourages partnerships between Aboriginal communities and the industry. Work is under way to identify Aboriginal communities near existing mines and upcoming mining projects in Canada to assist in the early identification of potential opportunities and benefits for these communities. Statistics are also being developed that will assist governments, Aboriginal communities, and industry to better understand the opportunities for, and barriers to, Aboriginal participation in mining projects, as well as industry participation in Aboriginal communities.

Land Use and Protected Areas

With a land mass of almost 10 million square kilometres, Canada is second only to Russia in size. Current mining operations take up less than 1 percent of Canada's land. More than 60 percent of production is concentrated in the provinces of Ontario, Quebec, and British Columbia, but producing mines are found in all provinces and territories.

Although mining operations occupy only a small percentage of Canada's land mass, land access has been a major issue for the Canadian minerals and metals industry for several years. The amount of land closed to mineral exploration and development in Canada has risen over the last 30 years.

Traditional Knowledge

Aboriginal traditional knowledge can provide valuable insights to enhance resource management decisions. Canada has produced, in partnership with stakeholders, a brochure outlining how traditional knowledge can be used to inform natural resource decision making. It includes examples of its application to Canadian mining projects.

Environmental Assessment

In Canada, environmental assessment (EA) is a primary process used as a basis for deciding whether to authorize a project, and for the terms and conditions to be included in various permits should authorization be granted. A framework of laws, regulations, procedures, and guidelines establishes the rules, steps, and activities of the process.

A well-coordinated EA of a proposed mining project can contribute significantly to effective planning of that project. EA is a process through which a wide range of expertise — including mining specialists, environmental experts, and persons knowledgeable about local conditions — can be brought into focus. EAs of mining projects generally require a whole-of-mine-life focus, from mine concept to mine closure. This includes designs from the outset to minimize disturbance and protect key habitats. Many mining companies in Canada have realized that this is ultimately the most cost-effective approach to planning and managing a mine and, specifically, to managing environmental effects.

For governments, EA provides a mechanism for coordinating the work of the various agencies that have some responsibility for the mining project in question. More fundamentally, it is an opportunity to ensure that the jurisdiction's environmental objectives are met.

The minerals and metals industry requires access to large areas of land to explore for mineral deposits. To increase the probability of successfully finding an economically viable mineral deposit, the industry requires access to large amounts of land. Once the exploration stage is completed, however, mining uses relatively small areas of land, on a temporary basis, to recover mineral resources. The mine may also require infrastructure in the form of road or rail access, airstrips, and power generation and transmission, all of which may increase access to remote areas. Modern mining practices and regulations ensure that much of the land used for mining will later be reclaimed for other uses.

Protected areas in Canada are created to ensure representation of natural regions; protect biodiversity, specific species, or wildlife habitat; preserve ecological integrity; or ensure public access to outstanding natural areas for recreation and tourism. The level of protection in protected areas varies, and mineral exploration and development in these areas may be prohibited, regulated, or managed, depending on which conservation objectives have been set. A sustainable development perspective to the creation of protected areas can help to ensure that future generations are not denied potential access to natural resources while at the same time meeting environmental objectives.

Focusing on Land Access Issues

Sustainable development means balancing industry's need for access to land and the need to protect biodiversity and preserve ecological integrity. In 1998, Canada produced a background paper entitled Land Access, Protected Areas and Sustainable Development, which clarifies, for the minerals and metals industry, current initiatives on this subject and suggests future options to further align Canada's environmental, social, and economic objectives. This paper is available on the Internet at <http://nrcan.gc.ca/mms/pubs/land-e.pdf>.

Mining and Biodiversity

Canadians are increasingly becoming aware of the importance of maintaining biological diversity.

Biodiversity stewardship involves the management of land and activities with proper regard for wildlife, especially wildlife at risk, and habitat. Although some activities to protect wildlife and habitat may be regulated (for example, through species at risk protection), biodiversity stewardship is first and foremost a voluntary commitment to management planning and practices that will help to conserve wildlife and habitat.

Canada is developing a biodiversity stewardship initiative to promote the use of voluntary stewardship activities by natural resource industries to conserve wildlife and habitat. The initiative is intended to promote a biodiversity stewardship ethic within Canada's natural resource industries through the exchange of ideas and best practices. It will also promote partnerships between industry, conservation groups, Aboriginal associations, and communities.

A number of mining companies with operations in Canada are now integrating wildlife and habitat conservation into their project planning, mine development, and closure activities. Many of these companies also support wildlife-related activities outside the mine development area as a measure of their contribution to sustainable development. While some of these activities are regulated, many are voluntary.

Wildlife

The Canadian government, in cooperation with the Department of Environment and Resource Studies at the University of Waterloo, has compiled the Inventory of Mining Industry Practices to Conserve Wildlife and Habitat in Canada (<http://mmsd1.mms.nrcan.gc.ca/business/inventory>). The inventory catalogues wildlife-related activities of the mining industry in Canada. It is intended as an information source for those seeking to implement their own habitat- and wildlife-related activities, as well as a public information tool.

THE INTERNATIONAL CONTEXT

Commercial mining and mineral and metal activities occur in more than 150 countries. Every nation depends on either exports or imports of mineral and metal products for its industrialization, or both, including environmentally sound technology, equipment, and consumer goods that enhance the quality of life. In many countries, mining contributes to community needs through infrastructure development, medical services, and educational facilities in poor communities.

Canada participates in a number of regional and global mechanisms that encourage dialogue on issues related to mining and sustainable development. Different organizations have opted to explore different aspects, such as innovation, technology development, investment and market access, and trade barriers.

APEC Expert Group on Mineral and Energy Exploration and Development

In 1995, the forum for Asia–Pacific Economic Cooperation (APEC) established an Expert Group on Mineral and Energy Exploration and Development (GEMEED) to discuss mining and energy exploration, as well as development issues in the Asia–Pacific region. It also coordinates and promotes discussion of mineral-related issues within other APEC committees and working groups. Recently, GEMEED has included a specific focus on the sustainable development of minerals and metals.

Mines Ministries of the Americas

Since 1996, mines ministers and senior officials from countries in the Americas and the Caribbean have been meeting annually to renew their commitment to the principles of sustainable development and to discuss ways of implementing Agenda 21. The network is known as the Mines Ministries of the Americas, or by the Spanish acronym CAMMA. Member countries have also participated in Pan-American workshops on the Safe Use Principle and on occupational safety and health in the mining industry. Recommendations from both of these workshops have been incorporated into the ministers' declarations from their annual conferences.

International Study Groups

Three international study groups on lead and zinc, nickel, and copper provide an opportunity for information exchange among countries that produce and consume these commodities.

In December 1999, the study groups held a joint workshop on the sustainable development of nonferrous metals at which participants from 25 countries, international organizations, industry, and nongovernmental organizations recognized the contribution of non-ferrous metals to society and agreed to address challenges to the responsible production, use, re-use, and recycling of metals within the context of sustainable development. Five themes were identified for future action: partnerships, responsible management, good governance, information, and communication.

World Mines Ministries Forum

In March 2000, Canada hosted the first-ever gathering of representatives from mining ministries around the world. The World

CAMMA

Strengthening CAMMA's network across the hemisphere and accelerating the diffusion of minerals and metals sustainable development policies and technologies was the objective behind the establishment of a CAMMA Web site (<http://www.camma.org>). The site is intended to facilitate the exchange of information and best practices on sustainable development and the safe use of minerals and metals. It also provides links to government ministries responsible for mining in North, Central, and South America, and the Caribbean.

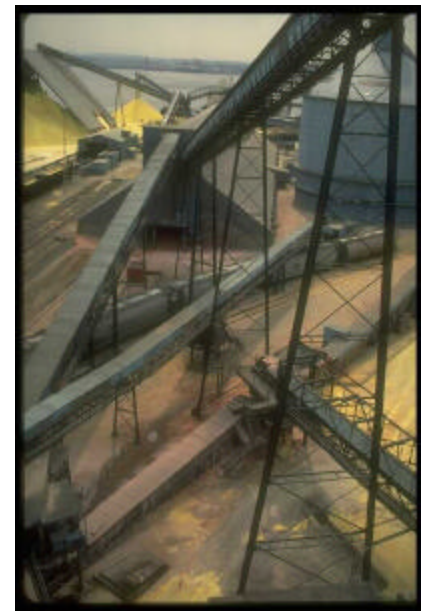


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Mines Ministries Forum brought government decision makers together with representatives from industry, nongovernmental organizations, and academia to share information on four main themes: mining and the community, sustainable mineral development, geological surveys in the information age, and the competitiveness of nations.

Other International Fora

Various aspects of minerals and metals and their impact on human health and the environment are captured in a range of international fora, including the following.

The **United Nations Commission on Sustainable Development** (CSD) was created in 1992 to ensure effective follow-up to the commitments made at the United Nations Conference on Environment and Development. It meets annually to examine different themes based on Agenda 21, and its current program of work was adopted at the 1997 Special Session of the General Assembly. Progress will be reviewed in 2002.

The **United Nations Environment Programme** (UNEP), together with the United Nations Department of Economic and Social Affairs (DESA), sponsored a Round Table on Mining and the Environment in November 1999 to review draft guidelines for mining and sustainable development. UNEP and the United Nations Conference on Trade and Development cosponsor the Mineral Resources Forum, a Web site to encourage interaction among a diverse set of users and to promote an integrated interdisciplinary approach to mineral issues and policies.

The **Organisation for Economic Co-operation and Development** (OECD) provides an important forum for member governments to address common problems, encourage cooperation, and promote the integration of economic, social, and environmental policies. Through programs dealing with chemical management, pollution prevention and control, and waste management, among others, the OECD develops recommendations that affect national and international policies related to the treatment of minerals and metals.

The **World Health Organization** (WHO) and the **International Labour Organization** (ILO) address social policy issues related to minerals and metals. An ILO Convention (176) and Recommendation (183) on Safety and Health in Mines were adopted in 1995.

The ILO has also paid particular attention to the iron and steel industry, adopting more than 100 conclusions and resolutions since

1946. In 1996, the focus was expanded to include “basic metal production” and future consideration of the occupational health and safety issues associated with the smelting, refining, and finishing of nonferrous metal products. In 2001, a tripartite group of experts is expected to develop and adopt a Code of Practice on Safety and Health in the Nonferrous Metals Industries that will provide specific guidelines for use throughout the industry.

The **Intergovernmental Forum for Chemical Safety** (IFCS) was established in 1994 to identify priorities for cooperative action to implement Chapter 19 (chemicals) of Agenda 21. The fourth IFCS meeting, with the theme “Partnership for Global Chemical Safety”, will be held in Salvador, Brazil, October 14–20, 2000.

Multilateral Environmental and Other International Agreements

A number of multilateral environmental agreements and international conventions have an impact on the use of minerals and metals. These include the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal; the Convention on the Law of the Sea; the Convention on Long-Range Transboundary Air Pollution; the Framework Convention on Climate Change; the proposed Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade; and the proposed Convention on Persistent Organic Pollutants.

International Institutions and Networks

In addition, some international networks focus on the sustainable development of minerals and metals.

The **International Council on Metals and the Environment** (ICME) was founded in 1991 to promote the development and implementation of sound environmental and health policies and practices in the production, use, re-use, recycling, and disposal of metals. In October 1999, ICME adopted a new mandate to reflect its increasing concern for sustainable development. ICME is now focusing on promoting sustainable development policies and practices by firms engaged in the mining and production of metals, which will ensure the safe production, use, recycling, and disposal of metals.

The **Mining and Energy Research Network** (MERN) is an international collaborative research program involving centres of excellence in major mineral-producing countries. It was established in

1991 with the goal of generating analysis to help improve the environmental and social performances and competitiveness of mining companies in the context of increasing environmental regulation and technological innovation.

THE PATH FORWARD

The last two decades of the 20th century have been characterized not only by globalization, but also by a new sense of environmental awareness and social activism. The Brundtland Commission, which in 1987 coined the phrase “sustainable development”, along with the 1992 United Nations Conference on Environment and Development, marked a transformation in how national governments, policy makers, consumers, and industry alike view industrial activity, trade, and the processes of consumption and production.

Canada is committed to ensuring that future development of its natural resource base is consistent with the principle of sustainable development. Not only must Canada meet its needs for minerals and metals today, it must also ensure that future generations are able to meet their needs as well. This challenge can only be met by all stakeholders working together, as partners. Everyone — governments, industry, workers, interest and environmental groups, and communities — has a stake in environmentally friendly and socially responsible mineral development.

In addressing the sustainable development of minerals and metals, there are a number of challenges ahead.

At the domestic level, countries are challenged to develop a policy, regulatory, and fiscal framework that will encourage innovation, increased productivity, trade, and investment in an environmentally sound and socially responsible minerals and metals sector. Industry is seeking to adopt and promote strong environmental stewardship over its day-to-day operations. Issues surrounding land use, access, and tenure must be addressed while maintaining the balance between the rights and interests of all stakeholders.

At the international level, some mineral-consuming countries are responding to heightened interest in environmental and health issues by proposing consumer restrictions and bans on certain mineral and metal products and their uses.

Governments must work together to ensure that new environmental and trade agreements and policy initiatives do not discriminate against metals and minerals and that decisions are taken, based on

the best scientific information available and the application of agreed methods of risk assessment.

Multilateral approaches are also needed to ensure the dissemination of scientific research and new technologies and to support continuous improvements in environmental management, corporate stewardship, life-cycle and risk assessment, and management approaches.

As the UN body established by member countries of the United Nations to implement Agenda 21, the blueprint for achieving sustainable development in the 21st century, the CSD has a key role to play in advancing the concept of sustainable development as it relates to metals and minerals. However, despite their essential role in the economic and social development of all societies, minerals and metals and related issues are not specifically addressed in Agenda 21. Instead, minerals and metals are addressed in the context of chemicals management and hazardous waste.

This oversight was partially addressed at the Special Session of the United Nations General Assembly in 1997. In its resolution “Program for the Further Implementation of Agenda 21”, the UN General Assembly acknowledged that inorganic chemicals, such as minerals and metals, possess roles and behaviour that are distinct from organic chemicals. It also acknowledged the need for integrated management solutions that would, among other things, promote recycling and re-use.

Canada believes that because of their importance to the continued advancement of society, minerals and metals and their uses must be included on the sustainable development agenda.

The discussion of land management at CSD 8 will provide an opportunity to advance the dialogue on the sustainable development of minerals and metals — a dialogue that Canada will seek to broaden when UN member countries meet in 2002 for the 10-year review of the implementation of Agenda 21.



Photo courtesy of the Natural Resources Canada photo library.

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- Asia–Pacific Economic Cooperation (APEC):
<http://www.apecsec.org.sg>
- Asia–Pacific Economic Cooperation (APEC) Expert Group on Mineral and Energy Exploration and Development (GEMEED) Secretariat:
<http://www.gemeed.cl>
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal:
<http://www.unep.ch/basel>
- British Columbia Ministry of Energy and Mines:
<http://www.em.gov.bc.ca>
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<http://www.biodiv.org/conutext/cbd0000.htm>
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<http://www.ilzsg.org>
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<http://www.uoguelph.ca.cntc/mite>
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- North-South Institute:
<http://www.nsi-ins.ca>
- Nova Scotia Department of Natural Resources:
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- Ontario Ministry of Northern Development and Mines (MNDM):
<http://www.gov.on.ca/MNDM/ndmhpge.htm>

Organisation for Economic Co-operation and Development (OECD):

<http://www.oecd.org>

Prince Edward Island Development:

<http://www2.gov.pe.ca/development/index.asp>

Prior Informed Consent for Certain Hazardous Chemicals in International Trade (PIC):

<http://irptc.unep.ch/pic>

Prospectors and Developers Association of Canada (PDAC):

<http://www.pdac.ca>

Saskatchewan Energy and Mines:

<http://www.gov.sk.ca/govt/enermine>

Sustainability 2000:

<http://www.sustainability2000.org>

United Nations:

<http://www.un.org>

United Nations Commission on Sustainable Development:

<http://www.un.org/esa/sustdev>

United Nations Conference on Trade and Development (UNCTAD):

<http://www.unctad.org/en/enhome.htm>

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<http://www.undp.org/indexalt.html>

United Nations Economic Commission for Europe (ECE):

<http://www.unece.org/Welcome.html>

United Nations Environment Programme (UNEP):

<http://www.unep.ch>

United Nations Framework Convention on Climate Change and Kyoto Protocol:

<http://www.unfccc.de/resource/convkp.html>

United Nations Industrial Development Organization (UNIDO):

<http://www.unido.org>

World Bank Group — Mining:

<http://www.worldbank.org/html/fpd/mining/index.htm>

World Business Council for Sustainable Development:

<http://www.wbcsd.ch>

World Health Organization (WHO):

<http://www.who.int>

World Trade Organization (WTO):

<http://www.wto.org>

Yukon Economic Development:

<http://www.economicdevelopment.yk.ca>



Tailings pond, 100 hectare area, Equity Silver Mine, Houston, British Columbia. *Photo courtesy of the Natural Resources Canada photo library.*