



**Mining, Minerals
Sustainable Development**



**International
Institute for
Environment and
Development**

PROPOSED OUTLINE FOR MMSD DRAFT REPORT

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PROPOSED OUTLINE FOR MMSD DRAFT REPORT

The following is MMSD's current thinking on the main themes and possible structure for the Project's Draft Report. It attempts to incorporate all the suggestions and comments received on our various discussion documents to date. Undoubtedly, this document will undergo a great number of changes and modifications as it evolves to the Project's Final Report. Its purpose is to guide our thinking as to how diverse topics and particular activities being undertaken by MMSD can be integrated into a coherent framework for reporting purposes. It outlines the most important themes, and some of the sub-themes within each.

It also indicates which themes are already being developed into more in-depth Project Activities designed to explore the theme more intensively. For these activities, the organisations and individuals with whom we are working are identified. In many cases, where we have yet to identify exactly how we will proceed to examine the theme, we have noted some potential partners with whom we would be very pleased to collaborate. It is important to note that those listed as potential partners bear no responsibility for this document, and that the terms and nature of their involvement are still in many cases under discussion. We have not attempted to be comprehensive in identifying all the potential partners for specific project activities. The organisations mentioned are solely to provide an indication of the types of organisations who are already working in these areas and with whom we would like to explore the possibility of forming some kind of partner relationship.

As an attachment to this document, a number of Concept Notes describe in detail some of the activities developed to date, providing their objectives, the form the analysis will take and the results we hope to achieve from them. These notes are referenced in the main outline where appropriate.

PROPOSED OUTLINE

1 Purpose and Scope of MMSD

1.1 Introduction

- What we mean by “transition to sustainable development” and the role of the mining and minerals sector
- MMSD’s objectives
- Why MMSD now
- How MMSD provides a platform for stakeholder engagement
- How priority issues are identified and analysed
- What the major outcomes are
- How ideas and outcomes are communicated
- The importance of the regional processes

1.2 The Sustainable Development Agenda

- The emergence of the concept of sustainable development
- The Rio process and the minerals industry
- Agenda 21 and the industry future
- What has happened since Rio

1.3 The Efforts on which we Build

- Sustainable development initiatives in the mining and minerals industry
- Lessons learnt from other similar international, regional and national initiatives in other industries

1.4 Key Organisations and Networks

- Key players in facilitating the transition to sustainable development

1.5 Expectations on MMSD Project

- Political mapping: what actors want what outcomes from the project

2 THE MINING AND MINERALS INDUSTRIES

2.1 Economic and Political History of Mining and Minerals

- How long have minerals been produced
- By whom
- How has mineral production and use influenced society
- Historical problems with environmental, social and cultural interactions with mining.
- Key environmental, social and economic characteristics of the industry 50 years ago and 25 years ago compared to today

2.2 What is Mined and Why – Background to the Industry

- The minerals which are produced worldwide and where
- Who produces them
- Who buys them
- How and where are they processed
- How and where are they used
- Quality of life issues
- Recycling, reuse, remanufacture, competing materials
- Who benefits from these processes and how
- Toward a definition of need for minerals – what do we mean by “need?”
- Focus of this report – which minerals and why
- Industry description – size, contribution to national income, structure and stages of production and transformation

- Industry trends – demand, supply, concentration, degree of integration, types of technology, end-usage, balance between virgin and recycled materials

Possible Partners: MERN, USGS, CRU & others

2.3 *Mineral Resource Availability*

- Historical context – limits to growth debate
- The implications of the recognition and internalisation of full environmental and social costs (see Concept Note 1).

Partners: Professor John Tilton, Colorado School of Mines and Resources for the Future

3 THE MINERALS ENTERPRISE

3.1 *The Kinds of Enterprises Which Produce Minerals*

- Multinational corporations
- Private national concerns, large, medium, and small
- Government owned companies
- Partnerships
- Artisanal mining and the informal sector

3.2 *Corporate Social Responsibility*

- Baseline Assessment of Current Corporate Practice in Sustainability - a survey of how and why mining companies approach sustainable development issues
- Community and government attitudes to corporate practice
- Supply chain issues – CSR along the supply chain
- Foundations – control and responsibility
- Boundaries of CSR – what companies are responsible for

Partners: PricewaterhouseCoopers (see Concept Note 2)

3.3 *Sustainable Livelihoods - Small Scale and Artisanal Mining*

- The issues surrounding the dependency of large groups of people on small scale mining as a livelihood
- Provision of platform for effective communication of concerns

Potential Partners: UK Department of International Development (DFID), Intermediate Technologies Group

4 THE MINERALS INDUSTRY AND THE FINANCIAL SECTOR

4.1 *How Are Exploration, Mining, and Mineral Processing Financed?*

- The small and informal sector
- Financing exploration
- Mining and the equity markets
- Lending to the minerals sector
- Project finance

4.2 *The Role of Financial Institutions and Standards for Mining Finance*

- The role of financial institutions in providing credit conditions that promote incentives for the adoption of best practice
- Role of public sector – IFIs, MDBs, ECAs
- Role of private banks
- Influence of socially responsible and ethical investment
- Sphere of influence – problems with juniors, venture capitalists, niche players, and artisanal miners

4.3 *Capacity Issues in the Financial Sector*

Potential Partners: World Bank, UNEP, KPMG, private banks (see Concept Note 3)

5 THE MINERALS INDUSTRY AND GOVERNMENT

5.1 *The Role of Government in the Minerals Sector*

- From most to least developed countries
- From rich to poor mineral endowment
- Conditions for mining – the host country relationship with the mineral enterprise

5.2 *Managing Mineral Wealth*

- Problems in effecting broad economic and social development
- Wealth generation and distribution at the national, regional and local level – rent capture, gainers and losers
- Tradeoffs between economic and other sustainable development objectives
- Boundaries of corporate and government social responsibility
- Beneficiation, value-added and backward & forward linkages
- North-South equity issues
- Price volatility and managing minerals cycles

5.3 *Capacity Issues in Government*

- Strengthening regulatory institutions - capacity building, anti-corruption measures

Potential Partners: UNCTAD, UN regional commissions, World Bank

6 THE MINERALS SECTOR AND THE COMMUNITY

6.1 *Economic Benefits and the Community*

- Comparative land use issues
- Changing employment patterns and their impact on the mine-community relationship
- The role of local government
- Company sponsored foundations

- Infrastructure issues
- The role of mining as an agent of local economic development

6.2 *The Concerns of Communities Affected by Large Scale Mining*

- Community stability
- Community economic development
- Change as a cause of conflict
- Environmental impacts: exposure issues
- Air, water and surface quality issues - trends in emissions, standards, technological developments
- Health Issues – positive effects of better facilities, accidents, impact of isolation, separation, health risks such as HIV
- Resettlement and loss of livelihood (e.g. agriculture, small scale mining)

Potential Partners: ILO, ICEM, ICME, Eurometaux, WACH

6.3 *The Role of Environmental Impact Assessment*

- EIA, SIA, cumulative effects, health impact assessment, risk assessments
- Legal provisions and technical issues
- Quality of guidelines
- Independence and accountability issues
- Stakeholder involvement – incorporation of traditional knowledge
- Strategic environmental assessment

6.4 *Capacity Issues in Mining Communities*

7 THE MINERALS INDUSTRIES AND THE MINE WORKER

7.1 *Employment Conditions*

- Mine Health and Safety – ILO Convention 170; HIV issues
- History of the mine labour movement, issues on bonded labour, non-union labour, child labour, retrenchment and retraining
- Wage trends in mining
- The miner as a family member

7.2 *Capacity Issues for Mine Workers*

Potential Partners: ILO, ICEM

8 THE MINERALS SECTOR AND CIVIL SOCIETY

8.1 *Mining and Land Access*

- Sovereignty issues
- Compensation, royalties and benefits

8.2 *Mining and the Concerns of Indigenous Communities*

- the impact on the cultures and rights of indigenous people

8.3 *The Human Rights Agenda*

- Where should the minerals industry not operate?
- Intimidation and abusive practices

8.4 *Social Justice and Poverty Reduction*

- Equitable distribution of benefits
- Community development potential of mining

Potential Partners: Amnesty International, Transparency International, Human Rights Watch, North-South Institute, Oxfam

9 THE MINERALS INDUSTRY AND ITS SUPPLIERS

9.1 *Suppliers of Inputs*

- Corporate social responsibility along the supply chain

9.2 *The Consulting Sector*

- The role of consultants in assisting the transition to more sustainable practices

9.3 *Minerals and Energy Consumption*

- The Kyoto process and its potential impacts on the industry as a consumer of energy

10 MINERALS AND THE MARKETS FOR MINERALS

10.1 *Sustainability Concerns of Metals in the Market Place*

- Life cycle analysis of Cu/Pb/Zn/Ni from the mine through processing, use, recycling and environmental fates; implications for decision makers
- Health and safety in the market place – hazardous minerals and toxicity in use
- The precautionary principle
- Impacts of eco-efficiency and resource productivity
- Impact of technological development for minerals use
- Recycling – balance between virgin and recycled now and future, job creation potential; implications of Basel convention;
- Issues surrounding materials substitution – what are the alternatives?

Potential Partners: UNEP, Professor Robert Ayres of INSEAD, ICA, IZA, NiDI, ICME, Eurometaux & others (see Concept Note 4)

10.2 *Globalisation, Minerals Trade and Market Access*

- Market access restrictions and trade barriers
- Implications of international conventions
- Implications of restrictions imposed because of unacceptable practices, such as conflict diamonds

- Policy changes affecting trade flows, such as take-back laws
- Financial instruments and subsidy programmes
- Gaps in governance of international trade

Potential Partners: IISD, UNCTAD, UNECLAC, EU, Euromines/Eurometaux

11 THE MINERALS CYCLE AND THE ENVIRONMENT

11.1 Mining and Exploration Issues

11.2 Management of Large Volume Wastes

- The sustainability issues surrounding mine waste disposal options and their impacts
- Tailings and waste rock disposal options – submarine and land, co-disposal
- Chemical stability – ARD/heap leach issues
- Energy use in mining
- Regional issues

Potential Partners: Mackay School of Mines, INAP, ICME (see Concept Note 5)

11.3 End of Mine Life Issues

- Economics of mine closure
- Closure technologies and rehabilitation
- Abandoned mines
- Responsibility for legacies of historic mining and mineral activity – regulatory issues, on-going pollution
- Employment and social structure issues

Potential Partners: Mackay School of Mines, UNEP, EBRD, USGS (see Concept Notes 6 and 7)

11.4 Mining and Biological Diversity

- measuring impact on biodiversity; protected and restricted or “no-go” areas

Potential Partners: Conservation International, IUCN

12 ACCESS TO INFORMATION

- The role of information in building trust
- Differences in access to information
- What information is needed and by whom?
- Information, transparency and community empowerment - capacity for participation and self-determination
- Public participation – legal instruments, agreements, dispute-resolution processes

Potential partners: EMLA (see Concept Note 8), International Bar Association

13 THE VIEW FROM THE REGIONS

13.1 Australasia

13.2 Europe

13.3 Latin America

13.4 North America

13.5 Southeast Asia

13.6 Southern Africa

14 WHERE DO WE GO FROM HERE?

14.1 What Would a Sustainable Society Look Like?

- Upper and lower limits; boundary conditions
- Where do the minerals industries fit?
- The Use of Minerals in 2025 – scenario analysis of the future

Potential Partners: IIED, WBCSD, Wuppertal Institute, Rocky Mountain Institute

14.2 The Future Transition to Sustainable Development

- Critical and Contentious Issues
- Drivers for Change
- Bottlenecks to Change

14.3 Putting the Process in Motion

- Design of implementation process – tools/instruments
- Sustainable development indicators
- Regulatory: Standards, access to information, stabilisation funds
- Voluntary: Codes of Conduct/Good Practice Manuals
- Market-based: Certification
- Financial: credit conditions
- Technological: cleaner production

Potential Partners: Stratos Inc. (see Concept Note 9)

15 CONCLUSIONS AND RECOMMENDATIONS

- Lessons from the MMSD project
- Recommendations for companies, governments, financiers, workers, communities, recyclers, NGOs and other stakeholders

CONCEPT NOTE 1

THE LONG RUN AVAILABILITY OF MINERAL RESOURCES

The Mining, Minerals and Sustainable Development Project of the International Institute for Environment and Development has prepared this Concept Note to serve as a basis for discussion of the research and analysis identifying the key issues in the long run availability of mineral resources.

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Background

The past two decades have witnessed a shift in the on-going debate over the long-run availability of mineral resources. While fears over resource exhaustion have not entirely disappeared, those who are pessimistic about the future availability of minerals focus increasingly on the environmental and other social costs associated with mineral exploitation. These costs, they contend, may soon preclude the widespread use of mineral resources regardless of their physical availability in the earth's crust.

Availability of non-renewable mineral resources is a long standing concern. Many feel it is just a matter of time before minerals are depleted, others believe they are for all practical purposes inexhaustible. Much has been written on this topic over the past 30 years. Concern over the availability of mineral resources can be traced back to the Classical economists, and continues today in the debate on sustainable development. There is a need to review this literature, contrasting concerns over renewable and non-renewable resources.

Many different measures have been used to assess long-run trends in resource availability, both physical measures (eg, reserves, the resource base) and pure economic measures (eg, real prices, real costs). The usefulness of these measures must be considered. A resource can actually increase over time if the cost-reducing effects of new technology more than offset the cost-increasing effects of resource depletion. Most of the studies in this area indicate that scarcity has declined substantially over the past century, but a number also suggest that this favourable trend has over the past several decades come to end. The past, of course, is not a perfect guide to the future. Are there good reasons to believe that the favourable trends over the past century will not continue?

A critical issue to consider is whether the internalisation of the environmental and other social costs associated with mineral exploitation will pose a threat to long run minerals availability. Are producing firms, and ultimately consumers, willing to pay the full costs for mineral commodities? How will the increasing awareness of the full costs of minerals affect their supply?

Objectives

The objectives of this research topic include:

1. To provide an overview of the work on mineral availability and to place it in a conceptual framework.
2. To explore trends in resource scarcity over the past century and to examine the availability of mineral resources over the near future (the next 50 years) and the distant future.
3. To assess the threat to mineral resource availability posed by environmental and other social costs by:
 - examining the ability of public policy to force firms producing mineral commodities and ultimately the consumers of these products to pay their full costs of production, including all the associated social costs;
 - considering the ability of companies to reduce production costs, assuming all social costs are internalised, by new technology and other means;
 - considering the implications of the findings for public policy and for the future availability of mineral resources.
4. To explain why the debate over mineral availability continues, and why it is not likely to be resolved soon. What have we learned? Where is there widespread agreement among experts? Why does the debate continue? What are the important implications of what has been learned?

Project Design

This project will be undertaken as a joint effort of Professor John Tilton, Coulter Professor of Mineral Economics, Colorado School of Mines, the Washington, D.C. based policy institute, Resources for the Future and the MMSD Project.

The peer review group and workshop participants will be selected in consultation with Professor Tilton and Resources for the Future.

PHASE I

Preparation of the draft report on the long-run availability of minerals by Professor John Tilton, Colorado School of Mines, to be completed by April 2001.

PHASE II

Identification of a peer review panel of approximately 15 people to comment and critique the draft document. Convening of a workshop of this group of people to pursue in depth some of the critical issues arising from Prof. Tilton's analysis. It is planned to hold the workshop in May 2001 in Washington D.C. in partnership with Resources for the Future.

PHASE III

A summary of Professor Tilton's work and the issues raised in the peer review process and the workshop, highlighting the important findings, will be incorporated in the Final Report of the MMSD Project.

Expected Results

Among the results expected from this work are:

1. A clearer understanding of the implications for sustainable development of the availability or scarcity of mineral resources.
2. A broad-ranging account of the problems of internalising environmental and social costs in minerals exploitation and the implications ultimately for consumers of the change in supply if the full costs are internalised.
3. Clearer understanding of the implications of the prohibition of mineral exploitation to protect indigenous cultures or biodiversity.
4. Clearer understanding of the implications for population growth and poverty of the long run availability of mineral resources.
5. Recommendations on public policies to promote recycling and the use of renewable resources.

CONCEPT NOTE 2

CURRENT MANAGEMENT PRACTICE

The Mining, Minerals and Sustainable Development Project of the International Institute for Environment and Development has prepared this Concept Note to serve as a basis for discussion of the potential benefits of undertaking a mining company survey to identify current corporate practice toward sustainability.

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Background

If the minerals sector is to meet the challenge of sustainable development, it will need to operate in the future in a different way than it operated in the past. Mineral exploration and production is undertaken by a variety of companies ranging from large trans-national corporations operating globally to small niche players in individual countries. All of these companies act within communities – people and communities are affected by their activities. A key aspect of the transition to sustainable development is the need for meaningful consultation with the relevant stakeholders.

Factors which need to be integrated into company decision-making include community opposition to project development, cultural conflict with minority ethnic or indigenous communities, a perception that the project is not contributing sufficiently to economic development at the local and national level, human rights issues and environmental problems. The key sustainability concerns of mining companies, particularly where operations are in developing countries, need to be how to manage environmental quality, social justice and equitable management of the economic benefits of mineral wealth.

There is considerable uncertainty about the boundaries of corporate responsibility in many areas, especially where inadequate regulatory regimes co-exist with governmental agencies lacking in capacity to facilitate economic and social development. A key challenge is how to establish these boundaries and to manage involvement with the affected communities.

In order to understand current corporate practice, it is proposed to undertake a survey of the top 50-60 mining companies globally. The survey will take the form of a detailed questionnaire that will be despatched to the CEOs of these companies in advance of arranging a person-to-person interview to discuss the survey responses in detail. The results of the survey will be used to inform the discussion on the types of activities currently undertaken by these companies and to provide a basis for a broader debate on best practice for incorporating sustainability concerns into decision-making.

Objectives

The objectives of the proposed survey would include:

1. To create a baseline assessment of corporate engagement in sustainability concepts and practices in the mining industry against which future engagement can be measured
2. To assess current company understanding of sustainability issues in the mining industry and the current status of arrangements to manage much of those issues
3. To identify how the larger company players in the industry view the boundaries between corporate and government social responsibilities and to examine the prospects for partnership approaches in exercising these responsibilities.
4. To move toward a broad consensus on what mining companies need to do to adequately address sustainability concerns of the communities within which they operate. How can they best factor environmental and social equity concerns into planning, developing and operating projects and, in the longer term, preparing for closure?

Project Design

This project will be a joint effort of the MMSD Project and management consultants, PricewaterhouseCoopers (PwC). PwC's Global Environmental Services Team in London will manage the survey, in collaboration with its Global Mining Team in Sydney. In addition, PwC will draw on its local environmental and mining experts to conduct the company interviews.

The survey will be managed under the direct guidance of a Review Panel composed of representatives from non-governmental organisations (covering environmental, human rights, poverty alleviation, biodiversity and indigenous people concerns), industry representatives, academics and other interested experts in corporate social responsibility. It is proposed that the Review Panel be composed of seven outside experts. Two PwC staff and one MMSD member will work with this Review Panel to develop the questionnaire and the final report.

PHASE I

The first phase will begin with the selection of the Review Panel to ensure a broad representation of interests concerning various aspects of corporate social responsibility. The Panel will meet in late October or the first week of November for 1-2 days in order to design the survey questionnaire so that it adequately addresses all relevant aspects of corporate policy and actions affecting sustainability issues.

Once agreement has been reached on the appropriate format for the questionnaire, a pilot questionnaire will be despatched by PwC to a small sample of mining companies. The feedback from this pilot survey will be provided to the Review Panel who will then decide whether any further refinements to the questionnaire are required. It is hoped that the pilot survey could be

completed by mid-December 2000 and that the revised survey could be despatched by PwC to 50-60 of the largest mining companies globally by mid-January 2001.

PHASE II

PwC staff will undertake the second phase of this work. Teams of consultants will conduct in-person interviews with the CEOs of the designated companies to complete and follow-up on issues raised in the survey questionnaire. PwC will then collate the survey results and write up the results in a factual manner. This survey report prepared by PwC will then be circulated to the Review Panel for discussion and comment. PwC will attempt to address any questions or concerns raised and to incorporate these into the survey report. PwC will also provide individual company feedback to participating companies who wish to understand where they stand in respect to the rest of the mining sector. Details of other company responses will be kept confidential.

Similarly, the format of the report will ensure that the information provided is in a form that will allow individual company performance to remain anonymous. It is expected that this phase of the work will be carried out between mid-February and April 2001. The final report is expected to be ready for publication by the end of April 2001.

PHASE III

The MMSD Project team will take the survey report and will provide an analysis of the conclusions and recommendations following from these results. This will inform the broader research effort on corporate social responsibility. This report on the implications of the survey findings will be made available for discussion and comment from stakeholders in July 2001.

PHASE IV

The results of this survey and the implications for best practice in corporate approaches to sustainability will be reported in the Final Report of the MMSD Project, due at the end of 2001.

Expected Results

Among the results expected from this project are:

1. A better understanding of what mining companies understand by sustainable development and how they view these concerns affecting their business, from long term strategic decisions to day-to-day operations at individual sites.
2. A clearer understanding of what actions mining companies are currently undertaking to incorporate sustainability issues into their decision-making processes.
3. Greater definition of the role and responsibility of companies in evaluating sustainability factors and making decisions based on them.

4. Recommendations on what constitutes best practice for large companies in addressing the sustainability concerns of the communities in which they operate.
5. A platform from which to move the sector into a new phase in engaging sustainable development.

CONCEPT NOTE 3

THE ROLE OF FINANCIAL INSTITUTIONS IN THE TRANSITION TO SUSTAINABILITY IN THE MINERALS SECTOR

The Mining, Minerals and Sustainable Development Project of the International Institute for Environment and Development has prepared this Concept Note to serve as a basis for discussion among potentially interested institutions of the potential benefits and structure of a global dialogue on the role of financial institutions in the transition to sustainability in the minerals sector.

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Background

Mineral exploration and production are financed by a variety of institutions in disparate ways. Some of these institutions are exclusively private, such as commercial banks and brokerage firms. Others, such as the World Bank Group, regional development banks, or export credit agencies, are or have some of the characteristics of, public institutions.

Whether the financing is debt or equity, and whether the financial institution is public or private, those who put their funds at risk in exploration or mining ventures have a number of reasons for involving themselves in the discussion over how the minerals sector will have to change to meet the challenge of sustainable development.

- If the conditions under which the industry operates in the future are to be quite different from those of the past, the financial institutions which understand those trends the best and anticipate them first will have a competitive advantage.
- What we broadly term “sustainability factors,” which include community opposition to project development, cultural conflict with minority ethnic or indigenous communities, a perception that the project is not contributing sufficiently to economic development at the national or local level, human rights issues, or environmental problems, have led projects to fail, with consequent losses to investors or lenders. A clearer understanding of these factors can lead to better understanding and evaluation of risks.
- This better understanding and evaluation of risks could, in the view of some observers, allow market forces more efficiently to allocate capital, since participants in the market would have a better information base on which to make decisions.
- There is a growing awareness that capacity problems in many countries, and inadequate regulatory regimes may limit their ability to play an effective role in overseeing the social, environmental, economic and governance issues attached to mineral projects. But if certifying that local law is being complied with is not adequate due diligence, to what kind of standards can financial institutions refer?

- It is no longer feasible for most public financial institutions to take the position that they have no responsibility for assuring that sustainability factors are considered in decisionmaking. This trend may also be affecting private financial institutions. Yet there are serious practical, legal, and national sovereignty objections to putting financial institutions in a “policeman” role. There is a lack of consensus about the proper role of the financial institution, public or private, which leads to doubt, confusion, and reputational and other risks.

Objectives

The objectives of the proposed global dialogue would include:

1. To develop a clearer understanding of current practice in the way financial institutions inform themselves about and evaluate sustainability factors in making decisions about financing of mineral projects.
2. To survey such guidelines, standards, or similar criteria which have been developed for these purposes.
3. To identify key issues where there is a lack of understanding or clarity in evaluation of risks based on these factors, or the appropriate role of financial institutions.
4. To move toward a broader consensus on evaluation of sustainability factors and their role in decisions of financial institutions.

Project Design

This project will be a joint effort of the MMSD Project, the World Bank Group, and the United Nations Environment Program.

It will be managed under the general guidance of an Advisory Committee composed of representatives of these institutions, other public and private financial institutions active in the mining sector, governments, nongovernmental organisations, exploration, mining and mineral companies, and interested experts.

PHASE I

The first phase will consist of a scoping meeting to be held before the end of 2000, to which approximately 50 individuals will be invited, broadly representative of various mining finance institutions. The purpose of the scoping meeting will be to focus key concerns, identify critical stakeholders, define issues, and develop a program for research and analysis on a limited number of important issues.

PHASE II

Phase II will consist of detailed analysis of the limited number of issues identified in the scoping session. We envision the researchers selected to do this work will collaborate with small review

committees established at the scoping meeting. This phase of work will last roughly from January 1 to July 1, 2001.

PHASE III

The third phase would be a broad conference to be held in September or October of 2001, to which a representative selection of identified stakeholders are invited, and at which the results of Phase II will be reviewed. The participants will be asked to consider possible consensus on the key issues, and on an action plan for moving forward.

PHASE IV

The results of this project will be reported in the Final Report of the MMSD Project, due at the end of 2001.

Expected Results

Among the results expected from this project are:

1. A clearer understanding of current practice in integrating sustainability factors in the decision to finance projects, and areas in which that practice may need improvement.
2. Clearer understanding of the extent to which it is possible accurately to predict and evaluate risk based on sustainability factors.
3. Greater definition of the appropriate role and responsibility of financial institutions in evaluating sustainability factors and making decisions based on them.
4. A plan for future progress in this sector.

CONCEPT NOTE 4

LIFE CYCLE ANALYSIS OF BASE METALS

The Mining, Minerals and Sustainable Development of the International Institute for Environment and Development has prepared this Concept Note to serve as a basis for discussion among interested stakeholders on the key issues facing the metals industry in adopting a more integrative life cycle approach to metals production and consumption.

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Background

One of the central challenges facing the MMSD project is to develop a robust understanding of the scale and nature of the social and environmental impacts generated by current patterns of minerals production and consumption. Policy makers need to be able to prioritise areas for change in the chain from extraction through processing use and disposal. Mining companies need to be able to identify the critical sustainability problems that their operations face, upstream and downstream. Society needs to be able to see how the impacts of minerals consumption compare with other materials.

Dissipative uses of some metals (such as lead) have a direct impact on human health as well as the natural environment. Some chemical uses, especially of by-products (such as arsenic) are virtually limited to exploiting their toxic properties. Concerns related to the increasing contamination of agricultural soils with lead, cadmium, copper and other toxic heavy metals may lead to restrictions, or even bans on certain uses. This could affect markets, and economics of mining vs. recycling. It makes sense to view the metals mining, smelting, utilisation and recycling system as an interrelated whole.

Life cycle analysis (LCA) is one tool that is being used to tackle the environmental dimensions of these problems. LCA is generally divided into three stages: first, making an inventory of inputs and outputs; second, assessing the impacts; and third, analysing options for improvement.

Life cycle inventories (LCI) have been carried out for a number of metals and applications, and currently, there are several industry association initiatives underway to apply life cycle inventories to the metal group they represent. Many problems continue to confront the application of LCA, such as the continued lack of accepted conventions, the failure to apply material balance conditions and the use of inconsistent and unverifiable data.

We plan to commission a comprehensive life cycle analysis of copper, lead and zinc from concentrate through processing, use, recycling and environmental fates. This will seek to build on earlier work by moving beyond the processing stage to include use, recycling and environmental fates and beyond an inventory of material flows to an assessment of impacts and areas for improvement. The study will be carried out in a collaborative way, involving key stakeholders in peer review and will clearly identify the necessary steps for implementing the results of the research by government, industry and society.

This study will form a key part of the input into the research and analysis topic on end-uses and environmental fates of minerals. The focus of the research will be on how it informs decision-makers in order to increase the service life of minerals.

Objectives

The objectives of this life cycle study will include:

1. To provide a clearer understanding of the key issues in life cycle analysis of metals by providing an overview of the many different initiatives that are underway for individual metals
2. To update and extend work carried out to identify the key inputs and outputs “from cradle to grave” of the major base metals
3. To identify where the significant environmental impacts occur along the value chain for this core group of metals
4. To examine how higher rates of reuse, remanufacture and recycling of materials can reduce the need for newly mined products and can change the balance between recycled and virgin materials
5. To move toward a broader consensus on the policy implications of this type of analysis that will assist in prolonging the service life of metals

Project Design

This project will be undertaken as a joint effort of Professor Robert Ayres, INSEAD and the MMSD Project.

It will be managed under the general guidance of an Advisory Committee composed of representatives organisations that have been involved in undertaking LCA research in metals and mining sectors, including mining industry associations, academics, government agencies, NGOs and other interested experts.

PHASE I

The first phase will consist of a scoping meeting to be held in late 2000. Invitees to this meeting will include various industry associations, the leading academics and a number of other consultants with particular expertise in the issues of life cycle analyses of metals. We plan that about 10-12 experts in LCA of metals will attend this workshop.

Several of the industry associations have undertaken life cycle inventory (LCI) exercises for their own metal groups. These include International Primary Aluminium Institute, International Copper Association, International Zinc Association, International Iron and Steel Association,

International Chrome Development Association and Nickel Development Institute. A number of university mining schools have also conducted LCAs for various metals.

This initial scoping meeting will identify the key gaps in the work that has been undertaken to date and will provide recommendations for the coverage and focus of the LCA study to be undertaken by Professor Ayres and his colleagues. It will also provide the basis for a global survey and review of what studies and research has been undertaken in this area.

PHASE II

The second phase of this project will be to undertake an up-to-date in-depth LCA analysis of a core group of base metals (copper family). Prof. Ayres' research will draw on and review the existing literature in this area and will address the concerns raised by the participants of the initial scoping meeting. Prof. Ayres intends to draw on the services of a number of consultants with familiarity with the inputs and outputs of the production process from mine to ultimate end-use and disposal of the selected group of metals.

The study will start from the cradle (the mine) and follow the key metals (copper-lead-zinc-nickel) through the various stages of concentration, smelting, alloying, intermediate and end-use. The requirements for fuels and electric power, as well as other materials (e.g. flotation agents, acids and bases) will be estimated. Subsequently, the work will estimate production and conversion losses at each stage of the value-added chain. Finally, the analysis will summarise available data on environmental transformations. The draft report is expected to be completed by July 2001.

PHASE III

The draft report will be circulated to the initial workshop participants and others who have been identified in the intervening time for comment and critique. A workshop of this group will be convened sometime in August 2001 to discuss the implications of the life cycle analysis for decision making in the mining companies about the services they provide and for policy making in the regulatory agencies to encourage longer service lives for minerals.

PHASE IV

A final synthesis and overview of this report and the subsequent workshop contributions will be incorporated in the Final Report of the MMSD Project, due at the end of 2001.

Expected Results

Among the results expected from this project are:

1. A clearer understanding of the practical relevance of life cycle analysis for the metals and minerals industry and for policy makers in facilitating the transition toward sustainable development.

2. A greater consensus on the appropriate methodology and interpretation of the results of these studies.
3. A more integrative approach to assessing the environmental consequences of metals along the value chain and to analysing the options for improvement at various stages.
4. Recommendations for policy makers on the appropriate measures to adopt to maximise the length of time that a metal or mineral remains in service
5. Recommendations for mining companies on how to adapt to the changing economics of mining versus recycling.
6. A plan for using life cycle analysis to make further progress in achieving a sustainable balance between virgin and recycled materials.

CONCEPT NOTE 5

LARGE VOLUME WASTE

Background

Large-scale modern mining operations produce large volumes of solid waste. These wastes consist of waste rock (mineralised or barren rock and overburden), tailings (finely ground material remaining after metal recovery), and spent ore from heap operations. Most of this waste is placed on the land, however there are a number of locations where tailings are disposed of in river systems and oceans. The site-specific disposal selection and placement is typically controlled by technical and economic feasibility evaluations, considering the predicted environmental and social impacts at the time of mine development.

The physical footprints of waste disposal facilities at large open pit mines are significant. Sulphide bearing wastes can generate acid and the resulting acid drainage contains high concentrations of various metals and salts. Release of metals and other constituents may also occur through leaching with meteoric water at non-acid generating waste.

Tailings are usually disposed of as a slurry containing fairly large volumes of process water. Alternatively, tailings can be thickened prior to disposal. The co-disposal of tailings and waste-rock is another option that can be considered.

Heap leaching of gold and silver ores use cyanide as a lixiviant while sulphuric acid is used for copper heap leaching. The remaining spent ore contains some concentration of the lixiviant, even after rinsing, and this and other constituents can leach from the waste through meteoric water. Specific approaches have been developed for the closure of such facilities.

While the environmental issues associated with large volume waste are fairly well understood, important areas of research remain such as the area of acid drainage. This study will consider environmental issues and other sustainability factors for large volume waste, i.e. economic, community and governance issues.

Objectives

The objectives of the proposed study on large volume waste are to evaluate the following topics from the perspective of how they contribute to sustainable development and to identify areas where further research and development are necessary.

Riverine Disposal

- Case studies of active projects (Ok Tedi, Grasberg, Porgera)
- Case studies of past projects (e.g. Clark Fork River, Butte, Montana)

Ocean Disposal

- Case studies of active projects
- Case studies of past projects

Land Disposal

- Summary of tailings disposal design information sources and information on tailings dam failure incidents
- Thickened tailings disposal – concepts, practice
- Waste rock disposal – summary of information sources, issues

Chemical Stability

- Acid Rock Drainage (ARD) and leachate production; develop summary of ongoing work, summarise the knowns and unknowns
- Effluent from heap leach facilities and tailings; summarise state of practice and unknowns from existing information

Co-disposal of Tailings and Waste Rock

- Summary of existing information and planned research

Project Design

The project will consist of a summary of existing information on large volume waste as it relates to the environmental, economic, community and governance aspects. A small committee of experts representing the broad topics under consideration will work with the project manager and research fellows in giving guidance to the development of the information summaries and their final presentation. A workshop will be convened in late summer/early fall 2001 to review the draft reports and prepare the final document for inclusion in the MMSD project report.

Expected Results

Among the results expected from this project are:

1. Summaries of the impacts of large volume waste on the development of sustainable practices in mining.
2. A list of best management practices or guidance on the disposal of large volume waste so that it can contribute to sustainable development.
3. A list of research needs related to large volume waste disposal.

CONCEPT NOTE 6

ABANDONED MINES

Background

Abandoned mines from historical mining operations are present in all mining regions of the world. In most cases there is no clear documentation on the ownership of these mines. Many of these mines are unsafe and are physical hazards, e.g. open shafts, underground openings, unstable slopes of tailings and waste rock, etc. There are also many environmental concerns with these mines.

Attempts have been made to quantify the number of abandoned mines in various parts of the world. A review of the databases will summarise existing information and highlight the gaps.

Objectives

The objectives of the proposed study on mine closure are to evaluate the following topics from the perspective of how they contribute to sustainable development and to identify areas where further research and development are necessary.

1. Review databases developed by various groups across the world on the magnitude of abandoned mine problems and impacts
2. Review technologies and experiences with abandoned mine rehabilitation
3. Consider the “polluter pay” principle’s application to abandoned mines

Project Design

The project will consist of a summary of existing information on abandoned mines as they relate to the environmental, economic, community and governance aspects. A small committee of experts representing the broad topics under consideration will work with the project manager and research fellows in giving guidance to the development of the information summaries and their final presentation. A workshop will be convened in late summer/early fall 2001 to review the draft reports and prepare the final document for inclusion in the MMSD project report.

Expected Results

Among the results expected from this project are:

1. Summaries on the impacts of abandoned mines and how the lessons learned can contribute to the development of sustainable practices in mining.
2. A list of best management practices or guidance on abandoned mines issues that can contribute to sustainable development.
3. A list of research needs related to abandoned mines.

CONCEPT NOTE 7

MINE CLOSURE

Background

Mine closure is a reality that all mining operations have to consider. While many lessons have been learned about mine closure, there are still many unknowns. One of the realities that mining companies and societies face about mine closure is that in most cases the closure costs have been underestimated. In addition, the issues surrounding mine closure are greatly influenced by technological developments.

The financial assurance of mines (to provide a fund for mine closure when the owner is not financially able to do so) and the accrual of funds for mine closure are very important as economic tools. These provisions must be considered from a sustainability viewpoint as they affect economic, environmental, community and governance issues.

Objectives

The objectives of the proposed study on mine closure are to evaluate the following topics from the perspective of how they contribute to sustainable development and to identify areas where further research and development are necessary.

Mine Closure Technologies and Practices

- Summary of mine closure guideline requirements
- Initial database on closure technologies/practices

Economic Issues of Mine Closure

- Evaluate the present approach to closure cost estimation and discount at the time when investment decisions are made
- Investigate how unanticipated closures as a result of abrupt economic changes are handled
- Investigate the issue of closure cost accruals (accounting practices, cash vs. book value)
- Investigate the use of financial assurance instruments

Project Design

The project will consist of a summary of existing information on technical and financial aspects of mine closure as they relate to the environmental, economic, community and governance issues. A small committee of experts representing the broad topics under consideration will work with the project manager and research fellows in giving guidance to the development of the information summaries and their final presentation. A workshop will be convened in late summer/early fall 2001 to review the draft reports and prepare the final document for inclusion in the MMSD project report.

Expected Results

Among the results expected from this project are:

1. Summaries of the technical and financial aspects of mine closure and their impacts on the development of sustainable practices in mining.
2. A list of best management practices or guidance on mine closure issues that can contribute to sustainable development.
3. A list of research needs related to mine closure.

CONCEPT NOTE 8

ACCESS TO INFORMATION: A KEY TO BUILDING TRUST IN THE MINERALS SECTOR

The Mining, Minerals and Sustainable Development Project of the International Institute for Environment and Development has prepared this Concept Note to serve as a basis for discussion among potentially interested institutions of the potential benefits and structure of a global dialogue on the role of access to information in the transition to sustainability in the minerals sector.

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Background

Access to and availability of information is a key to empowering organisations or individuals to defend their interests effectively and to building trust among the many different social interests potentially affected by the minerals industry. This is a cross cutting issue affecting virtually all stages in the mineral cycle, and a concern repeatedly raised from many directions by many different actors.

While much of the focus has been on civil society and its desire for access to information about the industry's operations, there are also circumstances in which the industry itself feels that it has inadequate information about civil society and its concerns, or about the government agencies with which it interacts. Government, too, may feel that it is not getting information it needs to be an equal partner in decisionmaking.

Information is in a very real sense power. When interests are in conflict, those who feel they have less access to information than their adversaries may find it hard indeed to reach any kind of agreement or consensus until they are convinced that the underlying information inequality has first been addressed. Broader access to information may not in itself create more trust, but it is hard to see that trust being built without it.

Yet there are circumstances in which most would concede that there is a legitimate case for maintaining confidentiality of information. Geologic data may have been acquired at great expense, and be all an exploration company has to sell. Internal deliberations of any group or organisation may be handicapped if they have no privacy in which to air contrary views or conciliate differences.

The growing awareness of the key role of information access in building the possibility of more effective dialogue among social actors, and in a transition to a more consensus-based and more sustainable society is demonstrated by the proliferation of information-based processes and requirements, some of which are highly controversial.

Examples include but are certainly not limited to:

- The Global Reporting Initiative
- The Aarhus Convention
- The growing number of laws giving public rights to information
- The Toxic Release Inventory
- Voluntary company reporting
- Rights to public availability of information in the environmental impact assessment process.

Objectives

The objectives of the proposed activity would include:

1. To develop a clearer understanding of existing and proposed mandatory and voluntary systems for making information available to actors participating in or affected by the mineral industries.
2. To develop a report presenting a clear, concise and analytic view of existing initiatives, guidelines, laws, standards, conventions, or other provisions which pertain to information availability or the right to information.
3. To identify the key types of information which industry, NGOs, and government feel they need to have greater confidence in their reciprocal interactions.
4. To identify the key types of information which each of these actors is reluctant to share and the reasons for such reluctance.
5. Where information is desired which is not available simply because it is not gathered or compiled, to study the question of the costs and benefits of developing such information and the principles which determine which of the actors should bear the costs.
6. To identify best practice in the area of information availability.

Project Design

This project will be a joint effort of the MMSD Project, and at least one external organisation.

It will be managed under the general guidance of an Advisory Committee composed of representatives of these institutions.

PHASE I

The first phase will consist of a meeting to be held in January 2001, to which approximately 12 individuals will be invited, based on their expertise and diversity of backgrounds and viewpoints. The purpose of the meeting will be to discuss and broaden mutual understanding of The Global Reporting Initiative, The Aarhus Convention, the growing number of laws giving public rights to information, the Toxic Release Inventory, voluntary company reporting, rights to public availability of information in the environmental impact assessment process, and other standards or systems relevant to the purpose of this activity.

The output will be a brief report summarising the current knowledge about these systems, identifying gaps, helping to map key stakeholders with particular interest in this activity, and to provide an informed platform for Phase III and feed into MMSD's final report.

MMSD will seek broad comment on and discussion of this interim report to ensure consideration of divergent views.

PHASE II

Phase II will consist of detailed research and analysis of any gaps in current knowledge which are identified in Phase I. This phase of work will last roughly from January to July 1, 2001.

PHASE III

The third phase would be a broad conference to be held in August or September of 2001, to which a representative selection of identified stakeholders are invited, and at which the results of Phases I and II will be reviewed.

The meeting will attempt to identify how improvement in information ability can best build mutual confidence among different interests with specific attention to:

1. Civil society/NGOs;
2. Mining companies;
3. Consumers and users of metal products; and
4. Government.

For each of these sectors, the meeting will attempt to achieve definition of:

- The types of information needed to build confidence that the group can hold its own if it effectively engages with others on contentious or controversial issues.

- The processes through which the information needs to be made available in order to build confidence in its credibility.
- What information it feels it should not be required to share, and the rationale for that reluctance.

The participants will be asked to consider possible consensus on the key issues, and on an action plan for moving forward.

PHASE IV

The results of this project will be reported in the Final Report of the MMSD Project, due at the end of 2001.

Expected Results

Among the results expected from this project are:

1. A clearer understanding of current and proposed mandatory and voluntary systems for making information available to other actors in the process of mineral production and use, informing MMSD's final report.
2. Clearer understanding of the ways in which availability or unavailability affect the ability of different actors to engage effectively with others, informing MMSD's final report.
3. Definition of what constitutes best practice in the area of information availability.
4. An agenda and specific proposals for future progress in this sector.

CONCEPT NOTE 9

PLANNING FOR MMSD OUTCOMES

CONSIDERATIONS AND OPTIONS

This Concept Note on *Planning for Outcomes* describes the process being undertaken by MMSD to provide a common basis for discussion among interested organisations and individuals on options for MMSD outcomes. The focus on outcomes early in the life of MMSD is essential to ensure that MMSD links the identification and analysis of issues and areas for change or improvement with practical actions.

The process complements other MMSD activities and is intended to result in the design of practical, effective and efficient mechanisms for change toward sustainable development that stakeholders in the mining and minerals sector can take up, for use jointly and individually.

MMSD's terms of reference do not extend to becoming an agent for implementing any of the recommendations or guidance which may come out of the Project. Rather, its terms of reference contemplate that as an integral part of its work, it study not just what must be done, but how those objectives can practically be achieved or implemented.

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Improvements And Change

The mining and minerals sector's contribution to sustainable development can involve improvements and/or change in:

- *Values* e.g. importance of equity considerations
- *Behaviour* e.g. public reporting on sustainable development performance
- *Relationships* e.g. stakeholder involvement in industry advisory bodies

Initiating and sustaining improvements and change toward sustainability will require the involvement of the full range of stakeholders working or interested in mining and minerals. These include individual companies and industry associations, labour, communities, NGOs, the research and academic community, and governments and international organisations. Creating and sustaining this wide level of engagement will require developing a clear agenda for such changes that is:

- based on rigorous research and analysis
- understood and accepted by key stakeholders
- broadly known and accepted by the public

A Spectrum Of Possible Outcomes

The improvements and changes desired by MMSD to make a contribution toward sustainability can take the form of different types of outcomes:

- measures and tools
- process
- institutional

Table 1 illustrates the wide range of possible outcomes associated with each of these categories. Each of these example outcomes will be described briefly in the paper.

The application of outcomes will be context-specific. In some cases, it will be necessary to develop new outcomes, tailored to the specific issues and circumstances the mining and minerals sector faces. In some cases, however, it may be possible to adopt existing cross-sectoral initiatives (e.g., company use of the Global Reporting Initiative norms for sustainability reporting). In other cases, it may be appropriate to adapt sector-specific variants of existing tools (e.g., a mining and minerals sector environmental management system version of ISO 14001).

In some cases, outcomes will be appropriate for adoption by a broad range of stakeholders across the sector. In others, they will be undertaken by individual or common-interest stakeholders (e.g., common standards adopted by mines ministers). In others, outcomes will be developed through collaborative partnerships such as government-industry environmental performance agreements, or industry-NGO dialogues and action plans.

Selecting Appropriate Outcomes

The process of selecting outcomes must ensure that outcomes are both appropriate and supported by relevant stakeholders: outcomes must be both effective and trusted.

Ensuring effectiveness and trust will require the use of multi-stakeholder processes that account for and consider possible outcomes at the same time as they begin to identify and assess issues and opportunities for action.

Ensuring effectiveness and trust will also require, in all cases, a rigorous review of all possible outcomes based on a number of considerations, including:

- effectiveness for the purpose
- acceptability to key stakeholders
- public legitimacy
- feasibility
- efficiency
- measurability

Further, each MMSD initiative will need to consider appropriate linkages to relevant existing and emerging initiatives at the international, national, local and company-specific levels, to avoid duplication and to build a critical mass of organisations and individuals necessary to serve as a platform for implementation of MMSD results.

Process

The process of preparing for outcomes will involve a number of different activities:

PHASE I

In partnership with Stratos Inc., Ottawa, MMSD is in the process of preparing an Interim Report on '*Planning for Outcomes*'. This Report is based on contracted and in-house research and involves extensive consultation with individuals from various stakeholder groups. It also incorporates the lessons learned from a meeting of experts in July 2000 on '*Preparing for implementation of MMSD*'.

The paper will be distributed in electronic and hard-copy form to stakeholders involved in the various streams of MMSD work at the global and regional levels. It will also be distributed to potential stakeholders involved in individual processes currently outside of the MMSD Project.

PHASE II

Following publication of the Interim Report, a more in-depth review of different outcomes based on the considerations outlined above will be undertaken. This review will be widely distributed for comment.

PHASE III

The third phase will involve a series of workshops and meetings with different stakeholder groups to get their reactions to the ideas developed.

The outputs of Phases I and II will also be used as inputs to and discussion for the different streams of MMSD research and dialogues at global and regional level.

PHASE IV

The results of this process will be included in the Final Report, due at the end of 2001.

TABLE 1: EXAMPLE MMSD OUTCOMES

<p>Tools And Measures</p> <p>1) voluntary 2) economic incentive-based 3) legislative, regulatory administrative</p>	<ul style="list-style-type: none"> • Internationally accepted guidelines for best practices • Environmental management system standards (e.g., a mining and minerals version of ISO 14001) • Performance standards with certification scheme • 3rd-party verification of industry-adopted standard • SD reporting norms (e.g. adoption/adaptation of the Global Reporting Initiative Guidelines) • Industry codes of practice – voluntary, association led • Industry codes of practice – compulsory for association membership • Government-led challenges e.g. pollution prevention, eco-efficiency, GHG reduction, biodiversity protection, etc.) • International/regional/bilateral agreements embodying any of the above • Sustainability criteria for investment – e.g. mutual funds, SD stock index • Sustainability criteria for access to commodity trading exchange • Tax incentives (e.g. for new processes that reduce pollution, etc.) • Emissions credit and trading – national and international • International conventions • National policies and laws • National regulations and standards • Licensing or accreditation for mines professionals • Etc.
<p>Processes</p>	<ul style="list-style-type: none"> • The MMSD process itself – sharing and learning among stakeholders • National sustainable development initiatives (industry-led, multi-stakeholder) • Individual company sustainable development learning initiatives • International/regional/bilateral agreements creating processes • Capacity-building initiatives for mines regulators • Multi-stakeholder dialogue processes to resolve a specific issue • Reconciliation processes to build a national consensus on mining, minerals • Website dialogues • Etc.
<p>Institutional</p>	<ul style="list-style-type: none"> • Knowledge bases/networks for sustainable mining

Outcomes	practice <ul style="list-style-type: none">• Research funds• International inspection panels• International ombudsman, independent with multi-stakeholder oversight• CEO Forum• Mines Ministers Forum• Association networks• Etc.
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