



Managing the environment through planning for closure

Towards integrated environmental management through planning for closure from the outset. The Harare recommendations of the 6th Workshop of the Mining and Environment Research Network. Harare, Zimbabwe, August 4 – 9, 1996.

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The Mining and Environment Research Network is an interdisciplinary, international collaborative research network involving over fifty centres of excellence in more than thirty mineral producing countries. It was the goal of our Sixth Workshop to disseminate research findings and to suggest a series of recommendations relating to integrated environmental management through planning for mine closure from the outset.

These recommendations highlight the generic elements of company strategy and public policy that are needed to underline a forward-looking approach to environmental management. These elements should ensure that integrated pollution control and socially desirable measures are built into mining projects from the outset, and remain robust until closure and, where relevant, beyond.

The workshop brought together senior policy makers, company executives with environmental responsibilities, researchers from different academic disciplines, practitioners, members of international organisations and NGO representatives. In addition to Zimbabwe, participants represented twenty other countries within North and South America, Europe, Africa, Asia and Australasia¹.

The workshop examined the complex issues surrounding artisanal (informal) mining. Participants particularly emphasised the urgent need for these miners to become organised and for governments to address title issues as a first step towards achieving improved environmental management. The recommendations below cover the formal, organised large and small-scale mining sectors.

The workshop also recommended that different policy mechanisms and company strategies be used to integrate environmental management within the very different contexts of old and new operations. The constraints and opportunities for change are quite different depending on: vintage of technology and process route; accumulated waste from past operations; and, work prac-

tices and company cultures already in place.

The following recommendations are presented in summary form only. Their reproduction here serves to highlight the complexity of the issues at stake rather than provides a comprehensive set of guidelines. The presentations which were the basis of the discussions leading to the formulation of these recommendations will be published shortly in the Workshop Proceedings. A report will also be submitted to the Overseas Development Administration of the United Kingdom, which has been the principal sponsor of network research on the theme of Planning for Closure. The four areas categorised are inter-related. However, for the purpose of these recommendations we believe that they warrant separate emphasis on account of the crucial role each plays in efforts to achieve environmentally sensitive minerals development in line with the recommendations of the Rio Earth Summit and Agenda 21, which stress the need for: environmentally sensitive business practices; clean technology development and diffusion; and, regulatory incentives to prevent pollution from the outset rather than initiate clean-up at a project's end.

I. Policy mechanisms and institutional support

- The promotion of collaboration between different government organisations to achieve the integration of environmental regulation with policy to promote mining;
- The promotion of regulatory flexibility: e.g. the setting of performance standards, not defining of specified techniques; innovative financial arrangements such as phased bonds;
- The avoidance of uncertainty in policy development;
- The removal of disincentives for clean-up;
- The expansion of financial incentives to promote:

- * environmentally proficient practices;
- * pollution prevention through technological innovation;
- * socially responsible mining practices.
- The development of Environmental Management System (EMS) standards that incorporate social issues as a cost-effective and consistent industry-wide generic approach; and that are also linked to the ISO 14000 series and the environmental reporting procedures of financial institutions;
- The use of strategic and regional environmental assessment and planning techniques as an ongoing process;
- The development of institutional capacity to evaluate environmental impact assessments (EIAs) and to monitor and assess subsequent practices and EMS;
- Assessment of the environmental implications of the transfer of title and develop a framework for the sharing of responsibility for environmental liabilities over time.
- The definition of markers that indicate the extent to which progress towards sustainable development objectives have been met.

II. Environmental impact assessment (EIA)

- The use of more proactive and extended EIAs that incorporate social impacts, both temporally and spatially.
- The use of social impact indicators to monitor societal effects over time.
- The promotion of stakeholder participation in the EIA process and within the EMS throughout the life of the mine.
- The improvement of social and environmental baseline information.
- The use of risk assessment techniques in environmental management.

III. Technology

- The promotion of R & D and an appropriate R & D framework to stimulate the development of pollution prevention techniques;

- The development and diffusion of technology solutions between firms across both the small and large scale sectors;
- Where possible the incorporation of rehabilitation measures during the mining process;
- The promotion of remediation based on innovative and economically beneficial end-uses e.g. the development of agro-industrial plantations and water resource storage schemes for irrigation and aquaculture;
- The introduction of life cycle assessment approaches as a generic tool to assist technology choices and support EMSs;
- The need for greater assessment of the social context of technology development, application and diffusion.

IV. Company strategy

- The promotion of the industry-wide use of generic EMSs as guarantors of environmental performance over time;
- The continuous improvement of EMSs and use of environmental performance indicators;
- The monitoring of predicted impacts and unexpected events;
- The development of participatory approaches and the involvement of local communities in the EMS, and particularly the closure process;
- The integration of all mine employees within the closure process from the outset;
- The designing of incentives for employees to evaluate and improve environmental practices;
- The introduction of efficiency improvements and good housekeeping measures to support EMS in older operations;
- Collaboration within national and international mining associations to disseminate and promote improved environmental practices;
- The support of, and participation in, regional initiatives towards education and experience sharing;
- The promotion of research initiatives to inform and support public policies and

company strategies towards integrated environmental management;

- The definition from the outset of the objectives of the closure plan and evaluation of their degree of achievement. Specifically this means:

- * reduce the generation of waste in both terms of toxicity and volume, and optimise recycling;
- * stabilise and/or isolate residues from the outset to reduce the potential of acid mine drainage and water contamination;
- * dispose of plant, equipment and materials safely and contain waste to achieve zero discharge and reduce visual impact over time;
- * a rolling programme of remediation and revegetation from the outset;
- * collaborate with governments and local communities to define viable post-mining land use for the region, and to ensure that local communities are not being impoverished or are suffering from ill-health as a result of either the mining activity or the closure process.

V. Education research and training

- Enhance and create environmental awareness throughout the education system and workforce;
- Train for innovative community relationships and include training and knowledge acquisition initiatives for staff as well as members of local communities;
- The promotion of training in EMS within firms across all personnel;
- The promotion of demonstration and pilot projects to stimulate the development and diffusion of clean technology;
- Ensure continuing education opportunities in the area of mining and environment by promoting innovative courses within educational institutions for those already working in industry as well as for new students;
- The support of collaborative policy research and dissemination activities and the diffusion of best practice.

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Argentina: Gerencia Ambiental; CIS; University of Buenos Aires.

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Brazil: University of Sao Paulo; CETEM.

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Canada: Centre for Resource Studies.

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China: Eco-Environmental Research Centre Academia Sinica.

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Poland: University of Mining and Metallurgy.

Republic of Guinea: Ministry of Mines & Geology.

South Africa: MEPC; Mintek; University of Cape Town.

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Tanzania: Ministry of Energy and Minerals.

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Note

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