

# THE ENVIRONMENTAL MANAGEMENT PROGRAMME ROUTE TO INTEGRATED ENVIRONMENTAL MANAGEMENT: A SOUTH AFRICAN MINING INDUSTRY PERSPECTIVE<sup>1</sup>

Johan C. Greeff<sup>2</sup>

**Abstract:** The Minerals Act, No. 50 of 1991, stipulated that all prospecting or mining operations submit rehabilitation programs for approval. Members of the Chamber of Mines of South Africa concluded that this requirement concentrates more on restoring the surface than on the management of environmental impacts. This is especially important as the major opencast coal mines are located in the Eastern Transvaal Highveld, which contains some of South Africa's high potential agricultural land. Industry's view was that it had to implement integrated environmental management to resolve this potential conflict. The concept of an environmental management program report (EMPR) was consequently developed. The report includes an environmental impact assessment and an environmental management program. The EMPR concept has been approved by the four regulatory authorities concerned. Joint consultation between the various stakeholders gave each ownership of the process, fostered understanding of needs, and clarified views on sometimes differing requirements. Implementation of EMPR's on mines was facilitated by the compilation of an Aide-Memoire for the preparation of environmental management program reports for prospecting and mining. Work involved in the preparation of the Aide-Memoire became a joint venture between industry, the regulatory authorities, and interested and affected parties. Development to fruition of the EMPR concept in South Africa places the mining industry as an equal partner in a tripartite government-interested affected parties - proponent scenario.

## Introduction

South Africa is a major producer of gold, coal, platinum and manganese. The mines, both working and defunct, have significant pollution potential. The need for effective environmental management to control this potential gained momentum during the seventies and eighties, so much so that the nineties could be described as the "Decade of the Environment".

The mining industry in South Africa is a prime mover in initiating effective environmental management. While the approach used for the development of the management of impacts applies to all mining operations, it was the advent of major opencast coal mines that spurred activity.

## The Chamber of Mines

The Chamber of Mines of South Africa is a voluntary association of mining companies and mining finance houses, or groups, as they are known in industry, which produce over 85% of South Africa's minerals. The Chamber's prime objective is to protect, advance and promote the interests of its members, but not to fund and control their activities. Chamber coal mines employ 31,675; Chamber gold mines employ 467,273. Because so many mines are members, the Chamber, in effect, serves almost the whole mining industry, and in many cases is regarded as its spokesperson.

The broad mining perspective of the Chamber includes collection and dissemination of accurate information to *inspire* investor confidence, addressing authorities and government of the day, opposing and

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<sup>2</sup>Johan C. Greeff, General Manager, Safety and Technical Services, Chamber of Mines of South Africa, Johannesburg, Republic of South Africa

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proposing new laws, encouraging legislative revision when industry's interests are affected and supporting and coordinating joint mining industry operational functions. Primary input to initiate this joint action is provided by a number of specialist technical committees on which delegates from groups serve. One of these specialist technical committees is the Environmental Management Committee, which deals with all environmental matters. Their recommendations on policy issues are submitted to the Chamber's Executive Committee.

### The Mines and Works Act: Scratching the Surface

Major opencast or strip mining operations in South Africa commenced in the mid 1970's. The impetus for this mining method was twofold--

- To provide reasonable-cost coal for use by a new generation of power utilities, supplying 3,600 MW into the national grid.
- To assist South Africa to become a major coal exporter.

These mines were designed to produce 8 - 10 million mt per year from depths of up to 60 m. Legislation of the time directed at rehabilitation and minimization of environmental impacts was woefully inadequate. The Mines and Works Act contained general provisions which, among other things--

- Required broken ground that had finally subsided to be filled in.
- Prohibited the release of water containing injurious matter.
- Stipulated that dumps be covered with soil or sludge or otherwise dealt with to prevent the dissemination of any form of pollution.

The majority of these strip mines are located in the Eastern Highveld of the Transvaal. The mineralization covers an area of 4,770,000 ha, of which 409,500 (8.6%) are expected to be affected by high-recovery coal mining in the long term. On the whole, the landscape is gently undulating without prominent hills. The central and eastern parts are characterized by the presence of pans and lakes. The area is classified as a summer rainfall area with an average annual rainfall that increases from 700 mm in the west to 800 mm in the east. In comparison with the general situation in South Africa, the area is rich in water and has a high agricultural potential. Maize, which is a basic food throughout southern Africa, is one of the major crops in this area.

The differing land use requirements posed by mining and agriculture had the potential for conflict, and the Chamber of Mines accordingly commissioned or developed sets of guidelines to provide for rehabilitation of these strip mines:

- Volume 1/1983 - The Design, Operation and Closure of Metalliferous and Coal Residue Deposits.
- Volume 2/1979 - The Vegetation of Residue Deposits against Wind and Water Erosion.
- Volume 3/1981 - The Rehabilitation of Land Disturbed by Surface Coal Mining in South Africa.
- Volume 6/1985 - Pollution Problems and Hydrological Disturbances Resulting from Increased Underground Extraction of Coal.
- Volumes 4 and 5 have been discontinued.

An additional motivation was, in the absence of suitable legislation, to discharge the operator's responsibility toward the environment. Development of the guidelines was coordinated by the Environmental Management Committee. These guidelines were subsequently accepted by the Government Mining Engineer as a standard against which all rehabilitation was evaluated, and were promulgated as amendments to the Mines and Works Act in 1980.

The main directives in these amendments were aimed at the submission of a layout plan and rehabilitation program and restoration of the surface. The amendments applied to opencast mines only.

Approval of the layout plan and the rehabilitation program was not a prerequisite to either commencing or continuing mining operations. The manager's obligation was thus to a certain extent discharged by the mere submission of the layout plan and rehabilitation program. However, the statutory route, originally directed at restoration of the surface rather than the management of environmental impacts, increasingly veered to encompass the latter in preparation of submissions. The legislation was also deficient in that it did not make provision for statutory consultation with other involved government departments (Water Affairs and Forestry, Environmental Affairs and Agriculture) in the approval process.

A decade of experience was amassed as environmental managers learned to cope with the challenges and demands posed by the restoration of ground disturbed by opencast mining. Expansion of experience was not limited to coal mines. More than a century of gold mining operations had left some 7,500 hectares of residues, about which environmental managers had to expand their knowledge base. Crucial to this was the role of the Chamber in optimizing technical input and decisions, and commissioning research, reports and guidelines as well as disseminating information and formulating industry policy.

### **The Minerals Act: Turning a New Leaf**

The Minerals Act, No. 50 of 1991, replaced the Mines and Works Act. One of the objectives of this Act is: "...to regulate the orderly utilization and the rehabilitation of the surface of land during and after prospecting and mining operations...".

Statutory directives to attain this include--

- Prior approval of the layout plan and rehabilitation program.
- Consultation with other Departments before approval.
- Extension to include both opencast and underground mining operations.

Chamber members, on assessing the requirements, concluded that--

1. The rehabilitation plan concentrates more on repairing damage than on holistic environmental management. There was thus a need to provide for statutory environmental management. Furthermore, there was an increasing amount of pressure on industry to demonstrate its environmental performance.
2. The principles of integrated environmental management were already accepted by the mining industry.
3. The industry recognized that, under the original procedures, all mines would be subject to an investigation requiring an environmental impact assessment and, therefore, there was no need for a screening procedure.
4. The commonly accepted ideas of an environmental impact assessment (EIA) contained no mention of an environmental management plan during the implementation stage. This was only introduced as a condition of approval after the assessment stage.
5. Potentially at least four environmental documents were needed for a mining project - a rehabilitation plan (by the Department of Mineral and Energy Affairs), an EIA as well as an air pollution control plan (the Department of Environment Affairs), and a water pollution control plan (the Department of Water Affairs and Forestry). In the interests of employee effort as well as time and money, the industry wanted only one document.

6. A lead agent to mining projects, the Department of Mineral and Energy Affairs, was clearly identified in the Minerals Act. The act stated unequivocally that while the other Departments had to be consulted in the approval process, Mineral and Energy Affairs was the approval authority.

#### **Amendment of Regulations: Another Branch**

Simultaneously with the promulgation of the Minerals Act, the Government Mining Engineer submitted to the Chamber for comment proposals for amendment of environmental regulations for promulgation in terms of the Minerals Act. Evaluation of the environmental requirements determined in the Minerals Act and of the proposed amendments to the regulations necessitated a review of the environmental policy thrust by Chamber members. This led to a decision to recommend that the Minerals Act be further amended to embrace the concept of integrated environmental management, rather than to concentrate on rehabilitation concepts only.

#### **Integrated Environmental Management**

Integrated Environmental Management (IEM) is designed to ensure that the environmental consequences of development proposals are understood and adequately considered in the planning process. The concept was proposed to the Minister of Environment Affairs by the Council for the Environment during 1989. The view of the Department of Environment Affairs is that the IEM procedure should be implemented in such a way that it complements, rather than duplicates, existing planning and other procedures. Where appropriate, IEM should be used to supplement existing requirements, rather than to replace them. The basic principles underpinning IEM are that there be--

- Informed decision making.
- Accountability for information on which decisions are taken.
- Accountability for decision taken.
- An open, participatory approach in the planning of proposals.
- Consultation with interested and affected parties.
- Due consideration of alternative options.
- An attempt to mitigate negative impacts and enhance positive aspects of proposals.
- An attempt to ensure that the social costs of development proposals be outweighed by the social benefits.
- Democratic regard for individual rights and obligations.
- Compliance with these principles during all stages of the planning, implementation and decommissioning of operations.
- The opportunity for public and specialists to have input in the decision-making process.

Central to the concept of IEM is that its underlying principles should direct the planning of proposals, rather than being considerations to be addressed once a proposal has been planned.

#### **The Environmental Management Programme Report**

The principles of integrated environmental management were thus recommended for implementation in the mining industry through an Environmental Management Programme Report (EMPR). The EMPR is a document with the following overall objectives--

1. To meet the environmental requirements and directives as contained in the Minerals Act, No. 50 of 1991, and its regulations.
2. To provide a single document that will satisfy the various authorities concerned with the regulation of the environmental impact of mining.

3. To give reasons for the need for and for the overall benefits of the proposed project.
4. To describe the relevant base line in environmental conditions at and around the proposed site.
5. To describe briefly the prospecting or mining method and associated activities so that an assessment can be made of the significant impacts that the project is likely to have on the environment during and after mining.
6. To describe how the negative environmental impact will be managed and how the positive impacts will be maximized.
7. To set out the environmental management criteria that will be used during the life of the project so that the stated and agreed land capability and closure objectives can be achieved and a closure certificate can be issued.
8. To indicate that resources will be made available to implement the environmental management program set out in part 6 of the document.

The EMPR document is not intended to be an exhaustive description of the project. Rather, it is a document containing sufficient information to make the reader aware of the overall character of the site and the surroundings, the mining method, the likely impacts and how these are to be managed. The document should be simple, yet as comprehensive as possible, in order to accommodate a prospecting or mining operation of any size or complexity; it should be flexible so that the environmental management program can be tailored to the site-specific mine and environmental conditions; and finally it should be adaptable, so that with judicious pruning it can be used for the smallest and simplest prospecting or mining operation.

An EMPR is prepared on the strength of the facts pertaining at the time of planning the operation. It must, however, be seen as a dynamic document that may require updating during the life of the project. The preparation of the EMPR should not be mechanical. It is important that the information needs are fully understood.

Involvement in the process places a great responsibility on the proponent to commit himself to the effective implementation and management of the EMP until closure of the mine is granted. Implementation and management of the program in effect comprise an environmental contract between the proponent and the approval authority. It is thus crucial that the proponent fully understand the consequences and risks involved. The proponent has to ensure that--

- The EMP is an integral element of the overall management plan of the mine.
- The information needs required under management strategies proposed are fully developed.
- The development and/or compilation of the EMPR and especially the EMP does not constitute a paper exercise.

#### The Aide-Memoire

Industry recommended, and the other interested and affected parties accepted, the compilation of a Aide-Memoire to assist the preparation of the EMPR. A Steering Committee (representative of the Chamber of Mines of South Africa; the Aggregate and Sand Producers' Association of South Africa, the South African Agricultural Union, and the Departments of Water Affairs and Forestry, of Agriculture, of Environment Affairs, of National Health and Population Development, and of Finance), chaired by a representative of the Government Mining Engineer's Office, was formed to collaborate the drafting of the Aide-Memoire. The final version was agreed to on August 25, 1992 and was formally handed to the industry by the Director-General, Department of Mineral and Energy Affairs, on January 7, 1993. It must be borne in mind that the Aide-Memoire is only a guideline for the preparation of an EMPR. The Aide-Memoire attempts to reflect the information needs of the various authorities as fully as possible at present. However, the aspects to be considered, as outlined in that document, are open to a wide range of interpretation, and the requirements of

the authorities are not as clear as they should be. For example, in the process of developing an EMPR, it is of specific interest to the Department of Water Affairs and Forestry to --

- Demonstrate that the "best practice" based on the best available technology not entailing excessive cost (BATNEEC) will be implemented by the mine irrespective of whether impacts on the water environment are expected or not.
- Demonstrate that the impact of the mine's intended actions on the water resource is understood and that satisfactory mitigation measures have been proposed in order to meet the required water quality objectives.
- Demonstrate that the above two aspects will be effected during the full life cycle of the mining venture.

In the evaluation process, the Department of Water Affairs and Forestry will essentially establish whether these requirements have been fulfilled. Notwithstanding the level of detail of the EMPR, approval will not be granted if the mentioned requirements have not been met. Thus, it is of utmost importance for the proponent to establish the information needs and evaluation criteria of the various authorities and to approach the development of the EMPR from that perspective. The EMPR process is the first in the country that gives expression to how IEM principles can be applied in practice. There are differences though--

- It was agreed during the EMPR negotiations that all mines will follow the "impact assessment" route; therefore, for mines, there is no need for the "classification of proposal" stage, the list of activities, the list of environments, or the summary list of environmental characteristics.
- The EMPR process does not include a "record of decision". Protagonists of the EWMPR have indicated that the record of decision is a matter for the authorities.
- The onus is on the proponent of the EMPR to prepare it, rather than on consultants, as intimated throughout the IEM process. This was done deliberately to ensure that the proponent has full ownership of the proposal, including its environmental management program, since it is the proponent, not the consultant, who must face the consequences if something goes wrong. It is also only the proponent who understands the full impact that various environmental commitments will have on his business operations. However, the proponent is free to use consultants to assist in compiling the EMPR, and frequently does so.

The Minerals Act has been amended to provide for inclusion of the EMPR as recommended and agreed to rather than the layout plan and rehabilitation program originally promulgated.

### Conclusion

The mining industry has grasped the significance of using IEM principles in achieving very essential developments in South Africa without unnecessarily impacting on the environment. In the process, it has demonstrated its willingness to apply self-regulation. Every mine in South Africa is currently preparing, or has already prepared, an EMPR. The result has been a quantum leap in focusing employee effort, time, and money on environmental issues at the mines. It is imperative that the process be allowed to come to maturity before being amended in any significant manner.