Mineral Policy and Sustainable Development

DURING THE 2009/2010 YEAR, MINTEK’S MINERAL ECONOMICS AND STRATEGY UNIT (MESU) re-affirmed its place as a strategic partner in the fields of mineral economics, mineral strategy, mineral development and optimisation, environmental impact assessments and rehabilitation as well as financial and statistical evaluation, for a wide cross-section of the minerals community.

At the beginning of the financial year, MESU was restructured to more effectively address the needs of the greater minerals-based community, by streamlining the operating sections into the Mineral Economics Section, which incorporated the structure of the economic, mineral economics and certain of the environmental skills and experience, while the Regional Mineral Development Section incorporated the policy, strategy, sustainable development, inputs and infrastructure-related knowledge and expertise.

Mineral Economics and Strategy
MESU has solidified its relationship with Japan Oil, Gas and Minerals National Corporation (JOGMEC) and was able to continue work for them. It is anticipated that this relationship will be developed and extended into the coming years as JOGMEC realigns its priorities after the economic crisis to conduct more programmes on the African continent. A large part of this comprises strategic investigations of critical commodities, currently being conducted by the Section.

1. Artisanal workers recovering copper from tailings.
2. Small-scale brickmaking at a site on the DRC Copperbelt.
3. Rehabilitation of asbestos tailings dumps.
New capacity is being developed within the Section around the economics of energy and water - two resources that are essential for mining and mineral beneficiation. As South Africa moves towards a period of potentially more restricted supply of these inputs, a full understanding of their controlling dynamics is essential.

Capacity around specific commodities and minerals formed an important part of the work conducted this year. These commodities included iron ore, coal, uranium, platinum, lithium, osmium, salt (halite), gypsum and many others. Partly through internally-funded investigations via the Science Vote (as well as generous support from Government departments such as DST and DTI) and partly through a desire by local and international companies to position themselves for growth in the post-crisis period, these investigations are likely to be ongoing for a number of years, and this bodes well for the Mineral Economics section as well as MESU in positioning themselves for future work in these areas.

The Section continued its mainstream asbestos dump rehabilitation project for the DME, focusing on sites near Kuruman, Prieska and Owendale. The tenders for these projects were successfully advertised, site visits conducted and tenders awarded. Some of the projects are already practically complete.

An area of study which is becoming more pertinent is that of alternative and renewable energy sources. MESU continues to participate in the joint programme with the Szt István University in Gödöllő, Hungary, completing the first year of the two year collaboration. This relationship is linked to alternative energy uses in the mining sector in South Africa, with a specific focus on biofuels.

1. Site inspection of an asbestos tailings dump.
2. Fibres of crocidolite (blue amphibole) asbestos.
3. Mintek is developing new capacity around the economics of water and energy – two major inputs into the mineral processing industry.
4. A small business utilising waste material from the dimension stone industry.

It is partly funded by the NRF, and the positive spin-offs from this work are illustrated by the potential of conducting studies for various provincial governments on the viability of instituting biofuel programmes.

**Mineral Development**

An important part of MESU’s responsibilities comprises the socio-economic environment and its development as it relates to mineral endowment and exploitation. To this end, a significant study was conducted into the iron ore industry, including an in-depth investigation of the iron ore value chain and how it relates to socio-economic and environmental conditions at Kumba’s Thabazimbi mine. The second economy was also investigated through a background study into the issues and features characterising the local small-scale mining sector.

On the issues of water and energy consumption, MESU conducted a number of studies during the year, including an investigation of the water consumption in the South African mining sector with specific attention to the coal, gold and PGM sectors.
The section also undertook a brief overview of Mintek’s role in developing water-efficient technologies for mineral processing applications, and a determination of the criteria to be considered in the future allocation of electricity to processing smelters in South Africa.

MESU also played its part in the construction sector, identifying opportunities with Supply Chain Analysis for optimising value chains. To reinforce the study, the construction minerals sector for the Namakwa District Municipality, Northern Cape, was used as a case study. In addition, an industry-wide evaluation of input costs for the processing of industrial minerals was carried out.

The study into a Mining and GeoSciences Framework for Research and Development across Africa, conducted for the DST, was completed, and a successful interactive two-day conference examining all the issues from different viewpoints was held at Mintek following the completion of the report.

**Small-Scale Mining and Beneficiation**

Mintek’s Small Scale Mining and Beneficiation (SSMB) division enhances sustainability in the small scale mining sector by researching, adapting and transferring appropriate technology. New opportunities are identified for mineral-related small scale enterprises (SMME’s), and appropriate interventions are implemented, with the emphasis on promoting sustainable mining, downstream processing, and value addition through integrated development.

During the period under review, a total of 197 people in the Western Cape, Mpumalanga, KwaZulu-Natal, and Free State were trained in Occupational Health and Safety, Environment and Quality (SHE), Small Scale Mining: Surface Mining and Small Scale Mining: Quarrying under the MQA-funded training programme.

A further four rural pottery units were established with funding from the North West Province Department of Education in Morokweng, Braklaagte, Boitekong, and Kanana, and a total of 46 beneficiaries were provided with training.

A new rural jewellery co-operative was established in Ogies, Mpumalanga Province, with funding provided by Shanduka Coal. Mintek is providing ongoing marketing support and training to this enterprise, as well as those already established in Bethanie, Steelpoort, and Witbank, which are sponsored by Xstrata Alloys, and Kuruman, sponsored by BHP Billiton. A total of 31 jewellers received training under these projects, and a further 10 people were trained in glass beadmaking in Ikwezi and East London, Eastern Cape Province, under a project sponsored by the Ikwezi Empowerment Group.

A contract has been signed with Pretoria Portland Cement Company (PPC) Construction Industry Associations Trust to rehabilitate and upgrade a ceramics factory at Ndedwe in KwaZulu-Natal. The project forms part of PPC’s social investment programme. Ndwedwe is a rural area about 70 kilometres north of Durban, where unemployment is very high.
The IGoli process is one of a number of areas of possible collaboration between Mintek and CIMM. Other topics being considered include minimising the impact of the European Union’s restrictions on the import of chemicals and minerals under its REACH (Registration, Evaluation and Authorisation of Chemicals) policy, heap bioleaching of base metals, control systems and instrumentation for mineral processing circuits, and sustainable development in mining.

A contract has been signed with the National Research Foundation (NRF) to conduct collaborative research on agrominerals with Moi University in Kenya.

Two research assistants from the Chilean Research Centre for Mining and Metallurgy (Centro de Investigación Minera y Metalúrgica – C2M) visited Mintek for a month of training on the IGoli mercury-free gold recovery process. In early 2010, two engineers from Mintek travelled to Chile at the invitation of C2M to explore opportunities for implementing the technology among the country’s artisanal gold miners. A series of technical trials was conducted in Andacollo, Coquimbo Region, in collaboration with the Mining Association of Andacollo and attended by local officials and gold producers.

DST in March 2010 to implement a 60 ton per month production plant in Marble Hall, Mpumalanga Province. The DST will provide start-up funding, estimated at around R2.9 million, and Lyttleton the premises and certain of the manufacturing inputs. The product will be marketed to the commercial and small-scale agricultural sectors, as well as to commercial fertiliser producers for augmenting with nitrogenous fertiliser.

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