Name of Convention	Date of Signature / Ratification / Accession	Overall objectives
	31 July 2002. The Protocol entry into force in South Africa on 16 February 2005.	(UNFCCC). Countries that ratify this protocol commit to reduce their emissions of carbon dioxide and five other greenhouse gases, or engage in emissions trading if they maintain or increase emissions of these gases.
Convention on Nuclear Safety	Convention signed on 20 September 1994. Instrument of ratification deposited on 24 December 1996. Entered into force 24 March 1997.	To legally commit participating States operating land-based nuclear power plants to maintain a high level of safety by setting international benchmarks to which States would subscribe.
SADC Protocol of Energy, 1996	Ratified on 29 April 1999	▪ Harmonize national and regional energy policies, strategies and programmes on matters of common interest based on equity, balance and mutual benefit. ▪ Co-operate in the development of energy and energy pooling to ensure security and reliability of energy supply and the minimization of costs. ▪ Co-operate in the development and utilization of energy in the Region in the following sub-sectors: wood fuel, petroleum and natural gas, electricity, coal, new and renewable energy sources, energy efficiency and conservation, and other cross-cutting themes of interest to Member States. ▪ Ensure the provision of reliable, continued and sustainable energy services in the most efficient and cost-effective manner. ▪ Promote joint development of human resources and organizational capacity building in energy. ▪ Co-operate in the research, development, adaptation, dissemination and transfer of low-cost energy technologies. ▪ Achieve standardization in appropriate energy development and application including the use of common methods and other techniques.
Protocol on Mining, 1997	Ratified on 29 April 1999	▪ Seek to harmonize national and regional policies, strategies and programmes related to the development and exploitation of mineral resources.

Name of Convention	Date of Signature / Ratification / Accession	Overall objectives
		▪ Cooperate in facilitating the development of human and technological capacity. ▪ Encourage the development, transfer and mastery of science and technology throughout the Region. ▪ Encourage private sector participation in the exploitation of mineral resources. ▪ Promote economic empowerment of the historically disadvantaged groups in the mining sector. ▪ Jointly develop and observe internationally accepted standards of health, mining safety and environmental protection.

4.2 Bilateral Agreements

South Africa has entered into several bilateral agreements aimed at enhancing cooperation if the field of energy. These include the following:

1. Memorandum of Understanding between the Republic of South Africa and the Republic of Mozambique to enter negotiations aimed at reaching agreement on gas, 1996
2. Memorandum of Understanding between the Republic of South Africa and the Republic of Mozambique with regard to Mepanda Uncua to investigate the possibility of a hydro scheme, 1997
3. Agreement between the Republic of South Africa and the Republic of Mozambique to create a Cross Border Gas Trade Commission and facilitate the movement of gas across the border, 2001
4. Agreement between the Republic of South Africa and the Republic of Namibia to create a Cross Border Gas Trade Commission and facilitate the movement of gas across the border, 2001
5. Agreement between the governments of Swaziland, Mozambique and South Africa to establish a joint commission to oversee the electricity interconnector, 2000.
6. Memorandum of Cooperation between the Government of the USA and the Government of the RSA on the exchange of information and cooperation on nuclear safety, safeguards and physical security, 1999.
7. Agreement of Cooperation between the Government of France and the Government of the RSA on the development and utilization of peaceful nuclear energy
8. Statement of Intent Concerning Cooperation in Sustainable Energy Development and the Mitigation of Greenhouse gases between the USA and RSA.
9. Agreement between the Department of Energy of the USA and the Government of the RSA through its Department of Minerals and Energy on Collaboration in Energy policy, Science, Technology and Development.
10. Memorandum of Understanding on Energy between RSA and the Dutch Government.
11. Agreement on Energy Policy, Science, Technology and Development between the SA Government and the Department of Energy of the United States of America.
12. Memorandum of Understanding between the Government of the Republic of Zimbabwe and the Government of the Republic of South Africa on Cooperation in the field of Energy.
13. Memorandum of Understanding on Energy Co-operation between the Republic of South Africa and the Arab Republic of Egypt.
14. Southern African Power Pool Memorandum of Understanding

15. Agreement of Cooperation between USA and RSA on the Peaceful Uses of Atomic Energy, November 2005.

4.3 Other International Commitments

Through participation in various fora, the Government of South Africa has also assumed certain responsibilities and obligations. With regard to minerals, these responsibilities arise from among others the Johannesburg WSSD Plan of Implementation, the New Partnership for Africa's Development, the Inter-governmental Forum on Mining, Minerals, Metals and Sustainable Development, the Global Dialogue, the African Mining Partnership, and the Mining, Minerals and Sustainable Development Project.

4.3.1 WSSD Johannesburg Plan of Implementation

The WSSD Johannesburg Plan of Implementation recognizes that the implementation of the outcomes of the World Summit for Sustainable Development which took place in 2002 will benefit all people, particularly women, youth, children and vulnerable groups and that implementation should involve all relevant stakeholders through partnerships, including between governments. It also notes that good governance; peace security, stability and respect for human rights as well as respect for cultural diversity are essential for achieving sustainable development. Also acknowledged by the Plan is the importance of ethics for sustainable development.

The key aspects of the Plan include poverty eradication, changing unsustainable patterns of consumption and production, protecting and managing the natural resource base of economic and social development, sustainable development in a globalizing world, health and sustainable development, sustainable development of small island developing states, sustainable development for Africa, other regional initiatives in Latin America and the Caribbean, Asia and the Pacific, West Asia, Economic Commission for Europe region, the means of implementation, as well as an institutional framework for sustainable development. With regard to enhancing the contribution of mining, minerals and metals to sustainable development, the plan aims to

i. Support efforts to address the impacts and benefits of mining, minerals and metals, including workers' health and safety, and use various partnerships to promote transparency and accountability for sustainable mining and minerals development.

ii. Enhance the participation of stakeholders, to play an active role in minerals, metals and mining development throughout the life cycles of mining operations, in accordance with national regulations and taking into account significant transboundary impacts;

iii. Foster sustainable mining practices through the provision of financial, technical and capacity-building support for the mining and processing of minerals, including small-scale mining, and, where possible and appropriate, improve value-added processing, upgrade scientific and technological information and reclaim and rehabilitate degraded sites.

With regard to energy, the Plan among other advocates measures to improve access to reliable, affordable, economically viable and environmentally sound energy resources; transition to cleaner use of liquid and gaseous fossil fuels; the development of energy for policies and frameworks that will help create access to reliable, affordable and economically viable, socially acceptable and environmentally sound energy services; and enhance international cooperation to improve access to energy.

4.3.2 Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development

This Forum is a Type II Partnership Agreement which emanates from the 2002 World Summit on Sustainable Development (WSSD) outcomes for mining which was held in Johannesburg, South Africa in September 2002. From this Summit, a WSSD Johannesburg Plan of Implementation (JPOI) was developed for implementation. The JPOI provided specific actions and targets for the mining industries throughout the world.

The objective of the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGFMMMSD), is to enhance and promote the contribution of the mining, minerals and metals sector to sustainable development. The functions of the Forum are consultative and advisory. The forum aims to provide governments with a framework for discussing the opportunities provided by the mining sector and to respond to the challenges that they pose.

The thirty-three members of the Forum are: Argentina, Bolivia, Brazil, Burkina Faso, Burundi, Canada, Dominican Republic, Ethiopia, Gabon, Ghana, Kazakhstan, Jamaica, Kenya, Madagascar, Malawi, Mali, Mauritania, Morocco, Niger, Nigeria, Philippines, Republic of Guinea, Romania, Russian Federation, Senegal, South Africa, Surinam, Swaziland, Tanzania, Uganda, United Kingdom, Uruguay and Zambia. In addition to member countries, international agencies (UNCTAD, UNDESA, UNIDO, UNEP, ILO, World Bank, the European Commission and observers from China also participated).

A market outlook advisory committee was established to examine mineral and metal market trends and potential constraints to international trade in mineral and metal products. Members of the Forum also agreed that preparations must be initiated to report progress on the WSSD outcomes for mining to the United Nations Commission on Sustainable Development Conference to be held in 2010-2011. From all the countries represented at the Forum, South Africa has certainly taken the lead on preparations in this regard through the Sustainable Development through Mining (SDM) Programme that was initiated by the DME in November 2004.

4.3.3 Mining, Minerals and Sustainable Development

The Mining, Minerals and Sustainable Development (MMSD) project was an independent process of multi stakeholder engagement and participatory analysis that sought to address aspects of the interface between the mining and minerals sector and the concept of sustainable development. The project was coordinated by the International Institute for Environment and Development and undertaken between 2000 and 2002. The objective of the project in Southern Africa was to determine how the mining and minerals sector can best contribute to the region's transition to sustainable development. The MMSD Southern Africa project comprised two components namely research and stakeholder consultation. The five research topics identified by stakeholders were:

- Small scale mining and sustainable development in southern Africa
- HIV/AIDS, the mining and minerals sector and sustainable development in southern Africa
- Social issues within the mining and minerals sector in southern Africa
- Mining, minerals, the biophysical environment and the transition to sustainable development in southern Africa

- Mining, minerals, economic development and the transition to sustainable development in southern Africa.

4.3.4 New Partnership for African Development

The New Partnership for Africa's Development (NEPAD) is a programme of the African Union whose primary objectives are to eradicate poverty; place African countries on a path of sustainable growth and development; halt the marginalization of Africa in the globalization process and enhance beneficial integration into the global economy; and, accelerate the empowerment of women. The priorities are:

a) Establishing the conditions for sustainable development by ensuring peace and security; democracy and good, political, economic and corporate governance; regional co-operation and integration; and Capacity building.
b) Policy reforms and increased investment in agriculture, human development, infrastructure, diversification of production and exports, intra-African trade and improving access to markets of developed countries; as well as the environment.
c) Mobilizing resources by increasing domestic savings and investments; improving management of public revenue and expenditure; improving Africa's share in global trade; attracting foreign direct investment; and increasing capital flows through further debt reduction and increase overseas development assistance (ODA).

4.3.5 African Mining Partnership

The aim of the African Mining Partnership (AMP) is to promote and coordinate mining and mineral-led initiatives under the auspices of NEPAD. Projects and programmes have been identified in six key areas namely: artisanal mining, harmonization of mining policies, environment and sustainable development, beneficiation, human resource development, and promoting foreign investment and indigenous participation in mining ventures. To date, South Africa and Mali have initiated training exchange programmes in the area of beneficiation. On the project sustainable development / environment, the AMP has linked up with the NEPAD Infrastructure on the Spatial Development Initiative (SDI) in Africa. The intention is to influence infrastructure development with the mineral potential within areas. The AMP will has its next Minister's meeting again early in February 2007 which is linked with the Mining Indaba.

5. PROGRAMMES AND STRATEGIES FOR ENVIRONMENTAL MANAGEMENT

The Department of Minerals and Energy is implementing several programmes and strategies aimed at realizing its objectives. These programmes and strategies which are largely aligned with national policy and legislation, as well as with international commitments include the Energy Efficiency Strategy, Integrated National Electrification Strategy, Free Basic Electricity Programme, Integrated Energy Plan and Gas Infrastructure Plan.

5.1 Programmes and Strategies for the Energy Sector

5.1.1 Clean Development Mechanism

Clean Development Mechanism (CDM) is a flexible mechanism under the Kyoto Protocol of the UNFCCC that provide a practical framework to reduce or stabilize gases (greenhouse gases) that cause global warming and climate change. CDM projects generates carbon credits with a monetary value that could result in additional financial resources flow to a developing country allowing it to implement a greenhouse gas reduction programme that would otherwise not be viable.

The South African Designated National Authority (DNA) was established in December 2004 as an important step for the implementation of the provisions of the Kyoto Protocol and of the UNFCCC. The main function of the DNA is to regulate and promote CDM activities in SA. In its evaluation process, the DNA uses an established approval procedure and criteria that looks at the social, economic and environmental contribution of projects. SA ranks in number 7 in the CDM market in the world.

The facilitation of the establishment of the Designated Operational Entity (DOE) plays an important role in the CDM project life cycle. It is responsible for validation and verification of the project and the project developers incur the validation costs. In order to reduce validation costs for SA project developers the DNA approached a number of organisations that could potentially act as DOEs and encourage them to apply for accreditation by the CDM Executive Board. As a result SA based Price Waterhouse and Coopers have been accredited by the CDM executive Board. This is the only DOE in Africa at large.

5.1.2 Renewable Energy Strategy

Underpinning the Renewable Energy Strategy is a realistic implementation plan, including budgets and targets. The Renewable Energy Strategy and Implementation Plan were finalized in June 2004. The legislative framework for this Strategy was provided in the formulation of the Energy and Electricity Regulation Acts. National Treasury approved the renewable energy subsidy scheme in September 2005. The scheme started off with once-off capital grants (R14.2m) for over a period of 3 years made available for renewable energy projects. The scheme is administered by the DME Renewable Energy Finance and Subsidy Office which came into operation in October 2005.

5.1.3 Energy Efficiency Strategy

The Energy Efficiency Strategy of South Africa was approved by Cabinet in March 2005 and is aimed at developing and introducing energy efficiency practices in South Africa in accordance with the Energy Policy. The Strategy also sets the target for improved energy efficiency in South Africa at 12% by 2015. The strategy relates the development of the energy sector with national socio-economic development plans and other Government initiatives. It also provides guidelines for the implementation of energy efficient practices. The Minister also signed an Energy Efficiency Accord with 32 companies including large industrial consumers to get the commitment of industry to implement energy efficiency practices in the industrial sector. The Strategy acknowledges the significant potential for energy efficiency improvements across all sectors. Its vision is to contribute towards affordable energy and to minimize the negative effects of energy usage on human health and the environment. The Strategy allows for the introduction of voluntary measures to monitor progress in implementation.

5.1.4 Paraffin Safety Information Strategy

In order to deal with the problems created by the use of paraffin, the Department has drafted this Strategy document to give guidance to the implementation of a campaign to increase awareness of health and safety hazards related to illuminating paraffin. This will enable the DME to start with the campaign which is expected to promote behavioral changes with respect to the handling, storage and use of paraffin.

5.1.5 South African Supplier Development Agency

The South African Supplier Development Agency (SASDA) was launched by the Deputy President on 12 September 2005, with the support of the Minister of Minerals and Energy. The purpose of SASDA is to increase the participation of HDSAs in the petroleum sector through targeted procurement. Its mandate is to accelerate progress in the empowerment of HDSAs in the petroleum industry through increased access to industry procurement opportunities.

5.1.6 Integrated National Electrification Strategy

The purpose of the Integrated National Electrification Programme (INEP) is to provide capital subsidies to municipalities to address electrification backlogs for residential dwellings. The Government co-ordinates the electrification programme, including the establishment of targets, determination of allocation criteria and priority areas, allocation and management of funds, and the determination of the appropriate mix between grid and non-grid technologies. The Government will also establish a National Electrification Fund to provide electrification subsidies from an electrification levy. The National Electricity Regulator will regulate domestic electricity tariffs in order to rationalize the large variety of tariffs existing in South Africa and ensure that supply options with progressive capacity-differentiated tariffs and connection fees are available to domestic customers.

5.1.7 Free Basic Electricity

The DME has joined hands with the Department of Provincial and Local Government through the National Free Basic Services Task Team in assisting municipalities with capacity necessary for effective implementation. Since June 2005, the number of municipalities that have not signed the funding agreements with ESKOM is less than 56%. Nationally there are about 3.5 million beneficiaries on the programme of which about 0, 5 million are in Eskom areas. In addressing the energy in balance in the domestic sector, the government has initiated an integrated national electrification programme (see above) and also put in place measures to provide free basic services, including electricity, to poor households. The Free Basic Electricity Policy addresses ways through which the Government can bring relief to poor electrified households and ensure optimal socio-economic benefits from the

National Electrification Programme. The Electricity Basic Service Support Tariff (EBSST) allows for a limited free amount of electricity to support basic energy services of a typical poor household.

5.1.8 Integrated Energy Plan

The purpose of the integrated energy plan is to balance energy demand with supply in concert with safety, health and environmental considerations. The following are the key aspects of the plan:

- Energy supply will remain reliant on coal for at least the next two decades.
- Energy supply will be diversified through the increased use of natural gas and renewable energies.
- Investigations into nuclear options as a future new energy source will be continued.
- The use of energy efficiency management and technologies will be promoted.
- Load factors on electricity generation plant to lower levelised lifecycle costs will be maximised.
- Reliance on imported liquid fuels by exploring and developing oil / gas deposits will be lessened.
- Existing oil refineries capacities when appropriate rather than green fields development will be increased.
- Existing synfuel plants will be maintained and supplemented with natural gas as feedstock.
- New electricity generation will remain coal based with potential for hydro, natural gas and nuclear capacity.
- Environmental considerations in energy supply, transformation and end use will be ensured.
- Universal access to clean and affordable energy, with emphasis on household energy supply being co-ordinated with provincial and local integrated development programmes will be promoted.
- Policy, legislation and regulation for the promotion of renewable energy and energy efficiency measures and mandatory provision of energy data will be introduced.
- Integrated energy planning will be undertaken on an ongoing basis.

5.1.9 Restructuring of the Electricity Distribution Industry

The restructuring of the electricity distribution industry will ensure increased access to electricity, affordability of energy services, improved governance and will stimulate the economy. The process of launching the Regional Electricity Distributors (RED) has taken place and will now be municipal entities. RED one has been established as a municipal entity in July 2005 by merging the electricity business of Eskom within the political boundaries of the City of Cape Town. On 14 September 2005, Cabinet approved the creation of 6 metro REDs and by 30 March 2006, the final RED boundaries for selected local municipalities to determine whether they will form part of a Metro RED, the National RED or a RED on their own.

5.1.*10* Integrated Energy Centers

A total of 5 Integrated Energy Centers (IeCs) were proposed for construction and launching in 2005. Delays were however experienced as a result of approving EIAs. Three such centers were established:

- The Caba Mdeni IeC in Magadla village (Eastern Cape), partly sponsored by Sasol.
- Kgalagadi IeC in Dithakong Cillage in Kuruman (Northern Cape).
- Eshane IeC in Greytown (KwaZulu Natal)

IeCs are at the heart of Government's Integrated Sustainable Rural Development Project. An IeC is a one-stop energy shop owned and operated by a community co-operative and organized as a community project. It provides energy solutions to communities and access to affordable, safe and sustainable energy services. Each local IeC is aligned with the IDPs for that particular area, which is implemented through the Integrated Sustainable Rural Development Project, thus integrating the provision of wider energy choices with other projects such as water supply, building schools etc.

5.1.11 Appliance Labeling Campaign

To assist households in becoming more energy efficient, the DME initiated an Appliance Labeling campaign. Labels on household appliances inform consumers how energy efficient their appliances are. The DME, in collaboration with the Department of Public Works and Eskom, is retrofitting government buildings to make them more energy efficient. This contributes a saving of about R600 000 in electricity bills per year.

5.1.12 Gas Infrastructure Plan

The Gas Infrastructure Plan is intended to be a strategy for the development of the natural gas industry in South Africa.

5.1.13 Women in Nuclear South Africa

Women in Nuclear South Africa (Winsa) were launched in August 2003. Winsa aims to gather and disseminate information at national, regional and global level on providing women and sharing information with women on the challenges and opportunities for women in the nuclear discipline and to find a dedicate way in empowering women in the nuclear discipline.

5.2 Programmes and Strategies for the Mining Sector

5.2.1 Sustainable Development through Mining Strategy

"The South African Constitution provides that everyone has the right to an environment that is not harmful to their health and well-being and to have the environment protected for the benefit of present and future generations." Following on from the World Summit on Sustainable Development in 2002, the Department of Minerals & Energy (DME) initiated a programme to develop a national strategic framework to guide the mining and minerals sector in South Africa to sustainable development.

The programme titled "Sustainable Development through Mining" (SDM) embraces initiatives and policies emanating from the United Nations (UN) Johannesburg Plan of Implementation (JPOI), the UN Global Compact, the Mineral and Petroleum Resources Development Act (MPRDA), the Business Charter for Sustainable Development and the Mining, Minerals and Sustainable Development Initiative among others. The DME has undertaken this programme and appointed the Council for Scientific and Industrial Research (CSIR), Mintek and the Council for Geoscience (CGS) to assist them in this task. The programme has now entered its second full year, and the core competencies of the respective science councils have been harnessed into a cohesive unit.

The classic definition of sustainable development is "development that meets the needs of the present generation without compromising the ability of future generations to meet their needs" and the DME has integrated this philosophy through the articulation of its vision "by 2010 the mining sector will contribute optimally to sustainable. The overarching aims of the strategic framework will give effect to the fulfillment of the DME's commitments in terms of the Johannesburg Plan of Implementation (World Summit on Sustainable Development 2002).

The sustainable development ideal lies at the nexus of biophysical, social and economic realms, supported by good governance and the concept can be seen as a process of continually striving for a dynamic balance between people, planet and prosperity through:

- Using and protecting the physical and natural environment and its resources;
- Creating equitable and viable economic systems with an ethical basis
- Acknowledging and guiding social and cultural systems and values towards greater equity, responsibility and human well being

The illustration (Figure 1) below outlines these four elements interacting harmoniously in achieving the SDM vision:

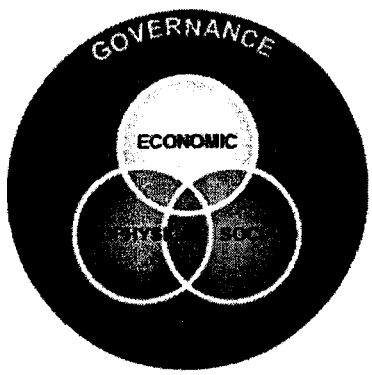


Figure 1: Four elements of Sustainable Development

The challenge of sustainable development within the minerals sector is how to ensure that the sector contributes to human welfare and well-being without reducing the potential for future generations to do the same. The challenge lies on how to ensure judicious use and management of the various forms of capital such as:

- natural capital, which provides a continuing income of ecosystem benefits, such as biological diversity, mineral resources, and clean air and water;
- manufactured capital, such as machinery, buildings and other forms of infrastructure;
- human capital, in the form of knowledge skills, health, and cultural endowment;
- social capital, the institutions and structures that allow individuals and groups to develop collaboratively;
- financial capital, the value of which is representative of the other forms of capital

Sustainable development, the understanding thereof and the move towards more sustainable practices within the mining sector, has been characterized by an ecocentric focus, where a disproportionate amount of emphasis had been placed on "righting" the environmental impacts of mining. There is however broad consensus that in order for sustainable development in mining to be practiced more equitably, actions and interventions in the biophysical, social, economic and governance realms must take place. The schematic below (Figure 2) illustrates the above and summarizes the overall aim of the SDM programme, viz. moving from this unbalanced picture towards a more balanced inclusive one where social, economic and governance actions to move the sector towards sustainable development are more equitable.

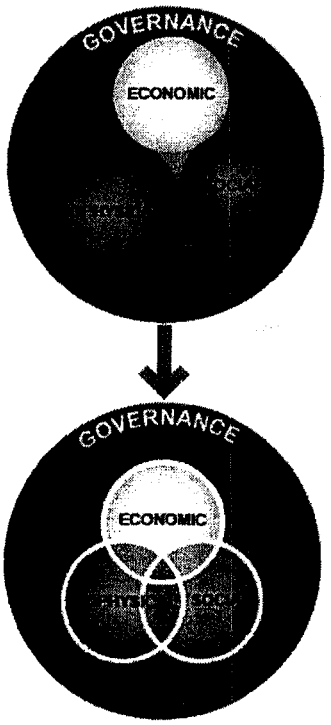


Figure 2: Balancing the four elements of Sustainable Development

The achievement of the SDM vision above is a broad concept encompassing amongst others, the full minerals resource value chain, expectations of a range of stakeholders and complex regulatory environments. Achieving the vision of sustainable development therefore needs to be guided by a framework to ensure synergy between stakeholder efforts and directed progress in this regard.

With a broadly supported vision in place, the approach will be to identify key obstacles to achieving the vision and to develop strategies and plans to overcome these obstacles. This framework will provide guidelines to the mining industry, government and other key stakeholders as well as interested and affected parties, ensuring that South Africa and its people benefit in a sustainable manner from the mining of its mineral wealth. Indicators to monitor the mining industries adherence to the sustainable development guidelines will also be created. Aiming to ensure that the appropriate tools are created to assist the mining industry with sustainable development, the strategy takes into account the national, regional and international commitments made by the minerals sector. In order to support the achievement of the vision for the sector's optimal contribution to sustainable development, the strategy will identify and provide direction for among others:

- institutional structures (Government and business sector level);
- policy, planning and legal aspects;
- competency and capacity building;
- financial resources;
- research priorities;
- infrastructure and technology requirements; and
- monitoring, evaluation and reporting.

For the DME to achieve its stated objective, the need to conduct intense consultation with government, industry, civic organizations etc. was realized. The research will commission specialist studies to understand the current situation in areas such as beneficiation, economic, social and governance. Once these are understood the process of developing a long term strategy with sustainable development indicators will be conducted through specialist studies or research based on the understanding of the constraints and gaps.

Stakeholders within the South African minerals sector will play an important role in developing the DME's strategic framework for sustainable development. Key in this respect is stakeholder support for the vision regarding the sector's contribution to sustainable development. Another important element is the role of stakeholders in identifying obstacles to the achievement of this vision, and in identifying possible actions to offset/overcome these constraints. A number of strategic themes have been developed out of the SDM vision – the provisional listing below will form a basis for debate and consideration (through the stakeholder consultation forum and other appropriate channels). For each strategic theme, a number of objectives have been derived from that aim to contribute to the attainment of the vision of the SDM initiative. Some of the themes identified are:

1. That the South African Mining sector reflects the Sustainable development values, principles and aspirations of the country.
2. That community empowerment, environmental & social rights is central tenets of the sector.
3. That all those operating within the minerals sector earn a social license to operate and that building and accounting for social and natural capital is implicit.
4. To recognize that sustainable development strategy and policy must transcend both the government of the day and the requirements of the UNCSD and should be valid and appropriate across all time scales.
5. That Sustainable Development strategy facilitates the transition from finite resource based industries & economies to sustainable knowledge based economies.
6. That Sustainable Development strategy promotes economic diversification in existing and future mining industries
7. That the minerals sector takes due cognizance of globalization's influence on sustainable development and the consequences thereof. This includes the implications of trade barriers, global market forces, international agreements, requirements and conventions.
8. That the cumulative and life-cycle aspects of the sector are fully aligned with sustainable development principles.
9. That Sustainable Development Policy acknowledges the potential and realized contribution of the industry for socio-economic empowerment and that policy creates conditions to ensure the continuation of this (valued) contribution.
10. That value extraction from South Africa's minerals sector benefits vulnerable groups.
11. Government is empowered to facilitate sustainable development outcomes and to link to national and international sustainable development strategies and initiatives.
12. Government, industry and other stakeholders must realize the synergies achieved through effective cooperation.
13. The Minerals Sector moves towards sustainable end states and to internalize negative costs and associated consequences.
14. That value addition from SA's mineral resources should be maximized locally.
15. All stakeholders in the sector must share an SD vision based on a culture of mutual respect.
16. The vision of sustainable development in the sector must be communicated effectively to all stakeholders.

5.2.2 Database for Derelict and Ownerless Mines

The SDM programme will identify and map all current and previously unrehabilitated and abandoned mines in South Africa, and assess or rank the status of these mines in terms of their impact on the environment and community among other issues. Best practice rehabilitation methods and regional rehabilitation strategies will be developed for each mineral sector and region. One of the core focus areas for the research is the development of a ranking / prioritization system for derelict and ownerless mines in South Africa. This will allow evaluation and comparison of derelict mining sites in terms of the

risk they pose to human and ecological health and safety, as well as their impact on the surrounding environment, their potential for deterioration, and associated rehabilitation cost efficiency. This enables decisions regarding rehabilitation and closure priorities to be made on a scientific basis.

The ranking system will be based on five principle considerations:

- public and ecological health and safety;
- physical stability;
- chemical stability;
- land use; and
- economic considerations.

In developing mining strategies, the programme conducts mining and closure studies. The key aspect of these studies is that they are intended to consider the holistic environment and may assist in identifying best practices for mining, rehabilitation and closure in support of a sustainable future.

Based on the current environmental state, these are used to inform future development options for the study area. Comprehensive consultation and collaboration with stakeholders in the various regions will assist in the elimination of duplication and ensure all role players in a region are part of the process.

Based on the understanding of the state of the area, specialist studies are commissioned where gaps exist. Best practice guidelines for managing the exploration, mining, rehabilitation, closure and post closure in a most sustainable manner are then developed for each mining sector and region. To date some five thousand ownerless and derelict mines have been identified throughout the country and s0me 3000 smaller shafts, trenches and operations have also been identified which are being verified.

5.2.3 Regional Mine Closure Strategies

A tremendous urgency has been placed on resolving the water ingress and other gold mining related closure problems. The development of Regional Mine Closure Strategies (RMCS) within the various gold mining areas in South Africa, have therefore been identified as a major and urgent outcome for the DME for 2006/2007, 2007/2008 financial years. Six reasons have been identified highlighting the importance of regional mine closure strategies within which individual mine closures can be planned:

1. According to the report The Development of Appropriate Procedures towards and after Closure of Underground Gold Mines from a Water Management Perspective (WRC Report no. 1215/1/05) (Pulles, Banister and van Biljon, 2005), the suggested division of all of South Africa's goldfields into 17 regions has been decided on the basis of inter-mine connectivity and the geo-hydrological units

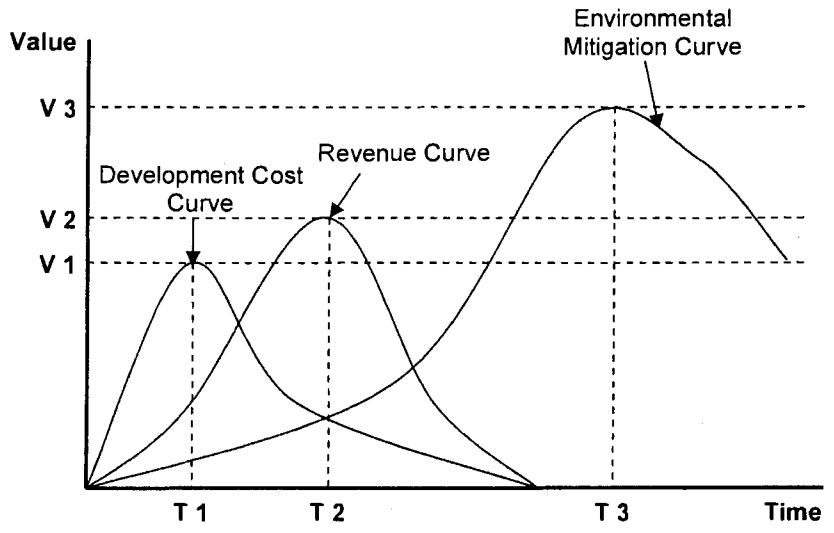
that apply. An advantage of this divisional logic is that in all cases except the Far West Rand's Central sub-basin and the Eastern sub-basin, the mines grouped within a geo-hydrological region are also located within the same hydrological unit. This potentially simplifies questions of management and administration. However, Pulles et al. (2005: ix) state that the closure of a mine within one region will often impact on the remaining mines. By implication, there is consequently a risk that "the cumulative impact resulting from all the mines in a region could be imposed upon the last mine in the region to cease operations". The last mine to be functioning could thus potentially be held responsible and liable for the cumulative impact of all the mines which are connected with it. This translates to financial risk which can become a driver of disinvestment in the mining industry with a resultant potential loss of jobs and associated economic activity. Even if this scenario does not take place, at the very least, it may be difficult, if not impossible, to apportion liability to the contributing mines within a region in a manner that is legally defensible and hence enforceable. Within this ordering logic, it is noted that because different mines will cease their operations at different times, an overarching framework needs to be developed for each region within which individual mines will be able to plan for mine closure. That framework should not become a disincentive to long-term investment and should also be legally enforceable if it is to be viable over time.

2. RMCS could be developed in order to make provision for the likelihood of a potential cumulative environmental impact resulting from the mining operations of certain groupings of mines, for example, polluted water from several mines decanting at one point with a resultant negative environmental impact on a specific area potentially removed from individual mine premises. This is currently taking place on Harmony's mine property in the West Rand where acidic water is decanting and polluting both the Wonderfontein and Tweelopies streams, potentially with heavy metals and radionuclides. Environmental impacts are, however, not limited to polluted groundwater but also include other hazards such as toxic dust deposits. This has the potential for strong and emotive public responses and therefore needs to be recognized as a management problem that is likely to need constant and creative solutions if it is to be contained.

3. It is also important to take into consideration issues of scale. A particular manifestation of this is the ratio of dependence of individuals on one mining operation. For example, the majority of the inhabitants of Carletonville are highly dependent on the mines in that area, whereas Johannesburg's population is not greatly dependent on the mining operations in the city's

surroundings. This point suggests that there may be reasons for looking at mine closure in the context of a region other than solely on the basis of underground mine inter-connectivity. In similar vein, the scale of the localized economy centered on the Klerksdorp-Orkney-Stilfontein-Hartbeesfontein (KOSH) area differs fundamentally from the scale associated with either the Far West Rand or Johannesburg area. Scale thus has many permutations and dimensions to it, both temporally and spatially, but also in terms of economic enmeshment and dependency of livelihoods. One of the critical elements of scale that needs to be considered is that relating to the "transboundary nature" of the problem which is further complicated by different authorities managing specific "parts" of the problem. Each of these different authorities introduces complexity into the management solution and thus needs to be considered from the start.

4. RMCS may provide the possibility for establishing controlling mechanisms that could make it more difficult for mining houses to externalize their costs. This could become a control mechanism to induce responsibility by the mining houses to accept the unintended consequences of their activities, such as the cost of environmental or human health mitigation. The externalization factor seems to be a key element when it comes to developing regional mine closure strategies, because the temporal dimension of this has the potential to impact on future generations and thus be fundamentally at odds with the Constitutional imperatives in this regard. Conceptually this can be thought of as shown here in Figure 3.



Conceptual representation of the cost of mining externalities such as environmental mitigation, which has a periodicity that differs from the Development Cost Curve and the Revenue Curve cycles that both terminate on mine closure. The Environmental Mitigation Curve is potentially greater in magnitude than the Revenue Curve, representing an externality imposed on society.

Figure 3: Environmental Mitigation Curve

5. It is important that mine closure be approached from a sustainable and "cradle to grave" perspective. Ideally it should be planned when a mine starts operating. In this regard, regional mine closure strategies may be able to provide regulations regarding mine closure that are applicable to all mines within a given region. They may also make provision for post-closure stewardship, in order to continue monitoring the implementation of individual mine closure plans. This will set specific standards for all mines and promote the alignment of individual mine closure plans.

6. RMCS are also needed to prevent a decline in investor confidence, which may be the unintended consequence of one mine deciding to close unilaterally in a way that affects the safe operation of an adjacent mine, or possible publicity arising from environmental degradation that impacts negatively on the stock market price of gold shares (such as that which could arise from the recent publicity of alleged radioactivity in a dam on the farm Adma, near Calretonville. The consequences of a single mine's decision (taken in isolation from its neighboring mines) may thus ultimately provide a disincentive for future foreign investment in the mining industry. This could also arise from a fear that litigation arising from alleged radioactivity could become a future financial risk for any given investor. It should be noted here that if sustainable development is to go hand in hand with mining, foreign investment is crucial and as such public perception matters a great deal. Government thus needs to consider a move away from the *laissez faire* approach of the Apartheid years where mining houses were allowed to drive their own agenda, towards a controlled and regulated environment that is both investor friendly, but at the same time ensures that all mines in a particular region operate safely, both in terms of mineworkers and the broader public that are exposed to surface contamination.

It can therefore be argued that for the above reasons, regional mine closure strategies will be able to address the diverse and complex issues related to mining and mine closure from a broader and more inclusive perspective than individual mine closure plans would be able to provide.

The gold mining areas in South Africa (Figure 4) for the development of such Regional Mine Closure Strategies are grouped as follows:

1. The Witwatersrand Gold Fields

2. Free State Gold Field
3. KOSH gold mining area
4. The Far West Rand Gold Field
5. West Rand Basin
6. Central Basin
7. Eastern Basin
8. Evander Gold Field
9. The Rietfontein Gold Field
10. The South Rand Gold Field
11. The Venterskroon Gold Field

Gold outside the Witwatersrand Gold Fields:

1. Pilgrim 's Rest Gold Field
2. Barberton Gold Field
3. Kwazulu-Natal (Klipwal)
4. The Giyani Greenstone Belt
5. The Murchison Greenstone Belt
6. The Amalia-Kraaipan Goldfield
7. The Pietersburg Gold Field
8. Other isolated gold mines e.g. Millwood

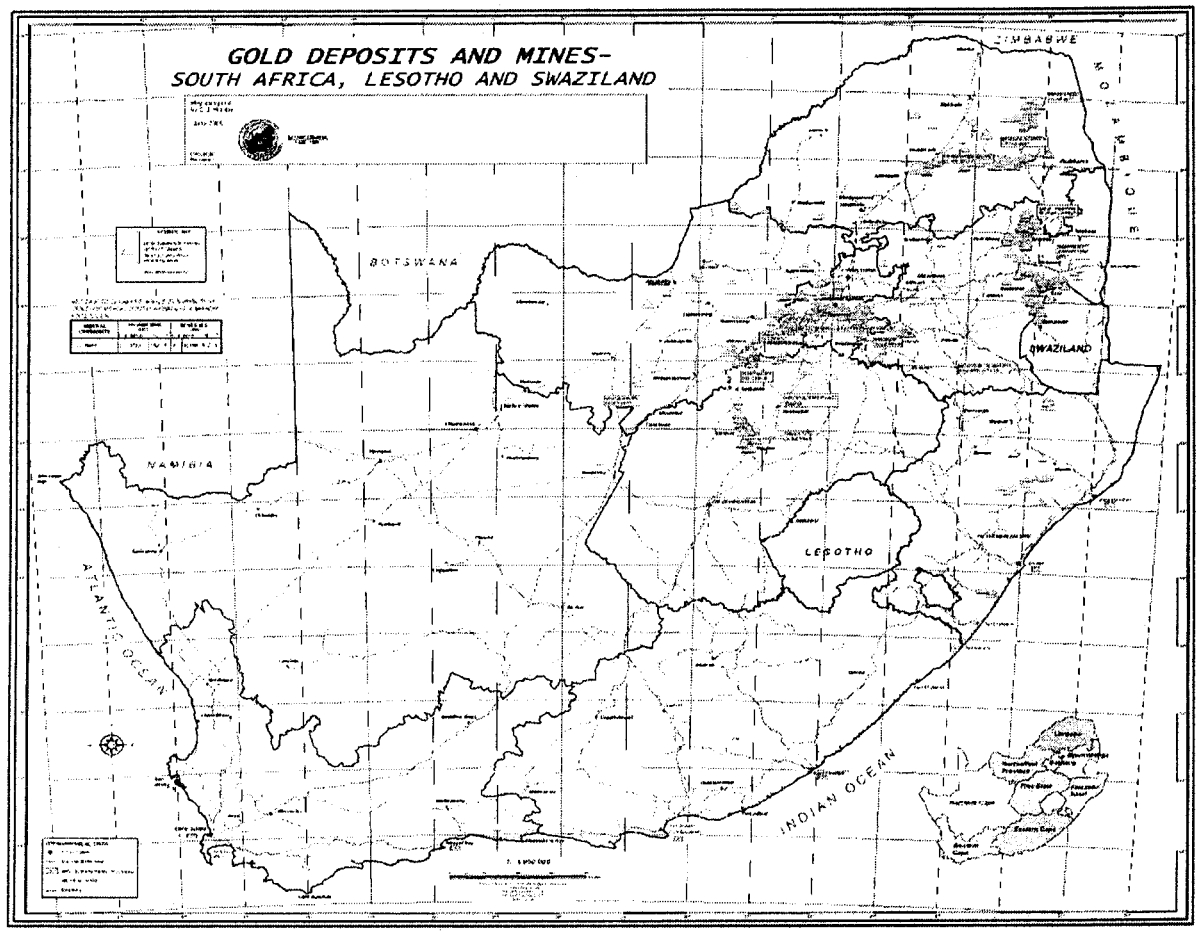


Figure 4: Map indicating the gold mining areas in South Africa (Source, Council for Geoscience)

RMCS are different to a mine closure plan. The closure strategy considers the various issues that are relevant to mine closure on a broader integrated level and develops a strategic framework within which individual mine closure plans to fit. The regional closure strategy must be developed in consultation with the relevant authorities, relevant mining industry (employers and employees) and I&APs that fall within that region. Due to the urgency of the need to develop these strategies, it is suggested that only relevant authorities (including local authorities) and the mining industry be consulted. The individual mines submitting their closure plans will still be required to engage all the relevant I&APs in accordance with the requirements of the MPRDA, 2002 and its supporting regulations. A regional mine closure strategy must as a minimum incorporate the following aspects within its framework:

- Listing of all mine infrastructures located within the "region" (i.e. mine shafts, ventilation shafts, headgears, waste rock dumps, sand dumps, slimes dams etc.).

- The legal status and ownership of the mines and/or the various components of the mine infrastructure must be established.
- The Spatial Development Plans that have been prepares by the various local authorities that fall within the region must be accessed and integrated.
- The socioeconomic profile of the "region" must be established and consultations must be held with local government officials in order to develop an integrated socioeconomic profile and to define the socioeconomic profile and to define the socioeconomic development plans that exist.
- A review of the type and value of the minerals that could potentially be sterilized through regional closure must be undertaken.
- A regional scale assessment must be undertaken in order to define the regional issues and to develop broad mine closure and environmental management objectives for the "region". This assessment must, as a minimum, include through review of surface and ground water, dust, radioactivity and instability issues.
- As it is well known that there are major potential long-term water pollution issues associated with the regional closure of the gold mines, particular emphasis must be placed with the regional closure of the gold mines, particular emphasis must be placed on developing a clear understanding of the following water related issues:

I. Construct a 3-dimensional model of all the underground workings for all the mines in the region.
II. Define all confirmed and potential hydraulic interconnections between mines.
III. Define anticipated remaining life for each mine and shaft.
IV. Develop a regional-scale groundwater model capable of quantifying major water ingress points, rates of flooding and inter-mine flow rates.
V. Undertake a regional-scale geochemical sampling programmes and screening-level kinetic geochemical modeling.
VI. Establish the probability of decant of contaminated underground water into the aquifer or surface water systems and the location, volumes and contaminant loads associated with such decants.
VII. Establish surface and groundwater impacts associated with surface features (e.g. waste rock dumps, tailings dams, pollution control dam's metallurgical plant footprints, etc.)
VIII. With reference to the applicable Catchment Management Plan, establish the acceptable volumes and contaminant loads and negotiate and agree with Authorities
IX. Apportion acceptable load to each mine within region and reach agreement between mines and Authorities

X. Develop and implement regional monitoring programmes to provide data to validate the basis of the regional mine closure strategy.

Integrate all the above into a coherent and practical regional mine closure strategy which:

- can assist to identify appropriate solutions to strategic problems i.e. water ingress, mining waste/dust, water pollution, instability/seismic events within that "region";
- can be used by the relevant authorities to review the appropriateness of individual, mine closure plans; and
- can be used by the mines as a framework within which to plan their own detailed individual mine closure plans.

In developing a regional mine closure strategy, use must be made of the extensive previous investigations undertaken by various Government departments, institutions, mining companies, consultants etc. in this "region". Unnecessary duplication of work should be is avoided. In this regard, the DME is finalizing various MOUs with other Government departments (national, provincial, local), research and academic institutions to use existing information. However, it is known that there are significant data gaps, e.g. geochemistry and mineralogy within specific "regions" that will need to be filled with specific sampling programmes.

5.2.4 Witwatersrand Water Ingress Project

The DME initiated the Witwatersrand Water Ingress Project (WWIP) in 2003. The Witwatersrand area includes the following basins:

- Central Basin;
- Eastern Basin;
- Western Basin;
- Far Western Basin; and
- Klerksdorp-Orkney-Stilfontein-Hartebeestfontein (KOSH) gold mining area.

The Council for Geoscience was appointed to assist the DME in investigating viable water management solutions and sustainable closure options. As a result the generic solutions within all the basins include the following:

- Water management options are evaluated from the basis of preventing water ingress (through the building of canals and to keep clean water clean) and managing and control decant water.
- Where mining can still continue in the short (5 years) to medium (10 years) term - the water levels must be maintained at an appropriate safe level for mining. Mining companies and prospective mining companies must make a commitment towards pumping water while mining.
- After cessation of underground mining, any option which allows water to recover to decant level and decant freely is not regarded as sustainable in the long term – owning to the unpredictability of the decant process.
- The water level within a basin can only be allowed to recover to an "Environmental Critical Level" (ECL), which will prevent surface and groundwater contamination. The ECL has only been defined for the Western Basin (Figure 5 and 6) and need to be established for the other basins.

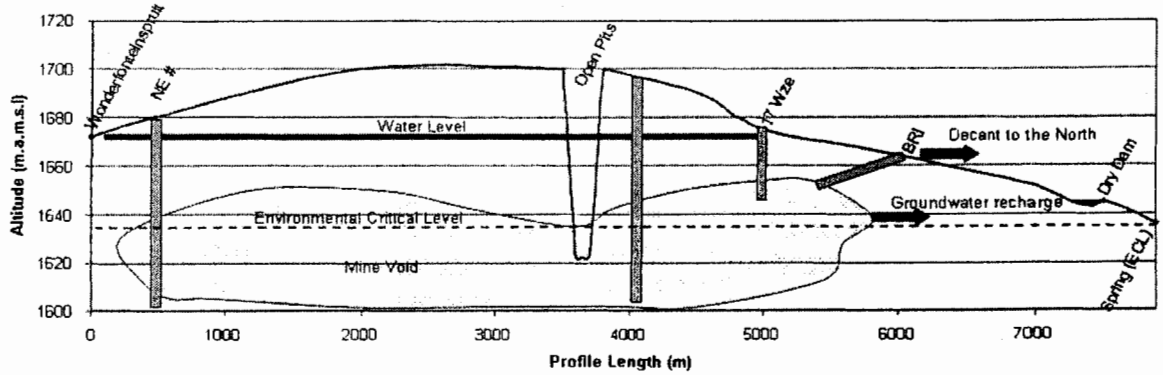


Figure 5: A north-south section across the Western Basin, showing the current water level, the ECL, the shaft positions and the decant and recharge areas. (Source, WWIP)

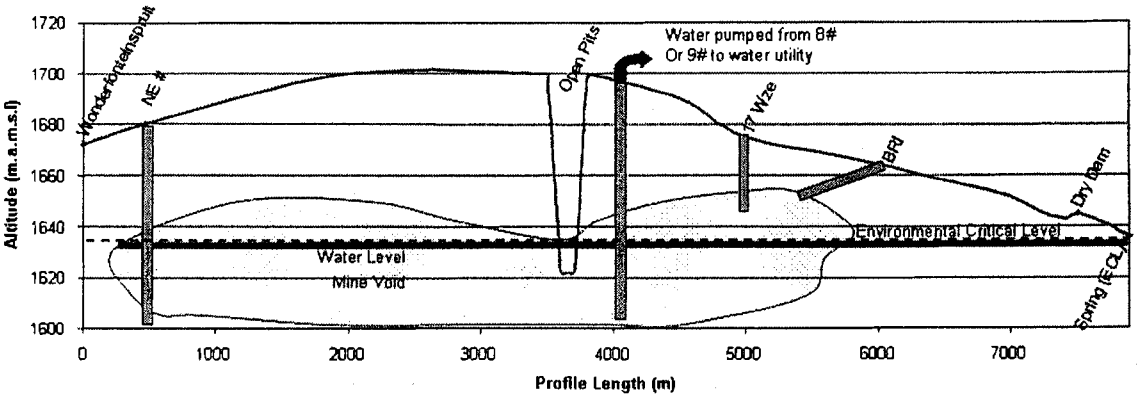


Figure 6: A north-south section across the Western Basin, showing the effect that pumping water to lower the void water level to around or below the ECL would have. (Source, WWIP)

- Owing to the high cost of full desalination of the water, it is proposed that water be treated to industrial quality and used locally for industrial or agricultural purposes. The transfer of industrial quality water to scarce areas such as the Rustenburg area (to provide water for the platinum mines) is also possible.

The following water management options were identified as the preferred management options:

- Central Basin: A controlled decant tunnel is attractive from a sustainability viewpoint. It is however expensive and the possibility of using a siphon has been identified. Continued pumping and treatment of water would result in long-term liabilities to Government and this option is not recognized as long-term sustainable water management option. A canal at Florida Lake is being implemented to prevent water ingress (5Ml/day) which will assist in making the decant volumes less and prevent clean water from running through mined-out areas and picking up pollution.
- Western Basin: The pumping and treatment of water seems to be the only option left. Atomaer is in the process of finalizing an agreement with the relevant mining companies to establish a water utility and treatment plant for this purpose.
- Eastern and Far Western Basins: Partial dewatering of the dolomites via well-fields, which are currently a major source of ingress would limit ingress into the mining basins and keep clean water clean. In the Far Western Basin, this would maintain current water levels in the dolomite, reducing the risk of reactivating sinkholes.

With regard to the water management options for the basins, the following risk factors were identified:

- Water levies could pose a risk to the financial viability of the options.
- Dutiable users may have to be identified or developed for the water produced.
- The water volumes involved will have to be correctly predicted, for the efficient design and abstraction, treatment and distribution infrastructure. Seasonal variations, as seen in the Western Basin will have to be taken into account. .

5.2.5 Strengthening Environmental Enforcement Programme

The DME as part of the SDM programme are producing a series of documents in an effort to aid implementation of the Minerals and Petroleum Resources Development Act (MPRDA). The aim of these guidelines are to assist mine planners, government officials, major stakeholders as well as other interested and affected parties alike to understand the key legislative requirements pertaining to the guideline documents. It is believed that a simpler explanation of the legislative requirements will facilitate a deeper understanding thereof. There are several of these publications and at present they are in different stages of production which are:

1) Evaluation of the quantum of closure-related financial provision provided by a mine.

The objectives of this guideline document are to:

- Improve the understanding of the financial and legal aspects pertaining to the costing of remediation measures as a result of prospecting and/or mining operations;
- Enable the DME to adequately evaluate/review the quantum for financial provision submitted by the mining industry; and
- Provide the DME Regional Office personnel with a comprehensive and useful guideline on the generally accepted closure methods.

This document is now available and can be accessed on www.dme.gov.za or alternatively a hard copy is available on request through our website.

2) Strategies to Improve the Contribution of Granite Mining to Sustainable Development

This document is based on a study that was carried out as part of the SDM research programme commissioned by the DME. The programme's over-arching goal is to develop strategies for ensuring that mining activities contribute optimally to the sustainable development of the areas and regions within which they take place. Some of the objectives of the draft document are:

- Understand the nature of activities of the granite value chain.
- Understand the biophysical, socio-economic, planning and policy environments within which granite mining take place.
- Acquire insights into the macro-economic context within which the industry operates.
- Analyze the industry within the broad sustainable development context.
- This document is currently in its final draft phase, and will shortly become available.

3) MEM Guideline on Mine Closure

The purpose of this guideline is:

- to simplify the complex processes and procedures around the issue of formal mine closure and also
- to enhance understanding of the requirements of the MPDRA and its regulations.
- to provide some practical guidance to mine owners/ operators and government officials involved with mine closure.

4) Towards Management and Closure of South African Gold Mine Mineral Residue Deposits

This document is specifically designed to deal with gold mine mineral residue deposits (tailings/slimes dams, waste rock dumps and sand dumps), and will be used in conjunction with the guidelines on overall mine closure. The objective of this document is two-fold:

- to provide the South African gold mining industry with a set of legislative principles to manage the environmental impacts associated with gold residue deposits; and
- to provide guidance to environmental practitioners and the regulators, for the optimal requirements for gold mine residue deposit management when aiming to attain closure.

5) MEM Guideline - Environmental decision-making and implementation (for Scoping, EIAs and EMPs) and the monitoring and performance assessment of EMPs

Drafts of these guideline documents have been finalized and it awaiting the finalization and promulgation of the MPRD Amendment Bill.

6) GIS Decision-making support system

Industry compliance includes assisting the DME (in terms of enforcement) and industry to comply with the Minerals Petroleum Resources Development Act (MPRDA) in conjunction with any additional relevant legislation. The SDM programme will develop an Environmental Decision Support System (EDSS) that will enable government and other parties to monitor the compliance of the mining industry with the sustainable development framework for mines.

The EDSS will support data capture, storage, retrieval and reporting per mine, mine sector and region. A system to facilitate mine audits by the DME and the transfer of this data to decision support systems will be developed. A key component of this area is in assisting department officials when making decisions, in particular those decisions that are related to socio-economic and environmental impacts. As part of strengthening enforcement and assistance with industry compliance, the Site Inspection Assistant Tool (SIAT) is being developed to assist DME officers when doing mine audits. The current tool is a PDA assisted site inspection tool. The tool will:

- Ensure that the environmental officer verifies the information contained in the EMP's
- Provides a template according to which inspections can be conducted
- Add GPS and an integrated camera as additional data capturing tools
- Keep record of all field inspections
- Provide an electronic report facility

5.2.6 Rehabilitation of unsafe shafts and holdings within the Witwatersrand gold mining area

The DME initiated a project in 2005 to close and rehabilitate the unsafe shafts and holdings within the Witwatersrand area. The Council for Geoscience was appointed to assist DME in this task. About 600 mine openings, shafts or holdings were identified. As a phase 1, the DME identified 44 extremely

hazardous mine related openings which were rehabilitated in 2006. A second phase was initiated in 2006 for rehabilitation. An extensive public awareness campaign was launched through the publication of an awareness pamphlet. Various public meetings, door-to-door visits were undertaken in co-operation with the Ward Councillors of the relevant local authorities.

5.1.7 Rehabilitation of Derelict and Ownerless Mines Programme

With the 2005/06 financial year, the following derelict and ownerless mines were identified for rehabilitation:

- Asbestos: Bestwell, Asbes mine, Bute, Heuningvlei, Corheim, Hartland, Jebolo.
- Clay-coal informal mine: Osizweni phase 1 – making the mining area safe.

6. STRATEGIC OBJECTIVES AND OUTCOMES OF CORE ENVIRONMENTAL FUNCTIONAL AREAS

This section describes the functions of the functional areas described in Section 2 as well as their strategic objectives and outcomes for the period 2005/6 to 2009/10.

6.1 Core Environmental Functions

The functions of the directorates within the Department of Minerals and Energy which are directly relevant to environmental management are described in Table 4. Please note that input is focused other new structures as approved within DME.

6.2 Strategic Objectives and Outcomes

The DME undertakes its work through programmes on mine health and safety; mineral development, hydrocarbons and energy planning and nuclear and electricity. The strategic objectives focus areas and the expected outcomes and impacts in each functional area that is relevant to environmental management are described in Table 5. The objectives and outcomes are well-related to the various conventions, policies and legislation that are described in the earlier sections.

Table 4. Functions of the Department of Minerals and Energy Relating to Environmental Management

Branch	Chief Directorate	Directorate: Functions	Role of Environmental Management
Mineral Policy and Promotion	***Mining and Mineral Policy*** Undertake research, develop mine environmental policies and advise thereon.	*Directorate: Mine Environmental Policy, Research and Development* ▪ Develop, implement and advise on environmental management legislation, policy, and guidelines for the SA mining industry. ▪ Align environmental legislation and policies with national policies. ▪ Co-ordinate and monitor the effective implementation of mine environmental management, legislation, policies and strategies. ▪ Liaise with all stakeholders on relevant matters. ▪ Provide and co-ordinate training to regional personnel on relevant mine environmental matters. ▪ Develop, co-ordinate and implement a National Strategy for the rehabilitation of derelict and ownerless mines and provide advice in this regard. ▪ Develop measures to strengthen the implementation of environmental requirements in terms of the MPRDA. ▪ Conduct research and provide advice on matters	***Environmental Management:*** As Directorate column.

Branch	Chief Directorate	Directorate: Functions	Role of Environmental Management
		pertaining to: (a) Mine rehabilitation; (b) Water ingress and decanting problems; (c) Other past legacies.	
	Mining and Mineral Policy Develop new policies, review existing policies and amend legislation to achieve transformation and to attract new investment	▪ Conduct research to position South Africa's mineral and mining industry ▪ Review mining and mineral policies ▪ Co-ordinate harmonization of legislation ▪ Draft legislation and regulations ▪ Identify strategies and compile guidelines for the implementation of mine and mineral policies.	The same as Directorate column.
Mineral Policy and Promotion [Note: for purpose of reporting on SD, the functions of Mineral Promotion were included].	***Mineral Promotion.*** Promote mineral development and advice on trends in the mining industry in order to attract investment.	▪ *Directorate Mineral Economics:* Research and advice on local and international mineral economic trends.	Advise on local and international development and tendencies in the field of: ▪ Precious metals, minerals and ferrous minerals; ▪ Non-ferrous metals, minerals and energy commodities; ▪ Industrial minerals; ▪ Mineral economics; and ▪ Render a mineral statistical service.
Mineral Policy and Promotion	***Mineral Promotion.*** Promote mineral development and advice on trends in	▪ *Directorate Small-scale mining:* Facilitate and co-ordinate institutional support and develop SSM projects	▪ Facilitate joint venture partnerships and/or mentor arrangements for SSM and mineral

Branch	Chief Directorate	Directorate: Functions	Role of Environmental Management
[Note: for purpose of reporting on SD, the functions of Mineral Promotion were included].	the mining industry in order to attract investment.	within the 9 provinces.	enterprises; ▪ Provide economic and technical advise; ▪ Co-ordinate SSM enterprise development projects; ▪ Identify SSM projects and provide statistical information to DME; ▪ Provide secretarial services to the SSM Board.
Mineral Policy and Promotion [Note: for purpose of reporting on SD, the functions of Mineral Promotion were included].	***Mineral Promotion.*** Promote mineral development and advice on trends in the mining industry in order to attract investment.	▪ *Directorate: Beneficiation Economics:* To identify and align strategic beneficiation opportunities with policy objectives and the regulatory process.	▪ To survey priorities and select particular mineral commodity opportunities for local beneficiation; ▪ To develop policy interventions which address constraints and promote further local processing of mineral commodities.
Mineral Regulation	***Mineral Regulation and Administration (Eastern, Central, Western Regions):*** Transform and regulate the industry	***Regional Directorate(s) Mineral Regulation:*** Transform the industry through the allocation and regulation of rights and maintain an electronic geographic system.	***Industry Transformation and Regulation:*** ▪ Ensure that rights are granted in compliance with the law and that Brad-based Socio-economic Empowerment targets are achieved in the process.

Branch	Chief Directorate	Directorate: Functions	Role of Environmental Management
			▪ Consult with and incorporate requirements of other regulations into the regulatory process. ▪ Maintain a database on rights granted and on socio-economic matters. ▪ Monitor compliance with the conditions of rights granted and take corrective action when required. ▪ Co-ordinate and integrate the services of attached National Mining protection System personnel. ▪ Provide financial administrative services for both external financial management and the verification and collection of royalties. ▪ Facilitate urban renewal and rural development through the economic development of surface land and by co-coordinating integrated development plans with mining activities.
		Regional Directorate(s) Mineral Regulation: Enforce environmental management and address environmental legacy of mining in the region.	***Environnemental Management :*** ▪ Adjudicate environnemental management programmes. ▪ Ensure that environmental cost information is

Branch	Chief Directorate	Directorate: Functions	Role of Environmental Management
			forwarded to the mine economic adjudicators for economic evaluation purposes and maintain a database in this regard. ▪ Ensure effective environmental auditing and performance assessment. Implement effective measures to address the environmental legacy of mining. Co-ordinate and integrate the services of attached specialist personnel for small-scale mining, social plans and energy. Ensure receipt and verification of results and returns and the transmission to appropriate information custodians. Establish social plan cost and forward the information to mine economic adjudicators for economic evaluation purposes.
	Mineral and Petroleum Titles Registration : Manage registration of prospecting & mining rights centrally	Register and administer prospecting, mining and other rights	
Hydrocarbons and Energy	***Hydrocarbons*** Regulate hydrocarbon energy carriers and related activities	***Petroleum and Gas Regulation:*** Administer the Petroleum Products Act	***Petroleum regulation***
		Petroleum and Gas Regulation: Administer the Gas Act	***Gas regulation***

Branch	Chief Directorate	Directorate: Functions	Role of Environmental Management
		Petroleum and Gas Regulation: Administer the Petroleum Pipelines Act	***Pipeline regulation***
	Hydrocarbons Direct policy development for petroleum	***Petroleum Policy:*** Determine fuel standards and promote fuel efficiency	***Fuel Standards, Environment and Fuel Efficiency***
		Petroleum Policy: Develop and implement policies for the petroleum sector	***Petroleum policy development***
	Hydrocarbons Direct optimal policy development for the coal and gas sectors, taking into account the environmental aspects	***Coal and gas:*** Develop and implement policy on coal reserves, discard coal and low smoke fuels	**Coal policy**
		Coal and gas: Develop and implement policy for the gas sector	***Gas policy***
	Energy Planning Manage policy development and effect energy efficiency and environmental compliance	***Environment and energy efficiency:*** Ensure energy efficiency and environmental compliance	***Energy efficiency and environment***
		Environment and energy efficiency Research, develop and implement general policy and legislation relating to cross-cutting energy issues	***Energy policy and research***

Branch	Chief Directorate	Directorate: Functions	Role of Environmental Management
	Energy Planning Manage an administration service, information service and ensure integrated planning	***Energy planning and development*** Manage and energy information system	***Database information and publication***
		Energy planning and development Ensure integrated energy and resource planning taking into account the national economic needs	***Planning and energy economy***
	Energy Planning Develop policy and strategy for the implementation of renewable energy technology	***Renewable energy*** Develop policy and strategy towards the establishment of a regulatory and legislative framework and renewable energy technologies	***Technology development***
		Renewable energy Implement and monitor renewable energy technologies as a catalyst for economic development with a specific reference to rural areas	***Renewable energy implementation***
Electricity and Nuclear	***Electricity*** Research national and international trends/developments that impact on the electricity supply industry	***Electricity policy analysis*** Do research on national and international trends/developments regarding the electricity supply industry	***Policy analysis***
	Electricity Develop, implement and monitor policy and legislation with	***Regulation*** Develop, implement and monitor policy and legislation relating to all aspects of regulation within the	***Regulation***

Branch	Chief Directorate	Directorate: Functions	Role of Environmental Management
	respect to electricity regulation	electricity supply industry	
	Nuclear Administer all matters related to nuclear non-proliferation as required by legislation and international agreements	***Nuclear Non-proliferation*** Ensure compliance with all existing and new national and international nuclear non-proliferation obligations and agreements	
	Nuclear Administer all matters related to nuclear technology	***Nuclear technology*** Administer at national level the management and discarding of radioactive waste and storage of irradiated nuclear fuel	
	Nuclear Administer all matters related to nuclear safety as required by legislation and international agreements	***Nuclear safety*** Develop, implement and monitor nuclear policy and legislation related to all nuclear safety matters including radiological environmental protection and advise thereon	
		Nuclear safety Draft regulations and administer matters related to: (a) safety standards and regulatory practices	

Branch	Chief Directorate	Directorate: Functions	Role of Environmental Management
		(b) co-operative governance (c) fees for nuclear authorization (d) financial securities for nuclear installations or any other Ministerial obligations in the NNR Ac	