The Presidency
Department of Planning, Monitoring and Evaluation

Department of Environmental Affairs

Department of Mineral Resources

Report on the Implementation Evaluation of the Effectiveness of Environmental Governance in the Mining Sector

FULL REPORT

G:ENESIS

DIGBY WELLS ENVIRONMENTAL

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List of abbreviations

AMD	Acid Mine Drainage
BA	Basic Assessment
CER	Centre for Environmental Rights
DAC	Development Assistance Community
DEA	Department of Environmental Affairs
DME	Department of Minerals and Energy
DMR	Department of Mineral Resources
DPME	Department of Planning, Monitoring and Evaluation
DWS	Department of Water and Sanitation
ECO	Environmental Compliance Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act of 2011
EMI	Environmental Management Inspector
EMP	Environmental Management Plan
EMPR	Environmental Management Programme Report
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographic Information System
I&AP	Interested and Affected Parties
IPIC	Interdepartmental project implementation committee
KII	Key Informant Interview
MESU	Mineral Economics and Strategy Unit
MMDA	Mines and Minerals Development Act of 2008
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NEM: AQA	National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMLA	National Environmental Management Laws Amendment Act, 2014 (Act 25 of 2014)
NEPF	National Evaluation Policy Framework
NGO	Non-Governmental Organisation
NWA	National Water Act, 1998 (Act 36 of 1998)
OECD	Organisation for Economic Co-operation and Development
PGM	Platinum Group Metal
PPP	Public Participation Process
RoD	Record of Decision
SADC	Southern African Development Community
SAMRAD	South African Mineral Resources Administration System
SEMA	Specific Environmental Management Act
ToR	Terms of Reference
WUL	Water Use Licence

Executive Summary

1. Introduction

The Department of Planning, Monitoring and Evaluation (DPME), as part of its mandate under the National Evaluation Policy Framework (NEPF) and in partnership with the Department of Environmental Affairs (DEA), commissioned Genesis Analytics and Digby Wells Environmental to conduct an implementation evaluation of environmental governance in the mining sector. The purpose of this evaluation is to assess the relevance and effectiveness of the environmental governance legislation in mining and the implementation thereof in achieving its objective. The evaluation covers the period from the promulgation of the Minerals Act, 1991 (Act 50 of 1991) (the Minerals Act) up to the legislation in place as of March 2014. Given that amendments to the legislation were implemented on 8 December 2014, a post-script has been appended to the evaluation that details the context of these amendments and how they relate to the analysis and recommendations raised as part of this evaluation.

2. Context of the evaluation

Mining and environmental considerations

South Africa's mining industry historically formed the basis for the country's economic growth and today continues to play an important role in ensuring the country's position in the global market. South Africa is also one of the most biologically diverse countries in the world and its unique vegetation, ecosystems and species are some of its best assets. However, South Africa is faced with scarce water resources, loss of natural habitat, the introduction of alien species and climate change. Given the above, mitigating the environmental impact of the mining industry, both as a whole and the environmental performance of individual mines, is critical. This is especially relevant given the substantial costs involved in mining-related environmental rehabilitation and the potential for these costs to accrue to the State if rehabilitation is not done adequately and timeously.

Environmental governance in mining

Historically, the environmental aspects of mining were not well regulated. It was only with the Mines and Works Act, 1956 (Act No. 27 of 1956) that specific measures for the protection of the surface of land were enacted. In 1991, the Minerals Act was passed and a more determined approach to environmental regulation was enforced. In particular, an applicant for a mining authorisation was required to prepare an Environmental Management Programme Report (EMPR) in accordance with an agreed format, requiring mines to demonstrate a plan for environmental remediation and to establish financial provision for rehabilitation activities. These principles have remained in place in the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA).

In addition to the MPRDA, the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) also governs the mining sector in terms of matters related to environmental management. NEMA is the legislative environmental 'framework' in South Africa, defining the environmental management approach that should be integrated across all sectors. It contains a statement of environmental principles which incorporates many key principles of international environmental law and also establishes a regulatory framework for the conducting of environmental impact assessments. As custodian of the country's mineral and petroleum resources, the Minister of the Department of Mineral Resources (DMR) must ensure sustainable development of these resources within the framework of national environmental policy, including NEMA.

The DMR and DEA's intertwined mandates resulted in on-going tension as to who should be the regulator of the mining industry from an environmental perspective. In 2008 it was agreed that while the DMR would continue to regulate the industry for the granting of rights and health and safety matters, the granting of environmental approvals would rest with the DEA. The new system was intended to be phased in over a transitional period - two amending Acts

were passed in this regard, the Mineral and Petroleum Resources Amendment Act, 2008 (Act No. 49 of 2008) (the MPRDA Amendment) and the National Environmental Management Amendment Act, 2008 (Act No. 62 of 2008) (NEMA Amendment). The latter Act was further amended by the National Environmental Management Laws Amendment Act, 2014 (Act No. 25 of 2014) (NEMLA). The end result of these laws is that the DMR will regulate the mining industry and grant environmental authorisations, but for environmental purposes, the principles and Regulations of NEMA shall be applied. This compromise leaves a temporary uncertainty that will be resolved only over time and the formulation of new procedures.

3. Methodology

The Development Assistance Community (DAC)[1] evaluation criteria were selected as the guiding framework for the evaluation. This approach provides an in-depth assessment of the programme's relevance, effectiveness, efficiency and impact[2].

A combination of research methods was used to conduct the evaluation:

- **A literature review:** to understand the context of South Africa's environmental governance framework in mining, the rationale for the framework, documented implementation experience and comparative experience of other countries.

- **Key informant interviews (KIIs):** with officials from the DEA, Department of Water and Sanitation (DWS) and DMR responsible for the environmental governance framework's legislation, management and administration; non-governmental organisations (NGOs); research institutions; legal firms and advisers practicing in the field of environmental law; mining company representatives; industry bodies; and local municipalities.

- **Four case studies**: to demonstrate the effectiveness of the environmental governance framework:
    - **Gauteng**: gold mining in the Witwatersrand and West and East Rand; and the subsequent effects of Acid Mine Drainage (AMD) on the environment;
    - **Northern Cape**: the effects of asbestos (crocidolite) mining and processing in Prieska;
    - **Mpumalanga**: the environmental challenges associated with coal mining; and
    - **North West**: platinum mining and the effect of high levels of sulphur dioxide and carbon dioxide emissions on the environment.

The evaluation faced a number of limitations including a lack of response to interview requests from some of the identified stakeholders, and the inadequate provision of quantitative data. Further to this, subsequent to the start of this evaluation, two sets legislation were published for public comment[3]. These amendments do not form part of the context in which this evaluation was commissioned, however they do have implications for the evaluation findings. As such, a post-script has been appended to the evaluation that details the context of these amendments and how they relate to the analysis and recommendations raised as part of this evaluation.

[1] The Organisation for Economic Co-operation and Development (OECD) DAC criteria provides a useful framework for evaluating developmental assistance. This framework is globally recognised and is used by the majority of development assistance organisations, thus enabling comparison between programmes. More information is available at http://www.oecd.org/dac/evaluationofdevelopmentprogrammes/daccriteriaforevaluatingdevelopmentassistance.htm.

[2] Given that legislation is designed to be sustainable, testing the sustainability of the legislative framework in implementation is circular. As such, the sustainability of the environmental governance framework itself did not form part of the evaluation, but rather the extent to which the framework enables its purpose of the protection of environmental sustainability is measured through the relevance and effectiveness criteria.

[3] The first set of draft regulations relates to EIAs under Sections 24(5) and 44 of NEMA. The second set pertains to the financial provision and closure for mines under the same Act

4. Analysis

The analysis of the findings of the evaluation are summarised by evaluation question according to the Terms of Reference:

4.1. Is the current guideline used to determine the cost of rehabilitation of mining operations adequate and effective to ensure adequate rehabilitation and to protect the State from mining-related long term liability?

Based on a comprehensive review of the guideline, stakeholder interviews and experience working with the guideline, it is considered to be insufficient for calculating the costs of rehabilitation. The guideline is thought to be outdated, too generic, and do not include underground or surface water liabilities, which usually account for a large percentage of mines' total liability. Most mines complete their own calculations based on different parameters and set aside additional funds to ensure that they have sufficient resources for rehabilitation and closure.
The inadequacy of the guideline has the following consequences:

- Typically, larger, reputational-driven mines set aside funds in addition to that which is stipulated by the guideline so as to ensure adequate rehabilitation. While this is not the case of all large mines, many of the larger mines have multiple lines of reporting and authority and thus are more prone to self-comply than the smaller companies.
- Smaller, more compliance-driven mines set aside what is stipulated by the guideline and thus do not have sufficient funds for rehabilitation, which could result in the State having to fund the necessary rehabilitation measures. However, given that these are the smaller mines, their proportion of risk to the State is smaller.

Although on the face of it, the inadequacies of the guideline for the calculation of financial provision may present some risk to the State, this is mitigated by the provisions of the MPRDA and the Regulations. Section 43(7) of the Act provides that "the holder of a prospecting right or mining right [or the holder of a historic right], must plan for, manage and implement such procedures and such requirements on mine closure as may be prescribed."

The DEA draft financial provision Regulations that were made public in the fourth quarter of 2014 do refer to an updated guideline for calculating the cost of financial provision for the rehabilitation and closure of mines. Since these Regulations have not yet been brought into force, the effectiveness of the implementation of this guideline cannot be assessed as part of this evaluation.

4.2. Are there means or mechanisms for determining the most sustainable use of land, if so are they effective? If not, what mechanism can be proposed?

Regulation 41(1)(d) of the MPRDA requires that a scoping report be drafted that identifies the alternative land uses for a proposed operation, in this case a proposed mining operation. It is important to note that this does not call for the identification of the most *sustainable* land use but rather just the identification of *alternative* land uses. As such, the identified land use alternatives may not necessarily be the most sustainable. This is particularly the case as the application is made in terms of the MPRDA, which does not take into account agriculture or tourism and is primarily focused on the socio-economic aspects of 'alternative land use'.

Moreover, the term "sustainability", has not been defined in the Regulations of the MPRDA and is thus open to interpretation. The following definition from the Constitution (the Constitution of the Republic of South Africa, 1996) in Article 24 of the Bill of Rights will be applied. This articulates the right to:

> *An environment that is not harmful to people's health or well-being that is protected for the benefit of present and future generations, that prevents pollution and ecological*

degradation; promotes conservation; and secures ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.

Every prospecting or mining applicant must provide an Environmental Management Plan or Programme (EMP) detailing the assessment of potential impacts of the proposed operation on the socio-economic environment. Beyond stating that an assessment of potential impacts on the socio-economic environment must be undertaken, there are no prescribed mechanisms to do so. Mining yields substantial economic yields in the short- to medium-term, making mining the most economically viable option in most cases. However, this does not take into account the long-term costs associated with a loss of economic activity such as agriculture or conservation.
Furthermore, the process of considering alternatives, as required by the Regulations, does not, as a strict rule, take into account alternative mining methods, such as the use of different technologies, or alternative land uses beyond mining versus not mining.

In short, the legislation that was the subject of this evaluation does not prescribe the means and mechanisms to determine the most sustainable use of land nor does it define with accuracy the concept of sustainable use of land. The evaluation of alternative land use options using only a socio-economic assessment will not necessarily provide the best assessment. This has not been addressed by the amended legislation that is detailed in the post-script to this evaluation.

4.3. Are the current institutional mechanisms for environmental performance appropriate and effective in achieving and promoting good governance in the mining sector? If not, what changes can be made?

The institutional mechanisms used for environmental performance are the promulgated statutes and regulations relating to environmental management. The framework described in the regulations is appropriate for promoting good governance in the mining sector in theory; however, it is poorly enforced in practice.

The following issues have been identified within the regulatory framework as of March 2014:

- Closure certificates are seldom issued – in 2013/2014 575 closure certificates were under review, of which only 159 were issued. This is primarily the result of the reluctance of the DMR to issue these certificates, the reluctance of mining companies to apply for closure, and the requirement that all affected departments must comment on the application before the certificate is issued. Firstly, the reluctance of the DMR to issue closure certificates is due to the transfer of the environmental liability from the mining company to the State. If the DMR issues a closure certificate, it has no legislative power, nor financial means to remedy any issues that may arise on the site post-closure; similarly, the DMR has no authority to force the company to remedy said issue. Secondly, mining companies are reluctant to apply for closure certificates because once these are issued, the company cannot re-mine the site in later years. Thirdly, before a closure certificate can be issued, all affected departments must comment on it which is often the cause of the delays in issuing the certificates.
- The current guideline used to calculate financial provision is insufficient - only 60.4% of operational mines in 2012/13 were operating with adequate financial provision. As a result of this, the State is likely to be left with legacy issues. Yet this guideline continues to be used nationally by mining companies to calculate the rehabilitation funds set aside for any impacts which may emanate post closure. This is anticipated to result in further funding shortfalls in the future. The DEA is currently undertaking a process to update the guideline, however, this has not yet been implemented and thus this evaluation cannot comment on the effectiveness of these revisions.
- Beyond these specific issues, there are gaps in the environmental framework as a result of the constant iterations and amendments. This has proven to be amongst the

most significant challenges as far as legislation is concerned. One such example is in the deletion of Sections 38 to 42 of the MPRDA of 2002 (that is, the Sections that previously dealt with environmental governance under the MPRDA). These sections were deleted with the intent to replace them under NEMA. However, with the frequent changes in the environmental legislation, these sections were eventually omitted and were not covered elsewhere, thus leaving a major gap in the environmental legislation. The new legislation detailed in the post-script to this evaluation significantly contributes to reducing these legislative gaps. The lack of definitions provided in the legislation also creates many uncertainties in terms of the standard the legislated requirements are supposed to meet. This has not been addressed by the amended legislation as detailed in the post-script to this evaluation.

There are a number of challenges related to the implementation of the legislation:

- Poor quality EMPs are often approved by the competent authority as the authority lacks the capacity and technical expertise to assess the EMP appropriately. The consequence of this is that mines are not measured against an accurate base and thus are not likely to ensure environmental sustainability.
- Limited capacity and technical expertise within the authority's offices is another significant challenge with regards to implementation[4]. The competent authority needs to have an understanding of environmental impact assessment procedures, the impacts imposed on the environment, an understanding of post-mining land use and an understanding of the overall mining industry. The existing lack of some of these requirements by the current competent authority means that mining companies' environmental practices are not always enforced to the degree that they should be. While there are capacity building initiatives underway to remedy these shortcomings, these are relatively new and as such the benefits thereof are still to be realised.
- High staff turnover in government departments is also proving to be a challenge as it results in limited institutional memory[5]. This adds to the inefficiencies of the process as new staff have to ramp up each time someone leaves.
- The lack of communication and cooperation between the various government departments also results in an overlap of mandates, policies and procedures thus creating delays and duplication within the application process. With the new addendum to the regulations, effective on 8 December 2014, it is anticipated that the delays in the application process will be reduced as the authority will be mandated to adhere to the application timelines. Furthermore, the fragmentation between different spheres of government results in inconsistency between the various competent authorities, thus creating confusion for applicants. This duplication and uncertainty has adverse implications for mining companies' use of resources and their investment decisions. While it is anticipated that the Interdepartmental Project Implementation Committee (IPIC) will reduce the extent of this confusion and duplication, the full effect of this committee is yet to be determined.

4.4. What is the effect of the promulgation of the Minerals Act, 1991 (Act No. 50 of 1991) and the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) on the environmental performance of mining? Is there a measureable improvement on the environmental performance of mining as a result of these two pieces of legislation?

Since the promulgation of the new legislation, many changes have been noted in terms of the requirements stated in the Acts. With these measures, environmental governance of the mining industry has been significantly enhanced. As a result of the current governance framework, mining companies, as per the requirements of the legislation, are held liable for

[4]It is reported that requests for funding have been made to National Treasury to increase capacity to implement the "One Environmental System".

[5] The internal reasons for this high turnover were not made available to the evaluation team given the potentially sensitive nature of the information.

the environment and any impacts caused as a result of their prospecting and mining activities. The MPRDA substantiated the requirements detailed in the Minerals Act and provides a stronger framework by virtue of the Regulations relating to the compilation of EMPs and the calculation of financial provision. This in and of itself is a significant improvement to the governance framework pre-1991.

In as much as the regulated changes in legislation have been noted, implementation remains a concern. This includes a limited number of closure certificates being issued, poor quality EMPs being submitted and approved, inadequate compliance monitoring and a lack of capacity in the competent authority. Without adequate enforcement, management and oversight the legislation loses its effectiveness, despite covering all the necessary components for ensuring environmental sustainability.

4.5. To what extent are mining-related environmental liabilities covered by the state? Could these costs have been significantly reduced through efficient and effective environmental governance in the mining sector?

Most of the historical mines that were established and operated prior to the current environmental governance framework are no longer operational and cannot be held liable for environmental rehabilitation costs. These costs have therefore become the responsibility of the State. Since 2005, the State has significantly increased its efforts and expenditure in rehabilitating derelict and ownerless - between 2005 and 2008 the State rehabilitated 5 derelict and ownerless mines at a cost of R42 million whereas in 2012/2013 the DMR rehabilitated 13 derelict and ownerless mines at a cost of approximately R69.9 million. Going forward, the DMR plans to spend R327.6 million in the medium term to rehabilitate 120 over the medium term. These costs to the State could have been reduced if the legislation at the time required mines to make financial provision for rehabilitation and closure.

Under the legislation that was examined as part of this evaluation a mine is liable until a closure certificate is issued by the DMR after which the State becomes liable. A closure certificate is issued when the DMR, and all other affected departments, are satisfied that all reasonable actions have been taken to mitigate the foreseeable environmental impacts of mining. Currently not many closure certificates are being issued for the reasons outlined above. This is exacerbated by the short-fall in mines' financial provisioning due in part to the inadequate costing guideline. Not issuing closure certificates has the adverse effect of dis-incentivising mines to rehabilitate and close.

As such, the State is liable for historical mines; however, it has limited liabilities for new mines given that it has issued so few closure certificates.

4.6. Is the anchoring of the implementation and enforcement of mining-related environmental governance within the DMR appropriate? If not, what would be the appropriate department?

Under the current legislation (including the National Environmental Management Laws Amendment Act, 2014, which was not in force as at the date this evaluation commenced) the DMR is recognised as the responsible authority for the implementation and enforcement of mining-related environmental governance. This evaluation accepts this as the agreed-upon allocation of this responsibility, and another change to the regime would be too disruptive to the mining industry, but has identified a number of criteria that are required for an effective competent authority:

- A stable staff complement is required with a balance of technical skills and mining knowledge including all specialist fields;
- Experienced environmental scientists and technical experts with specific mining experience are required;
- Sufficient qualified staff to enforce the legislation and monitor compliance;

- Staff need to have experience and exposure in the area they are working in;
- Capacity and institutional knowledge needs to be developed;
- The necessary office space, computers, systems and equipment for staff to work efficiently;
- Efficient, credible and accountable systems that facilitate the effective implementation of the legislation;
- Internal conflict resolution mechanisms;
- An unbiased implementation of the legislation;
- The correct understanding and interpretation of the legislation;
- The authority and commitment to take criminal action for non-compliance;
- The ability to get input from other departments and work together with other departments to reach consensus on decisions;
- The ability to make informed decisions based on the application and supporting documentation, and to request additional information if required before making a decision; and
- The ability to provide mines with advice / guidance / training on how to improve their processes so as to go beyond compliance and apply best practice guidelines.

Currently, these criteria are not all met by any of the relevant government departments (DEA, DMR or DWS). This is primarily as a result of internal issues within each department, of which the evaluation team does not have in-depth insight given the internal nature of the information.

5. Conclusions

The findings and analysis of the evaluation have illustrated that in theory the environmental governance framework is appropriate for promoting good environmental governance in the mining sector. However, in practice, the inadequate implementation and enforcement of the framework seriously compromises its efficacy and ability to ensure environmental sustainability.

With the promulgation of the Minerals Act in 1991, environmental governance in the mining sector improved significantly. With the promulgation of this legislation, mining companies were held liable for the environment and any impacts caused as a result of their prospecting and mining activities. This was further strengthened with the promulgation of the MPRDA, NEMA and their Regulations by virtue of the EMP requirements and the calculations of financial provision. The legislation therefore provides a strong basis for environmental governance in the mining sector, however, the implementation thereof reduces its efficacy.
The short-comings to both the legislation and the implementation thereof are listed below.

Regulatory framework shortcomings:

- Closure certificates are seldom issued;
- Financial provision guideline is insufficient;
- The constant iterations and amendments to the framework have resulted in gaps and deletions, missing definitions and confusion in the industry; and
- The means by which to calculate the most sustainable use of land are poorly defined and implemented.

Implementation of the legislation

- The competent authority (DMR) lacks the capacity, technical and legal expertise to implement the framework appropriately;
- There is limited retention of institutional knowledge in the competent authority; and
- Implementing the framework requires input and consultation from numerous departments. Currently this process is fragmented and the lack of communication results in delays and duplication within the application process. While this is expected

to be reduced with the addendum to the Regulations, effective on 8 December 2014, this is yet to be determined.

There are a number of processes in place and changes underway to overcome these challenges, including the establishment of an IPIC and addendums to the existing legislation. Until this legislation is promulgated in effect, and the activities of the IPIC have been implemented in fruition, the effect of these changes is indeterminate. However indicatively they illustrate that there is impetus in the industry to improve the environmental governance framework and the implementation thereof.

6. Recommendations

Based on the findings of the evaluation, the following recommendations have been provided to improve the effectiveness and implementation of the governance framework:

1. **The guideline for calculating the cost of financial provision for the rehabilitation and closure of mines should be updated**. The guideline should include provision for water management and treatment so as to limit the State's liability for this aspect. Furthermore, the guideline should take into account the different types and sizes of mines. *The DEA draft financial provision regulations that were made public in the fourth quarter of 2014 do refer to an updated guideline for calculating the cost of financial provision for the rehabilitation and closure of mines. Since these Regulations have not yet been brought into force, the effectiveness of the implementation of this guideline cannot be assessed as part of this evaluation.*

2. When the new guideline is published, training should be provided to mines and consultants on its implementation.

3. **Where possible, concurrent rehabilitation should be encouraged or enforced.** This will limit the mining-related liabilities for the State should the mine close unexpectedly. To do this, the DMR could consider allowing mines to reduce their financial provisions as and when their liabilities reduce due to concurrent rehabilitation. Monitoring of these adjustments will need to be carefully considered. *Concurrent rehabilitation is included in the draft financial provision regulations that were released for public comment in the fourth quarter of 2014. At the time of writing, the period for public comment had expired.*

4. In terms of the determination of sustainable land use, **the term 'sustainability' should be clearly defined, there should be a clear demarcation of responsibility between the mine and the authorities for conducting sustainability assessments and the method for undertaking these assessments should be defined.** *This has not been addressed in the amended legislation detailed in the post-script to this evaluation.*

5. **Mining companies should be responsible for all foreseeable environmental impacts as approved in their EMP, as well as any unforeseen environmental impacts at the time of operation. The State should then be liable for all other unforeseen environmental impacts.** As post- closure liabilities will therefore lie with the State, stricter enforcement needs to be placed on the issuing of closure certificates. To account for unforeseen latent effects, the State should set up a national fund that will cover any liabilities that may occur after closure. *The proposed MPRDA Amendment Act, which has been approved by Parliament but not signed into law, will make companies liable for all environmental impacts in perpetuity. Concerns have been raised about the Constitutionality of this proposal.*

6. **As the DMR is the competent authority henceforth, and another change to the regime will be too disruptive to the mining industry, it should develop the capacity, skills, technical expertise and systems necessary to meet the criteria required for an**

effective competent authority. In particular, it should employ more compliance officers with the necessary skills to monitor and enforce compliance with the framework.

7. **Communication channels within and between the different departments should be reviewed and improved** so as to avoid delays and unnecessary duplications. *The amended legislation as detailed in the post-script to this evaluation, which allows for the three acts related to environmental governance in mining to be read together, is an important step towards harmonisation of the framework. However, the effectiveness of its implementation cannot yet be assessed.*

8. **The legislation, in particular NEMA, should provide definitions across environmental regulations to avoid any confusion regarding the regulatory requirements and standards**. This includes clearly defining the term 'sustainability'. This has not been addressed by the amended legislation detailed in the post-script to this evaluation.

9. **The current online application system, the South African Mineral Resources Administration System (SAMRAD), which processes mining licence applications, should continue to be strengthened such that it is available 24 hours a day, is more user-friendly and links to the DEA's existing systems.** Improving the systems used by the departments will contribute to improved capacity within the departments and reduced fragmentation across the departments.

10. The difficulty faced by the evaluation team in extracting quantitative data relevant to the evaluation further highlights the importance of the DMR moving to an automated internal reporting system that allows for current and historical data to be stored in a central database.

Some of these recommendations are already being considered by the IPIC and the various task teams established as part of this initiative. However, as these initiatives are relatively new and their full effect is still to be determined, the challenges to the effectiveness of the environmental governance framework and the consequent recommendations presented above remain relevant to the findings of this evaluation.

1. Introduction

1.1. Background to the evaluation

The National Evaluation Policy Framework (NEPF), approved in November 2011, sets out the context for a National Evaluation System for South Africa. The NEPF encompasses various government interventions, including policies, plans, programmes and projects. The Department of Planning, Monitoring and Evaluation (DPME) at the Presidency is mandated to conduct evaluations under the NEPF.

An implementation evaluation of the effectiveness of environmental governance in the mining sector was one of the evaluations scheduled for 2014/2015. The government department responsible for regulating the mining industry is the Department of Mineral Resources (DMR). However, other departments, such as the Department of Environmental Affairs (DEA) and the Department of Water Affairs, now the Department of Water and Sanitation, (DWS) must be consulted with respect to environmental concerns in the mining sector.

The DPME, in partnership with the DEA, issued a Terms of Reference (ToR) in March 2014 for a service provider to conduct an implementation evaluation of environmental governance in mining. The central objective of the evaluation is to determine whether the objective of the environmental governance regime for the mining sector is being met through the implementation of the current legislation. The evaluation covers the period from the promulgation of the Minerals Act, 1991 (Act No. 50 of 1991) (the Minerals Act) up to the legislation in place as of March 2014. Given that amendments to the legislation were implemented on 8 December 2014, a post-script has been appended to the evaluation that details the context of these amendments and how they relate to the analysis and recommendations raised as part of this evaluation.

The DPME contracted Genesis Analytics (Genesis) in collaboration with Digby Wells Environmental (Digby Wells) to conduct this evaluation. Throughout the evaluation a number of deliverables have been submitted and approved, including an inception report, literature review, fieldwork report and case study reports.

1.2. Purpose of the evaluation

The objective of the environmental governance framework for South Africa's mining sector is to ensure that the environmental impacts of mining activities are effectively mitigated or managed to a level that is acceptable to the country in accordance with the Constitution of South Africa, 1996 (Act No. 108 of 1996) (the Constitution) and international standards. The purpose of this evaluation is to assess the relevance and effectiveness of the legislation and the implementation thereof in achieving this objective.

In carrying out the evaluation, the evaluation team was guided by a number of overarching questions, namely:

- What is the effect of the promulgation of the Minerals Act and the Mineral and Petroleum Resources Development Act, 2002 (MPRDA) (Act No. 28 of 2002) on the environmental performance of mining? Is there a measurable improvement on the environmental performance of mining as a result of these two pieces of legislation?
- Is the current guideline used to determine the cost of rehabilitation of mining operations adequate and effective to ensure adequate rehabilitation and to protect the State from mining-related long term liability?
- Are there means or mechanisms for determining the most sustainable use of land, if so are they effective? If not, what mechanism can be proposed?
- Are the current institutional mechanisms for environmental performance appropriate and effective in achieving and promoting good governance in the mining sector? If not, what changes can be made?
- To what extent are mining-related environmental liabilities covered by the State?

Could these costs have been significantly reduced through efficient and effective environment governance in the mining sector?

- Is the anchoring of implementation and enforcement of mining-related environmental governance within the DMR appropriate? If not, what would be the appropriate department?

The Development Assistance Community (DAC)[6] evaluation criteria were selected as the guiding framework for the evaluation. This approach provides an in-depth assessment of the programme's relevance, effectiveness, efficiency, impact and sustainability. Table 1 below describes four of the five criteria.

Table 1: DAC evaluation criteria

Criteria	Definition
Relevance	The extent to which the policies and regulation are suited to the priorities and objectives of the various stakeholders.
Effectiveness	Measures the extent to which an intervention attains its objectives and targets.
Efficiency	Measures the outputs in relation to the inputs associated with an intervention. It determines the extent to which the intervention uses the least costly resources possible to achieve the desired results.
Impact[7]	The positive and negative results produced by a development intervention, directly or indirectly, intended or unintended.

Given that legislation is designed to be sustainable, testing the sustainability of the legislative framework in implementation is circular. As such, the sustainability of the environmental governance framework itself did not form part of the evaluation, but rather the extent to which the framework enables its purpose of the protection of environmental sustainability is measured through the *relevance* and *effectiveness* criteria.

Additionality is often included as a sixth criterion to measure the extent to which an intervention catalyses investment that would not have happened in its absence. This criterion has been excluded from this evaluation as it is an evaluation of a policy/regulatory framework, as opposed to a programme/intervention.

2. Context of the Evaluation

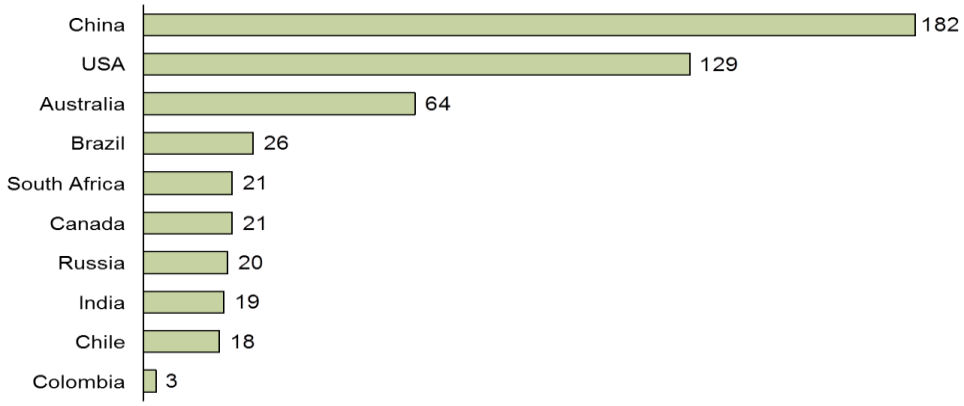
2.1. Mining in South Africa

South Africa's mining industry historically formed the basis for the country's economic growth; and today continues to play an important role in ensuring the country's position in the global market. Mining currently contributes 16.7% of South Africa's Gross Domestic Product (GDP) and contributes to 14% of formal non-agricultural employment in the country.[8] The industry has not only directly contributed to economic growth, job creation, export earnings and foreign direct investment, but has also had secondary effects in terms of determining the size and location of many of the country's urban centres, such as Johannesburg, Rustenburg, Witbank, Vereeniging and Welkom.

[6] The Organisation for Economic Co-operation and Development (OECD) DAC criteria provides a useful framework for evaluating developmental assistance. This framework is globally recognised and is used by the majority of development assistance organisations, thus enabling comparison between programmes. More information is available at http://www.oecd.org/dac/evaluationofdevelopmentprogrammes/daccriteriaforevaluatingdevelopmentassistance.htm.
[7] While this is not an impact evaluation, early indications of possible longer term outcomes will be assessed where possible.
[8] Chamber of Mines, 2013

As illustrated in Figure 1, South Africa's mining sector was estimated to be the fifth-largest globally in 2011 in terms of GDP.

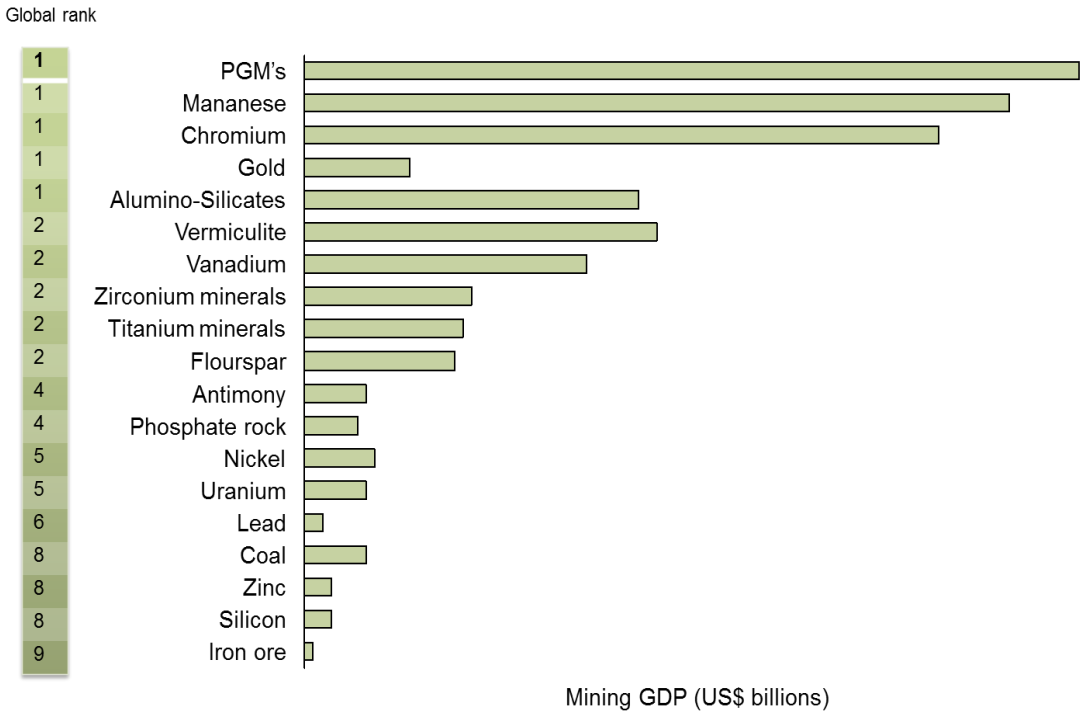
Figure 1: The global top ten mining countries as measured by mining GDP (US$ billions)



Source: Roger Baxter, Chamber of Mines of South Africa, 2011

South Africa has the world's largest resources of platinum group metals (PGMs) (87.7% of world total), manganese (80%) and chromium (72.4%), and has substantial resources of gold (29.7%) and alumino-silicates (34.4%)[9] (see Figure 2). In terms of production, South Africa accounts for over 40% of global production of ferrochromium, platinum group metals and vanadium. South Africa is also the world's leading producer of chrome ore, vermiculite and alumino-silicates, and is among the top three producers of manganese ore, titanium minerals and fluorspar.

Figure 2: South African reserves for key minerals, 2008



Source: Roger Baxter, Chamber of Mines of South Africa, 2011 adapted from USGS/COM/DMR

[9] Roger Baxter, Chamber of Mines of South Africa, 2011

2.1.1. Environmental considerations

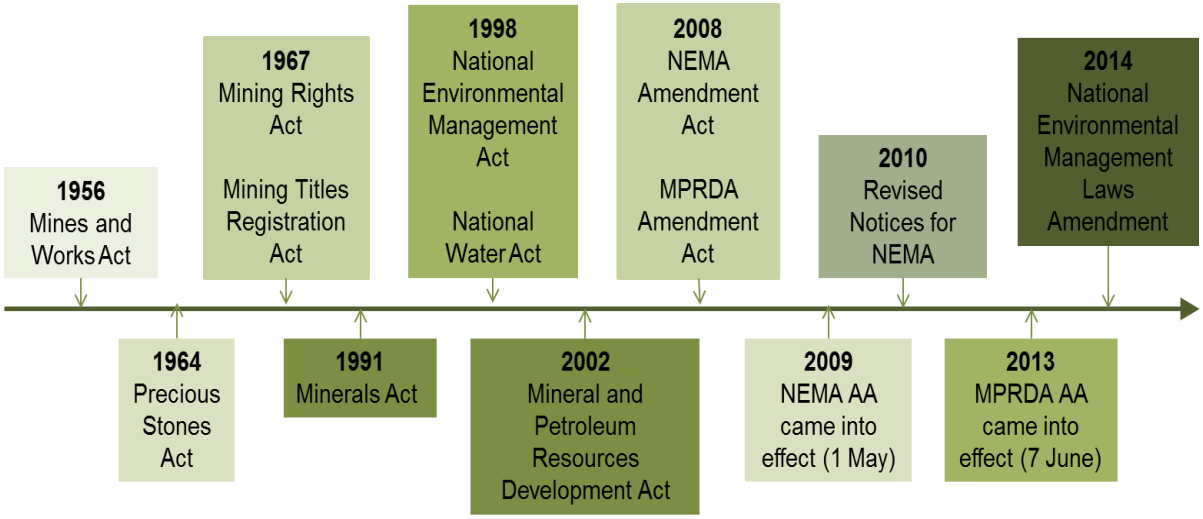
South Africa is one of the most biologically diverse countries in the world and its unique vegetation, ecosystems and species are some of its best assets. However, South Africa is faced with scarce water resources, loss of natural habitat, the introduction of alien species and climate change – all of which need to be mitigated and managed to preserve the country's rich natural endowment.

Given the above, mitigating the environmental impact of the mining industry, both as a whole and the environmental performance of individual mines, is critical. This is especially relevant given the substantial costs involved in mining-related environmental rehabilitation and the potential for these costs to accrue to the State if rehabilitation is not done adequately and timeously.

2.1.2. Environmental governance in mining

Figure 3 below illustrates the timeline of the evolution of environmental legislation in the mining sector in South Africa. Historically, the environmental aspects of mining were not well regulated. It was only with the Mines and Works Act, 1956 (Act No. 27 of 1956) that specific measures for the protection of the surface of land were enacted. This was administered by the Department of Mines (as it was then known), which from then on became the government department primarily responsible for regulating the environmental aspects of the mining industry.

Figure 3: Timeline of the evolution of environmental governance in the South African mining sector



In 1991, the Minerals Act was passed and a more determined approach to environmental regulation was enforced. In particular, an applicant for mining authorisation was required to prepare an Environmental Management Programme Report (EMPR) in accordance with an agreed format, requiring mines to demonstrate a plan for environmental remediation and to establish financial provisions for rehabilitation activities. The Minerals Act compelled all operations to obtain a prospecting or mining authorisation before operations could commence. Prior to this, base mineral operations required no licence or permit. Compliance with the Minerals Act was monitored by what was known then as the Department of Minerals and Energy (DME). These principles have remained in place in the MPRDA, which compels mining companies to:

- Implement the principles of sustainable development as set out in Section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as well as other generally accepted principles of sustainable development by integrating social, economic and environmental factors into planning, implementation, closure and post-closure management of prospecting and mining operations.
- Implement integrated environmental management as laid out in Chapter 5 of NEMA.

- Conduct an environmental impact assessment and submit an environmental management programme to identify, mitigate and manage the environmental impacts emanating from prospecting or mining activities.
- Consult with interested and affected parties, government departments and organs of State at national, provincial and local authority level.
- Make sufficient financial provision for rehabilitation, remediation of environmental damage and management of negative environmental impacts. The MPRDA Regulations prescribe the methods for financial provision – a bank guarantee, trust fund, or cash payment - and the detailed itemisation of all costs.
- Plan for mine closure to ensure environment, social and economic sustainability beyond the life of the mine.
- Conduct an environmental risk assessment and adopt a closure plan that continues throughout the life cycle of the mine, starting with conceptual closure plans prior to production, periodic updates throughout the life of the mine, and a final decommissioning plan.

As Figure 3 illustrates, over and above the MPRDA, NEMA also governs the mining sector. NEMA is the legislative environmental 'framework' in South Africa, defining the environmental management approach that should be integrated across all sectors. It contains a statement of environmental principles which incorporate many key principles of international environmental law such as the polluter pays principle, the precautionary approach, the principle of sustainable use and the principle of public participation, amongst others. NEMA also establishes a regulatory framework for the conducting of environmental impact assessments.

The acceptance of the Integrated Environmental Management (IEM) principles embodied in NEMA brings the mining legislation closer to the ambit of other environmental planning legislation used to control activities that could potentially have a negative impact on the environment. Specific obligations are placed on the DMR to ensure harmonisation of environmental policies, plans and programmes. As custodian of the country's mineral and petroleum resources, the Minister of the DMR must ensure sustainable development of these resources within the framework of national environmental policy, including NEMA. Regulations as contemplated in Section 24 and Section 24J of NEMA set out the requirements for public participation, with regard to the following:

- The Public Participation Process (PPP);
- Registration of Interested and Affected Parties (I&APs);
- Entitlement of registered I&APs to comment on submissions; and
- Recording of comments of I&APs in reports submitted to competent authorities.

In addition to these Acts, mining companies are also required to comply with ancillary legislation such as the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA) and the National Water Act, 1998 (Act No. 36 of 1998) (NWA). The NEM: AQA, which came into effect in September 2005, provides for national norms and standards regulating air quality monitoring, management and control, and for specific air quality measures. The NWA serves to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner. In particular, the NWA requires that all water uses on mines be licensed.

2.2. Implementation of the environmental framework

One Environmental System

The DMR and DEA's intertwined mandates resulted in on-going tension as to who should be the regulator of the mining industry from an environmental perspective. Consensus was reached in 2008 whereby the Ministers of the two departments agreed that while the DMR would continue to regulate the industry for the granting of rights and health and safety

matters, the granting of environmental approvals would rest with the DEA. The new system was intended to be phased in over a transitional period. To this end, two amending Acts were passed, the MPRDA and NEMA. The latter Act was further amended by the NEMLA. The end result of these laws is that the DMR will regulate the mining industry and grant environmental authorisations, but for environmental purposes, the principles and Regulations of NEMA shall be applied. This compromise leaves a temporary uncertainty that will be resolved only over time and the formulation of new procedures.

Implementation of Environmental Governance in MPRDA and NEMA

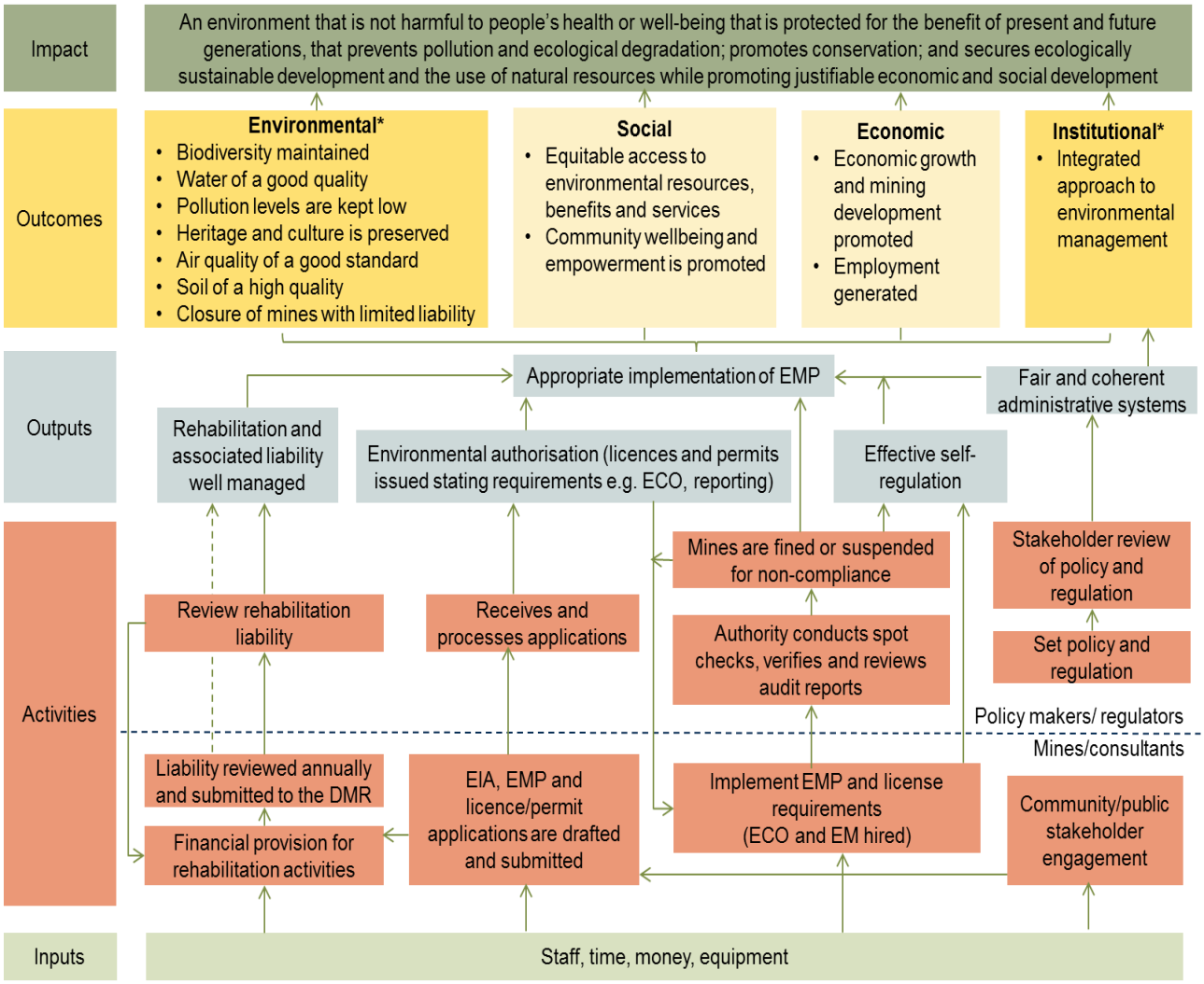
In terms of implementation under MPRDA, mining rights holders are required to submit performance assessments to the Minister of Mineral Resources either as required by the Environmental Management Plan (EMP) or the EMPR or every two years. Where a rights holder contravenes its EMP or EMPR, the Minister may cancel or suspend a prospecting or mining right in terms of Section 47 of the MPRDA. This would require a fairly severe contravention of the EMP or EMPR and would likely follow the Minister having given the holder an opportunity to respond to, and address the contravention. Additionally, Section 47 gives the Minister the discretion to suspend and cancel rights if the rights holder has submitted inaccurate, incorrect or misleading information to the DMR. Furthermore, contraventions of an EMP and other environmental obligations in terms of the MPRDA may result in criminal liability. Prospecting or mining without a right (Section 98(a)(i)) or an approved EMP or EMPR (Section 98(a)(iii)) constitutes a criminal offence.

NEMA empowers Environmental Management Inspectors (EMIs) to enforce NEMA and Specific Environmental Management Acts (SEMAs), which include, among others, the NWA and the NEM: AQA. EMIs may inspect premises and issue compliance notices in terms of Section 31L of NEMA for non-compliance with NEMA or SEMAs (such as the NWA or the NEM: AQA). As has been noted above, there are many obligations on prospecting and mining companies and the responsible DMR officials are obliged to consider which laws are not being complied with. From the date of NEMLA coming into operation, it is the Minister of the DMR that must appoint inspectors with substantially the same powers but with particular reference to prospecting and mining.

2.3. Theory of change

There is no existing theory of change underpinning the environmental governance framework for South Africa's mining sector. The evaluation team's interpretation of what this would look like is represented in Figure 4 below. This is based on the framework's objectives as articulated in legislation and initial conversations with the relevant government departments, and was approved by the Steering Committee in a workshop in August 2014.

Figure 4: Interpretation the theory of change for environmental governance in South Africa's mining sector



**As agreed with the Steering Committee, the focus of the evaluation is on the environmental and institutional outcomes.*

2.4. Case studies – Background and context

Acid Mine Drainage – Gauteng

Gold mining in the Witwatersrand goldfields began in the late 1880s. By the 1920s, approximately half of the world's gold production came from the Witwatersrand mining belt, continuing through to the 1980s where South Africa remained the largest gold producer in the world[10]. The nature of the gold deposits in the Witwatersrand required the development of large, complex underground workings, creating a complex system of underground tunnels and interconnected mines, commonly referred to as 'basins'[11].

As deeper workings developed, the inflow of water into the mines became problematic and mines had to dewater underground workings to enable access to the gold ore and ensure safe mining conditions. When mines ceased operations, pumping ceased thus allowing the defunct underground workings to flood. Owing to the interconnections between mines, this water then flooded into the neighbouring mines, thus increasing the volume to be pumped by the neighbouring mine. As more and more mines closed, the remaining mines were left with

[10] Department of Water Affairs, 2013

[11] "Each basin represents a zone of near-continuous gold reefs, bounded by geological discontinuities": Expert Team of the Inter-Ministerial Committee under the Coordination of the Council for Geoscience, 2010

a growing burden for pumping[12]. Subsequently, when all mines in the basins closed and ceased pumping, the voids left by the mining operations started increasingly to fill with water[13]. This steadily resulted in Acid Mine Drainage (AMD). Waste from gold mines constitutes the largest single source of waste and pollution in South Africa and there is wide acceptance that AMD is responsible for the most costly environmental and socio-economic impacts[14].

Many of the gold mines were abandoned or were considered insolvent before the full environmental impact of their mining operations became evident. As a result of this, there are now numerous "ownerless" mines in the Witwatersrand basin, whereby the previous mine owners cannot be traced and the new owners will not take responsibility for the previous owners' actions. Consequently, assigning responsibility and the corresponding legal action for AMD in the Witwatersrand basins is very difficult. As such the State is now responsible for addressing the immediate challenges and associated impacts of AMD. Long term measures to address AMD are being investigated and will most likely also fall to the State to implement.

Coal Mining - Mpumalanga

Mpumalanga is estimated to produce over 70% of South Africa's coal. These reserves are concentrated around the areas of eMalahleni-Middelburg, Ermelo and Standerton-Secunda. In addition to the mines themselves, the intensive coal mining in Mpumalanga has resulted in a multitude of coal-related activities in the area. These include the generation of electricity in coal fired power stations; heavy industry using coal to produce steel and alloyed products; coal hauling by truck; and to a lesser extent a culture of indoor coal burning for heating and cooking.

Each of these activities is associated with a number of environmental and health hazards. In terms of mining, the environmental effects include air pollution, greenhouse gas (GHG) emissions, soil impacts, biodiversity impacts and water pollution. In terms of transportation, the environmental effects include noise pollution, congestion and damage to roadways. Finally, coal beneficiation results in discard and slurry, which without preventative measures can cause water contamination.

Currently this province has amongst the worst air quality in the world, largely due to coal mining activities, uncontrollable underground fires and power-stations burning coal. The good quality coal is exported, leaving the lesser quality to be burned by South African coal-fired power stations, adding to South Africa's carbon footprint and dirty emissions[15]. In November 2008, the then Department of Environmental Affairs and Tourism (DEAT) declared the Mpumalanga Highveld a "pollution hotspot", or priority area for air quality management.

The majority of the coalfields in Mpumalanga are also located in the grassland biome which experiences relatively high, consistent rainfall, ranging from approximately 650 to 1100 mm per annum with relatively low inter-annual fluctuations[16]. As a result of this rainfall, the area is one of the primary water catchment areas in South Africa and one of the higher potential agricultural areas in South Africa in terms of both consistency of crop yields and livestock production[17]. The case of Mpumalanga thus highlights the conflictual nature of mining versus alternative land uses and the importance of objectively assessing various land uses to ensure that a balance is struck between economic development through mining and the protection of the environment.

Asbestos Mining – Northern Cape

Rich deposits of three commercial asbestiform minerals make South Africa unique. South

[12] Ibid
[13] Department of Water Affairs, 2013
[14] CSIR, 2007
[15] Munnik, Hochmann, Hlabane 2009
[16] SANBI, 2006
[17] SANBI, 2006

Africa produced most of the world's supply of crocidolite (blue) and amosite (brown) asbestos and a smaller proportion of chrysotile (white) asbestos throughout the 20th century, with the Northern Cape crocidolite mines employing between 12 000 and 14 000 workers in the 1960s and 1970s[18]. Despite the undoubted commercial success of the industry, it has resulted in one of South Africa's largest public health disasters over the past few decades.
The contemporary sources of environmental exposure to asbestos in South Africa include unrehabilitated or partially rehabilitated dumps, roads, transport spillage, deteriorated housing materials, factory emissions, and a variety of manufactured products. The most significant impact of asbestos mining is air pollution from airborne asbestos fibres which results in asbestosis, mesothelioma and other asbestos-related lung diseases. Although there are no operational asbestos mines in the Northern Cape, environmental exposure is still a concern as these fibres from unrehabilitated mine dumps become airborne.

Mining-related environmental liabilities from historical asbestos mines are currently the responsibility of the State. The first crocidolite asbestos mines opened near Prieska in the Northern Cape in 1893 and the last chrysotile asbestos mine, Msauli mine near the Swaziland border in Mpumalanga, closed in 2002[19]. Asbestos mining was not sufficiently covered under the Mines and Works Act because asbestos is classified as a base mineral, for which no licence or authorisation was required. When the Minerals Act came into effect it only applied to new mines that were opened. Most asbestos mines were ceasing operations by this time and were therefore not subjected to the rehabilitation requirements of the Minerals Act. Due to the lack of legislation applicable to asbestos mines during operation, the State could not hold the mining companies liable for environmental rehabilitation costs.

Platinum Mining - North West

Platinum mining in South Africa has increased significantly in recent years, from a supply of 54 tons in 1975 to a peak of 164 tons in 2006[20]. The majority of platinum group metal (PGM) ore is sourced by underground mining, with 2009 production data showing that underground mining represents approximately 85% of the ore milled, with approximately 15% by open pit mining. The large volumes of tailings and waste rock require active planning and management to prevent major environmental or social impacts such as tailings dam failures or other problems, such as dust and environmental health issues. In addition, slag wastes from smelters are important (and can even be reprocessed to extract residual PGMs), and are commonly disposed of in or on tailings dams at PGM mines.

Other possible environmental impacts originate from the mine smelters, which in burning continuously release carbon dioxide (CO_2) and sulphur dioxide (SO_2) resulting in complaints from the community of various respiratory illnesses. Noise and vibration in the mining environment also present safety concerns in the way of houses shaking and cracks appearing.

Despite being similar in grade to gold ores, PGM ores are processed in a manner more akin to base metal ores, yet unit environmental costs for PGMs are only slightly higher in energy, slightly lower in water and moderately higher in GHG emissions than gold mining. The PGM ore grade does appear to be a reasonably important influencing factor of unit energy costs and GHG emissions in PGM production. Given the dominance of electricity in energy consumption, there are perhaps unique opportunities available for PGM mining to investigate the use of renewable energy technologies, and thereby reduce GHG emissions.

Water consumption is a critical issue in platinum mining, especially in an arid region such as the North West. The extent of impacts on water resources remains contested and uncertain. Overall, the environmental costs of PGM production are significant but appear to be related mainly to production levels and given the likely future demand, the cumulative environmental costs in such a concentrated region provide both a major challenge and opportunity for

[18] Felix, Leger and Ehrlich, 1993
[19] McCulloch, 2003
[20] Johnson Matthey, 2013

sustainability.

2.5. Country comparisons

To offer a background against which South Africa's environmental governance framework can be evaluated, and to gain a better understanding of the successes and challenges experienced in other countries implementing environmental governance regimes in their mining sectors, a comparative review of the Zambian and Australian cases was conducted and is presented below. Through these reviews, best practices for the implementation of environmental governance frameworks in the mining sector were identified.

2.5.1. Zambia

Zambia offers potential for comparison to South Africa due to its mature mining sector, geographic relevance in the Southern African Development Community (SADC) region and the recent debate over environmental regulation in the sector.

Zambia's mining industry has historically been dominated by copper mining while its coal industry is set to experience rapid growth in the coming years[21]. Relative to other mineral-driven low to middle income countries, Zambia depends heavily on export, government revenue, GDP and employment contributions by the mining sector.

Zambia's environmental regulation is highly fragmented with the framework spread over more than 30 sets of legislation. The main legislation governing environmental activities of mining comprises:

- The Mines and Minerals Development Act of 2008 (MMDA), which replaces the Mines and Minerals Act of 1995.
- The Environmental Management Act of 2011 (EMA), which replaces the Environmental Protection and Pollution Act of 1990.

Various other environmental regulations and bylaws also pertain to mining activity in Zambia. These include Air Pollution Control Regulations of 1996, Water Pollution Control Regulations of 1993, Water Supply and Sanitation Act of 1997 and the Waste Management Regulations of 1993.

The following lessons have been extracted from Zambia's environmental framework:

- Owing to the fragmented nature of the legislation, the mining laws in Zambia do not provide for a sound basis for environmental control[22]. Although the EMA does seek to consolidate these laws, legislative oversight by numerous ministries means that successful compliance is difficult to achieve.
- There is a need for a single, clearly identified ministry that is responsible for environmental governance in the mining sector. This not only makes compliance for mining houses easier, but also allows for government to integrate developmental and environmental objectives effectively. Co-ordination of legislation is key to avoiding loopholes and evasion of environmental governance by mines.
- Formal environmental institutions are not well linked to development planning, finance and sector institutions. Environmental institutions are separate from development institutions, and are weaker politically and in capacity terms. Interaction is primarily for advisory purposes rather than for joint decision-making. While the Environmental Impact Assessment (EIA) process is an exception to this, EIAs tend to be carried out only when major investment location decisions have already been made and the results are often overridden by politicians[23].
- The availability of resources to carry out regulation design, implementation and

[21] KPMG International, 2013
[22] Silengo, 1996
[23] Aongola, 2009

monitoring, e.g. equipment and staff, is critical to the effective implementation of the environmental governance framework. In the Zambia case, this will strengthen enforcement of legislation and make government less dependent on data submitted by mines, as is currently the case.
- While improvement of legislation and oversight is important, the constant fluctuations in the structures and responsibilities of state associations and ministries can lead to reduced accountability and adaptability of the framework.

It is these shortcomings and lessons that were noted when evaluating the effectiveness of environmental governance in mining in South Africa. While there are structural differences between the two countries, many factors such as institutional capacity, mining as a key contributor to the economy and the increasing awareness of the importance of environmental governance makes this a valuable country comparison.

2.5.2. Australia

Australia's environmental governance framework is considered to be a best practice example of balancing the economic benefits associated with mining and the impact that such activities have on the environment.

Australia is considered to be one of the world's leading mineral resource countries and the minerals industry is one of the largest contributors to its export trade. According to Geoscience Australia (2012), Australia is "the world's largest refiner of bauxite and the fourth largest producer of primary aluminium. It is the largest producer of gem and industrial diamonds, lead and tantalum, mineral sands, ilmenite, rutile and zircon. It is the fifth largest producer and largest exporter of black coal and the second largest producer of zinc. It is the third largest producer of gold, iron ore and manganese ore and the fourth largest producer of nickel. It is the fifth largest producer of copper and silver and has the world's largest resources of low-cost uranium".

Australia has two systems of environmental governance in mining: the Federal system and the State/Territory system:

- **Federal system**: All mining activities that have the potential to affect a 'matter of national significance' are assessed under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act No. 91 of 1999 as Amended). This Act requires that a project must gain ministerial approval, and that the proponent must undertake an environmental approval process, either under the relevant State regulations, or through a process determined by the Federal Department of Environment[24].
- **State/Territory system:** If the Federal government referral process deems that the proposed mining activity does not affect matters of national environmental significance, the project is assessed under the relevant State/Territory legislation.

To streamline the Federal and State environmental approvals processes, a 'strategic approach' may be taken. Strategic approaches allow the Australian government to work closely with State and Territory governments in the planning and assessment process. Strategic approaches allow for the alignment of State/Territory and Federal policies and frameworks. They provide a streamlined and consistent approach to achieving good environmental outcomes. Strategic approaches also facilitate combined efforts in the early stages of planning to ensure that environmental issues, including matters of national environmental significance, are considered from the start. Bilateral agreements are also often formulated to give State/Territory governments responsibility for undertaking environmental assessments and/or approvals for certain issues[25].

[24] Australian Government Department of the Environment, 2014
[25] Australian Government Department of the Environment. Environment Assessments. (n.d)

In 1999, the introduction of Australia's EPBC Act led to a shared responsibility between the Federal and State/Territory governments for protecting the country's most important natural resources. Much of the debate around the effectiveness of Australia's environmental governance in the context of mining has been around this shared responsibility and whether it represents a duplication of effort, or whether the dual process is necessary to ensure real environmental protection.

Many mining and development proponents argue that the current regulatory regime is too onerous and time consuming. This is said to result in delayed or abandoned projects which jeopardise Australia's economic future. Their arguments primarily contend that:

- There is unnecessary double-handling of environmental assessments (Federal and State approval required for major projects);
- The government's assessment and approvals timeframes are not conducive to competitive development;
- The costs involved in meeting environmental standards are prohibitive to profitable development;
- Much environmental regulation appears to be politically driven, rather than by science or reasonable risk management; and
- Stronger international competition requires that environmental regulation be adjusted to allow Australia to remain a competitive investment location.

Conversely, environmental groups and many other stakeholder bodies contend that environmental regulation is not rigorous enough, and that few mining companies' applications are ever rejected by either State or Federal governments. Identified concerns include:

- A failure to protect properly Australia's greatest environmental assets (e.g. the Great Barrier Reef) from mining development (e.g. through total bans on mining activities);
- Governments having a vested interest in seeing projects proceed, thus limiting the legitimacy of the assessment process;
- Illegitimate community engagement – expecting stakeholders to be able to digest and comment on voluminous and complex technical information;
- Lack of follow-up – checking to ensure that the impacts identified in the assessment process have eventuated and to what extent;
- Environmental consultants being paid by project proponents does not facilitate truly independent reporting; and
- Failure to account for cumulative impacts.

The over-regulated versus under-regulated debate, and striking a balance between environmental protection and economic growth and development through mining, is ongoing in Australia, and is directly relevant to South Africa, where this same debate exists.

3. Methodology

3.1. Analysis framework

A systematic analysis framework was designed and was informed by reviewing international examples of environmental governance in mining (Australia and Zambia), the history of South Africa's environmental governance framework in mining and drafting the theory of change underpinning South Africa's framework. Pertinent segments of this review have been included in the preceding sections and referenced throughout the report, where relevant.

The analysis framework relates the six evaluation questions to the four relevant DAC criteria. This is done by unpacking the DAC criteria into indicators and questions which are then used to answer each of the six evaluation questions.

Table 2: Analysis framework themes/indicators by DAC criteria

DAC criteria	Theme/indicator
Relevance	• Purpose of the environmental framework in mining • Relevance of the components of the MPRDA and NEMA in achieving the legislation's intended outcomes and impacts • Extent to which the industry is over-regulated with regards to the environmental legislation
Effectiveness	• Suitability of the guideline and mechanisms for calculating the costs of rehabilitation • Responsibility for regulating and enforcing the framework • Mechanisms to assess alternative land use • Compliance with the environmental governance framework • Appropriateness of the EMPs and all related governance processes for ensuring sustainable land use • Ownership/responsibility for environmental liabilities
Efficiency	• Application processes • Reporting requirements
Impact	• Effect of the environmental governance framework

The full analysis framework also describes how the information relating to each question was gathered; either through key informant interviews (KIIs), case studies or the literature review. The full analysis framework is presented in Appendix 1.

The methodology and analysis framework were approved by the Steering Committee through their acceptance of the Inception Report (June 2014) and Analysis Framework (September 2014).

3.2. Research methods

3.2.1. Literature review

The aim of the literature review is to understand the context of South Africa's environmental governance framework in mining, the rationale for the framework, documented implementation experience and comparative experience of other countries. This informed the analysis framework and development of research tools. In addition, where necessary, the literature review filled knowledge gaps of primary evidence from the KIIs and case study interviews.

The literature review included an overview of South Africa's mining industry and the environmental governance framework, the implementation thereof and limitations that the framework has been faced with. A similar structure was followed when reviewing the Zambian and Australian cases. Zambia offers potential for comparison to South Africa due to its mature mining sector, geographic relevance in the SADC region and the recent debate over environmental regulation in the country's mining sector. Australia's environmental governance framework is considered to be a best practice example of balancing the economic benefits associated with mining and the impact that such activities have on the environment.

3.2.2. Key informant interviews (KIIs)

KIIs were conducted with key stakeholders either through face-to-face interviews or telephonically to collect qualitative information to answer the evaluation questions. Stakeholders included:

- Officials from the DEA, DWS and DMR responsible for the environmental governance regime's legislation, management and administration;
- Non-Governmental Organisations (NGOs);
- Research institutions;
- Prominent firms of attorneys and other legal advisers practicing in the field of environmental law; and
- Industry bodies.

The following table presents the complete list of stakeholders that were consulted as part of the KII process:

Table 3: Interview list of KII stakeholders

Stakeholder organisations	Key informant
National government departments	
DMR	Mr Mosa Mabuza Mr Joel Raphela Mr Andre Cronje
DEA	Dee Fischer
DWS	Marius Keet
Industry association	
Chamber of Mines	Mr Lesufi Ms Mudau
Legal representatives	
Werksmans	Chris Stevens
Webber Wentzel	Manus Booysen
Hogan Lovells	Warren Beech
Non-governmental organisations	
Legal Resources Centre	Naseema Fakir
Centre for Environmental Rights (CER)	Tracy Davies Melissa Fourie
Federation for a Sustainable Environment	Marietta Lieferlink
Research organisations	
Council for Geosciences	Mxolisi Kota
CSIR: Mining innovation department	May Hermanus

Each interviewee was sent an email with a letter of introduction from the DPME, DMR and DEA attached. In cases where emails went unanswered, follow-up phone calls were made. If the stakeholder felt they were not in a relevant position to be interviewed, the evaluation team asked to be put in contact with someone who was.

3.2.3. Case studies

As part of the research process, and to demonstrate the effectiveness of the environmental governance framework, four case studies were conducted. These are detailed below:

- **Gauteng**: gold mining in the Witwatersrand and West and East Rand; and the subsequent effects of AMD on the environment.
- **Northern Cape**: the effects of asbestos (crocidolite) mining and processing in Prieska.
- **Mpumalanga**: the environmental challenges associated with coal mining.
- **North West**: platinum mining and the effect of high levels of sulphur dioxide and carbon dioxide emissions on the environment.

The focus of the case studies in Gauteng, the Northern Cape and parts of Mpumalanga are predominantly historical, concentrating on the effects on the environment as a result of past mining activities and the legislative framework that was in place at the time. Most mines that were responsible for the causes of asbestos pollution and AMD have closed and the owners cannot be traced. The case studies in the North West and parts of Mpumalanga focus on contemporary environmental issues and the current legislative framework.

For each of these latter case studies, mine managers and environmental compliance officers from a selection of the mines active in the region were interviewed. In selecting these mines, it was important that a representative sample of those operating in the region according to size, type and the life of the mine was chosen. In addition to this, relevant government officials at the provincial and municipal levels, as well as relevant Non-Governmental Organisations (NGOs) operating within the region, were consulted. Table 4 lists these stakeholders:

Table 4: Interview list of case study stakeholders

Stakeholder organisations		Key informant
Gauteng		
Provincial government department	DMR	Adv Mmadikeledi Malebe Ms Mashudu Maduka
	DWS	Ms M Musekene Mr Marius Keet
	Westonaria Local Municipality	Thabo Ndlovu
Mpumalanga		
Provincial government department	Mpumalanga Department of Agriculture, Rural development, Land and Environmental Affairs (DARDLEA)	Mr Selby Hlatshwayo
	DWS	Ms M Musekene
Mining house	GlencoreXstrata	Elmien Webb
	Namane Resources	Jan Britz
	Exxaro	Koos Smit
North West		
Provincial government department	Rustenburg Local Municipality	Lilian Sefike
	DWS	Justice Maluleke Wendy Ralekoa
Mining house	Impala Platinum	Ms Annah Kgaswane
	Northam Platinum	Maggie von Ronge
Northern Cape		
Provincial government department	MINTEK	Godfrey Mothapo
	Siyathemba Local Municipality	Mr Jakob Basson JRM Alexander

Although listed separately, in practice, KIIs and case study interviews often provided overlapping information – national level stakeholders often provided information on the specific case studies, and case study interviewees supplied details on national environmental governance policies and procedures.

3.2.4. Ethical considerations

Throughout the data collection process, the ethical considerations of the respondents were taken into account, namely:

- **Anonymity and confidentiality**. All information was collected in a confidential manner and names have not been attributed to responses.
- **Voluntary participation**. All respondents consented to the interview and were able to withdraw from the interview at any point.

- **Clear outline of the purpose of the research**. Each respondent was notified of the purpose of the research and the information collected was used solely for this purpose.

3.3. Limitations of methodology and scope

3.3.1. Timing of legislation

The MPRDA, which clearly outlines the post-closure environmental responsibilities of the parties involved in mining, was promulgated in 2002. According to interviewee responses, very few mines have closed under this legislation which means that the full impact of the legislation is yet to be uncovered[26]. As such, many findings on the post-closure environmental effects are based on the experience and perceptions of the stakeholders interviewed.

In addition, subsequent to the start of this evaluation, two sets of related draft regulations were published for public comment. The first set of draft regulations[27] relates to EIAs under Sections 24(5) and 44 of NEMA. The second set[28] pertains to the financial provision and closure for mines under the same Act. These amendments do not form part of the context in which this evaluation was commissioned and, as such, may address some of the themes and gaps identified during the evaluation. While these draft regulations will be mentioned where applicable, they are not evaluated as part of this study.

3.3.2. Interview response rate

While the project team applied its best efforts to interviewing all relevant stakeholders, in several cases this was not achieved. Stakeholders either did not respond to attempts to contact them or were unsupportive of an interview, specifically regional DEA, DMR and selected mining house representatives. In the historical cases of AMD and asbestos pollution, mining houses have typically closed and could not be approached. Gold mines that are currently operating in the region did not feel that they were the appropriate parties to give comment on the situation. In the Fieldwork Report submitted on 17 October 2014, the project team notified the Steering Committee of the lack of response from the identified stakeholders, and requested assistance in engaging with the stakeholders identified for KIIs. To mitigate this limitation, secondary research supplemented missing primary research.

3.3.3. Lack of quantitative data

Throughout the evidence gathering process, the evaluation team attempted to locate quantitative data from various stakeholders to corroborate the qualitative findings. Quantitative data from DMR, for the most part, is not stored electronically and is housed at the regional offices, as such, obtaining this data is difficult. The DMR submitted some quantitative data to the evaluation team; however, this included only recent data and did not span the early years of the evaluation. Despite these limitations, this data was used to substantiate the more recent qualitative findings.

3.4. Capacity development

The evaluation team included a capacity development plan within the evaluation process. The evaluation team suggested that individuals be nominated from the DPME, DEA and DMR to be assigned to work alongside the evaluation team. These nominated individuals were to be actively involved in every phase of the process from inception until conclusion, to ensure a complete and comprehensive understanding and skills transfer. Given past experiences, this form of capacity building has proven to be most effective and has resulted in positive and tangible results.

[26] This could not be substantiated with historical evidence, however, given that only 159 closure certificates were issued in 2012/2013 against the 575 that were under review, this is considered to be a fair judgement.
[27] As published in Government Gazette, General Notice 733 of 2014, 29 August 2014. These have since been gazetted as GN R982 and will come into force on Monday 8 December 2014
[28] As published in Government Gazette, General Notice 940 of 2014, 31 October 2014

Two individuals were nominated to participate in the capacity development process by the DPME and expressed a particular interest in attending interviews with the Gauteng-based stakeholders involved in the AMD case study. The candidates were invited to attend these meetings as well as several internal meetings to participate in discussions on the evaluation methodology and framework.

4. Findings

This section outlines the findings as obtained from desktop research, KIIs and case studies. The findings are presented according to the DAC criteria which have been further divided into subthemes.

4.1. Relevance

4.1.1. Purpose of the environmental governance framework

Although with varying levels of detail and understanding, all stakeholders interviewed were **aware of the environmental requirements** for obtaining a mining right. Most stakeholders perceived the purpose of the environmental governance framework to be the governance of the associated environmental impact of mining. It aims to ensure that the environmental impact of mining is adequately assessed and mitigated, and that effective compliance with the framework is undertaken. The framework also looks to balance the economic and socio-economic impacts of mining with the environmental impacts. Some stakeholders believed that this balance is not achieved, with environmental impacts given either too much weight, according to some mining companies, or not enough, according to environmental rights groups.

When considering the optimal **balance between incentivising economic development and regulating the environmental effects in the sector**, many stakeholders were of the opinion that the environmental framework does not directly disincentivise mining investment - it is just one of many investment considerations such as labour and social obligations. According to one respondent, the government has promulgated world class legislation to create a “macro and regulatory environment that maximises the mining sector’s role in economic development and holds them responsible at the same time”. However, the weak implementation of the legislation and the lack of timeliness in the relevant processes, particularly regarding the issuance of licences, do pose a formidable deterrent to investment in the sector. Similarly, stakeholders raised concerns regarding the uncertainty around recent legislative changes, and the interaction between and responsibilities of different government departments.

Other stakeholders firmly believed that the environmental concerns in the sector are outweighed by the immediate economic benefits of mining, such as job creation and GDP growth. The longer term environmental effects and the responsible parties are not considered to be explicitly considered by the framework. Admittedly, the legacy issues of AMD and asbestos pollution tend to distort the perceptions and effects of the current framework. Several stakeholders agreed that had these mines operated under the current framework, some may not have been commercially viable but the others would have been more environmentally conscious, thus decreasing the probability of these issues occurring.
According to interviewees, **gaps in environmental governance framework** revolve around the perceived disorder of the regulation (which is spread across various pieces of legislation) and enforcement (which differs by government department, region and level). The following have been identified as recurring responses relating to gaps in the current framework:

- Inconsistent or missing definitions and references in corresponding pieces of legislation;
- Overlaps and delays in the current environmental licence application process;
- Lack of robustness of the public participation and stakeholder engagement

processes;
- 'Polluter pays principle' which may prove inadequate, particularly as it relates to water, as this may be difficult to prove in court as is the case with historic cumulative pollution;
- Site-specific nature of licences and the overall framework, as opposed to a more regional focus;
- Reviews of financial provision submissions are discretionary;
- Inadequate consideration given to the liquidation of mines; and
- Uncertainty regarding responsibility in the case of post-closure liability.
-

Several stakeholders maintained that while the overall design of South Africa's environmental legislation is on par with developed countries such as Canada and Australia, the framework falls short in its implementation. Several stakeholders reported lack of skills (technical ability to assess, audit and monitor mines), capacity (size of staff complement) and resources (physical infrastructure and systems) within government departments such as the DMR, DEA and DWS. In addition, stakeholders found a severe lack of co-ordination between relevant government departments which negatively affected implementation.

Importantly, legacy environmental concerns influence stakeholders' perceptions of the current framework. One stakeholder noted that "the problem associated with rehabilitation is not related to current legislation and associated requirements but rather the lack of legislation and general governance during historical mining activities".

4.1.2. Relevance of MPRDA and NEMA components in achieving the legislation's intended outcomes and impacts

A few respondents were of the opinion that the **objectives of the environmental legislation** are, from a legal perspective, unclear and open to a wide variety of interpretations. Following this, interviewees highlighted opposing views on the practical relevance of the components of the legislation in relation to its objectives. While some claimed that the framework is adequate and responds to all key aspects of environmental protection and management, the contrary view is that the framework is only effective in limited cases such as wetland rehabilitation and increased soil capacity. Stakeholders noted, however, that the amendments to MPRDA and NEMA and the move towards one environmental system have resulted in increased alignment within the framework.

Many stakeholders agreed that **policy objectives can be achieved** through the components of the MPRDA and NEMA, but that inferior monitoring and enforcement have obstructed the achievement of these goals. In terms of licence applications, the delayed timing of one component results in an overall delay in processes. One stakeholder highlighted that in Canada, a competing mining investment destination, the application process may take roughly 12 months until mining begins, while it can take as long as six to eight years in South Africa.

Some stakeholders feel that the **components of the MPRDA and NEMA** do not reinforce each other because there is no consistent interpretation of certain issues. Large variations in the level and types of skill and capacity in the DMR, DEA and DWS lead to conflicting assessments and judgements. The perception by stakeholders is that communication within a single department across the national, regional and local government spheres is also fragmented. In addition, stakeholders have had differing experiences of regulatory processes in different provinces. In general, some stakeholders consider the EIA process to be clear, while others have experienced duplication and confusion.

Based on data from the DMR, the **total value of the guarantees that were called up** in

2013/2014 is R512 165 578.08. This is presented by region in Table 5 below[29].

Table 5: Value of guarantees called by in 2013/2014 by region

Region	Amount called up 2013/14	Basic reasons for calling up
Mpumalanga	R5 083 822, 84	• Company rehabilitated • Received notice to withdraw from the guarantee from the financial institution, therefore the Department had to call the guarantee up to secure the funds
Gauteng	R539 809.00	• Received notice to withdraw from the guarantee from the financial institution, therefore the Department had to call guarantee up to secure the funds
Free State	R270 000.00	• Received notice to withdraw from the guarantee from the financial institution, therefore the Department had to call guarantee up to secure the funds
Limpopo	R873 541.08	• Received notice to withdraw from the guarantee from the financial institution, therefore the Department had to call guarantee up to secure the funds
Eastern Cape	R90 330.00	• Received notice to withdraw from the guarantee from the financial institution, therefore the Department had to call guarantee up to secure the funds
Northern Cape	R772 614.00	• Company rehabilitated • Received notice to withdraw from the guarantee from the financial institution, therefore the Department had to call guarantee up to secure the funds
Western Cape	R1 237 000.00	• Received notice to withdraw from the guarantee from the financial institution, therefore the Department had to call guarantee up to secure the funds
North West	R0.00	
KwaZulu-Natal	R0.00	

According to interviews, a new proposed financial provision guideline is being finalised. This will contain a three tier approach to ensuring sufficient funding is available for adequate rehabilitation, closure and latent environmental impacts.

The perception by stakeholders is that while the legislation adequately provides for mining companies to set aside funds for rehabilitation, whether the quantum is sufficient is doubtful. Many stakeholders conceded that the amount of funding depends uniquely on each operation and the consultants performing the assessment. The cost calculation guideline, as used by the State, seems to favour larger mining companies. According to interviews, smaller mines feel prejudiced by the financial provision costs resulting from the calculations as they often have insufficient capital to set funds aside for rehabilitation prior to the start-up of mining operations.

Interviews also indicated that the regulatory authorities propose to compel concurrent rehabilitation through monitoring and auditing procedures. This will ensure that there is no

[29] This data was submitted to the evaluation team as a consolidation of all the regions. As such the detail underpinning these aggregated figures cannot be ascertained or verified by the evaluation team. Similarly, the reasons for the guarantee being called up cannot be expanded further as this is the extent of the data received.

rehabilitation backlog at any stage and accordingly the financial provision will always be up to date. With annual audits, post-closure rehabilitation funding should thus be adequate.[30]

4.1.3. Extent to which the mining industry is over-regulated with regard to environmental legislation

In understanding the mining industry's level of environmental regulation, the **drivers of compliance** were explored. Larger mining companies seem to be driven to comply by reputational risk, potential revocation of their license to operate, listing requirements and the legal repercussions of non-compliance. From interviews, the attitude of leaders of mining companies to rehabilitation is also a large driver. If this is seen by them as a critical duty of the company rather than an administrative burden, staff members soon adopt a similar attitude. In many cases, attitudes filter down internally through company EMP compliance commitments and personal performance assessments and bonuses. In this way, the management and operating units of mining companies together ensure that compliance with environmental legislation is achieved. While not emerging miners themselves, some stakeholders mentioned that emerging miners are less likely to comply with environmental legislation, primarily due to capital constraints.

Compliance, for several mines, is often hampered by the delays in the approval of applications, thus affecting their business activities. Many mentioned that in particular, their applications for Water Use Licenses are problematic. Delays by the authorities make planning difficult for mines, and affect all operations. One particular mining company said that every two weeks it assesses and follows up on its outstanding licence applications. It has in place clearly structured plans to deal with the "tenuous" application process. 30 days after the deadline for feedback on the application has lapsed, a junior staff member follows up with a counterpart in the relevant government department. If no progress is made during this time, during the following 30 days a more senior member of the company follows up with a more senior counterpart at the regulator. This escalates until after 90 days when the CEO of the organisation follows up with the national department and then the Minister. While this detraction from the mining company's core business does not point directly to over-regulation, it does point to an inefficient implementation of the legislation.

In the context of **investment decisions**, environmental regulation was cited to be a consideration but the extent to which it is capable of encouraging disinvestment is varied. In one respondent's experience, South Africa has slipped down the rankings of mining investment attractiveness in Africa due to regulatory uncertainty. For example, roughly three or four years ago, raising funds on the Toronto Stock Exchange (TSX) in Canada was relatively easier. Reasons that have been cited by investors include increased in-country risk (socio-political factors), employment risks, regulatory concerns and empowerment obligations and the funding thereof. Some legal advisors have noticed that other countries such as the Democratic Republic of Congo are attracting investment usually destined for South Africa, as a result of the less complicated legislation.

Another stakeholder mentioned that marginal operations (for example, labour intensive underground mines, or low margin surface re-treatment operations) are becoming increasingly less economic with the environmental governance requirements, but it is unlikely that an entire mining project will not be funded due to these.

The general view of stakeholders is that the environmental legislation is not overly burdensome in isolation from the mining sector's social, labour and empowerment legislation. However, the legislation is undermined by the poor implementation thereof.

[30] These provisions are likely to be included in the Regulations relating to Financial Provision and Closure currently being considered.

4.2. Effectiveness

4.2.1. Suitability of the mechanisms for calculating the costs of rehabilitation

Rehabilitation costs are calculated by mines using the guideline issued by the State. Some stakeholders were of the opinion that these guidelines are useful for calculating costs to a point but could be too generic, leading to an over- or underestimation of costs in certain instances. As a result, many mines seem to supplement these calculations with their own research and monitoring. Tools that are used to determine accurately impacts and hence rehabilitation costs include Geographic Information System (GIS) software, satellite imagery and remote sensing to quantify surface infrastructure and disturbed areas requiring rehabilitation.

Mining companies also conduct additional scientific research to determine potential water impacts and related rehabilitation costs as the State guideline does not address underground or surface water related issues. For some mines this water liability accounts for 60 to 70 per cent of its liability. According to stakeholders, the guideline also fails to take into account inflation effects, and export prices and quantities of mining output. It has become the responsibility of each mine to tailor and apply the relevant methods to estimate accurately its rehabilitation costs. Rehabilitation cost calculations vary greatly based on the unique risks identified for each mine, different types of mining and products being mined, because each has unique environmental footprints. One stakeholder mentioned that the guideline is perhaps more accurate and relevant for larger mines as they are more activity specific. In spite of these shortcomings in the guidelines, many companies are setting aside more funds in their balance sheets based on their own calculations than would be required under the DMR guidelines.

The reason for the inappropriateness of the **rehabilitation cost calculation** is that the guidelines were initially designed as internal documents, used exclusively by DMR officials to evaluate the cost calculations submitted by mines. Interviews with regulators suggest that universities, NGOs and independent environmental consultants may contribute to a more accurate guideline for the calculation of rehabilitation costs and the significance of their role in this process should not be undervalued. Regulators and mines are currently considering a proposed risk-based approach which requires additional systems, capacities and collaboration with these institutions.

Interviews maintain that various departments involved in environmental governance of mines should work in partnership to develop and test the guideline used for rehabilitation costs. To build capacity in general, as well as for the purposes of improving the guideline, training of environmental officers is in the pipeline. One interviewee mentioned that a conference or workshop by the regulators for environmental officers to improve their practical knowledge of rehabilitation would be beneficial. A suggestion of using old mines as case studies to build up a knowledge base for improving current rehabilitation was also mentioned.

Since being published in 2006, the **cost rehabilitation guideline** has not yet been updated, although some stakeholders indicated that processes are underway to change this as part of the revision of the regulatory guideline. There is a perception amongst those practically applying the guideline that it is outdated, although it is widely accepted based on legal principles. Mines are legally obliged to update their cost of rehabilitation calculations annually while their EMPs are updated every five years.

The main **implication of inadequate cost estimations** is a funding shortfall once environmental liabilities need to be addressed. Underfunding is usually only detected by an independent third party expert, if hired. In addition, because there are no current legal consequences for inaccurate calculations, the future financial implications are likely to be borne by the State and not the mining companies creating the environmental damage. The Gauteng AMD and Northern Cape Prieska case studies highlight the extreme cases in which latent effects of mining have become the responsibility of the State long after mining

companies have closed.

Financial provision by mines is one way of limiting the State's liability in such cases. For most companies this financial provision liability is managed solely through their balance sheet during the operating phase. In other words, the cash amount is rarely handed over to the DMR but is rather accounted for as a liability to the DMR in the mining companies' financial records.

Mines operating under the current environmental governance framework are only issued with closure certificates once all authorities are satisfied that all reasonable measures have been taken by the mine to deal with post-closure environmental effects. The data provided by the DMR indicates that from there were 575 closure certificates under review in the 2013/2014 year and that 159 of these have been issued to date (24 February 2015). This is illustrated in Table 6 below, which also details the reasons for why certificates have not been issued[31].

Table 6: No. closure certificates by region

Region	No. closure certificates under review 2013/14	No. closure certificate issued to date	Reasons for not issuing closure certificate
Gauteng	**36**	**2**	• Awaiting comments from DWS • Outstanding rehabilitation
KwaZulu-Natal	**44**	**20**	• Outstanding comments from DWS • Outstanding rehabilitation
Mpumalanga	**59**	**20**	• Outstanding comments from DWS • Outstanding rehabilitation
Eastern Cape	**36**	**7**	• Outstanding comments from DWS • Outstanding rehabilitation
North West	**179**	**17**	• Outstanding comments from DWS • Outstanding rehabilitation • Outstanding closure inspection
Western Cape	**28**	**21**	• Outstanding comments from DWS • Outstanding rehabilitation
Northern Cape	**11**	**11**	
Free State	**86**	**47**	• Outstanding comments from DWS • Outstanding rehabilitation
Limpopo	**96**	**14**	• Outstanding comments from DWS • Outstanding rehabilitation

While there is a common perception within the mining industry that the authorities are averse to issuing closure certificates as they want to ensure that no latent effects become the undue responsibility of the State, the DMR asserts that the delay in issuing closure certificates is a

[31] This data was submitted to the evaluation team as a consolidation of all the regions. As such the detail underpinning these aggregated figures cannot be ascertained or verified by the evaluation team.

result of legal compliance that require all key stakeholders, such as DWS, to provide comments and for mining companies to follow a due process that will enable them to qualify for a closure certificate. This caution is a consequence of the lessons learnt from the environmental impacts caused by mines that operated under the previous legislation, which did not regulate environmental protection in the mining sector. One stakeholder warned that the withholding of closure certificates may result in larger liabilities as mining companies have been known to abandon mines prior to adequate rehabilitation, along with the associated environmental liabilities, to avoid the difficult process of obtaining a closure certificate.

4.2.2. Responsibility for regulating and enforcing the framework

Responses from stakeholders on who they believe the **competent authority** for environmental governance in mining should be were varied. Some interviewees were strongly of the opinion that either the DMR or DEA should be responsible, while others stated that it should not matter who holds the responsibility, government is one entity and there should be consistency across its parts. A middle-of-the-road view suggested by some was a collaborative interdepartmental approach to environmental governance in mining.

Proponents of the DMR stated that the sector and institutional knowledge of mining rested within the department, while others were of the opinion that the DEA understood the environmental aspects of mining better. In rare instances the DWS was submitted as the department to be responsible for environmental governance in mining. What was common to each suggestion, no matter which department, were the reservations pertaining to the lack of capacity and skills across all of these government departments.

A more detailed suggestion was that of a separate unit established within the DMR with an environmental inspectorate, similar to the current Health and Safety inspectorate. This enables the oversight and convenience of fulfilling mining and environmental obligations due to the 'one-stop shop' model. Stakeholders did, however, mention points of consideration regarding this model, including the competing objectives of the DMR and DEA as they relate to the economic and environmental effects of mining respectively, the ability of one department to supersede another's decision and the potential for a decision to be delayed through governance processes.

Other interviewees noted concerns with the responsible department having the role of both regulator and promoter of the mining industry. Important skills for the department responsible for regulating the environmental aspects of the industry include a technical and economic understanding of both the mining sector and environmental aspects thereof, as well as a strong grasp of environmental governance for the purposes of legal action. There is a perception at the moment the DMR and DEA sometimes accept the technical aspects of mines' applications and reports at face value due to their internal lack of capacity. One remedy to this in one case was the appointment of an independent consultant by the government department that was paid for by the mine to review the application. According to stakeholders, staff capacity and retention are also critical for the success of the competent authority. In addition, the department should have the necessary equipment and systems for monitoring and enforcement of the prevailing legislation. The responsible department should also possess adequate internal conflict resolution mechanisms, such as clear conflict resolution protocols; appropriate funding and strong coordinating abilities. The process itself should be streamlined with no confusion to applicants[32].

4.2.3. Mechanisms to assess alternative land use

Regarding the availability of **tools for assessing alternative land use**, stakeholders' views were divided in two. The first view is that there is no formal mechanism in place, while the second is that the process of stakeholder engagement, which is required under the EIA

[32] Stakeholders noted Canada as a good international example of this.

Regulations of NEMA as part of the EIA process and EMP application[33], is sufficient to determine alternative land use. Legislatively, consideration of alternatives as defined by NEMA is an alternative consideration to the types, designs and technologies of the same activity. The process of considering project alternatives, as required by the MPRDA Regulations, does not as a rule take into account alternative mining methods, such as the use of different technologies, instead it looks at whether mining should commence on the proposed project area or not at all (the Go/No go approach). The prescribed EMP is not required to assess or recommend an alternative activity altogether. Consideration of alternative uses of the land beyond mining, for example agriculture and industrial development, is not explicitly required. The difficulty with depending on stakeholder engagement to determine alternative land use is that stakeholders often have vested interests in the outcome of the process. Unsurprisingly, there are tensions between mining and agriculture, with one stakeholder claiming that neighbouring farmers who are involved in the process oppose proposals in a bid to influence the purchase price of the land use right.

Alternative land use is often complicated as proposed mining sites have sometimes been previously earmarked by a municipality for a purpose other than mining. In this case the objectives of different parties are usually opposed and there are no clear recommendations for how to resolve this. Another issue of confusion according to interviewees is the lack of detail regarding post-mining land use requirements e.g. types and quantities of vegetation which should be planted in an area where a game reserve is planned.

Interviews indicated that the extent of mining and prospecting in Mpumalanga has resulted in a source of conflict around **mining-related land uses versus alternative land uses**, particularly watershed protection, agriculture and biodiversity conservation. When opencast mining started in the 1970s the main focus of alternative land use was agriculture and the aim of rehabilitation was to stabilise the area to return it to its agricultural potential. However, after mining, the crop potential of the land was found to be very low and as a consequence, pastures were established instead of returning the land to its original crop land use. This posed a number of challenges including soil compaction, low production potential, low soil fertility, productive but expensive pastures which cannot be economically utilised and low diversity of vegetation cover.

According to the Bureau for Food and Agricultural Policy (2012), 46.4% of South Africa's high potential arable soil is found in Mpumalanga. Given the current rate of coal mining in Mpumalanga, this gives rise to concerns around food security, food production and food prices in the long run. This is exacerbated by the fact that Mpumalanga has historically been the "bread basket of South Africa".

Overall, the sentiment from stakeholders is that a mine producing an EMP with the aim of mining in a particular area is unlikely to fund or otherwise support research suggesting that mining is not the optimal use of the land. Moreover, the current legislation is geared to considering whether or not a mining project should be undertaken, not whether mining relative to a completely different land use beyond mining should occur.

4.2.4. Compliance with the environmental governance framework

The general opinion of stakeholders regarding **compliance with the environmental governance framework** is mixed. While some claim that mines attempt to hire the necessary specialists to research and draft their EIAs and EMPs, these are sometimes ignored during implementation. Sections of MPRDA, read with NEMLA allow for the DMR to send out inspectors to mines as part of its auditing function. According to one stakeholder, the MPRDA allows for compliance to be built up over time which, importantly, creates room for dynamism and flexibility.

[33] This includes the PPP, I&APs, the entitlement of registered I&APs to comment on submissions, and recording of comments of I&APs in submissions to competent authorities

Regarding the practice of such inspections and audits, the DMR compiles an annual inspection plan of all the operations identified for compliance inspection in a given financial year. Not all mining operations are included in this inspection plan, but rather a subset is monitored annually. Using Gauteng as an example, there are about 185 active operations in Gauteng (including Mining Rights, Prospecting Rights and Mining Permits) and the targeted number of inspections in Gauteng is 164 per financial year. The number of inspections to be conducted annually is determined by the Mineral Regulation Branch Strategic Plan; and the selection of these operations is based on the following criteria:

- Continuous non submission of statutory documents;
- Non-inspection in the previous year (s);
- Complexity of the operation;
- Information gathered from previous inspections;
- Information obtained during the assessment of the Environmental Performance Assessment Reports;
- Adequacy of the financial provision;
- Issues and/or complaints received from communities and other interested and affected parties;
- Manner in which environmental incidents have been occurring; and
- Self-monitoring results e.g. submitted water and dust monitoring results.

Within this framework, the operations that may cause or are causing the most significant environmental impacts are prioritised. Given the capacity and budgetary constraints within the departments, such a framework allows for the efficient selection and inspection of mining operations with their given resources.

In 2013/2014, the inspection plan identified 1700 operations to be monitored. However, in effect, 1868 operations were monitored that year. The reason given by the DMR for exceeding the target in 2013/2014 was that it identified the need to focus more on monitoring and compliance than originally anticipated.

Stakeholders also noted that compliance with EMPs is limited to day to day activities associated with mining. Dealing with the larger, long term impacts at a regional and national level requires a more strategic approach to planning and decision making within government. As part of the environmental regulations, which are currently under revision, it was reported that independent auditors for compliance monitoring will be required. These must include a mining engineer, mine surveyor and Environmental Assessment Practitioner. Currently, most of the larger mines have in-house environmental specialists who understand the legislative requirements and have access to resources, making compliance easier to achieve. Moreover, these companies are often listed on international stock exchanges or funded by other investors that require a high standard of environmental compliance. Further to this, environmental compliance by large mines often moves beyond funding requirements to the reputational risk relating to non-compliance. This is not only limited to the general public but also surrounding communities of mining areas. Another important factor in compliance is the willingness and commitment by upper management, which filters down to the implementation teams. For economic and financial reasons, it was reported that smaller mines tend to defer remediation, which is compounded by the irregularity of compliance monitoring. These mines often depend on industry bodies and the regulators to gain an understanding of the environmental regulation requirements.

Across both larger and smaller mines, compliance is generally believed to be acceptable at the initial EIA submission, but ongoing compliance with EMPs thereafter seems to be inconsistent. Estimates suggest that about 5% of all completed inspections are deemed non-compliant. There do exist instances of non-compliance, sometimes related to insufficient knowledge of new changes in legislation, where mature mines are retrospectively attempting to comply with legislation. Water use licence regulation was noted as a particularly complex situation with many changes in requirements occurring. In addition, reduced capacity within

the DWS, as well as the significance of water related impacts, has resulted in long delays in securing a Water Use Licence. As a result, some mines have purposefully begun mining activities that do not trigger water uses until a licence has been issued. While this is not strictly illegal, it does require close monitoring by the DWS to ensure compliance. One point raised was that the DWS neither has a financial provision fund for water damage by mines, nor is granted access to the DMR financial provision funds for such liabilities. This has meant that the DWS prefers to manage water usage and pollution while the mine is still operational.

Regarding **compliance with financial provision requirements**, the experience of most stakeholders has been challenging. Some stakeholders have had great difficulty in claiming back bank guarantees in cases where they have been attained but not put forward as part of their application. In some cases, the decision to apply was retracted and no mining right application was made.

In cases where **inspections and audits are completed by the DMR**, the sense from stakeholders is that information is accepted at face value, with a lack of technical skills and capacities in the department preventing any meaningful interrogation. Another perception from stakeholders is that regulation and monitoring practices between smaller and larger mines is inconsistent. Smaller companies are seen as less likely to comply and are targeted more regularly for inspection; whereas larger mines have stronger internal regulation and legal capacity to adhere to environmental regulation and challenge directives issued by the DMR.

When a breach is detected, the MPRDA allows for the competent authority to issue the mine with a directive or order to remedy, and in some cases, seize operations. In 2013, the DMR issued 781 orders to rectify certain mining activities, the majority of which were environmental non-compliance cases. If a mine's non-compliance continues, the DMR has the power to prosecute through criminal procedures. According to interviews, the DMR tends to issue a threat of legal prosecution whereas the DEA is more likely to implement criminal prosecution. Some stakeholders claimed that directives are not always followed up on, ultimately resulting in limited repercussions for non-compliance. Few stakeholders reported instances of mining licences being revoked, and when this does occur environmental rehabilitation is rarely completed.

Many stakeholders noted that the lack of technical knowledge means that inspectors are merely monitoring compliance as a box-check exercise. What may be more useful is a unified approach in which the department works with the mines to develop good environmental practices. The DMR is reportedly in the process of increasing capacity to improve its level of compliance monitoring within the sector.

The responsibility for the enforcement of **environmental governance** in mining extends to **other government departments**. While the role of the DEA is fairly limited regarding compliance monitoring, Water Use Licenses are issued by the DWS and monitored on an on-going basis by the department thereafter. In addition, when issuing closure certificates, the DMR must so do in consultation with the DWS.

Interview responses suggest that interaction between regulators and municipalities in mining regions is uncoordinated. In one case, a municipality granted a mine access to water sources without consulting the provincial DWS. The result has been that mining activities have begun but water levels are being quickly depleted due to a lack of planning. In another instance, complaints to the municipality regarding environmental effects on the local community could not be adequately resolved as the local DMR had not imposed any penalties on the offending mines. This points once again to a somewhat ineffective implementation of the environmental governance framework.

Often communities or NGOs that experience the effects of **noncompliance with the environmental framework** embark on legal proceedings against mines. This is relatively

common in South Africa where confrontation regarding the adverse effects of large mining companies is tolerated[34]. In instances of legal action, stakeholders mentioned that it is sometimes initially a challenge to identify the responsible institution. If mines claim that their environmental responsibilities have been fulfilled, the State is then held responsible for the constitutional rights of communities to safe drinking water, a non-hazardous living environment etc. The environmental responsibility is thus passed between the two institutions, making it difficult to be sure of which institution legal action should be directed towards. Communities have been reported to have suffered directly from the effects of mining activities in the form of pollution, resettlement to less favourable conditions requiring them to travel further for basic services, economic isolation or no access to water and sanitation.

4.2.5. Appropriateness of EMPs and related governance processes for ensuring sustainable land use

In general, stakeholders consider EMPs regarding prospecting rights to be generic, thus limiting their impact on environmental protection. EMPs for mining rights are seen by some to be more appropriate in design but are still seen by others as generic. This calls for the need by mines to continuously update and ensure the relevance of their EMPs. Some interview respondents suggested that EMPs and related processes are appropriate for ensuring sustainable land use, but that the monitoring and enforcement thereof is lacking. In some cases, it was suggested that the quality of EMP submissions by mines was poor, which are then not critically evaluated by the DMR, and are subsequently accepted.

One objection raised regarding the appropriateness of EMPs is that they are site based rather than regionally based. The regional effects of mining are often larger and more serious than those confined to a single site. As such, EMPs should account for the management of cumulative and associated impacts in a region[35].

Another objection is that sections of the EMP relating to post-mining land use are often poorly considered and vague. Investigations by one stakeholder found that in some EMPs wilderness is the proposed post-mining land use, which is simply the cheapest option. It was also reported that inappropriate post-mining land uses are proposed to win over municipalities, for example agriculture in a region with insufficient water to meet agricultural requirements. In places where gold mining has taken place, which may have resulted in degraded, radioactive or toxic areas, there have been proposals to use the land for residential purposes such as low cost housing and social development, even though the rehabilitation plans or development proposals have never been approved.

By law, municipalities provide inputs into EMP submissions based on spatial development plans, which assists with the process of integrated planning. However, stakeholders suggested that discussions with various other government departments (Department of Agriculture, DEA, DWS, DMR, Housing and Rural Development etc.) will improve the assessment of the on-the-ground feasibility of post-mining land uses and the sustainability thereof.

There is disagreement among stakeholders as to whether **EMPs** are sufficient **to ensure sufficient mitigation of environmental damage by mining**. This appears to be due to the inconsistent implementation of EMPs and related processes, as opposed to the tool itself. There is a lack of confidence in the DMR's ability to interrogate environmental licence and EMP submissions. The perception at present is that legally trained staff are used within the DMR to evaluate EMPs that are of a more scientific and technical nature. In addition, the level and quality of detail that is required in an EMP submission is subjective. EMPs are often drafted by consultants who are notionally independent and potentially biased to the mining

[34] One stakeholder mentioned that in some South American countries, large mining companies often intimidated any opposition to the undesirable social and environmental effects of mining.
[35] A region is defined as per the MPRDA on a provincial basis.

house who employs them. In other cases, stakeholders claim to have seen numerous EMPs that are identical in nature with insufficient dialogue and knowledge transfer between the right holder and the consultant.

4.2.6. Ownership / responsibility for environmental liabilities

Interview responses by stakeholders regarding the **responsible party for environmental liabilities** are noticeably divided. Some stakeholders argued that mines cannot be held responsible indefinitely as this would create potentially problematic rehabilitation disincentives as mines will no longer be granted closure certificates in the true sense of the term. Instead, very little or no rehabilitation will be conducted as there will be no end to their ownership of environmental liability. In response to this, one stakeholder noted that a distinction should be made between "physical rehabilitation and closure" and "legal closure certificate". In this way, it is possible for the mining company to rehabilitate and close certain on-site activities, without receiving a closure certificate. Many interviewees stated that mines do not operate *ad infinitum* or with unlimited revenue, and so there should thus be a limit to environmental liability. Some stakeholders believe that the State should then be liable once mines have fulfilled their initial responsibility and a closure certificate is issued. Similarly, another view is that the mining companies should be liable for foreseen environmental impacts and associated costs while the State is liable for unforeseen and latent effects. If mines ensured that the calculations for rehabilitation costs were scientifically correct and strongly vetted, this should not be a problem.

Others suggested that mines should be liable until the land use is restored and it can be proven that all environmental impacts have been addressed, including cumulative impacts. This may be for five to 10 years after a mine has closed operations, but the timelines are difficult to anticipate. According to the revised NEMA, directors of mining companies can be held accountable for environmental liabilities. The extreme view of some stakeholders is that current penalties are too lenient and that the ultimate penalty for reneging on environmental obligations should be the imprisonment of directors and managers of companies.

Following the latest set of amendments under NEMA and the MPRDA, it is no longer certain how long a mine should be liable for environmental damage.

In the instance of **AMD liabilities**, in the period leading up to 1975, intensive negotiations took place between the Department of Water Affairs (as it then was) and the organised mining industry, represented by the Chamber of Mines. These negotiations culminated in an agreement between the State and the mining companies, known as the Fanie Botha Accord (after the Minister of Water Affairs at that time) relating to the provision for and the management of water affected by mines. It is important to note that the Accord was limited to the rights and obligations of mining companies in relation to water pollution control measures, and did not purport to regulate any other aspect of environmental management.

A clear distinction was drawn between the period prior to 1956 (when the Water Act, 1956, came into force) and the period subsequent to that date. In essence, the State accepted liability for all pollution control measures, the maintenance of such measures and all associated costs in respect of mining operations abandoned prior to the promulgation of the Water Act, 1956, with no recourse to the company concerned. However, the mining companies undertook in such cases that where the company concerned still owned the land on which the abandoned operations were situated, to adopt a reasonable attitude towards the acquisition by the State of such land as it may require for the measures. Further, where the company concerned did not own the land but still owned the mineral rights, the company would do what it could to assist the State to acquire the land needed for the pollution control measures. Otherwise, the company concerned would have no other obligations. The Fanie Botha Accord did not attempt to describe the requirements for pollution control in general terms, but allowed the Government Mining Engineer to determine appropriate measures on a case by case basis. As mentioned above, the Accord was restricted solely to water pollution and in itself imposed no environmental obligations on mining companies. Nonetheless, its

importance lay in the creation of a precedent for the State and mining companies to negotiate solutions for the control of pollution and the sharing of costs.

To **incentivise improved environmental responsibility** by mining companies, some stakeholders suggested tax breaks on costs incurred for rehabilitation activities or more practically, some form of rebate on the royalty payable in the early years of a mine's life. Creating incentives for dealing with regional and cumulative impacts would be even more important to consider e.g. the eMalahleni water treatment plant. One example given was that the Chamber of Mine has done studies to determine the average water used to produce 1g of platinum and each member company attempts to align or better its water use with this standard. This can be perceived as bordering on self-regulation. In other cases, mines in the Northern Cape are taking over unrehabilitated legacy mine sites in exchange for reduced royalties to the State. Development of relevant new knowledge and good environmental practice by the regulators would also serve to incentivise compliance. Other stakeholders remained adamant that there should be no incentive offered for environmental responsibility when it is a necessary cost of mines benefitting from resulting profits. This was extended to question why a company should be incentivised to fulfil what are legal obligations in its mining right. Concerns around how various possible incentives would be implemented were also raised as this may threaten the relationship between the regulator and mines which they regulate.

4.3. Efficiency

4.3.1. Application processes

Applications for environmental authorisations are currently being made by mines to the DMR, DEA and DWS. At present, most mines are following duplicate processes stipulated in both the MPRDA and NEMA with similar EIAs and EMPs required to be submitted to both the DEA and DMR. Confusion regarding the ultimate competent authority is widespread and concerns around this have been highlighted by stakeholders. Most mines intend to continue following these duplicate processes until the amendments to the Acts are implemented in December 2014. Water use licence applications are submitted to the DWS only.

Stakeholders perceive the EIA submission process to be efficient and occurs within a timeframe of six to eight months. The entire process of environmental authorisation should take two to three years but certain authorisations may be delayed, which translates into some mines having no licence to operate even after this lengthy time. One mine reported to have submitted an EMP in 2012 that has still not been processed. According to NEMA, the regulator has at most 180 days for a Record of Decision (RoD) but stakeholders reported that often after six months, the only communication they receive from the regulator is regarding what changes to the submission are required, most of which are not driven by the guideline or regulations. There seem to be no clear timeframes for DWS regarding the issuance of Water Use Licences, which seem to be the source of most delays. In the best case, this may take 14 months and five years at worst. The DWS is aware of its resource shortage, in terms of personnel and equipment, and the resulting application process backlog. As such they are endeavouring to adhere to the new '300 day rule' as per NEMA and the MPRDA. Some stakeholders claim that efforts to deal with the situation seem to be ineffective, while others report that the processes and delays have slightly improved recently.

The new round of legislative amendments stipulates application process timeframes that are shorter than those contained in previous guidelines. The proposed 'one stop shop' at the DMR implies that a decision on applications will take at most 300 days, and that the process will be more streamlined, reducing duplication. One stakeholder mentioned that these timelines will depend on internal capacity and systems and is doubtful that this timeline will be adhered to.

When asked to **rate their experience of the application process** on a scale from 1 to 5 (where 1 is efficient and 5 is onerous), the best rating was 3 with most being a 4 or 5.

Reasons for the overall onerous perception of the application process are timing delays, technical inabilities by department staff and lack of effective internal assessment processes. One stakeholder cited an example where a single EMP amendment document required approximately 20 resubmissions with a particular section of the document being revised 39 times at the request of a DMR official. Another point raised in interviews was that each department involved in the application process examines only their particular field and tends to operate in complete isolation to others. This does not allow for the flow and accumulation of information, which is frustrating to the applicant.

Each mining site has large variations in terms of **application submission costs**, depending on the mining resource, type, activity and area. The range of costs mentioned by stakeholders for EIAs or EMPs is R5 million to R10 million. Included in this is the Water Use License cost which can be between R2.5 million and R3.5 million. Of these costs, the majority accrues to specialists for their time in researching and drafting the submissions. According to interviews, a standard EIA contains about five specialist studies. Big projects usually have numerous specialist studies resulting in an EIA costing R5 million. A more detailed and intense the public participation process is also costlier. One stakeholder mentioned that these costs were reasonable and served to exclude smaller mining companies that are unsustainable and unlikely to able to take responsibility for environmental damage. Another stakeholder highlighted the fact that companies in the mining industry are price takers, and have a limited ability to pass costs on to their customers, which leaves the industry with limited resources to absorb inefficient compliance costs.

To **improve the application process**, all stakeholders agreed that overcoming the duplication and disconnect between government departments would go a long way in addressing the inefficiency of the environmental governance system. This may take the form of a single document including different sections for all types of environmental applications, or a single overseeing authority that ensures all departments give feedback on their relevant sections and all licences are approved simultaneously. The perception in terms of implementation is that the departments require more staff with greater technical abilities, not only to improve turnaround times but to also critically evaluate submissions through additional research and experience. Mention was made of the inefficiency of the manual application processes, and that all departments should have basic computers and management information systems in place to assess submissions.

4.3.2. Reporting requirements

Smaller mining companies often lack in-house expertise, and hire consultants to prepare the bulk of their environmental application submissions and monitoring reports. In large mining companies, reporting documents and associated research is often produced internally and then reviewed by an external consultant. One large mining company claimed that both internal and external annual monitoring was done regarding Water Use Licenses. Some of its mine complexes prepare quarterly or even monthly reports. Once an EIA is approved, the mine appoints an independent Environmental Compliance Officer (ECO) to monitor the construction phase and all conditions associated with the licence. Another respondent claimed that mines often outsource activities during this phase to subcontractors that are unaware of licence conditions. If they are not monitored closely, subcontractors are sometimes in danger of violating these conditions and the mine company will then be held liable.

Similarly to the costs of applications, **monitoring costs** depend on the mine but also on the type of consultants and specialists used. One stakeholder mentioned that a single round of monitoring (i.e. one EMP submission) required 5 days of consultant time. The cost of a basic assessment (BA) can total between R500 000 and R1 million. Another said that updating documents in accordance with NEMA and NWA requirements for a new project cost R1 million excluding any specialist studies. This included an amendment to the documents, conducting of the public participation process, interactions with the relevant government departments and a handful of water studies.

When rating their **experience of monitoring and reporting requirements** on a scale from 1 to 5 (where 1 is efficient and 5 is onerous), interviewees responded with either 4 or 5. Lack of feedback on EMP reports from regulators seems to frustrate stakeholders who spend significant amounts of time and resources without the assurance that they have accurately compiled these reports. One company explained a situation in which the DMR had not approved its consolidated EMP report, but was subsequently required to prepare for audits on several separate EMPs relating to a single mine. The overall consequence of these experiences, according to stakeholders, is the breakdown in trust between the State and mining companies. The latter suggests that as an alternative to the State's focus on penalties, a collaborative approach to improving environmental governance practices should be developed.

In **comparison to environmental compliance internationally**, stakeholders considered South Africa's framework to be on par with developed country standards (such as Canada, Australia, United States) and more sophisticated than those of other African countries. There were differing views as to whether this made compliance costs in South African higher or lower than other countries. South Africa is also different from many other emerging countries in that the process of holding large multinational mines accountable through legislation is well-used and authentic.

There was little agreement in the stakeholder responses as to whether this means that South African requirements related to environmental matters in mining are more onerous than its international counterparts. One point highlighted was that it may be considered more burdensome due to blanket requirements. For example, even if an area or activity is not environmentally sensitive, environmental requirements remain the same. In terms of financial provision costs, South Africa is higher than other African countries but in line with developed countries. Within the Canadian and German contexts, there are programmes where the state takes over the liability for legacy issues associated with mining. South Africa does have slightly lower financial provision requirements relative to Scandinavian countries by about 20-30%.

The main suggestion for **improving monitoring** of environmental management in mining is the increased provision of feedback from the regulator to mines. To ease the compliance burden, amendments to EIAs and EMPs should also be handled as part of the review and monitoring process. Mines should be able to report activity changes and get approval for these changes without having to re-apply as new information, activities and environmental impacts arise. Similarly to the application process suggestions, improvement of the capacity of inspectors will assist in creating more of a collaborative approach to monitoring and to improving environmental practices.

4.4. Impact

4.4.1. Effect of the environmental governance framework

Historically, the environmental aspects of mining were not well regulated. It was only with the Mines and Works Act, 1956 (Act No. 27 of 1956) that specific measures for the protection of the surface of land were enacted. In 1991, the Minerals Act, 1991 (Act No. 50 of 1991) was passed, which paid more attention to environmental regulations. In particular, an applicant for mining authorisation was required to prepare an EMPR, requiring mines to demonstrate a plan for environmental remediation and financial provision for such activities. These principles have remained in place in the MPRDA as amended, which compels mining companies to:

- Implement the principles of sustainable development, as well as other generally accepted principles of sustainable development by integrating social, economic and environmental factors into planning, implementation, closure and post-closure management of prospecting and mining operations.

- Implement integrated environmental management.
- Conduct an environmental impact assessment and submit an environmental management programme to identify, mitigate and manage the environmental impacts emanating from prospecting or mining activities.
- Consult with interested and affected parties, government departments and organs of State at national, provincial and local authority level.
- Make sufficient financial provision for rehabilitation, remediation of environmental damage and management of negative environmental impacts. The MPRDA regulations prescribe the methods for financial provision and the detailed itemisation of all costs.
- Plan for mine closure to ensure environment, social and economic sustainability beyond the life of the mine.
- Conduct an environmental risk assessment and adopt a closure plan that continues throughout the life cycle of the mine, starting with conceptual closure plans prior to production, periodic updates throughout the life of the mine, and a final decommissioning plan.

Over and above the MPRDA, NEMA also governs the mining sector. NEMA and the EIA Regulations set out lists of identified activities requiring basic assessment procedures, scoping and full EIA procedures which are pertinent to many of the ancillary activities associated with mining.

Most stakeholders agree that there have been significant **changes since the promulgation of environmental governance legislation**. Mines operating under the current legislation are more accountable than those that were operating before the Minerals Act of 1991, the initial introduction of environmental responsibility. A number of stakeholders emphasised that had the current legislation been in place from the advent of mining, there may currently be fewer mines in existence but they would all be more environmentally responsible and the legacy environmental impacts and related costs to the State would be significantly reduced.

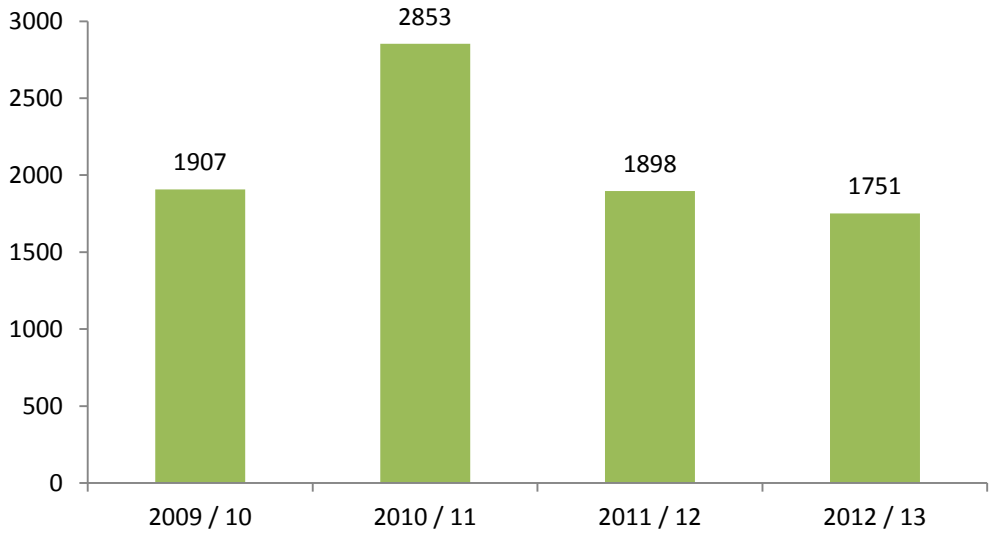
Many stakeholders reported that mining companies today are more aware of their environmental impact and responsibilities. It is generally accepted that the most significant improvements regarding environmental governance have occurred in the last 10 to 15 years (specifically through the 1991 Minerals Act and the 2002 MPRDA). This legislation has forced investors and mining companies to quantify the explicit costs of environmental rehabilitation upfront. In terms of mines that enter liquidation or are abandoned with no closure certificate, the financial provision requirements currently in place would have avoided much of what is the State's liability today. The framework has also driven mines to develop more environmentally responsible technologies and techniques of mining which may not have happened otherwise.

Those stakeholders who did not believe that the framework has been responsible for significant changes in environmental governance are primarily of the opinion that international listing requirements, reputational risk, shareholder activism and funding conditions are more important drivers of environmental compliance, particularly in larger companies. Others believe that the legislation is still unclear regarding responsibilities between the State and mining companies and as such, does not have any real impact. A significant driver behind this opinion also lies in the perception that implementation of the legislation is currently inadequate, which dampens any effect the legislation may have.

One mining company noted that due to the increased environmental awareness of the leadership in the company, the **quality of its EMPs** has improved. The company requires a 95% compliance level to be achieved, which is linked to personal performance assessments and bonuses. Other companies have also noted the increased investment in monitoring equipment – water monitoring in particular seems to be have improved due to the cumulative effect of pollution by mines in a surrounding area.

Figure 5 below shows the number of **EMP inspections** conducted by the DMR in recent years. Since 2010/11, when its peak of 2853 inspections took place, the number of inspections carried out by the DMR has fallen. However, it is unclear what proportion of the total number of EMPs this is, which would allow for a more conclusive finding.

Figure 5: Number of environmental management plan / programme inspections by the DMR



Source: DMR Annual Reports

Financial provision requirements are applicable to both old and new order mines. This can take the form of a cash deposit, a financial provision trust fund or a bank guarantee. According to interviews, mines granted mining rights under the MPRDA that have financial provision for rehabilitation in the form of bank guarantees have not been operating long enough and are not yet at the closure phase. Unless the mines are more mature and environmental effects are significant, bank guarantees are unlikely to be called up. Old order mines have also not had enough time since the 2002 MPRDA to see the effect of the financial provision. For a period of five years after the introduction of the MPRDA in 2002, these mines were given time to calculate and make provision for environmental rehabilitation going forward. Because drawing on financial provision occurs only in cases of insolvency, extreme noncompliance and latent environmental effects (which take many years to materialise), not enough time has passed for the State to have reason to call up on financial provisions.

In 2011/12 the DMR found that 629 mines operated with adequate financial provision for rehabilitation. In 2012/13 60.4% of all mines were operating with adequate financial provision. While preferable to compare both the absolute and percentage forms of mines with adequate financial provision for a clearer picture, this was not available[36]. In 2010/11 only 37.3% of mines were deemed to have fully funded their environmental liabilities, which fell short of the DMR's target. This figure is illustrative of the lack of compliance with financial provisioning and the significant environmental risk that the State could have to bear.

Table 7 below presents the financial provision statistics by regional office from the DMR. While this appears to show that a large sum has been set aside for financial provision, without data on the required value of financial provision, very little can definitively be said of these values.

[36] From the DMR annual reports, the reported indicator changed from an absolute number to a percentage with no further information.

Table 7: Financial provision statistics by region

Region	Financial provision
Gauteng	R3.9 billion
Mpumalanga	R11.1 billion
Northern Cape	R4.7 billion
Eastern Cape	R74.5 million
Western Cape	R382.3 million
KwaZulu-Natal	R890.8 million
Limpopo	R11.3 billion
Free State	R171.7 million
North West	R5.8 billion

Stakeholders believe that mines that were established after the 2002 MPRDA are well funded to manage rehabilitation and closure requirements. The perception is that the same may not be true for those mines that were established prior to 2002. Some stakeholders stated that the financial provisions are often not sufficient because of unexpected additional costs once rehabilitation begins, such as tender process costs, as well as inadequate methods of cost calculations.

The environmental effects of mining activities on the local communities are mixed. The resource, region, mining type and duration all interact to create different effects on the surrounding communities. The effects on the communities and the mitigation actions that have been studied as part of the case study research are summarised below. The effects of the legislation in each context are also addressed.

Box 1: Acid Mine Drainage – Gauteng

The environmental impacts associated with historic gold mining activities and areas include the flooding of the underground mine workings and the subsequent generation and decant of AMD. Flooding of the Witwatersrand Basin began when the last mine shut down, and the pumping of water from the underground, interconnected workings ceased. It has been noted, with the aid of a seismic monitoring programme, that the flooding of the Central Basin has been associated with an increase in seismic activity[37].

There are a number of risks associated with AMD, those of major concern are mentioned below:

- The contamination of shallow groundwater resources (namely dolomitic clusters) required for agricultural use (cattle or crop farming) and for human consumption;
- The flooding of underground infrastructure may occur in areas where mining took place close to urban areas;
- Elevated radioactive levels in the treated AMD and remaining waste generated (more so in the Western and Central Basin);
- On-going waste management requirements for the treatment of AMD; and
- AMD extensively contaminates surface streams and could incur devastating ecological impacts.

An Inter-Ministerial Committee (IMC) was established to enable inter-departmental cooperation in dealing with the issue of AMD in the Witwatersrand. This comprises of the Ministers of Mineral Resources, Water and Environmental Affairs, Science and Technology and the Minister in the Presidency: National Planning Commission. The IMC subsequently appointed a Technical Committee to coordinate a Team of Experts to prepare a report on the management of AMD in the Witwatersrand goldfields.

[37] Inter-Ministerial Committee. 2010

This report is but one component of a larger scheme to overcome AMD. It has been endorsed by Cabinet and funds were allocated to the Department of Water Affairs from Treasury to implement some of the IMC recommendations, namely[38]:

- Implement measures to pump underground water to prevent the Basins reaching their critical water levels;
- Implement measures to neutralise AMD, for example by changing the pH or removing the heavy metal components; and
- Initiate a feasibility study to address the medium- to long-term solutions.

Each basin within the Witwatersrand requires active treatment of AMD, with the treated water discharged into the environment. The treatment of AMD results in the generation of solid/liquid wastes (depending on treatment technology adopted). This solid/liquid waste would need to be managed and disposed of at suitably lined waste facilities. The waste disposal site will also result in manageable impacts to the environment, due to its constituents. The authority further stated that rehabilitation for the entire Witwatersrand region will amount to approximately R10 billion, however, the government currently lacks these funds. A stepped approach will be adopted to implement the STI and LTI measures for AMD management in the Witwatersrand.

The overall impacts and legacy issues experienced with historic gold mining in the Witwatersrand has improved our knowledge, which in turn has informed the evolution of legislative requirements that are now present in the current framework. Essentially, the extent to which the current legislative framework results in improved environmental management is a direct result of the impacts experienced and knowledge gained during the historical gold mining in the Witwatersrand.

There were divergent views between government departments with regards to the extent to which the negative impacts associated with mining historically would have be reduced had they been in operation under the current framework. One authority felt that if the mines responsible for the AMD issues in the Witwatersrand Basin were in operation today under the current framework, the negative impacts associated with the mining activities would still be present. This is assuming that the level of enforcement and application of the current environmental framework is as it stands at present. The authority is of the opinion that the current legislative framework is comprehensive, however, there is an element of ineffectiveness associated with the lack of enforcement, monitoring and mine closure certificates. Concerns were raised stating that due to a lack of closure certificates being issued, mining houses may eventually abandon their operations due to no response from the authorities, thus creating future legacy issues and state liabilities.

On the other hand, that the negative environmental impacts would have been reduced significantly had the current framework been effectively implemented at the time when the mines responsible for the legacy issues were in operation. One authority stated that the current framework would have helped, particularly in terms of application for water permits. Trust funds would have been made available for rehabilitation as per closure objectives described under the current framework. However, there are limitations within the current framework as the EMP obligates funds to be set for the DMR. It does not cater for water concerns and no financial provision is made for the water authorities.

[38] Inter-Ministerial Committee. 2010

Box 2: Coal mining – Mpumalanga

Coal mining stresses the environment during extraction, beneficiation and the transportation of coal to a power station or other customer. The coal mining process affects the environment in the form of water, air and soil pollution. Stakeholders also indicated that mining in Mpumalanga is resulting in sinkholes. There are examples of mines that were not appropriately rehabilitated or fenced off. As a result people have now settled on the exclusion zone of the mine and there have been instances of sinkholes occurring and children falling into the holes.

Underground fires in the coal beds in Mpumalanga are another environmental hazard to surrounding communities. These underground fires are typically ignited by surface fires or spontaneous combustion and can burn for decades underground[39]. These compromise the stability of the surface above the mine resulting in widespread subsidence. Where coal fires occur, there is also attendant air pollution from the emission of smoke and noxious fumes into the atmosphere, which adversely affects the surrounding communities[40].

These underground fires are common in abandoned mines that have not been rehabilitated. As a result of insufficient rehabilitation legislation in the past, Mpumalanga is now faced with these legacy issues. The current legislation and the rehabilitation requirements are, however, designed to protect against such occurrences from being repeated in the future.

Prior to the Minerals Act, base mineral mining companies did not require a mining license or authorisation and were thus able to practice environmentally detrimental mining techniques. After the promulgation of the Minerals Act, there was an immediate improvement in that coal mines were obliged to submit EMPs and to monitor their performance against these. However, the general perception among stakeholders was that measurable improvements to the environment would be greater if compliance with the framework was better enforced. Typically, the larger mines are driven to comply with good environmental practice as a result of reputational risk and internal targets and objectives. Smaller mines, however, do not have these drivers and are thus less likely to comply with the framework. Thus, while the framework has resulted in a greater awareness of environmental issues, the lack of enforcement and compliance has limited the framework's potential for measurable change. Despite this, stakeholders felt that even a poorly enforced framework was better than in the past when there was no framework.

In addition to an improved awareness of the environment, the framework has also forced companies to develop innovative, more environmentally friendly mining techniques. To reduce the costs associated with rehabilitation, mines have started developing mining methods that are less destructive to the environment. This was considered to be noticeable in 1991 with the introduction of the Minerals Act, and even more noticeable with the promulgation of the NEMA and the MPRDA.

Box 3: Asbestos Mining – Northern Cape

The asbestos fibres from asbestos mining areas can result in water and air pollution, which can result in health impacts for the surrounding communities.[41] The mining of asbestos resulted in the contamination of large areas in the Northern Cape. Asbestos tailings/waste from the mills was used to surface roads and other areas including school playgrounds. In the mid-1950s the Prieska town council used asbestos tailings to surface the golf course and the local communities used tailings to make bricks for building houses.[42] These sources now pose a risk to local communities. Today, unrehabilitated asbestos mines and dumps are also point sources of asbestos pollution as they contain significant amounts of asbestos fibres.

During asbestos production, which peaked in the 1960s and 70s, miners often lived with their families near the asbestos mines and often whole families worked as part of the asbestos production process. This resulted in both occupational and environmental exposure to asbestos. Women and children experienced intense exposure because they were responsible for the extraction and packing of fibre in dry and windy conditions. Men did the heavy manual labour – drilling, blasting, and loading rock into wheelbarrows or cocopans. There are also reports of families sleeping outside in summer to escape the heat and waking up to find themselves covered in asbestos fibre.[43]

At the beginning of the 20th century it was observed that people working with asbestos often suffered from lung disease. Asbestosis, lung cancer and mesothelioma as a result of asbestos mining in South Africa have caused thousands of people to suffer from progressive ill health or premature death.[44] Asbestosis is the name of the disease caused by exposure to asbestos in the workplace. It is a non-malignant lung disease caused by the inhalation of asbestos fibres. Pleural effusion is another asbestos related disease which results in a build-up of fluid between the membrane linings of the lungs and the chest cavity.[45] Mesothelioma can be contracted by environmental exposure to asbestos and is usually caused by exposure to crocidolite asbestos, which is

[39] Singer, 2010
[40] Ibid
[41] Bezuidenhout, 2013
[42] McCulloch, 2005
[43] McCulloch, 2005
[44] Harington and McGlashan, 1998
[45] Bezuidenhout, 2013

considered more carcinogenic than other asbestos fibres (amosite and chrysotile). This is a malignant lung disease or cancer and is usually fatal.[46] Approximately 26% of mesothelioma cases in South Africa are due to environmental exposure to asbestos. Exposure to crocidolite asbestos accounts for 93% of cases of mesothelioma due to environmental exposure in the Northern Cape. More than 70% of all cases of mesothelioma due to environmental asbestos exposure occur amongst women and children.

Asbestos mining in South Africa ceased in 2002 but unrehabilitated asbestos mines, now classified as derelict and ownerless mines, continue to act as a source of pollution in the Northern Cape. Where original mining companies are defunct or cannot be traced, it is the responsibility of the South African government to ensure that derelict and ownerless asbestos mines are rehabilitated to a similar or better land use capacity than its pre-mining land use capacity. The State also needs to monitor and improve the disturbed environment using the best available technology.[47]

By contrast, mines subject to regulation under the MPRDA, notwithstanding a cessation of operations, will only be regarded as closed if a closure certificate has been issued in terms of section 43 of the MPRDA. Until a closure certificate has been issued the owner of the mine remains legally responsible for all liabilities related to the mine. Furthermore, the owner is required to make financial provision for all environmental liabilities related to the mine in terms of sections 41 and 43 of the MPRDA.[48]

The costs of mining-related environmental liabilities for the State could have been reduced if the prevailing legislation during the mine's operation period required owners to make financial provision for rehabilitation and closure. This was however not the case and the rehabilitation responsibility, and hence costs, now fall to the State.

Box 4: Platinum Mining - North West

The mining and production of platinum involves extracting and refining the metal through complex and lengthy processes

Throughout this process different environmental impacts are generated. The table below sets out the different stages, the primary mining activity and the associated environmental impacts.

Table 8: Summary of environmental effects of platinum mining

	Above or below ground mining / extraction	Rock crushing	Floatation and drying	Smelting and refining
Primary mining activity	Blasting operations	Crushing and milling operations	Production of concentrate	Recovering platinum from concentrate
Environmental impact	• Noise and Vibration • Dust • Air pollution • Disturbance of ecological systems	• Dust • Energy consumption	• Energy and water consumption • Slurry of fine rock and chemicals deposited on slimes dams • Dust • Water pollution	• Air pollution (dust, sulphur dioxide) • Energy consumption (electric arc furnace, electrowinning)

Source: Cairncross, E. (2014), Authors

From interviews with local stakeholders, air pollution is the main environmental concern for local communities, especially during the windy seasons. The most common form is the emissions from the smelters which, according to stakeholders and literature, often emit more pollution than the guidelines/standards which govern them. The mine smelters burn 24 hours a day and the release of carbon dioxide (CO_2) and sulphur dioxide (SO_2) remain a major health risk for surrounding communities. The Annual Report of the DMR for 2011-2012 indicates that platinum mines reported the diagnosis of:

- 129 workers with silicosis;
- 1 005 with pulmonary tuberculosis; and
- 367 with noise induced hearing loss.[49]

The annual report also describes findings of high levels of silica dust in several mines as well as excessive heat and noise. A 2012 report by the Bench Marks Foundation reports that high incidences of asthma, ear, nose, throat and lung ailments in the Bojanala District of the Rustenburg area may be attributed to poor air quality.

[46] Bezuidenhout, 2013
[47] Liebenberg, Claassens and Van Rensburg, 2012
[48] AGSA, 2009
[49] Kisting. 2014

This is as a result of the smelters, as well as dust fall-out from dust roads used by mine vehicles, and open pit mining and tailings. These emissions also give rise to acid rain, with a harmful impact on farming activities.

Sources of noise and vibration in the mining environment result mainly from machinery, heavy transportation and blasting.[50] Communities in the vicinity complain of blasting at the mines which take place at regular intervals. This presents safety concerns in the way of houses shaking and cracks appearing. According to interviews, to ascertain whether nearby houses are cracked prior to blasting, local mines use vibration monitors to determine if their blasting is the cause when complaints are tabled. According to Impala Platinum, most of the mines near Chaneng and Luka in the Rustenburg region are between 500 metres and 1 000 metres deep. This means that these mines are shallow enough for them to cause surface tremors during blasting. This situation is similar in the Marikana region where houses also suffer from extensive cracking.[51]

Although interviewees indicate that platinum mining is usually conducted underground, thus affecting a smaller surface area, related activities may still have impacts on the surrounding land and the use thereof. Solid waste in the form of tailings dams and waste rock dumps litter the North West landscape, with about 98% of extracted ore ending up as rock dumps. As a consequence, rock dumps from ore processing covers land previously used for food production. Nearby land is sometimes abandoned with evidence of many vacant homes and untended crops.[52]

The significant water and energy consumption by the mines is in stark juxtaposition to communities that are in almost constant need of water and electricity[53]. This finding was supported by interviews as communities often complain of decreased levels of water and dry boreholes due to the high water usage of the mines. According to stakeholders, the province is highly stressed in terms of water availability and has experienced a water deficit since 2000. This is fuelled by reports[54] of mines accessing water from other sources such as boreholes and Rand Water.

Despite these findings, the perception by interviewees is that currently, communities themselves do not experience much water pollution. An additional finding from interviews was that, notwithstanding these environmental effects, communities in the area place more weight on the mines' economic benefits and job creation than environmental effects.

The most obvious effect of the promulgation of environmental legislation has been the modified compliance activities of mines in the region. Platinum mines that mine in the same vicinity are forming environmental forums to discuss the legislation and how to address environmental issues. For example, aquatic biomonitoring of the proximate rivers is done jointly for improved monitoring and formation of solutions. According to stakeholders, compliance with the legislation has also contributed to the improvements for the surrounding communities who may otherwise not have access to improved groundwater and air quality.

Local authorities are also empowered through legislation to notify the DMR of environmental hazards and, where necessary, to force government to address these issues by issuing directives. Stakeholders believe that with overarching legislation, environmental issues which go beyond a single mine may now be escalated and dealt with more effectively at a regional level.

The exact **amount spent by the State and private companies to rehabilitate areas** resulting from past mining activity is unclear. Private sector spending in this regard is unavailable. Below is an indication of spending by the DMR on legacy issues such as asbestos pollution. Unfortunately data was not available on the total value of the rehabilitation need and as such no comparative assessment can be made. It should be noted that the amount available to spend by these government departments is a) limited by the allocation of funds from the National Treasury and b) when available, are not necessarily conducive to the 'complete' solution.

[50] Cronjé, 2013
[51] The Bench Marks Foundation, 2012
[52] Kisting, 2014
[53] Cairncross, 2014
[54] Bench Marks Foundation, 2012

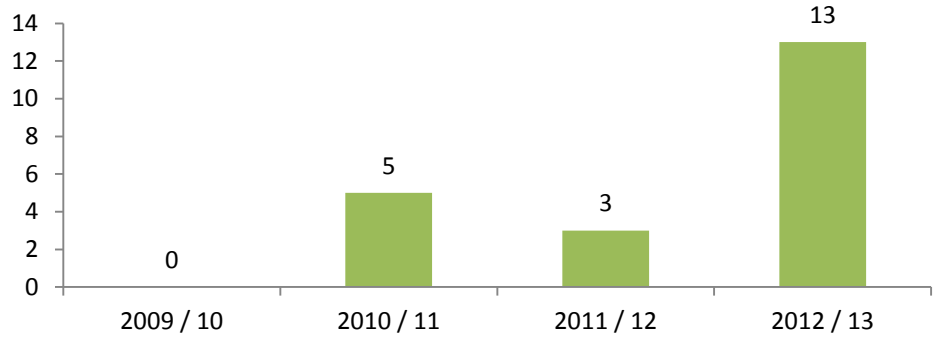
Table 9: Indication of DMR spending on legacy environmental effects

Detail of environmental rehabilitation spending by DMR	Total
2012 - 2013	**69 930 864**
Payment to Mintek for Mine rehabilitation projects: Mintek rehabilitated 14 sites and completed a closure plan for the Osizweni site with an allocation of R90mil over three years.	30 000 000
Council for Geoscience paid for mine rehabilitation project	20 000 000
Council for Geoscience paid for research into Witwatersrand water ingress project	18 381 000
Environmental rehabilitation liability	1 549 864
2011 - 2012	**49 998 440**
Payment to Mintek for Mine rehabilitation projects:	30 000 000
MINTEK paid for implementation of Witwatersrand water ingress project	16 893 000
Environmental rehabilitation liability There are a further 5930 abandoned mines that the DMR does not have current obligation to rehabilitate	3 105 440
2010 - 2011	**47 671 000**
Paid to Mintek for Mine rehab projects	30 000 000
Paid to Council for Geoscience for Witwatersrand water ingress project	17 671 000
Environmental rehabilitation liability	-
2009 - 2010	**17 600 000**
Paid to Council for Geoscience for Witwatersrand water ingress project	17 600 000

Source: DMR Annual reports

Figure 6 depicts the number of derelict and ownerless mine sites rehabilitated by the DMR. The annual reports do not specify whether these are exclusively asbestos mines. Since 2009/10 there has definitely been an increase in the number of mines rehabilitated by the State.

Figure 6: Number of derelict and ownerless mine sites rehabilitated by the DMR



Source: DMR Annual Reports

Spending by the State on issues relating to AMD occurs primarily through the DWS. In May 2012, Mr Trevor Balzer (the then DWS Chief Operations Officer) was quoted as saying that the approved budget for the AMD rehabilitation project until March 2014 was R433 million, but the DWS needed about R900 million[55]. A more recent media report claims that AMD rehabilitation is set to cost at least R9 billion[56]. This was confirmed by a stakeholder who referred to a treatment plant that is currently being constructed at the Eastern Basin at a cost of R1.3 billion. This would amount to R10 billion for the total AMD rehabilitation in the Witwatersrand region.

For the three years prior to 2008 the Department of Minerals and Energy (DME) (as it was

[55] http://www.pmg.org.za/report/20120522-briefing-department-water-affairs-progress-report-governmental-steps-
[56] http://www.moneyweb.co.za/moneyweb-south-africa/sa-needs-1bn-to-make-toxic-mine-water-potable

then known) had only rehabilitated five of the 5 906 **derelict and ownerless mines** in South Africa at a cost of R42 million and the Auditor-General found that the DME was not addressing the environmental and social impacts of the mines effectively and timeously. The DMR has since focussed its rehabilitation efforts on derelict and ownerless asbestos mines due to the associated health and environmental risks. Derelict and ownerless asbestos mines totalled 144 in April 2008 - 66 of which had been rehabilitated, 12 of which were partially rehabilitated and 66 which had not been rehabilitated. These mines are located in five Provinces with the majority (64 mines) located in the Northern Cape.[57]

The rehabilitation of derelict and ownerless mines forms part of the DMR (formerly DME) medium term strategy. The Department plans to spend R327.6 million to rehabilitate 120 over the medium term. The rehabilitation of these mines is a key area of focus for the Department and 30 mines have been prioritised for rehabilitation during the 2013-14 financial year. The strategic targets for the rehabilitation increase to 40 mines in 2014-15 and 50 mines in 2015-16.[58]

The DMR has been working with the Mineral Economics and Strategy Unit (MESU) of Mintek to rehabilitate derelict and ownerless mines since 2010. The DMR provides Mintek with funding and Mintek evaluates the sites and prepares rehabilitation plans. Mintek appoints subcontractors to conduct the rehabilitation work, while managing the rehabilitation process. One stakeholder mentioned that the State has granted royalty breaks to mines which opt to rehabilitate abandoned mines in the area.

During this three year programme, ending at the end of the 2012/13 financial year, the DMR has allocated R90 million for rehabilitation of these mines. Since the programme started in 2010, five sites in the Northern Cape have been successfully rehabilitated and rehabilitation is ongoing at sites in Limpopo, Mpumalanga and the Eastern Cape.[59]

Table 10 provides a summary of the DMR rehabilitation efforts for the financial years 2010/2011 to 2013/2014.

Table 10: Summary of DMR Rehabilitation Efforts for the 2010/2011 to 2013/2014 Financial Years

Financial Year	Target	Actual	Costs
2010/2011	7	5	R 30 million (Mintek)
2011/2012	10	3	R 30 million (Mintek)
2012/2013	12	13	R 20 million (Council for Geoscience) R 30 million (Mintek)
2013/2014	30	28	R 40 million (Mintek)

Sources: DMR 2011, DMR 2012, DMR 2013a and DMR 2014

In determining which ownerless and derelict mines to prioritise for rehabilitation, the DMR grades mines according to the ranking matrix approved in the National Strategy. This matrix ranks mines on the following criteria on a scale from 'very low' to 'very high':

- Proximity to human settlements;
- Immediate physical threat to people entering the site;
- Host rock/ore poses a threat to people entering the site;
- Contaminated soils pose a threat to people entering the site;
- Residue deposits pose a threat to people entering the site/or the environment;

[57] AGSA, 2009
[58] DMR, 2013
[59] Mintek, 2012

- Site results in water contamination;
- Site adversely affects local drainage;
- Windblown dust from the mine affects local communities;
- Combustion gases from the mine affect local communities;
- The mine has a negative impact on a sensitive or protected ecosystem;
- The mine has a negative impact on current or future land use; and
- Indiscriminate rehabilitation or neglect of the mine could destroy a potential heritage.

5. Analysis

This section serves to analyse the findings of the evaluation through answering the 6 evaluation questions provided in the ToR. Many of the questions are two-pronged, where the second component of the question relates to the recommendation stemming from the first component. These recommendation-oriented questions are dealt with in *Section 6: Recommendations*.

5.1. Evaluation questions

5.1.1. Is the current guideline used to determine the cost of rehabilitation of mining operations adequate and effective to ensure adequate rehabilitation and to protect the State from mining-related long term liability?

Based on a comprehensive review of the guideline, stakeholder interviews and experience working with the guideline, it is considered to be insufficient for calculating the costs of rehabilitation. Most mines complete their own calculations based on different parameters and set aside additional funds to ensure that they have sufficient resources for rehabilitation and closure. The guideline is thought to be outdated, too generic, and do not include underground or surface water liabilities, which usually account for a large percentage of mines' total liability.

Interviews with mining houses and industry bodies indicated the following inadequacies with the guideline:

- Typically, larger, reputational-driven mines set aside funds in addition to that which is stipulated by the guideline so as to ensure adequate rehabilitation. While this is not the case of all large mines, many of the larger mines have multiple lines of reporting and authority and thus are more prone to self-comply than the smaller companies.
- Smaller, more compliance-driven mines set aside what is stipulated by the guideline and thus do not have sufficient funds for rehabilitation, which could result in environmental degradation going forward and the State having to fund necessary rehabilitation measures. However, given that these are the smaller mines, their proportion of risk to the State is smaller.

Although on the face of it, the inadequacies of the guideline for the calculation of financial provision may present some risk to the State, this is mitigated by the provisions of the MPRDA and the Regulations. Section 43(7) of the Act provides that "the holder of a prospecting right or mining right [or the holder of a historic right], must plan for, manage and implement such procedures and such requirements on mine closure as may be prescribed." Regulation 61 spells out the key objectives for closure of a mining operation guiding the project design and management of environmental impacts; providing broad future land use objectives for the site; and determining proposed closure costs. Regulation 62 demands that a closure plan, among other matters, must provide details of any long-term management and maintenance expected and give details of the estimated closure cost and financial provision for monitoring, maintenance and post closure management.

The DEA draft financial provision Regulations that were made public in the fourth quarter of 2014 do refer to an updated guideline for calculating the cost of financial provision for the

rehabilitation and closure of mines. Since these Regulations have not yet been brought into force, the effectiveness of the implementation of this guideline cannot be assessed as part of this evaluation.

5.1.2. Are there means or mechanisms for determining the most sustainable use of land, if so are they effective? If not, what mechanism can be proposed?

Regulation 41 (1) d of the MPRDA requires that a scoping report be drafted that identifies the alternative land uses for a proposed operation, in this case a proposed mining operation. It is important to note that this does not call for the identification of the most *sustainable* land use but rather just the identification of *alternative* lands. As such, the identified land use alternatives may not necessarily be the most sustainable. This is particularly the case as the application is made in terms of the MPRDA, which does not take into account agriculture or tourism and is primarily focused on the socio-economic aspects of 'alternative land use'

Moreover, the term "sustainability", has not been defined in the Regulations to the MPRDA and is thus open to interpretation. The Constitution (the Constitution of the Republic of South Africa, 1996) provides in Article 24 of the Bill of Rights that everyone has the right to:

> *An environment that is not harmful to people's health or well-being that is protected for the benefit of present and future generations, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.*

The concepts of protection, prevention from degradation and conservation would appear to be the essentials of sustainability and thus this definition will accordingly be applied.

Every prospecting or mining applicant must provide an EMP detailing the assessment of potential impacts of the proposed operation on the socio-economic environment. Beyond stating that an assessment of potential impacts on the socio-economic environment must be undertaken, there are no prescribed mechanisms to do so. Mines typically elect to do a socio-economic impact assessment which is too narrow a parameter (considering the socio-economic environment only) to determine sustainability. Sustainability would have to take into account the social, economic and environmental sectors in detail using the appropriate methodology for a specific sustainability assessment. Mining yields substantial economic yields in the short- to medium- term, making mining the most economically viable option in most cases. However, this does not take into account the long-term costs associated with a loss of economic activity such as agriculture or conservation.

Furthermore, the process of considering alternatives, as required by the Regulations, does not as a strict rule take into account alternative mining methods, such as the use of different technologies, or alternative land uses beyond mining versus not mining (the Go/No Go approach).

In short, the legislation that was the subject of this evaluation does not prescribe the means and mechanisms to determine the most sustainable use of land nor does it define with accuracy the concept of sustainable use of land. The evaluation of alternative land use options using a socio-economic assessment only will not necessarily provide the best assessment. This has not been addressed by the amended legislation that is detailed in the post-script to this evaluation.

5.1.3. Are the current institutional mechanisms for environmental performance appropriate and effective in achieving and promoting good governance in the mining sector? If not, what changes can be made?

The institutional mechanisms used for environmental performance are the promulgated

statutes and regulations relating to environmental management. The framework described in the regulations is appropriate for promoting good governance in the mining sector in theory; however, it is poorly enforced in practice.

Statutes and regulations

The following issues have been identified within the regulatory framework as of March 2014:

Closure requirements

Closure certificates are seldom issued. This is primarily the result of the reluctance of the DMR to issue these certificates, the reluctance of mining companies to apply for closure and the requirement that all affected departments must comment on the application before the certificate is issued. Firstly, the reluctance of the DMR to issue closure certificates to mining companies is due to the transfer of the environmental liability from the mining company to the State. This means that the DMR will potentially be responsible for the latent environmental impacts emanating from the mining activities post closure, and the funds to rehabilitate those impacts are not always adequate. This is exacerbated by the fact that if the DMR issues a closure certificate, they have no legislative power, nor financial means to remedy any issues that may arise on the site post-closure; similarly, the DMR has no authority to force the company to remedy said issue. Without a closure certificate, the mining company is held liable for the environment indefinitely. This has an adverse impact to companies' willingness to invest in rehabilitation, and in some case has resulted in the sale or abandonment of mines. Secondly, mining companies are reluctant to apply for closure certificates because once these are issued, the company cannot re-mine the site in later years. Thirdly, before a closure certificate can be issued, all affected departments must comment on it which is often the cause of the delays in issuing the certificates.

Financial provisioning

As noted above, the guideline used to calculate financial provisions is insufficient. As a result of this, the State is likely to be left with legacy issues going forward. It is difficult to talk about financial provisioning without mentioning liability. The issue of retrospective liability in particular is a significant one. It has been mentioned that the guideline created to calculate financial provision is inadequate. Yet this guideline continues to be used nationally by mining companies to calculate the rehabilitation funds set aside for any impacts which may emanate post closure. This is anticipated to result in further funding shortfalls in the future. The DEA is currently undertaking a process to update the guideline, however, this evaluation cannot comment on the effectiveness of the implementation of these revisions.

Gaps in the framework

Beyond these specific issues, there are gaps in the environmental framework as a result of the constant iterations and amendments. This has proven to be amongst the most significant challenges as far as legislation is concerned. One such example was noted in the deletion of Sections 38 to 42 of the MPRDA of 2002 (that is, the Sections that previously dealt with environmental governance under the MPRDA). These sections were deleted with the intent to replace them under NEMA. However, with the frequent changes in the environmental legislation, these sections were eventually omitted and were not covered elsewhere, thus leaving a major gap in the environmental legislation. The new legislation detailed in the post-script to this evaluation significantly contributes to reducing these legislative gaps.

The lack of definitions provided in the legislation also creates many uncertainties in terms of the standard or the quality the legislated requirements are supposed to meet. As an example, failing to provide the definition for 'sustainability' in the current framework results in uncertainty in terms of which sustainability standard is to be met. This has not been addressed by the new legislation detailed in the post-script to this evaluation.

Implementation of the environmental governance framework

There are a number of challenges related to the implementation of the legislation. One of those challenges is with regards to the quality of work produced by some consulting

companies. There are some consultants that produce poor quality or, in cases, recycled, generic EMPs. These are often approved by the competent authority as the authority lacks the capacity and technical expertise to assess the EMP appropriately. The consequence of this is that mines are not measured against an accurate base and thus are not likely to ensure environmental sustainability.

Limited capacity and technical expertise within the authority's offices is another significant challenge with regards to implementation. The competent authority needs to have an understanding of environmental impact assessment procedures, the impacts imposed on the environment, an understanding of post-mining land use and an understanding of the overall mining industry. Currently the competent authority does not have this level and degree of understanding, nor does it have a sufficient number of people to monitor compliance. As such, mining companies' environmental practices are not enforced to the degree that they perhaps should be.

There are capacity building initiatives underway to remedy these shortcomings, including:

- Change management workshops;
- Weekly meetings with the DMR, DWS and DEA;
- An arrangement with the University of Pretoria for the facilitation of training for the Environmental Mineral Resources Inspectors;
- The DEA facilitating basic EIA training workshops for the Environmental Management officials in the DMR;
- The DEA facilitating Air quality and Waste Management training workshops for the Environmental Management officials in the DMR;
- The DMR becoming a member of the Working Group VII which deals with enforcement matters within government Departments that administer laws pertaining to the environment;
- The DMR attending the Enforcement Lekgotla facilitated by the DEA; and
- The DMR attending the MinMec forum which deals with EIAs and regulations.

These initiatives however are relatively new and as such the benefits thereof are still to be realised.

The high staff turnover rate in the government departments is also proving to be a challenge as it results in limited institutional memory[60]. The current system used by the regulator is not adequate to retain institutional memory given the high staff turnover. This adds to the inefficiencies of the process as new staff have to ramp up each time someone leaves.

The lack of communication and cooperation between the various government departments also results in an overlap of mandates, policies and procedures thus creating delays and duplication within the application process. With the new addendum to the regulations, effective on 8 December, it is anticipated that the delays in the application process will be reduced as the authority will be mandated to adhere to the application timelines. Furthermore, the fragmentation between different spheres of government results in inconsistency between the various competent authorities, thus creating confusion for applicants. This duplication and uncertainty has adverse implications for mining companies' use of resources and their investment decisions. While it is anticipated that the Interdepartmental Project Implementation Committee (IPIC) will reduce the extent of this confusion and duplication, the full effect of this committee is yet to be determined.

5.1.4. What is the effect of the promulgation of the Minerals Act, 1991 (Act No. 50 of 1991) and the Mineral and Petroleum Resources Development Act, 2002 (Act

[60] The internal reasons for this high turnover were not made available to the evaluation team given the sensitive nature of the information.

No. 28 of 2002) on the environmental performance of mining? Is there a measureable improvement on the environmental performance of mining as a result of these two pieces of legislation?

Since the promulgation of the new legislation, many changes have been made in terms of the requirements stated in the Acts. With these measures, environmental governance of the mining industry has been significantly enhanced. The main requirements that have contributed to this are outlined below:

- The rehabilitation of surface impacts on the environment as a result of prospecting or mining activities;
- Financial provision for the rehabilitation of the surface disturbed by prospecting or mining activities;
- Environmental management plans; and
- The inclusion of base mineral mines in the environmental framework, which was not well regulated under the Regulations under the Mines and Works Act, 1956.

As a result of the current governance framework, mining companies, as per the requirements of the newly promulgated legislation, are held liable for the environment and any impacts caused as a result of the prospecting and mining activities. The MPRDA substantiated the requirements detailed in the Minerals Act and provides a stronger framework by virtue of the Regulations relating to the compilation of EMPs and the calculation of financial provision. This in and of itself is a significant improvement to the governance framework pre-1991.

In as much as the regulated changes in legislation have been noted, implementation remains a concern. As noted above, this includes a reluctance to issue closure certificates, poor quality EMPs being submitted and approved, inadequate compliance monitoring and a lack of capacity in the competent authority. Without adequate enforcement, management and oversight the legislation loses its effectiveness, despite covering all the components necessary for ensuring environmental sustainability.

5.1.5. To what extent are mining-related environmental liabilities covered by the state? Could these costs have been significantly reduced through efficient and effective environmental governance in the mining sector?

Most of the historical mines that were established and operated prior to the environmental governance framework that was examined as part of this evaluation are no longer operational and cannot be held liable for environmental rehabilitation costs. These costs have therefore become the responsibility of the State. The costs of mining-related environmental liabilities for the State could have been reduced if the legislation at the time required mines to make financial provision for rehabilitation and closure.

Under the current legislation a mine is liable until a closure certificate is issued by the DMR after which the State becomes liable. A closure certificate is issued when the DMR is satisfied that all reasonable actions have been taken to mitigate the foreseeable environmental impacts of mining. Currently not many closure certificates are being issued for the reasons outlined above. This is exacerbated by the short-fall in mines' financial provisioning due in part to the inadequate costing guideline. Not issuing closure certificates has the perverse effect of dis-incentivising mines to rehabilitate and close, which could result in mines being abandoned when resources are depleted and the State becoming responsible for rehabilitation costs.

As such, the State is liable for historical mines, however, it has limited liabilities for new mines given that it has issued so few closure certificates.

5.1.6. Is the anchoring of the implementation and enforcement of mining-related environmental governance within the DMR appropriate? If not, what would be the appropriate department?

Under the current legislation (including the National Environmental Management Laws Amendment Act, 2014, which was not in force as at the date this evaluation commenced) the DMR is recognised as the responsible authority for the implementation and enforcement of mining-related environmental governance. This evaluation accepts this as the agreed-upon allocation of this responsibility, and another change to the regime would be too disruptive to the mining industry, but has identified a number of criteria that are required for an effective competent authority:

- A stable staff complement is required with a balance of technical skills and mining knowledge including all specialist fields;
- Experienced environmental scientists and technical experts with specific mining experience are required;
- Sufficient qualified staff to enforce the legislation and monitor compliance;
- Staff need to have experience and exposure in the area they are working in;
- Capacity and institutional knowledge needs to be developed;
- The necessary office space, computers, systems and equipment for staff to work efficiently;
- Efficient, credible and accountable systems that facilitate the effective implementation of the legislation;
- Internal conflict resolution mechanisms;
- An unbiased implementation of the legislation;
- The correct understanding and interpretation of the legislation;
- The authority to take criminal action for non-compliance;
- The ability to get input from other departments and work together with other departments to reach consensus on decisions;
- The ability to make informed decisions based on the application and supporting documentation, and to request additional information if required before making a decision; and,
- The ability to provide mines with advice / guidance / training on how to improve their processes so as to go beyond compliance and apply best practice guidelines.

Currently, these criteria are not all met by any of the relevant government departments (DEA, DMR and DWS). There is a lack of capacity, skills and resources to effectively implement environmental legislation, a large turnover of environmental officials in all departments; and as a result institutional knowledge is not developed and retained.

5.2. Assessment against best practice in environmental governance

Through the country comparisons and desktop view of the *Fundamental Principles for the Mining Sector from Berlin Guidelines 1991, revised 2000*, best practices were identified for the implementation of environmental governance frameworks in the mining sector. This was not a comprehensive best practice research exercise, as such the findings in Table 11 are not exhaustive. However, it does provide a useful framework against which South Africa's performance can be assessed.

Table 11: Comparison of South Africa against international best practice

Best practice	South Africa's practice	Performance
Recognise environmental management as a high priority, notably during the licensing process	South Africa has a well-developed environmental governance framework which clearly defines the importance of environmental management. However,	Can be improved

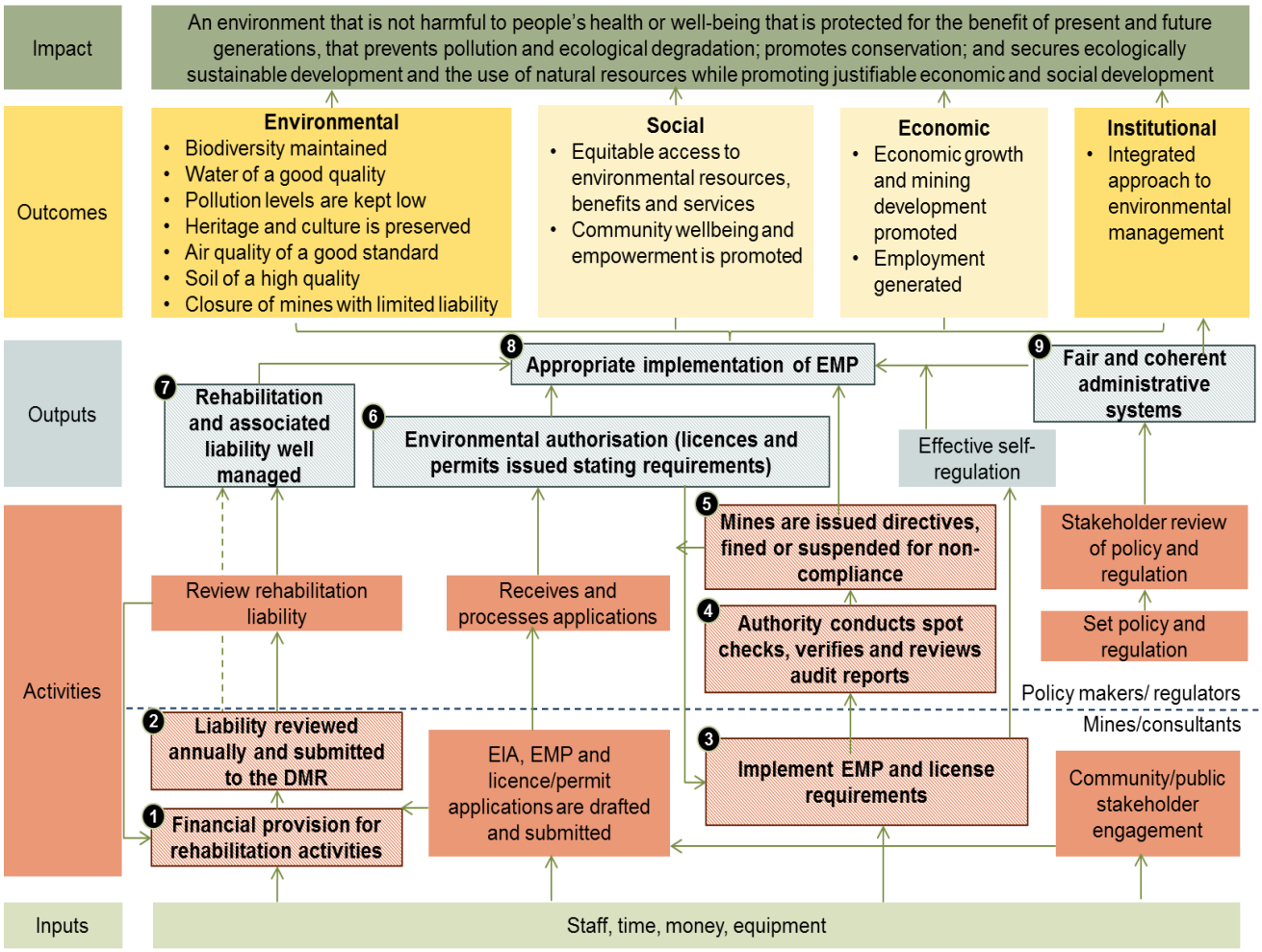
and through the development and implementation of environmental management systems.	the implementation of the framework and the associated systems is weak.	
Effective collaboration between all implementing authorities	In South Africa, there is a lack of communication and cooperation between the various government departments, resulting in an overlap of mandates, policies and procedures thus creating delays and duplication within the application and subsequent monitoring processes.	Poor
Adequate resources, staff and requisite training are available to the authority responsible for implementing the environmental governance framework	Limited capacity and technical expertise within the authority's offices is a significant challenge with regards to the implementation of the environmental governance framework	Poor
Recognition of the importance of socio-economic impact assessments and social planning in mining operations.	South Africa requires that mining companies undertake a socio-economic impact assessment in the application of its mining and/or prospecting right.	Good
Ensure the participation of and dialogue with the affected community and other directly interested parties on the environmental and social aspects of all phases of mining activities	South Africa requires comprehensive stakeholder engagement around the environmental and social aspects of mining operations.	Good
Avoid the use of such environmental regulations that act as unnecessary barriers to trade and investment	South Africa's environmental governance framework is not considered to be a significant deterrent for investors. However, the uncertainty around it and its fragmented nature is confusing for investors.	Can be improved
Recognise the linkages between ecology, socio-cultural conditions and human health and safety, the local community and the natural environment.	South Africa has a comprehensive framework that takes each of these into consideration	Good
Encourage long term mining investment by having clear environmental standards with stable and predictable environmental criteria and procedures	South Africa's environmental governance framework has undergone a number of changes recently. This has resulted in confusion in the industry regarding the regulatory requirements and standards. In addition to this, the legislation itself is fragmented, where mining companies must comply with a number of separate Acts and sets of Regulations.	Poor
Integrate mining planning into broader government land use planning and strategic objectives	South Africa has not developed a national view for land use planning. Mining land use planning is mostly undertaken in insolation to other land use planning objectives	Poor

Regulator provides appropriate tools, guidelines, templates and standardised processes to ensure that mines undertake environmental rehabilitation accurately and consistently.	While South Africa does have such guidelines and tools, these need to be updated and refined.	Can be improved
Ensure that funds are set aside for rehabilitation in a Mining Rehabilitation Fund	South Africa has a rehabilitation fund for this purpose.	Good

5.3. Theory of Change analysis

The theory of change for the environmental governance framework was depicted in Figure 4 above. This was based on the framework's objectives as articulated in legislature and initial conversations with the relevant government departments. Throughout the evaluation, the causal links and assumptions underpinning the theory of change were tested. Figure 7 and the text that follows describe where these break down. A logframe has been developed (presented in Appendix 2) which sets out the indicators that can be tracked to monitor the implementation of the environmental governance framework. The DMR is tracking many of the indicators already as part of their on-going monitoring processes. As such, the logframe presented in Appendix 2 is not so much an additional monitoring requirement, but rather a useful framework for presenting a sub-set of existing indicators which are relevant to the implementation of the environmental governance framework.

Figure 7: Theory of change: Causal link break downs and assumptions



1. **Financial provision for rehabilitation activities:** The guideline does not provide for an accurate costing of the rehabilitation activities.
2. **Liability reviewed annually and submitted to the DMR:** If the calculation of the financial liability in accordance with the DMR guideline is inaccurate, the annual review of the liability presents a skewed result.
3. **Implement EMP and licence requirements:** EMPs are not always prepared to the highest professional standards and some sub-standard EMPs are approved by the DMR. As such, while companies may indeed be implementing their EMP and license requirements, these are not necessarily adequate measures for ensuring environmental sustainability.
4. **Authority conducts spot checks, verifies and reviews audit reports:** The DMR conducts a very limited number of spot checks on operating mines due to a shortage of qualified staff.
5. **Mines are issued directives, fined or suspended for non-compliance:** The result of the poor level of monitoring noted above is that directives and notices of non-compliance are not uniformly or equitably applied.
6. **Environmental authorisations:** These are not timeously processed or issued. Similarly, the stated requirements are not always adequate.
7. **Rehabilitation and associated liability well managed:** As a result of sub-standard EMPs being approved and the delays in environmental authorisations, the rehabilitation activities and associated liability are not always well managed.
8. **Appropriate implementation of EMPs:** As noted above, the EMPs that are approved can be sub-standard and as a result, the implementation thereof is not always appropriate.
9. **Fair and coherent administrative systems:** There are duplications and gaps in the

system as a result of horizontal and vertical fragmentation and limited capacity within government departments.

As a result of these break downs, the ultimate objective of 'an environment that is not harmful to people's health or well-being, that is protected for the benefit of present and future generations, that prevents pollution and ecological degradation; promotes conservation; and secures ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development' is compromised.

6. Conclusions

The findings and analysis of the evaluation have illustrated that in theory the environmental governance framework is appropriate for promoting good governance in the mining sector. However, in practice, the inadequate implementation and enforcement of the framework seriously compromises its efficacy and ability to ensure environmental sustainability.

With the promulgation of the Minerals Act in 1991, environmental governance in the mining sector improved significantly. With the promulgation of this legislation, mining companies were held liable for the environment and any impacts caused as a result of their prospecting and mining activities. This was further strengthened with the promulgation of the MPRDA, NEMA and their Regulations by virtue of the EMP requirements and the calculations of financial provision. The legislation therefore provides a strong basis for environmental sustainability in the mining sector, however, the implementation thereof reduces its efficacy.

The short-comings to both the legislation and the implementation thereof are listed below.

Regulatory framework shortcomings:

- Closure certificates are seldom issued;
- Financial provision guideline is insufficient;
- The constant iterations and amendments to the framework have resulted in gaps and deletions, missing definitions and confusion in the industry; and
- The means by which to calculate the most sustainable use of land are poorly defined and implemented.

Implementation of the legislation:

- The competent authority as the authority lacks the capacity, technical and legal expertise to implement the framework appropriately;
- There is limited retention of institutional knowledge in the competent authority; and
- Implementing the framework requires input and consultation from numerous departments. Currently this process is fragmented and the lack of communication results in delays and duplication within the application process. *While this is expected to be reduced with the addendum to the regulations, effective on 8 December, this is yet to be determined.*

There are a number of processes in place and changes underway to overcome these challenges, including the establishment of an interdepartmental project implementation committee (IPIC) and addendums to the existing legislation. Until this legislation is promulgated in effect, and the activities of the IPIC have been implemented in fruition, the effect of these changes is indeterminate. However indicatively they illustrate that there is impetus in the industry to improve the environmental governance framework and the implementation thereof. Furthermore, the DMR has recognised the need to improve its own capacity as well as that of the DWS and DEA. In doing so, it has embarked on a number of capacity building activities, however, as these were only implemented as part of the 8 December 2014 changes, the effect of these activities is yet to be determined.

7. Recommendations

The findings and analysis of the evaluation have illustrated that in theory the environmental governance framework is appropriate for promoting good governance in the mining sector. However, in practice, the inadequate implementation and enforcement of the framework seriously compromises its efficacy and ability to ensure environmental sustainability.

Based on the findings of the evaluation, the following recommendations have been provided to improve the effectiveness and implementation of the governance framework:

1. **The guideline for calculating the cost of financial provision for the rehabilitation and closure of mines should be updated**. The guideline should include provision for water management and treatment so as to limit the State's liability for this aspect. Furthermore, the guideline should take into account the different types and sizes of mines. *The DEA draft financial provision regulations that were made public in the fourth quarter of 2014 do refer to an updated guideline for calculating the cost of financial provision for the rehabilitation and closure of mines. Since these Regulations have not yet been brought into force, the effectiveness of the implementation of this guideline cannot be assessed as part of this evaluation.*

2. **When the new** guideline **is published, training should be provided to mines and consultants on its implementation**.

3. **Where possible, concurrent rehabilitation should be encouraged or enforced**. This will assist to limit the mining-related liabilities for the State should the mine close unexpectedly. To do this, the DMR could consider allowing mines to reduce their financial provisions as and when their liabilities reduce due to concurrent rehabilitation. Monitoring of these adjustments will need to be carefully considered. *Concurrent rehabilitation is included in the draft financial provision regulations that were released for public comment in the fourth quarter of 2014. At the time of writing, the period for public comment had expired.*

4. **In terms of the determination of sustainable land use, the term 'sustainability' should be clearly defined, there should be a clear demarcation of responsibility between the mine and the authorities for conducting sustainability assessments and the method for undertaking these assessments should be defined**. *This has not been addressed in the amended legislation detailed in the post-script to this evaluation.*

5. **Mining companies should be responsible for all foreseeable environmental impacts as approved in their EMP, as well as any unforeseen environmental impacts at the time of operation. The State should then be liable for all other unforeseen environmental impacts.** As post- closure liabilities will therefore lie with the State, stricter enforcement needs to be placed on the issuing of closure certificates. To account for unforeseen latent effects, the State should set up a national fund that will cover any liabilities that may occur after closure. The required scale of such a fund is highly dependent on the types of mines and mining methods being used by the mines in the DMR's portfolio. As such, the scale of the fund will depend on the DMR's portfolio of mines at a given point in time. *The proposed MPRDA Amendment Act, which has been approved by Parliament but not signed into law, will make companies liable for all environmental impacts in perpetuity. Concerns have been raised about the Constitutionality of this proposal.*

6. **As the DMR will henceforth be the sole competent authority, given that another change to the regime will be too disruptive to the mining industry, it should develop the capacity, skills, technical expertise and systems necessary to meet the criteria required for an effective competent authority**. In particular, it should employ more compliance officers with the necessary skills to monitor and enforce

compliance with the framework.

7. **Communication channels within and between the different departments should be reviewed and improved** so as to avoid delays and unnecessary duplications. *The amended legislation as detailed in the post-script to this evaluation, which allows for the three acts related to environmental governance in mining to be read together, is an important step towards harmonisation of the framework. However, the effectiveness of its implementation cannot yet be assessed.*

8. **The legislation, in particular NEMA, should provide definitions across environmental regulations to avoid any confusion regarding the regulatory requirements and standards.** This includes clearly defining the term 'sustainability'. *This has not been addressed by the amended legislation detailed in the post-script to this evaluation.*

9. **The current online application system, the South African Mineral Resources Administration System (SAMRAD), which processes mining licence applications, should continue to be strengthened such that it is available 24 hours a day, is more user-friendly and links to the DEA's existing systems.** Improving the systems used by the departments will contribute to improved capacity within the departments and reduced fragmentation across the departments.

10. The difficulty faced by the evaluation team in extracting quantitative data relevant to the evaluation further highlights the importance of the DMR moving to an automated internal reporting system that allows for current and historical data to be stored in a central database.

Some of these recommendations are already being considered by the IPIC and the various task teams established as part of this initiative. However, as these initiatives are relatively new and their full effect is still to be determined, the challenges to the effectiveness of the environmental governance framework and the consequent recommendations presented above remain relevant to the findings of this evaluation.

Post-Script

The principal Act regulating the mining industry is the MPRDA. The MPRDA originally set out the complete framework for applications and granting of prospecting and mining rights; a procedure for environmental management, including financial provision for rehabilitation; and the procedure for mine closure. All of this was administered by the DMR, which, as custodian of the country's mineral and petroleum resources, it was required to exercise to ensure sustainable development of these resources within the framework of national environmental policy.

In addition to the MPRDA, NEMA also had a bearing on the environmental management of the mining sector. NEMA is the legislative environmental 'framework' in South Africa, defining the environmental management approach that should be integrated across all sectors. It contains a statement of environmental principles which incorporates many key principles of international environmental law and also establishes a regulatory framework for the conducting of environmental impact assessments. The framework of the NEMA is administered by the DEA. A significant part of the NEMA principles related to the identification of certain activities which could not proceed without environmental authorisation. These activities were listed in three Listing Notices, identifying the procedure by which such authorisation could be obtained.

The DMR and DEA's intertwined mandates resulted in on-going tension as to who should be the regulator of the mining industry from an environmental perspective. In 2008 it was agreed that while the DMR would continue to regulate the industry for the granting of rights and health and safety matters, the granting of environmental approvals would rest with the DEA. The new system was intended to be phased in over a transitional period - two amending Acts were passed in this regard, the Mineral and Petroleum Resources Amendment Act, 2008 (Act No. 49 of 2008) (the MPRDA Amendment) and the National Environmental Management Amendment Act, 2008 (Act No. 62 of 2008) (NEMA Amendment). The transitional periods of eighteen months each were to commence when both Acts were brought into effect; since the MPRDA Amendment was the second to commence, on 8 June 2013, the first transitional period, during which the Minister of the DMR remained the responsible authority, expired on 8 December 2014. Thereafter, for a further period of 18 months, the Ministers of DEA and DMR would exercise joint authority. After that period (that is, after 7 June 2016), the Minister of the DEA would be the sole regulator for environmental purposes of the minerals industry.

These provisions and principles were completely overturned by the National Environmental Management Laws Amendment Act, 2014 (Act No. 25 of 2014) (NEMLAA), which became effective on 2 September 2014. This Act deleted the transition provisions and allowed the DMR to govern the minerals industry under what was referred to as the "One Environmental System". However, while the NEMLAA placed governance in the hands of the DMR, it also provided that as far as environmental authorisations are concerned, the Regulations to be promulgated in terms of the NEMA (as amended) would be applied. Furthermore, the final point of appeal on any decision relating to environmental authorisations would lie with the Minister of the DEA.

In addition to amending NEMA, the NEMLAA also amended the National Environmental Management Waste Act, 2008 (Act No 50 of 2008) (NEM:WA). Prior to 2 September 2014, the application of the NEM:WA to mine wastes (defined in the MPRDA as 'residue deposits' and 'residue stockpiles') was explicitly excluded by Section 4 of NEM:WA. This provision was deleted by the NEMLAA and it was provided that mine wastes would henceforth be administered and regulated by the DEA.

Pursuant to these various Acts, the DEA promulgated Regulations on 4 December 2014 (GN R982, the EIA Regulations, 2014, and GN R983 to R985, the three Listing Notices) which came into force on 8 December 2014. Immediately thereafter, the DMR published new Directives for the compilation of applications for environmental authorisations, and templates for the preparation of Basic Assessment Reports (required for activities identified in Listing

Notice 1) and Scoping and Environmental Impact Assessment Reports (required for activities identified in Listing Notice 2). These Directives and templates were in full accordance with the NEMA EIA Regulations, 2014.

Thus, from 8 December 2014, a harmonious framework had been established for the environmental regulation of the mining industry.

This new system has to a considerable extent addressed some of the legislative gaps and deficiencies identified in the “Report on the Implementation Evaluation of the Effectiveness of Environmental Governance in Mining” prepared by Genesis Analytics and Digby Wells Environmental. Specific points in the evaluation analysis and recommendations have been contextualised as far as possible in relation to the extent to which they are addressed by the amended legislation and regulations.

Appendix 1: Analysis framework

Criteria	Indicator/ measure	Questions	Tools				Source						
			KII	Document review	Historic Case Study	Current Case Study	Mining house (C)	Mining house (H)	NGO & industry bodies	Lawyer	DMR	DEA	Other gov. dep
Evaluation question 1: What is the effect of the promulgation of the Minerals Act (Act 50 of 1991) and the Mineral and Petroleum Resources Development Act, 2002 Act No. 28 of 2002) on the environmental performance of mining? Is there a measurable improvement on the environmental performance of mining as a result of these two pieces of legislation?													
Relevance	Purpose of the environmental framework	Are you aware of the environmental requirements for obtaining a mining right?			Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGO s etc.	Lawyer			Other gov. dep
		What do you understand the purpose of the environmental governance framework to be?	KII		Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGO s etc.		DMR	DE A	Other gov. dep
		Does the environmental legislation allow for mining operations to expand and contribute to economic growth while still protecting the environment? Why/why not?	KII		Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGO s etc.	Lawyer	DMR	DE A	Other gov. dep
		Are there any gaps in the environmental framework? What are these?		Document review		Case study (C)	Mining house (C)						
	Relevance of the components of the MPRDA and NEMA in achieving the legislation's intended outcomes and impacts.	Does the financial provision for the rehabilitation allow for effective rehabilitation? Why/why not?	KII	Document review		Case study (C)	Mining house (C)		NGO s etc.	Lawyer	DMR	DE A	
		How relevant are the components of the legislation (EIA, EMP, land use assessment) in enabling the achievement of the legislation's objectives (an environment that is protected for future generations, that prevents pollution and ecological degradation while promoting justifiable economic and social development)?	KII			Case study (C)	Mining house (C)		NGO s etc.	Lawyer			
		Do these components of the legislation enforce one another to achieve these objectives? Why/why not?	KII			Case study (C)	Mining house (C)		NGO s etc.	Lawyer			

Criteria	Indicator/ measure	Questions	Tools				Source						
			KII	Document review	Historic Case Study	Current Case Study	Mining house (C)	Mining house (H)	NGO & industry bodies	Lawyer	DMR	DEA	Other gov. dep
	Extent to which the industry is over-regulated with regards to the environmental legislation	How does complying with the environmental governance regulations affect your core function?		Document review		Case study (C)	Mining house (C)						
		What drives decision-making processes and compliance with environmental governance framework? (i.e Anglo Framework, IFC Framework, SA regulations)		Document review		Case study (C)	Mining house (C)						
		To what extent does the environmental legislation affect your investment/growth strategies?		Document review		Case study (C)	Mining house (C)						
Impact	Effect of the environmental governance framework	What has changed since the promulgation of environmental legislation in the mining sector?	KII	Document review	Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		If there have not been any changes, why not?	KII	Document review	Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		Are there any noticeable changes on your environmental metrics between your first EMP compared to the most recent EMP readings? How frequently have these EMPs been drafted?		Document review		Case study (C)	Mining house (C)						
		How many EMPs have been received?	KII	Document review							DMR		
		What has been the effect on the local environment (and resulting effects on local communities) as a result of mining activities?	KII								DMR		
		If the mines were in operation today, under the current framework, to what extent would the negative impacts have been reduced?			Case study (H)			Mining house (H)	NGOs etc.		DMR	DEA	Other gov. dep

Criteria	Indicator/ measure	Questions	Tools				Source						
			KII	Document review	Historic Case Study	Current Case Study	Mining house (C)	Mining house (H)	NGO & industry bodies	Lawyer	DMR	DEA	Other gov. dep
Evaluation question 2: Is the current guideline **used to determine the cost of rehabilitation of mining operations adequate and effective to ensure adequate rehabilitation and to protect the State from mining-related long term liability?**													
Effectiveness	Suitability of the guideline and mechanisms for calculating the costs of rehabilitation	How do you determine the cost of rehabilitation?		Document review		Case study (C)	Mining house (C)						
		What guidelines / tools / methods do you use to calculate the costs of rehabilitation?	KII	Document review		Case study (C)	Mining house (C)				DMR		
		How often are these guidelines / tools / methods updated?	KII	Document review		Case study (C)	Mining house (C)				DMR		
		How much emphasis is there on R&D to understand the costs of rehabilitation?	KII								DMR		
		What are the implications of inadequate cost estimations for rehabilitation?	KII		Case study (H)	Case study (C)	Mining house (C)	Mining house (H)		Lawyer	DMR	DEA	Other gov. dep
	Compliance with the environmental governance framework	What do you understand the environmental consequence of mines not complying with the EMP provisions to be? (What are the legal/compliance consequences? Are these effective or could they be improved?)	KII	Document review		Case study (C)	Mining house (C)		NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		To what extent are mines complying with their EMPs, in your opinion?	KII	Document review					NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		Are mines setting aside appropriate funds for rehabilitation? Why/why not?	KII	Document review					NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
	Appropriateness of EMPs and all related governance processes for ensuring sustainable land use	How unique/individualised is the EMP to your mine?				Case study (C)	Mining house (C)						
		Do you feel that compliance with the EMP is sufficient for mitigating negative environment impacts/adequate rehabilitation? Why / Why not?	KII			Case study (C)	Mining house (C)		NGOs etc.	Lawyer	DMR	DEA	Other gov. dep

Criteria	Indicator/ measure	Questions	Tools				Source						
			KII	Document review	Historic Case Study	Current Case Study	Mining house (C)	Mining house (H)	NGO & industry bodies	Lawyer	DMR	DEA	Other gov. dep
	Ownership/responsibility for environmental liabilities	Other than enforcing the financial provision requirements, how can mines be incentivised to reduce their environmental liability?	KII	Document review	Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		Who do you think should be responsible for the environmental liability? Why?	KII		Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		How long do you think the entity should be liable for?	KII	Document review	Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
Relevance	Relevance of the components of the MPRDA and NEMA in achieving the legislation's intended outcomes and impacts.	Does the financial provision for the rehabilitation allow for effective rehabilitation? Why/why not?	KII	Document review		Case study (C)	Mining house (C)		NGOs etc.	Lawyer	DMR	DEA	
Efficiency	Reporting requirements	In your experience, how does the cost of environmental compliance in South Africa compare with that in other countries?	KII			Case study (C)	Mining house (C)		NGOs etc.	Lawyer			
		What proportion of your net profit / revenue is spent on compliance with environmental legislation?		Document review		Case study (C)	Mining house (C)						
Impact	Effect of the environmental governance framework	How much money has been set aside by the State for rehabilitation over the years?	KII	Document review							DMR		
		How much money is being spent annually by the State for rehabilitation?	KII	Document review							DMR		
		How many times has the State called up a company's guarantee?	KII	Document review							DMR		
		What is the current value of the rehabilitation fund?	KII	Document review							DMR		
		Is the value of the rehabilitation fund sufficient to cover all liabilities currently facing the mining sector?	KII	Document review							DMR		

Criteria	Indicator/ measure	Questions	Tools					Source					
			KII	Document review	Historic Case Study	Current Case Study	Mining house (C)	Mining house (H)	NGO & industry bodies	Lawyer	DMR	DEA	Other gov. dep
		What is being done to address the negative impacts to the environment as a result of past mining activities?		Document review	Case study (H)			Mining house (H)	NGOs etc.		DMR	DEA	Other gov. dep
		How much is being spent on this, by the state and privately?		Document review	Case study (H)			Mining house (H)	NGOs etc.		DMR	DEA	Other gov. dep
Evaluation question 3: Are there means or mechanisms for determining the most sustainable use of land, if so are they effective? If not, what mechanism could be proposed?													
Effectiveness	Mechanisms to assess alternative land use	Are there prescribed mechanisms in place to determine alternative land use (i.e. non-mining uses as alternatives to mining) ?	KII			Case study (C)	Mining house (C)				DMR	DEA	
		What mechanisms do you use to do the land use assessment?	KII			Case study (C)	Mining house (C)				DMR	DEA	
		What mechanisms would you propose as an alternative to those in existence (if any)?	KII			Case study (C)	Mining house (C)				DMR	DEA	
Evaluation question 4: Are the current institutional mechanisms for environmental performance appropriate and effective in achieving and promoting good governance in the mining sector? If not, what changes can be made?													
Effectiveness	Compliance with the environmental governance framework	What auditing processes are in place by the State to determine mines' compliance with their EMPs? Is this applied consistently?	KII			Case study (C)	Mining house (C)				DMR	DEA	Other gov. dep
		What do you perceive the consequence of mines not complying with that which is specified in the EMP to be?	KII	Document review		Case study (C)	Mining house (C)		NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		To what extent are mines complying with their EMPs, in your opinion?	KII	Document review					NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		Are mines setting aside appropriate funds for rehabilitation? Why/why not?	KII	Document review					NGOs etc.	Lawyer	DMR	DEA	Other gov. dep

Criteria	Indicator/ measure	Questions	Tools						Source				
			KII	Document review	Historic Case Study	Current Case Study	Mining house (C)	Mining house (H)	NGO & industry bodies	Lawyer	DMR	DEA	Other gov. dep
		How can mines be incentivised to follow good environmental practice, other than enforcing the legal framework?	KII	Document review					NGOs etc.	Lawyer	DMR	DEA	
		How do changes in legislation/regulator affect your ability to comply and implement the environmental framework?				Case study (C)	Mining house (C)						
	Appropriateness of EMPs and all related governance processes for ensuring sustainable land use	To what extent are EMPs and related processes appropriate for ensuring the sustainable use of land? How do you think this could be improved if at all?	KII			Case study (C)	Mining house (C)		NGOs etc.	Lawyer			Other gov. dep
		Do you feel that compliance with the EMP is sufficient for mitigating negative environment impacts/adequate rehabilitation? Why / Why not?	KII			Case study (C)	Mining house (C)		NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		Do the EMPs have a universally applied template? Would this be useful?		Document review		Case study (C)	Mining house (C)						
Relevance	Purpose of the environmental framework	What do you understand the purpose of the environmental governance framework to be?	KII		Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.		DMR	DEA	Other gov. dep
		Are you aware of the environmental requirements for obtaining a mining right?			Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.	Lawyer			Other gov. dep
		Does the environmental legislation allow for mining operations to expand and contribute to economic growth while still protecting the environment? Why/why not?	KII		Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		Are there any gaps in the environmental framework? What are these?	KII	Document review	Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.	Lawyer	DMR	DEA	Other gov. dep

Criteria	Indicator/ measure	Questions	Tools				Source						
			KII	Document review	Historic Case Study	Current Case Study	Mining house (C)	Mining house (H)	NGO & industry bodies	Lawyer	DMR	DEA	Other gov. dep
	Relevance of the components of the MPRDA and NEMA in achieving the legislation's intended outcomes and impacts.	How relevant are the components of the legislation (EIA, EMP, land use assessment) in enabling the achievement of the legislation's objectives (an environment that is protected for future generations, that prevents pollution and ecological degradation while promoting justifiable economic and social development)?	KII			Case study (C)	Mining house (C)		NGOs etc.	Lawyer			
		Do these components of the legislation enforce one another to achieve these objectives? Why/why not?	KII			Case study (C)	Mining house (C)		NGOs etc.	Lawyer			
	Extent to which the industry is over-regulated with regards to the environmental legislation	How does complying with the environmental governance regulations affect your core function?		Document review		Case study (C)	Mining house (C)						
		What drives decision-making processes and compliance with environmental governance framework? (i.e Anglo Framework, IFC Framework, SA regulations)		Document review		Case study (C)	Mining house (C)						
		To what extent does the environmental legislation affect your investment/growth strategies?		Document review		Case study (C)	Mining house (C)						
Efficiency	Application processes	How long does it take to get your environmental authorisation?		Document review		Case study (C)	Mining house (C)						
		To whom do you submit your environmental authorisation applications?		Document review		Case study (C)	Mining house (C)						
		Rate your experience of the application process on a scale from 1 to 5 (where 1 is efficient and 5 is onerous) and please explain your response				Case study (C)	Mining house (C)						
		Approximately how much does it cost you to submit your application for environmental authorisation?		Document review		Case study (C)	Mining house (C)						

Criteria	Indicator/ measure	Questions	Tools				Source						
			KII	Document review	Historic Case Study	Current Case Study	Mining house (C)	Mining house (H)	NGO & industry bodies	Lawyer	DMR	DEA	Other gov. dep
		Is there a step-by-step process to follow in applying for the relevant components of environmental authorisation? Is it easy to follow? Why/why not?		Document review		Case study (C)	Mining house (C)						
		When applying for your environmental authorisation are you given approximate turnover timelines? If yes, what are these?				Case study (C)	Mining house (C)						
		Are the timelines associated with the relevant components of your environmental authorisation (i.e EMP, EIA, land use assessment) adhered to? If no, which part of the process causes delays?				Case study (C)	Mining house (C)						
		How do you think the application process can be improved?				Case study (C)	Mining house (C)						
	Reporting requirements	Who is responsible for drafting and reporting on your EMP? Why?				Case study (C)	Mining house (C)						
		How much does reporting on your EMP cost you?		Document review		Case study (C)	Mining house (C)						
		Rate your experience of the monitoring and reporting requirements on a scale from 1 to 5 (where 1 is efficient and 5 is onerous)? Please explain your response				Case study (C)	Mining house (C)						
		How do you think the reporting requirements can be improved?				Case study (C)	Mining house (C)						
Impact	Effect of the environmental governance framework	What has changed since the promulgation of environmental legislation in the mining sector?	KII	Document review	Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		If there have not been any changes, why not?	KII	Document review	Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.	Lawyer	DMR	DEA	Other gov. dep

Criteria	Indicator/ measure	Questions	Tools						Source				
			KII	Document review	Historic Case Study	Current Case Study	Mining house (C)	Mining house (H)	NGO & industry bodies	Lawyer	DMR	DEA	Other gov. dep
		Are there any noticeable changes on your environmental metrics between your first EMP compared to the most recent EMP readings? How frequently have these EMPs been drafted?		Document review		Case study (C)	Mining house (C)						
		How many EMPs have been received?	KII	Document review							DMR		
		What has been the effect on the local environment (and resulting effects on local communities) as a result of mining activities?		Document review	Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.		DMR	DEA	Other gov. dep
		If the mines were in operation today, under the current framework, to what extent would the negative impacts have been reduced?			Case study (H)			Mining house (H)	NGOs etc.		DMR	DEA	Other gov. dep
Evaluation question 5: To what extent are mining-related environmental liabilities covered by the State? Could these costs have been significantly reduced through efficient and effective environment governance in the mining sector?													
Effectiveness	Suitability of the DMR's guideline and mechanisms for calculating the costs of rehabilitation	What are the implications of inadequate cost estimations for rehabilitation?	KII		Case study (H)	Case study (C)	Mining house (C)	Mining house (H)		Lawyer	DMR	DEA	Other gov. dep
	Compliance with the environmental governance framework	What auditing processes are in place by the State to determine mines' compliance with their EMPs? Is this applied consistently?	KII			Case study (C)	Mining house (C)				DMR	DEA	Other gov. dep
		What do you perceive the consequence of mines not complying with that which is specified in the EMP to be?	KII	Document review		Case study (C)	Mining house (C)		NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		To what extent are mines complying with their EMPs, in your opinion?	KII	Document review					NGOs etc.	Lawyer	DMR	DEA	Other gov. dep

Criteria	Indicator/ measure	Questions	Tools				Source						
			KII	Document review	Historic Case Study	Current Case Study	Mining house (C)	Mining house (H)	NGO & industry bodies	Lawyer	DMR	DEA	Other gov. dep
		Are mines setting aside appropriate funds for rehabilitation? Why/why not?	KII	Document review					NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
	Ownership/responsibility for environmental liabilities	Other than enforcing the financial provision requirements, how can mines be incentivised to reduce their environmental liability?	KII	Document review	Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		Who do you think should be responsible for the environmental liability? Why?	KII		Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
		How long do you think the entity should be liable for?	KII	Document review	Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.	Lawyer	DMR	DEA	Other gov. dep
Impact	Effect of the environmental governance framework	How much money has been set aside by the State for rehabilitation over the years?	KII	Document review							DMR		
		How much money is being spent annually by the State for rehabilitation?	KII	Document review							DMR		
		How many times has the State called up a company's guarantee?	KII	Document review							DMR		
		What is the current value of the rehabilitation fund?	KII	Document review							DMR		
		Is the value of the rehabilitation fund sufficient to cover all liabilities currently facing the mining sector?	KII	Document review							DMR		
		What has been the effect on the local environment (and resulting effects on local communities) as a result of mining activities?		Document review	Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGOs etc.		DMR	DEA	Other gov. dep
		How much is being spent on this, by the state and privately?		Document review	Case study (H)			Mining house (H)	NGOs etc.		DMR	DEA	Other gov. dep
Evaluation question 6: Is the anchoring of implementation and enforcement of mining-related environmental governance within the Department of Mineral Resources appropriate? If not, what would be the appropriate department?													

			Tools				Source						
Criteria	**Indicator/ measure**	**Questions**	**KII**	**Document review**	**Historic Case Study**	**Current Case Study**	**Mining house (C)**	**Mining house (H)**	**NGO & industry bodies**	**Lawyer**	**DMR**	**DEA**	**Other gov. dep**
Effectiveness	Responsibility for regulating and enforcing the framework	Which institution do you feel has the capacity and institutional knowledge to enforce the environmental legislation?	KII		Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGO s etc.	Lawyer			
		Which institution do you feel is best suited to implement the environmental governance framework and why?	KII		Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGO s etc.	Lawyer			
		What systems are required by the regulator for effectively managing and implementing the environmental governance framework?	KII		Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGO s etc.	Lawyer			
	Ownership/responsibility for environmental liabilities	Who do you think should be responsible for the environmental liability? Why?	KII		Case study (H)	Case study (C)	Mining house (C)	Mining house (H)	NGO s etc.	Lawyer	DMR	DEA	Other gov. dep

Appendix 2: Logframe

Table 12 below presents the logframe for the implementation of the environmental governance framework. As this is a governance framework rather than a typical programme or intervention, it is not practical to measure the impact indicators and majority of the outcome level indicators. Tracking these indicators would require the aggregation of a large number of metrics per each indicator across every mine in South Africa.

The majority of the indicators are already being tracked by the DMR, as such this is not an additional monitoring requirement, but rather a useful framework for presenting that which is already being tracked.

Table 12: Logframe for the implementation of the environmental governance framework

Narrative summary	Performance indicators					Means of Verification	Assumptions
	Indicator	Baseline	Target 2015	Target 2016	Target 2017		
Outcomes							
OC1: Institutional: Integrated approach to environmental management	Number of formal, effective systems and process in place to synthesise departments						The promulgation of the amendments to the regulations reduce the legislative overlap and duplication in the system currently.
Outputs							
O1: Appropriate implementation of EMP	Percentage of approved EMPs relative to rights issued considering the elements of sustainable development						EMPs are of a high standard and quality.
O2: Rehabilitation and associated liability well managed	Percentage of rights and permits/or mines with adequate financial provision for rehabilitation						EMPs are of a high standard and quality, and as such the financial provision has been adequately calculated. There are no delays in the issuing of environmental authorisations that affect the management of the liability.
O3: Environmental authorisation	Number of new rights and permits issued						The rights and permits are issued within the specified timeframes.
O4: Effective self-regulation	Percentage of mines exceeding their EMP requirements*						EMPs are of a high standard and quality.
O6: Fair and coherent administrative systems	Percentage adherence to compliance framework						The promulgation of the amendments to the regulations reduce the legislative overlap and duplication in the system currently.

** This is the only new indicator – each of the other indicators are already tracked by the DMR*

Appendix 3: References

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