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Department of Planning,
Monitoring and Evaluation

Department:
Environmental Affairs

Department:
Mineral Resources

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

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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

Policy Summary

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 evaluation analysis and 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. In light of this, the following recommendations have been provided:

1. The guideline for calculating the cost of financial provision for the rehabilitation and closure of mines should be updated.

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.

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.

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.

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

7. Communication channels within and between the different departments should be reviewed and improved. 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.

8. The legislation, in particular NEMA, should provide definitions across environmental regulations to avoid any confusion regarding the regulatory requirements and standards.

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.

Some of these recommendations are already being considered by the Interdepartmental Project Implementation Committee (IPIC). 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.

Please refer to the post-script to this evaluation report for details on the amended legislation and regulations and the extent to which they address the above recommendations.

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 evaluation analysis and recommendations.

2. Context of the evaluation

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, which remained in place with the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA). The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) is the legislative environmental 'framework' in South Africa, which defines the environmental management approach that should be integrated across all sectors, including the mining sector.

The Department of Mineral Resources (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.

3. Methodology

A combination of research methods was used to conduct the evaluation, including: a literature review; key informant interviews (KIIs); and four case studies (Gauteng gold mining, Northern Cape asbestos mining, Mpumalanga coal mining and North West platinum mining).

The evaluation faced a number of limitations including a lack of response to interview requests and limited quantitative data. Furthermore, two sets of draft Regulations were published for public comment at the start of the evaluation1, which are not in the scope of the evaluation, but do have implications for the evaluation findings. As such, a post-script has been appended to the evaluation that details the content of these amendments and how they relate to the evaluation analysis and recommendations.

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?

[1] 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

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. 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.

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. 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. Moreover, the term "sustainability", has not been defined in the Regulations of the MPRDA and is thus open to interpretation. This has not been addressed by the amended legislation that is detailed in the post-script to this evaluation.

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; however, there are no prescribed mechanisms to do so.

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:

- 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 reluctance from the DMR to issue the certificates, the reluctance of mining companies to apply for closure, and the requirement that all affected departments must comment on the closure application.
- 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[2].
- There are gaps in the environmental framework as of March 2014 as a result of the constant iterations and amendments[3]. The lack of definitions provided in the

[2] 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.
[3] A number of these legislative gaps have been addressed by the amended legislation as detailed in the post-script to this evaluation report

legislation also creates many uncertainties in terms of the standards the legislated requirements are supposed to meet[4].

- Poor quality EMPs are often approved by the competent authority as the authority lacks the capacity and technical expertise to assess the EMP appropriately.
- Limited capacity and technical expertise within the authority's offices is a significant challenge with regards to implementation[5].
- High staff turnover in government departments is proving to be a challenge as it results in limited institutional memory[6].
- The lack of communication and cooperation between the various government departments results in an overlap of mandates, policies and procedures thus creating delays and duplication within the application process.

4.4. What is the effect of the promulgation of the Minerals Act and the MPRDA 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 the environment and any impacts caused as a result of their prospecting and mining activities. The MPRDA provides a strong 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. 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 mine - between 2005 and 2008, the State rehabilitated only 5 derelict and ownerless mines at a cost of R42 million whereas in 2012/2013 the DMR rehabilitated 13 of these 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 derelict and ownerless mines. 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. Currently not many closure certificates are being issued. This is exacerbated by the short-fall in mines' financial provisioning due in part to the DMR's inadequate costing guideline. As such, the State has limited liabilities for new mines given that it has issued so few closure certificates.

[4] This has not been addressed by the amended legislation

[5] It has been indicated that there are a number of capacity building initiatives underway to remedy these shortcomings. These initiatives however are relatively new and as such the benefits thereof are still to be realised. Additionally, requests for funding have been made to National Treasury to increase capacity to implement the "One Environmental System".

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

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 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. The following have been identified as some of the key requirements for an effective competent authority: a stable, experienced staff complement with expertise in mining, environmental matters and enforcement; having the necessary equipment, systems and facilities to implement the legislation; a good understanding of the legislation and capacity to enforce it; and, good working relationships with all authorities responsible for implementing the framework. 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 its internal nature.

5. Conclusions

The promulgation of the Minerals Act in 1991 improved environmental governance in the mining sector significantly. With 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. There are some shortcomings to the legislation itself which are outlined above; however, for the most part, the legislation provides a strong basis for environmental governance in the mining sector. The implementation thereof, however, reduces its efficacy. These shortcomings have been listed above.

6. Recommendations

Based on the findings of the evaluation, the following recommendations have been provided:

1. The guideline for calculating the cost of financial provision for the rehabilitation and closure of mines should be updated. *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. *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. *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

7. Communication channels within and between the different departments should be reviewed and improved. 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 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.

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 Interdepartmental Project Implementation Committee (IPIC). 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.

Summary report

1. Introduction

1.1. Background to the evaluation

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 evaluation analysis and recommendations.

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 Department of Mineral Resources (DMR) appropriate? If not, what would be the appropriate department?

The Development Assistance Community (DAC)[7] 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.

[7] More information is available at http://www.oecd.org/dac/evaluationofdevelopmentprogrammes/daccriteriaforevaluatingdevelopmentassistance.htm.

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[8]	The positive and negative results produced by a development intervention, directly or indirectly, intended or unintended.

'Sustainability' is typically included as one of the DAC criteria, however, as 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.

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.9 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.

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.

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 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.

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 and establishes a regulatory framework for the conducting of environmental impact assessments. 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).

[8] While this is not an impact evaluation, early indications of possible longer term outcomes will be assessed where possible.
[9] Chamber of Mines, 2013

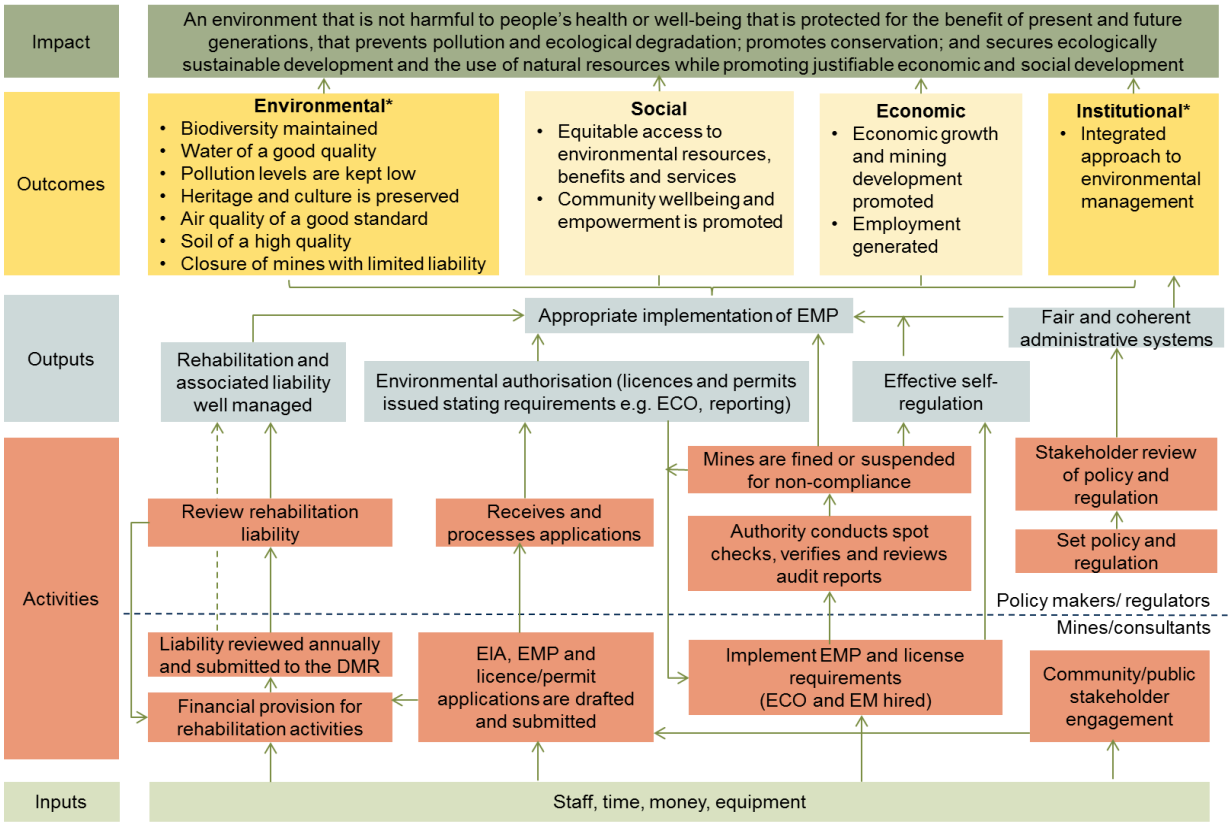
2.2. Implementation of the environmental framework

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. To this end, two amending Acts were passed; the end result of which is the DMR will regulate the mining industry and grant environmental authorisations, but for environmental purposes, the principles and Regulations of NEMA shall be applied. The constant iterations and amendments to the framework have resulted in gaps and deletions, missing definitions and confusion in the industry.

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 1 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 1: 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 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.

[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

[12] Ibid

[13] Department of Water Affairs, 2013

[14] CSIR, 2007

[15] Munnik, Hochmann, Hlabane 2009

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 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

[16] SANBI, 2006
[17] SANBI, 2006
[18] Felix, Leger and Ehrlich, 1993
[19] McCulloch, 2003
[20] Johnson Matthey, 2013

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 sustainability.

3. Methodology

3.1. Analysis framework

A systematic analysis framework was designed and was informed by reviewing international examples of environmental governance in mining, the history of South Africa's environmental governance framework in mining and drafting the theory of change underpinning South Africa's framework. 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 methodology and analysis framework were approved by the Steering Committee through their acceptance of the Inception Report and Analysis Framework.

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.

3.2.2. Key informant interviews (KIIs)

KIIs were conducted with 16 stakeholders from 12 organisations to collect qualitative information to answer the evaluation questions. Stakeholders included: officials from the DEA, DWS and DMR; Non-Governmental Organisations (NGOs); research institutions; prominent firms, attorneys and other legal advisers practicing in the field of environmental law; and, industry bodies.

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. The case studies in the North West and parts of Mpumalanga focus on contemporary environmental issues and the current legislative framework.

3.3. Limitations of methodology and scope

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[21]. 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[22]. 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 content of these amendments and their implications on the evaluation recommendations.

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. To mitigate this limitation, secondary research supplemented missing primary research.

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

[21] 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.
[22] 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

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.

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.

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. However, the weak implementation of the legislation and the lack of timeliness in the relevant processes, 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.

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 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 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.

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. 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.
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, nor is there coordination across and within departments.

Based on data from the DMR, the **total value of the guarantees that were called up** in 2013/2014 is R512 165 578.08.

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. The cost calculation guideline, seem 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.

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. 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.

4.2. Effectiveness

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

Rehabilitation costs are calculated by mines using an agreed upon guideline issued by the State. Some stakeholders were of the opinion that this guideline is useful for calculating costs to a point but could be too generic, leading to an over- or underestimation of costs in certain instances. Additionally, the guideline does not address underground or surface water related issues. As a result, many mines seem to supplement these calculations with their own research and monitoring..

The reason for the inappropriateness of the **rehabilitation cost calculation** is that the guideline was initially designed as internal documents, used exclusively by State officials to evaluate the cost calculations submitted by mines.

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.

The main **implication of inadequate cost estimations** is a funding shortfall once environmental liabilities need to be addressed. As 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. 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 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).

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 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. 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.

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 that the DMR and DEA sometime accept the technical aspects of mines' applications and reports at face value due to their internal lack of capacity. 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[23].

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 Environmental Impact Assessment (EIA) Regulations of NEMA as part of the EIA process and EMP application[24], is sufficient to determine alternative land use. 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. The prescribed EMP is not required to assess or recommend an alternative activity altogether. Consideration of alternative uses of the land beyond mining, is not explicitly required.

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. 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. This gives rise to concerns around food security, food production and food prices in the long run.

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.

Regarding the practice of DMR 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 which has clear criteria for the selection of the mines to be inspected. 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.

[23] Stakeholders noted Canada as a good international example of this.
[24] 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

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. 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.

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. Few stakeholders reported instances of mining licences being revoked, and when this does occur environmental rehabilitation is rarely completed.

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.

In instances of **noncompliance** with 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.

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[25]. The regional effects of mining are often larger and more serious than those confined to a single site.

There is disagreement among stakeholders as to whether **EMP**s are sufficient t**o 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. 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 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

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. 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.

In the instance of **AMD liabilities**, 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.

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. Development of relevant new knowledge and good environmental practice by the regulators would also serve to incentivise compliance.

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

[25] A region is defined as per the MPRDA on a provincial basis

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 occur 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. 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. The new round of legislative amendments stipulates application process timeframes that are shorter than those contained in previous guideline. 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.

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.
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.

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. 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.

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.

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.

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.

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 set out in Section 2 of NEMA, as well as other generally accepted principles of sustainable development.
- Implement integrated environmental management as laid out in Chapter 5 of NEMA.
- Conduct an EIA and submit an EMP
- 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.
- 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.

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 which 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.

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[26]. 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 3 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.

Table 3: 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.

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

- The contamination of shallow groundwater resources required for agricultural use 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;
- 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. 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. 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[27].

- 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.

[26] From the DMR annual reports, the reported indicator changed from an absolute number to a percentage with no further information.
[27] Inter-Ministerial Committee, 2010

The authority 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. 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.

Box 2: Coal mining – Mpumalanga

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[28]. 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[29]. 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. 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

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. At the beginning of the 20th century it was observed that people working with asbestos often suffered from lung disease. Asbestosis, lung cancer and

[28] Singer, 2010
[29] Ibid

mesothelioma as a result of asbestos mining in South Africa have caused thousands of people to suffer from progressive ill health or premature death.[30]

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.[31]

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[32]. 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. This results in noise and vibration pollution, dust, air pollution, disturbance of ecological systems, slurry of fine rock and chemicals deposited on slimes dams, water pollution and disturbance of ecological systems. 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.[33]

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. 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.

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.

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[34]. 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[35] of mines accessing water from other sources such as boreholes and Rand Water.

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. 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

[30] Harington and McGlashan, 1998
[31] Liebenberg, Claassens and Van Rensburg, 2012
[32] AGSA, 2009
[33] Kisting. 2014
[34] Cairncross, 2014
[35] Bench Marks Foundation, 2012

unavailable. The DMR spent approximately R69.9 million in 2012/2013; R50 million in 211/2012 and R47.7 million in 2010/2011. 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 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. Since 2009/10 there has been an increase in the number of mines rehabilitated by the State, whereby in 2009/2010 zero mines were rehabilitated, in 2010/2011 5 mines were rehabilitated and in 2012/2013 13 mines were rehabilitated.

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[36]. A more recent media report claims that AMD rehabilitation is set to cost at least R9 billion[37]. 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 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 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.[38]

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[39].

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 set of pre-determined criteria thus ensuring that mines are appropriately prioritised.

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

[36] http://www.pmg.org.za/report/20120522-briefing-department-water-affairs-progress-report-governmental-steps-
[37] http://www.moneyweb.co.za/moneyweb-south-africa/sa-needs-1bn-to-make-toxic-mine-water-potable
[38] AGSA, 2009
[39] DMR, 2013

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 are 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.

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." Similarly, Regulation 61 and Regulation 62 mitigate against this.

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. For the purposes of this evaluation, the definition as per the Constitution (the Constitution of the Republic of South Africa, 1996) was used.

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). 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

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 has not yet been implemented and thus this evaluation cannot comment on the effectiveness 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. 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. 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. The new legislation detailed in the post-script to this evaluation significantly contributes to reducing these gaps

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. It has been indicated; however, that there are a number of capacity building initiatives underway to remedy these shortcomings. 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[40]. 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 and the MPRDA 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:

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

- 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. 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 the focus 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 (in 2013/2014 575 closure certificates were under review, of which only 159 were issued). 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.

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 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 with a technical skills and mining knowledge;
- Experienced environmental and technical specialists with specific mining experience;
- Sufficient qualified staff to enforce the legislation and monitor compliance;

- Capacity and institutional knowledge;
- Necessary office space, computers, systems and equipment;
- Efficient, credible and accountable systems;
- 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 work with other departments to reach consensus on decisions; and,
- The ability to make informed decisions and to request additional information if required before making a decision.

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 4 are not exhaustive. However, it does provide a useful framework against which South Africa's performance can be assessed.

Table 4: Comparison of South Africa against international best practice

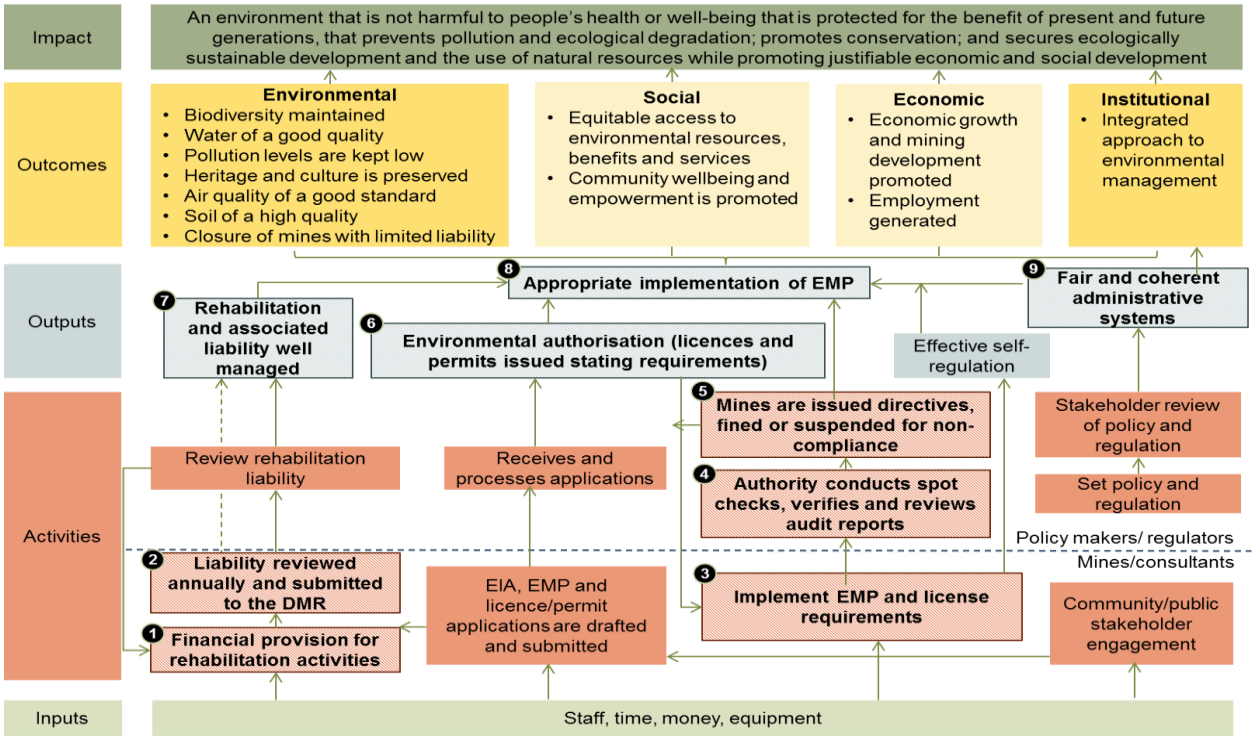
Best practice	South Africa's practice	Performance
Recognise environmental management as a high priority, notably during the licensing process and through the development and implementation of environmental management systems.	South Africa has a well-developed environmental governance framework which clearly defines the importance of environmental management. However, the implementation of the framework and the associated systems is weak.	Can be improved
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 1 above. Throughout the evaluation, the causal links and assumptions underpinning the theory of change were tested. Figure 2 and the text that follows describe where these break down.

Figure 2: 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 breakdowns, the ultimate objective of the framework 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 the 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

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, 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. 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: Logframe

Table 5 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 5: 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*

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