

A critical assessment of EIA follow-up conditions formulated for Environmental Authorisations in Mpumalanga Province

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Abstract

Compliance monitoring is a continuous process used to ensure that conditions stipulated in an environmental authorisation are adhered to. Compliance monitoring is a key component of Environmental Impact Assessment (EIA) and EIA follow-up. The aim of this research was to critically assess EIA follow-up conditions formulated for Environmental Authorisations in Mpumalanga Province. The practicability of conditions set out in the authorisation for EIA follow-up are of particular concern. Forty-two (42) environmental authorisations (EAs) issued under the 2010 NEMA EIA regulations were reviewed and assessed to analyse information relating to follow-up practice.

In order to synthesise the data effectively and create a comprehensive analysis, the EAs were divided into project type categories rather than listed activity categories. The assessment results on the strengths and weaknesses related to compliance monitoring and enforcement of the authorisation conditions revealed that the EIA follow-up conditions in Mpumalanga do make provision of EIA follow-up. The EAs fulfil the requirements of regulation 37 of the NEMA EIA regulations 2010 by promoting compliance monitoring of impacts. However, some conditions raise difficulty in monitoring due to their impracticability. Another weakness is that conditions focus mainly on the construction phase and very little attention is paid to operational and decommissioning impacts. The analysis results show that the practicability of the authorised conditions for environmental compliance monitoring had the following challenges: conditions intended to mitigate the adverse environmental impacts are generic and do not apply to specific projects or activities being authorised and there are no clearly defined timeframes for conditions requiring repetitive monitoring. Moreover, the study revealed gaps in monitoring of the authorised conditions that included poor clarity of roles of environmental control officers (ECOs) and auditors and a lack of reference to sections to be complied with pertaining to other relevant legislation.

The critical assessment of the EIA follow-up conditions formulated for Environmental Authorisations in Mpumalanga Province indicate that the formulation of conditions have implications in ensuring that compliance is effectively implemented. Clearly defined

conditions will ensure proper interpretation and correct implementation for compliance purposes.

Keywords: Compliance Monitoring; Environmental Authorisation (RoD); Practicability of conditions; Environmental Impact Assessment (EIA); EIA follow-up, Mpumalanga Province.

Preface

The aim of this research was to critically assess EIA follow-up conditions formulated for Environmental Authorisations in Mpumalanga Province. To achieve this environmental authorisations issued under the 2010 NEMA EIA regulations were reviewed and analysed. The author did not consider the authorisations issued under the 2006 NEMA EIA regulations because he wanted the research to reflect on current legal requirements and the fact that he did not want the research to undertake a comparison of the two regulations (2006 and 2010). Only information made available during the time of the research was used. A sample of 42 environmental authorisations were randomly chosen from the available data. This may have an impact on the generality of the results, as the data is not a representation of all authorisations issued. However, the author selected authorisations for different project types so that he could establish if the conditions had been formulated taking the impact an activity has on the environment into consideration or not. The author could have sampled more authorisations but that was not possible as he had to go through each authorisation to make sure that he didn't have authorisations for a single development type. He also had to consider the time he had to review the documents as there were limited timeframes for conducting the research, as well as considering the scale of the research (mini-dissertation). He did not conduct interviews with the stakeholders who play a role in compliance monitoring, for example authority officials, Environmental Practitioners (EAPs) and Environmental Compliance/Control Officers (ECOs). Questionnaires and possibly interviews would have been an effective tool to verify many of the findings, but due to time constraints, and the fact that this did not form part of the scope of the study, this was not considered.

The analysis only focused on the authorisation/permit conditions intended for compliance monitoring in the environmental authorisation document. The author did not analyse other sections, such as verifying if the authorisations were compiled according to the requirements as stated in the regulations, as the study aimed at looking at the provision of EIA follow-up in authorisation conditions.

With that said, I would like to thank the following people who encouraged me through the journey of this research.

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Abbreviations

AEL	Atmospheric emission licence
BA	Basic Assessment
BAR	Basic Assessment Report
DEAT	Department of Environmental Affairs and Tourism
DEDET	Department of Economic Development, Environment and Tourism
DMR	Department of Mineral Resources
DWA	Department of Water Affairs
EA	Environmental Authorisation
ECA	Environmental Conservation Act of 1989 (Act No. 73 of 1989)
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EPA	Environment Protection Agency
GN	General Notice
I&APs	Interested and Affected Parties
IAIA	International Association for Impact Assessment
INECE	International Network for Environmental Compliance and Enforcement
EIAMS	Environmental Impact Assessment Strategy

MPRDA	Minerals and Petroleum Resources Development Act of 2002 (Act No. 28 of 2002)
NEMAQA	National Environmental Management: Air Quality of 2004 (Act No. 39 of 2004)
NEMA	National Environmental Management Act of 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management Biodiversity Act of 2004 (Act 10 of 2004)
NEM:WA	National Environmental Management Waste Act of 2008 (Act 59 of 2008)
NEMAQA	National Environmental Management Air Quality Act of 2004 (Act No. 39 of 2004)
NFA	National Forests Act of 1998 (Act No. 84 of 1998)
NGO	Non Governmental Organisation
NHRA	Natural Heritage Resources Act of 1999 (Act No. 25 of 1999)
NWA	National Water Act of 1998 (Act No. 36 of 1998)
OECD	Organization for Economic Cooperation and Development
OHSA	Occupational Health and Safety Act of 1993 (Act No. 85 of 1993)
RoD	Record of Decision
SABS	South African Bureau of Standards
SAHRA	South African Resources Agency
SEMA	Specific Environmental Management Act
SMME	Small, Medium and Micro-sized Enterprise
UNEP	United Nations Environmental Programme
WULA	Water Use Licence Application

Chapter 1: Introduction

1.1 Background

Physical development is necessary for economic growth and general well-being of society in a country. However, such development normally brings changes in the environmental conditions in and around the development projects that could cause various short and long term impacts on the environment (OECD, 2013 and UN Documents, 2014). A number of studies have revealed that good environmental practice usually makes good economic sense (Kidd & Retief, 2009; Institute of Environmental Management and Assessment – IEMA 2003; Wood, 2000). An Environmental Impact Assessment (EIA) is regarded as one of the environmental management tools used to facilitate sound integrated decision-making where environmental issues are openly and methodically taken into consideration during the planning and development process (DEAT 2002; Roux and du Plessis 2007). Based on the assessment of environmental impact specific actions may be implemented to safeguard the environment through compliance monitoring. The effectiveness of an EIA process cannot be expected to tolerate full social and environmental management without the essential introduction of compliance monitoring. The emphasis of compliance monitoring is based on prevention of impact, which relates to the precautionary principle.

In the context of environmental impact assessment compliance monitoring is perceived as a continuous and systematic process used to ensure that conditions stipulated in an environmental authorisation (formerly known as record of decision (RoD)) are adhered to (DEAT, 2004a). It also recognizes, on an ongoing basis, activities that are in breach of the law, improperly authorised activities and so forth (DEAT, 2004a). Environmental authorisations (EAs) are defined as regulatory tools used to set out conditions for activities carrying with them the greatest environmental risk (Nel and Wessels, 2009). In terms of Section 24 of the National Environmental Management Act of 1998 [Act No. 107 of 1998 (NEMA)] no listed activity contained in the regulations may commence without an environmental authorisation (SA, 1998).

With the use of inspections and reporting compliance monitoring enables the detection of environmental impacts of development projects (Cuaño, 2014). Cuaño (2014) further indicate that compliance monitoring is strongly dependent on the EIA's findings on the pre-project environment and predictions of project impact. Therefore compliance monitoring according to Nel and Wessels (2009) creates an opportunity to assess whether the authorised activities and the predicted environmental mitigation measures are met. Hunsberger, Gibson and Wismer (2005) further indicate that monitoring also assists to assess compliance to applicable legislation and provide an opportunity for the authorised party to implement remedial measures.

EIAs are criticized for not fulfilling their role of minimizing the negative impact of development. One of the main reasons for this is the failure to enforce the recommendations of the EIA as a result of inadequate EIA follow-up (Arts, 1999). EIA follow-up activities can be defined as the monitoring and evaluation of the impact of activities that have been subjected to EIAs (IAIA, 2007). According to Arts, et al, (2001) and Morrison-Saunders, Baker and Arts (2003) typical tools that are used to ensure adequate implementation and follow-up of the EIA process are environmental compliance monitoring and auditing carried out after the environmental authorisation has been issued. The integrated environmental management guideline series describe monitoring as the collection and analysis of information on the compliance status of any regulated entity or activity (DEAT, 2004 and 2005).

Although the 2010 NEMA regulations make provisions associated with the formulation of conditions for compliance monitoring in an environmental authorisation, there are still shortcoming areas and best practices where the conditions of authorisations issued can be improved. According to Jordaan (2010) the accuracy of prediction and the level of compliance with conditions set out in the authorisation and management plans are of particular concern in EIA follow-up. These two aspects lie at the heart of post-decision actions and subsequent effectiveness of EIAs and have not received the required attention in the South African environment (DEAT, 2008). This research aims to critically analyse the conditions that are provided in environmental authorisations in Mpumalanga Province to ensure compliance monitoring. In particular, it studied the EIA follow-up

conditions formulated for environmental authorisations issued under the NEMA 2010 regulations.

1.2 Problem statement and substantiation

It is argued by many international sources that EIA follow-up is the most neglected stage of Environmental Impact Assessment and Management (EIAM) (Wood, 2000; Aucamp, 2009; Kidd and Retief, 2009; Paterson and Kotze, 2009; SA-EIAMS, 2011). Linked to this international challenge is what Wessels and Morrison-Saunders (2011) refer to, they state that “one of the biggest challenges faced by South Africa is compliance monitoring and enforcement of Environmental Management Plans (EMPs) of the thousands of EIA conducted per year in South Africa”. A large number of EIAs are being conducted for new proposed developments in Mpumalanga and the country as a whole. Simultaneously majority of the developments that have been granted authorisation are being implemented. In the light of these developmental needs it is clear that EIA, and more particularly EIA follow-up, are of great relevance to Mpumalanga during the construction and implementation phases of the authorised projects.

1.3 Research aims and objectives

The study aim, in light of the aforementioned problem statement, is to critically assess EIA follow-up conditions formulated for Environmental Authorisations in Mpumalanga Province

To address the aim of the study the following objectives need to be achieved:

- To assess strengths and weaknesses related to compliance monitoring and enforcement of the authorisation conditions;
- To analyse the practicability of the authorised conditions for environmental compliance monitoring; and

- To identify the gaps in monitoring of the authorised conditions and provide suggestions for improvement based on the findings of the analysis.

The study focused on Mpumalanga Province. The reasons for selecting the province are:

- Mpumalanga is rich in biodiversity as well as unique and important sensitive areas with the potential to benefit both current and future generations of the region. The focus of planning and decision making is necessarily on the future. The future of our natural resources has already been compromised with over 35% of the province's natural vegetation cover transformed and its biodiversity substantially destroyed. The protection of land and indigenous plants/vegetation, which often results in land degradation, is an issue of concern. In this context it must be recognised that any further disturbance of natural habitat has legal implications and in most cases requires a permit from the regulatory authority which in turn has connotations for follow-up.
- The province development priorities are agriculture, mining, tourism and Small, Medium and Micro-sized Enterprise (SMME) Development.

1.4 Structure of dissertation

The dissertation is organised into six (6) chapters. Chapter 1 provides a brief introductory background to compliance monitoring as an instrument of EIA follow-up and a rationale for focusing on Mpumalanga Province. It also outlines the aim and objectives of the study. Following the introduction in Chapter 2 the research process and the methodological approaches are described. Chapter 3 discusses the relevant literature by giving a theoretical perspective of EIA, EIA follow-up and the link it has to compliance monitoring. The results and a critical analysis of the data collected is presented in Chapter 4, while Chapter 5 discusses, reflects and considers the literature review and findings to address the research aim. Finally, Chapter 6 presents concluding remarks and provides suggestions for improvement of the EA conditions ensuring

compliance monitoring conditions included in environmental authorisations are relevant and effective.

Chapter 2: Research Methodology

An investigator starts research in a new field with faith, a foggy idea, and a few wild experiments. Eventually the interplay of negative and positive results guides the work. By the time the research is completed, he or she knows how it should have been started and conducted.

Donald Cram

This chapter describes the research methods used to obtain and process data to allow an empirical research assessment to be made on the follow-up conditions stipulated in the environmental authorisations issued by Mpumalanga Province. The methods and materials used in this study are suitable for fulfilling the specific objectives of the study. To achieve the aims a series of methodologies have been applied, the first of which involved a broad review of secondary data sources associated with EIA. It is crucial to frame any research within a literary context in order to identify where conclusions have already been reached and also to highlight where the focus of the research is required (i.e. “gaps” in knowledge) (Denscombe, 1998; Taylor and Bogdan, 1998; May, 2001).

2.1 Research design

This research followed a qualitative research method which comprised of document review and content analysis. The research design followed a “flexible design” path which is mainly characterized by having a rigorous data collection procedure, accessing different data sources and ensuring that the complexity of the research is truly reflected and communicated (Robson, 2002).

To investigate the presence of those elements which commonly render conditions of authorisation capable of being monitored for compliance, a number of environmental

authorisations and their associated conditions were examined. Environmental authorisations issued in Mpumalanga Province since the implementation of the NEMA EIA Regulations 2010 were sampled.

2.2 Research methods

As stated before, the research mainly focused on the qualitative research method to conduct the study. The methodology comprised of the following four stages, each with a distinct approach. The stages of the methodology are displayed in figure 2-1, which is followed by a brief discussion on each stage:

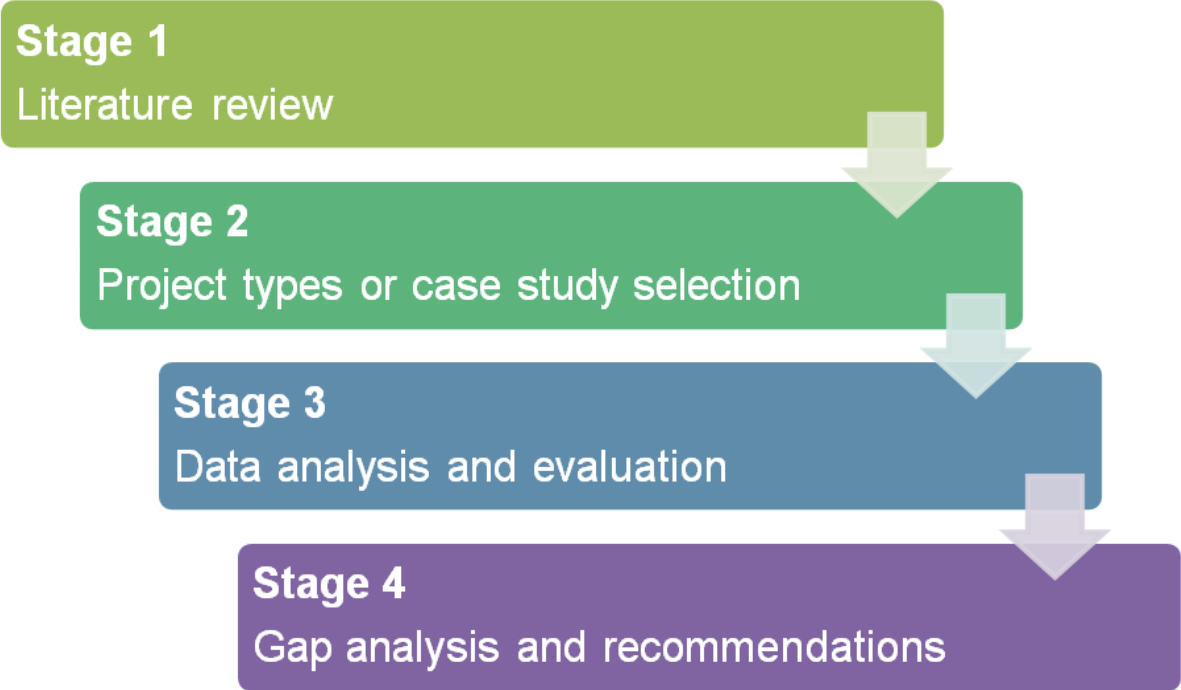


Figure 2-1: Research methodology stages

- (i) Stage 1: An assessment of local, international and legislative aspects of environmental compliance review and best practices. This stage is clearly described in the relevant literature review, is descriptive in nature and has, as its primary purpose the identification of possible review criteria for inclusion in an appropriate review framework.

The literature review centred on compliance monitoring as an EIA follow-up process. EIA follow-up is described as the actions that seek to ensure that the terms and conditions of project approval are met and to monitoring the impact of development and the effectiveness of mitigation measures (EIMA, 2003). The actions incorporate both voluntary actions of the proponent and imposed consented conditions post-decision. A comprehensive literature review on sustainable development and IEM was undertaken to provide the broad theoretical framework within which EIA follow-up resides. It looked at the legal, regulatory processes and guidelines involved in EIA. The laws, regulations and guidelines, along with the actual practice in applying of these, were reviewed along with the actual practice.

Morrison-Saunders and Arts (2004) indicated that EIA follow-up could include many activities, amongst others monitoring, auditing, ex-post-evaluation, post-decision analysis and post-decision management. Walmsley and Tshipala, (2007) describe compliance monitoring as an EIA follow-up process which provides information that is crucial to influence the management decisions on the continuous implementation of the activity that has been authorised, as well as making improvements to future EIA processes. Environmental compliance monitoring is required to verify a project's compliance against the EIA approval conditions set by Competent Authority (CA) to the project proponents and against existing laws and regulations.

- (ii) Stage 2 : The second stage consists of selection of project types or case studies entailing the identification of project types that require an environmental authorisation before they may commence.
- (iii) Stage 3: This stage relates to the analysis of the findings and evaluation criteria based on best practice information already gathered for purposes of case study review. Much of the analysis was based on the author's own inside knowledge as an Environmental Consultant employed to implement monitor compliance to EAs for various projects that have gone through the EIA process. This stage is primarily analytical in nature.

- (iv) Stage 4: The identification of gaps and specifying recommendations for improvement forms the fourth and last stage of this research. Corresponding trends between key improvement areas and issues of concern identified during the data analysis are highlighted. This stage is predominantly analytical and comparative in nature.

2.3 Methods for data collection and Analysis

Any time scientists disagree, it's because we have insufficient data. Then we can agree on what kind of data to get; we get the data; and the data solves the problem. Either I'm right, or you're right, or we're both wrong. And we move on. That kind of conflict resolution does not exist in politics or religion.

Neil deGrasse Tyson

According to Struwig and Stead (2007) data analysis in qualitative research is a process of gathering, modelling and transforming data with the goal of highlighting useful information, suggesting conclusions and supporting decision making. Data analysis has numerous aspects and approaches, encompassing diverse techniques under a variety of names, in wide-ranging business, science and social science domains. Research shows that there is no single method of data collection that is faultless. In this study information that is available in the form of documents containing conditions for approval was used for data collection.

To be able to address the research aim, research questions and to reach a conclusion, 42 EAs issued under the 2010 NEMA EIA Regulations were obtained from the Mpumalanga Department of Environmental Development and Economic Development (DEDET). An environmental authorisation is a document that contains a list of conditions that the applicant needs to adhere before the commencement of any activities. Applicants or proponents are granted an EA should a competent authority

come to a decision that a specific project, or certain activities in terms of the regulations, may proceed (EIMA, 2003). The 2010 National Environmental Management Act (NEMA) EIA Regulations specify the information to be contained in an EA. Each authorisation can be individually tailored for the activity it authorises, and can impose specific conditions on the conduct of the activity. Each activity attracts different requirements to prevent environmental harm, which are commonly detailed in the standard conditions of an environmental authorisation (Environmental Impact Assessment & Management Strategy – EIAMS, 2011).

All the EAs were for projects that underwent the Basic Assessment (BA) process, no EA was issued for the projects that underwent full environmental impact assessment (scoping and EIA). The lack of EA for EIA could be attributed to the limited time available to check all records available in the province, and the fact that the thresholds of a majority of activities under the 2006 regulations which required scoping and full EIA now require basic assessment under the 2010 regulations.

As a result of population growth there are a number of proposed developments to be implemented or being implemented to meet the need of the community in terms of supplying houses, infrastructure, food, job creation and economic growth. The research focused on obtaining EAs issued for various listed activities essential for addressing the needs of the community. Listed activities refer to development projects that may be harmful to the environment and which will require authorisation from a competent authority or Organ of State, in terms of Section 24 of the National Environmental Management Act of 1998 (Act No. 107 of 1998) (NEMA). The study however did not analyse the different activities but classified the projects in various categories in Table 2–1 below. This is because a single development project may comprise a number of listed activities; hence the use of development type according to Jennings (2011: 40) is a matter of simplification. However, the classification of development types is in itself somewhat loose and subjective in that a development may fall within one or more types; for example a project may entail both industrial and hazardous material storage. It is the intention of the study to be relevant and to add value to the environmental impact assessment system and process in Mpumalanga and South Africa as whole. Selected case studies should therefore represent a prominent sector that is characterized by new

developments and activities requiring environmental impact assessment and that may have a potentially detrimental impact on the environment.

The researcher anticipated to obtain at least one or two EAs from each district; however that was not possible due to limited time and as a result only information that was available was analysed. The majority of the EAs in the sample for the different project types were obtained from the Gert Sibande District Municipality, followed by Enhlanzeni and lastly Nkangala District Municipality. No explanation can be provided for the sample to be dominated by Gert Sibande as the three districts and Mpumalanga as a whole is dominated by similar economic activities including mining, agriculture and tourism. Table 2-1 shows the geographical distribution of the of development project types of the sample.

Table 2-1: Sampled project types and the district locations

Project Type	Description	Project District Location			Total Sampled
		Nkangala	Gert Sibande	Enhlanzeni	
Housing	Construction of residential settlements, mixed land use and schools	1	1	4	6
Infrastructure	Erection of telecommunication masts, construction and upgrades of roads and bridges	1	5	4	10
Water Transport	Potable bulk water and sewer pipelines	1	2		3
Industrial	Development of mining and factories	4	2		6
Storage of hazardous goods	Storage and handling facilities: dangerous goods or substances	1	2	3	5
Agricultural activities	Farming activities including construction and expansion of broilers, piggery and abattoirs	1	2	1	4

Project Type	Description	Project District Location			Total Sampled
		Nkangala	Gert Sibande	Enhlanzeni	
Geographical based activities	Developments project outlined in GN R546 (listing notice 3) of the 2010 EIA regulations	1		3	4
Waste Management	Construction or expansion of waste management facilities	1	3	1	5
Total		11	17	16	42

Environmental authorisations are organized according to a set of standard headings, the three main headings being Decision, Activities Authorized and Conditions. Nevertheless, this research only focused on Conditions stated paying special attention to the following sub-headings as provided by the 2010 MDEDET authorisation template:

- Management and monitoring of the activity; and
- Commissioning and operation of the activity.

Within the above stated sub-headings the research further assessed conditions specified for the various phases of a project; that is the design, construction, operation and site closure or decommissioning of the project. The conditions of authorisation were examined against the requirements of the NEMA EIA Regulations, 2010, for conformance to the requirements for contents of environmental authorisations. The above tabulated conditions were further grouped according to subject, for example: the appointment and tasks of an environmental officer; compliance to other statutory requirements, auditing and submission of an audit report.

EIA Follow-up authorised conditions were then analysed for purpose and clarity according to six simple questions as described by Jennings (2011):

- What must be done? If there is no “what” there is no condition, but equally if the ‘what’ is not clearly specified and understandable to the proponent and the compliance officers, there may as well not be a condition.
- Who must do it? The answer to this question defaults to the ‘permit holder’ as primary responsible party, given that a permit (environmental authorisation) is at some level a contract between the holder and the state as custodian of the environment. Nevertheless, it is possible that some other responsible party may be explicitly identified within the context of a specific condition requirement. For example, a condition requiring the appointment of an environmental control officer may also specify the duties of the environmental control officer.
- When must it be done? Besides the broad phasing timeframes of “construction”, ‘operation’ and ‘decommissioning’ there are frequently more specific timeframes applicable to particular conditions such as reporting.
- Where must it be done? Certain conditions or requirements are limited to specific areas of a project site (e.g., the construction camp); others apply to the project site in its entirety.
- How must it be done? This question may be applied in two ways. First, does the condition specify how its requirement is to be met? Second, how may compliance with the condition can be monitored? It is the second application of this question which was the focus of analysis.
- Why must it be done? It was anticipated that the answer to this question would be found in the ‘Reasons for Decision’, which form an annexure to each environmental authorisation.

Comparison of the forms of wording which yield the most comprehensive set of responses to these questions was used to assist in the development of rules for deriving permit conditions which can be effectively monitored.

2.4 Research study area and project types

2.4.1 Project types

Given the number of activities listed under the NEMA EIA Regulations, 2006, and the fact that a given development project may entail more than one listed activity, it was then decided to categorise the development projects on the sample according to project types rather than listed activity. The data was divided into categories in order to synthesize the data effectively and create a comprehensive analysis. However, as project categorization is a subjective process and the same project may fall within one or more category Jennings (2011) asserts that it is necessary to provide a formal definition of these categories.

Project types were defined as follows:

- Housing: Projects in this category consist of any buildings or structures established with commercial or dwelling/residential component, whether that is social, upmarket housing or educational facilities; and include the so-called mixed use developments which include business, commercial or industrial developments. Projects in the sample comprised of two township developments, two mixed use developments and two the establishment of a school.
- Infrastructure: Basic physical structures or services and facilities vital for the community's economic development and prosperity. These projects include the roads, bridges and telecommunication masts. Sampled projects in this category comprise of three erections of lattice telecommunication masts, two constructions of pedestrian bridges, two constructions of roads and three upgrades of existing roads.
- Water transport: These projects entail the bulk transportation of water (potable, raw or storm water) over any distance. These are essentially large diameter pipeline or canal projects. In the context of the sample there were two water transport projects, which entailed potable and sewer pipeline in an urban residential environment.
- Industrial: Economic activity concerned with the processing of raw materials and manufacture of goods. This category comprised the construction, establishment, modification, upgrade or expansion of industrial facilities. In the context of this study

projects included establishment of mines and upgrade of factories. Within the sample there were three establishments of a mine, one expansion of an existing mining activity, one construction of a chemical factory and expansion of an existing chemical factory.

- Storage of hazardous goods: Projects in this category have as their primary purpose the storage and handling of hazardous materials and dangerous goods such as chemicals and fuels. This included underground and above ground storage. The study comprised of three filling stations, two above ground bulk chemical storage facilities, two decommissioning of underground fuel storage facilities.
- Agricultural activities: Plant or crop production and animal or livestock production of which the purpose is food production, other human needs, or for economic gain. Projects in this category comprised of establishment and upgrade or expansion of farming developments. In the context of this study, projects included establishment of broiler farming, piggery and abattoirs. There is one expansion of an abattoir, one construction of broilers, one expansion of broilers and one development of a piggery.
- Geographically based projects: This category consisted of projects in sensitive environments or protected areas as outlined in listing notice 3 of the 2010 EIA regulations. The projects included activities of new developments of nature or game reserves and construction of accommodation in existing nature resorts. The sample has development of a wildlife and an eco-estate, three constructions of lodges in game reserves and one construction of a workshop in a nature reserve.
- Waste management: These projects encompass management of all processes and resources for proper handling of waste materials (garbage, sewage and other waste products). This category consists of establishment of facilities for various waste management activities. Project included development and upgrade of landfill sites and waste water treatment works. There is one sewage treatment plant, two waste water treatment plant upgrades, one clearing of indigenous flora for a waste site and one for a water treatment plant.

2.4.2 Study area

Mpumalanga is the second-smallest province in South Africa after Gauteng. It is bordered by Mozambique and Swaziland in the east and Gauteng in the west; it is situated mainly on the high plateau grasslands of the Middleveld. The province is made up of three (3) district municipalities that are further divided into various local municipalities (i.e. Ehlanzeni, Nkangala and Gert Sibande). The Nkangala and Gert Sibande districts is made up of six local municipalities (i.e. Victor Khanye; Dr JS Moroka; Emalahleni; Emakhazeni; Steve Tshwete and Thembisile Hani and Luthuli; Dipaleseng; Govan Mbeki; Dr Pixley Ka Isaka Seme, Lekwa, Mkhondo and Msukaligwa respectively). Ehlanzeni comprise of five local municipalities which are Mbombela; Bushbuckridge; Nkomazi; Thaba Chewu; Umjidi and Gert Sibande. Figure 2-2 below shows the map of Mpumalanga Province.

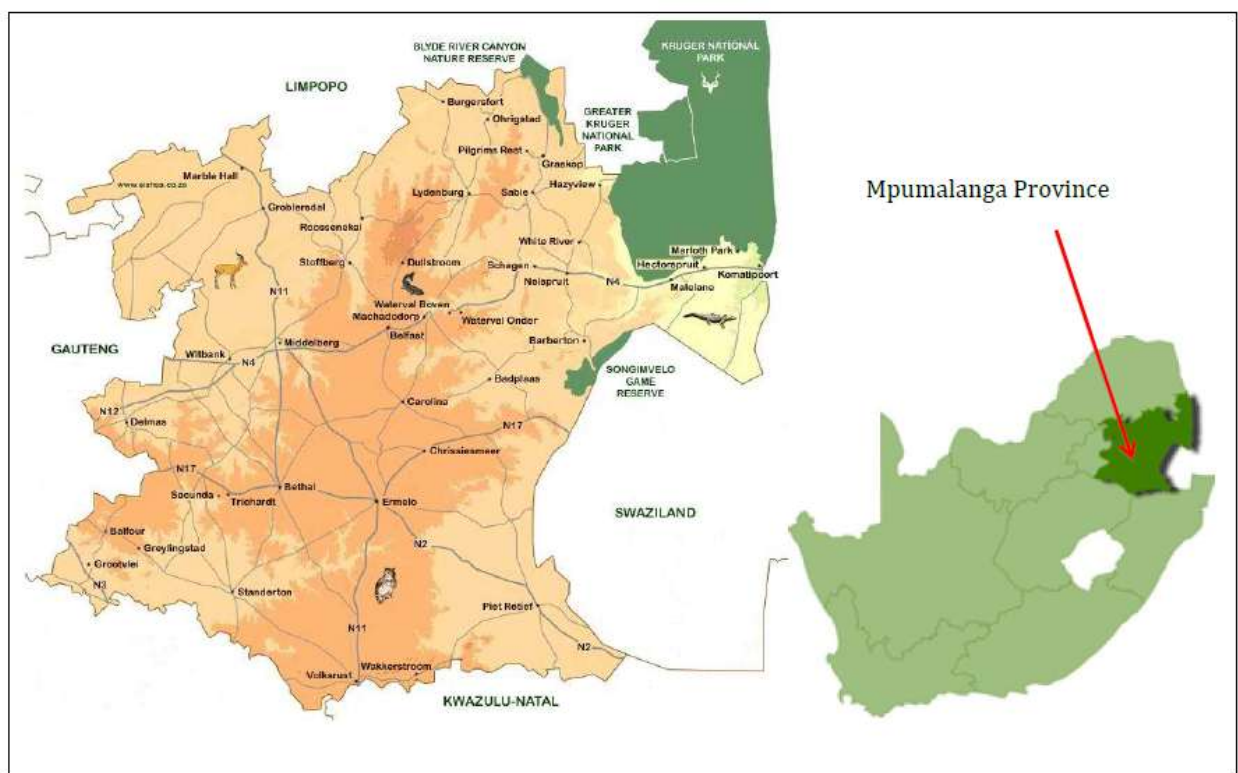


Figure 2-2: A map of South Africa and the location of Mpumalanga Province

The province incorporates a wide diversity of land uses ranging from residential (both urban and rural), agricultural, mining, industrial, commercial, tourism, natural open spaces, etc. The province is also rich in natural, cultural and historical resources.

Development pressures in the province result in conflicting demands created by the mix of land uses.

On the economic front the province's economy is dominated by agriculture, tourism, industry and manufacturing and its development priorities are focused on these sectors. Citrus, sugar and forestry are the major agricultural products, all being major contributors to export earnings. Mbombela is the second-largest citrus-producing area in South Africa and is responsible for one third of the country's export in oranges. Sheep, chickens, sunflower and sorghum are just some of the area's many agricultural products. The province boasts a range of natural attractions such as the Kruger National Park, South Africa's most prized tourism asset which include the Blyde River Canyon, Bourke's Luck Potholes, God's Window and other attractions make this a highly desirable place to visit (Young, 2013).

The area has a network of excellent roads and railway connections making it highly accessible. Strength of the province is the Maputo Corridor, which brings increased potential for economic growth and tourism development. The proximity to Gauteng opens up opportunities to a larger market, which is of benefit to the province's agricultural and manufacturing sectors (Mpumalanga Top Business Portfolio, 2010).

The environmental function in the province is assigned to the Department of Economic Development, Environment and Tourism (DEDET). The environment's department is made up of three regions which are also referred as the province's district municipalities i.e. Ehlanzeni, Gert Sibande and Nkangala District municipalities. The environmental department's head office managing the three regions is located in Mbombela (Nelspruit).

The district municipalities perform the function of EIA permitting, compliance monitoring and enforcement, pollution and waste management, as well as environmental planning and municipal support.

2.5 Limitations of the study

According to Robson (2002: 93) “Validity and generalizability are central concepts for making a study believable and trustworthy”. The sample used in this research was convenient samples that could be accessed within province. Because of this, the sample may not be representative of the province under study (Rosenthal and Rosnow, 1991). The findings and conclusion should therefore be approached with caution and should be limited to the province examined by this research. Therefore, the extent to which findings can be generalised to other provinces cannot be determined. Conclusions reached should demonstrate external validity by avoiding broad generalisations as in a statistical survey approach. Rather, the research follows a so-called ‘replication logic’ (Yin, 2003) which argues that results could be expected to repeat under similar conditions within the South African context.

Some limitations were experienced during the initial review of the Mpumalanga environmental authorisations files and it should be noted that compliance was measured from information available at the time of the research. These limitations include but are not limited to the following:

- The study was limited to Mpumalanga Province only and does not examine national practice. To develop a comprehensive guide to permit condition formulation it would be necessary to examine practice in all nine (9) provincial authorities as well as national authorities.
- Limited access to information due to confidentiality clauses and access to information restrictions during the research period. Only information made available during the time of the research was used.

In order to gain more in-depth understanding of the research, EAs of various project developments were reviewed and compared to be able to generalize the findings of the study.

Chapter 3: Literature Review

Environmental Impact Assessment (EIA) has gained widespread acceptance as a planning tool for promoting environmentally sound development practices both nationally and internationally (Wood, 2003; Morrison-Saunders and Arts, 2004). One of the main aims of an EIA is to strive for sustainable development of the immediate environment which, in the process, will be the major contribution to protecting the environment for present and future generations. The quality of life is to be defined by, among others, the quality of the environment within that area.

According to Glasson et al., 2005, managing the environment should be an ongoing process whereby good Environmental Management is practiced. EIA should not only promote Environmental Management at the planning phase but should be continuous and encouraged during the implementation phase. According to authors such as Nel and Wessels (2009), Wood (2003) and Wessels and Morrison-Saunders (2011), EIA however, often places greatest emphasis on the stages leading up to the environmental authorisation and less attention is paid on the post-EIA processes which include monitoring and auditing of the impact. Post-decision Environmental Management activities such as management; monitoring; evaluation; auditing and reporting are collectively termed EIA follow-up (Arts, 1998; Morrison-Saunders & Arts, 2004). Morrison-Saunders and Arts (2004) regard EIA follow-up as the weakest stage of EIA in most jurisdictions. Marshall (2005) regards the need for EIA follow-up as greatest where there is intrinsic uncertainty in impact assessment and stakeholders demand control of mitigation measures. Globally monitoring and environmental auditing are two important components of an EIA process. Although the implementation of these processes has so far been constantly neglected in the past, this process presently has become increasingly prominent (Ahammed et al., 2006). Numerous role players within the EIA industry indicate that there is a need to strengthen post-approval monitoring of compliance with conditions in environmental authorisations and enforcement where there has been non-compliance (EIAMS, 2011).

Large numbers of EIAs are being conducted for new proposed developments in Mpumalanga and the country as whole, and at the same time a majority of the

developments that have been granted authorisation are being implemented. These developments can be attributed to the continued population growth. As a result, there is a necessity to meet the need of the growing population in terms of supplying houses, infrastructure and food as well as creating jobs. In the interest of the environment and the public at large all environmental authorisations issued for developments require monitoring of compliance with the environmental authorisations and associated Environmental Management Plans/Programmes (EMPs) OECD (2004). The latter stipulates project specific Environmental Performance Specifications and mitigatory specifications that were identified during the EIA process and aims to contribute to the achievement of the objectives of the National Environmental Management Act (Act 107 of 1998) and of the Integrated Environmental Management (IEM) (SA, 1998). The monitoring of these specifications is required for the construction, operational, decommissioning and closure phases of a project (EIAMS, 2011). Therefore, compliance monitoring is an important component in the environmental management of site activities.

Compliance monitoring is considered an EIA follow-up tool. Compliance monitoring as part of the EIA follow-up process is a long-term process. This tool is used to assess, manage, control and evaluate certain environment sustainability issues. With the implementation of compliance monitoring government departments strive to evaluate the effectiveness of Environmental Management Systems (DEAT, 2004), and provides information that is vital to influence the management decisions on the continuous implementation of the authorised activity and to making improvements to future EIA processes (Walmsley and Tshipala, 2007).

Monitoring of impacts, according to (Ahammed and Nixon; 2006), is an essential part of the EIA process which forms part of its management component. It provides vital feedback to evaluate and verify whether the predictions made are realised; determine the success of mitigation measures; and identify and possibly rectify problems in the project implementation stage (DEAT, 2005). According Ahammed and Nixon (2006) monitoring is fundamentally aimed at i) detecting and correcting violations of pre-determined conditions; ii) providing evidence to support enforcement actions, and iii) evaluating progress by establishing compliance status. Ahammed and Nixon (2006)

further point out that the EIA process should be cyclical with feedback and interaction between the various steps – this is because an EIA aims to ensure that the consequences of any development activity, throughout its entire life cycle, are understood and mitigated. These authors further argue that monitoring and auditing are mechanisms used to establish checks on the later stages of the project cycle, which can play an important role in the post-decision stage of an EIA process and, without their implementation EIAs may lose their credibility.

3.1 What is compliance monitoring

Prior to discussing the role of compliance monitoring it is important to have an understanding of what is meant by monitoring and what is included in such. Compliance monitoring is the process whereby authorised activities are monitored and evaluated. According to Walmsley and Tshipala (2007), compliance monitoring is the continuous checking of processes to establish whether implementation of an activity is in accordance with the terms and conditions of an authorisation. This process, if implemented correctly, can maintain environmental protection. Monitoring with the identification and measurement of impacts from development is a process of repetitive observation of 'one or more elements or indicators of the environment according to pre-arranged schedules in time or space' (Selman, 1992). 'Monitoring may be defined as the measuring and recording of relevant variables associated with development impact' (Glasson, 1994, in Wood 1999a). Arts et al. (2001) states that 'in essence monitoring is the collection of data with the aim of providing information on the characteristics and/or functioning of environmental variables'. Craigie et al. (2009) describes environmental compliance and enforcement as 'ensuring adherence to statutorily prescribed environmental standards and to standards contained in non-binding instruments' (such as policies, strategies and guidelines). Therefore, compliance monitoring is aimed to assess compliance with legal requirements and monitor impacts on the environment.

From the above definition it is evident that compliance monitoring will be used to obtain information about the impact on the environment and to thereafter determine whether a certain set of conditions or pre-determined criteria is met. According to Morrison-Saunders et al. (2007) compliance monitoring as a whole is intended to strengthen the

EIA process and provide a means of control and rectification during the process of the project.

There are different factors that will influence the outcomes of post-decision implementation and compliance monitoring of environmental performance criteria. The main factors, as determined by Morrison-Saunders and Arts (2004), are listed below:

- Approaches and techniques used (instruments);
- Resources and capacity; and
- Type of activity.

Morrison-Saunders et al. (2001) indicates that EIA follow-up for EIA projects can result in outcomes relevant to proponents, community and government alike. Figure 3-1 below provides an illustration of outcomes which are relevant to the above mentioned groups. The proponents are the private companies or governmental organisations proposing to initiate a certain project. The regulator is represented by a government (the competent authority) or funding agency which is responsible for administering the EIA process (Marshal et al., 2005 and Youthed, 2009). The community is represented by any party influenced by the proposed development including formal committees and NGO's. Proponents' benefits range between protection from liability, maintaining community acceptance, maintaining EMS certificates, better project management and establishing a 'green profile' or image. For communities EIA follow-up can provide enhanced knowledge about real impact occurring in their neighbourhood, reduce uncertainties about (cumulative) impact and generate adequate management responses to complaints and concerns about nuisances, safety or health issues.

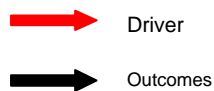
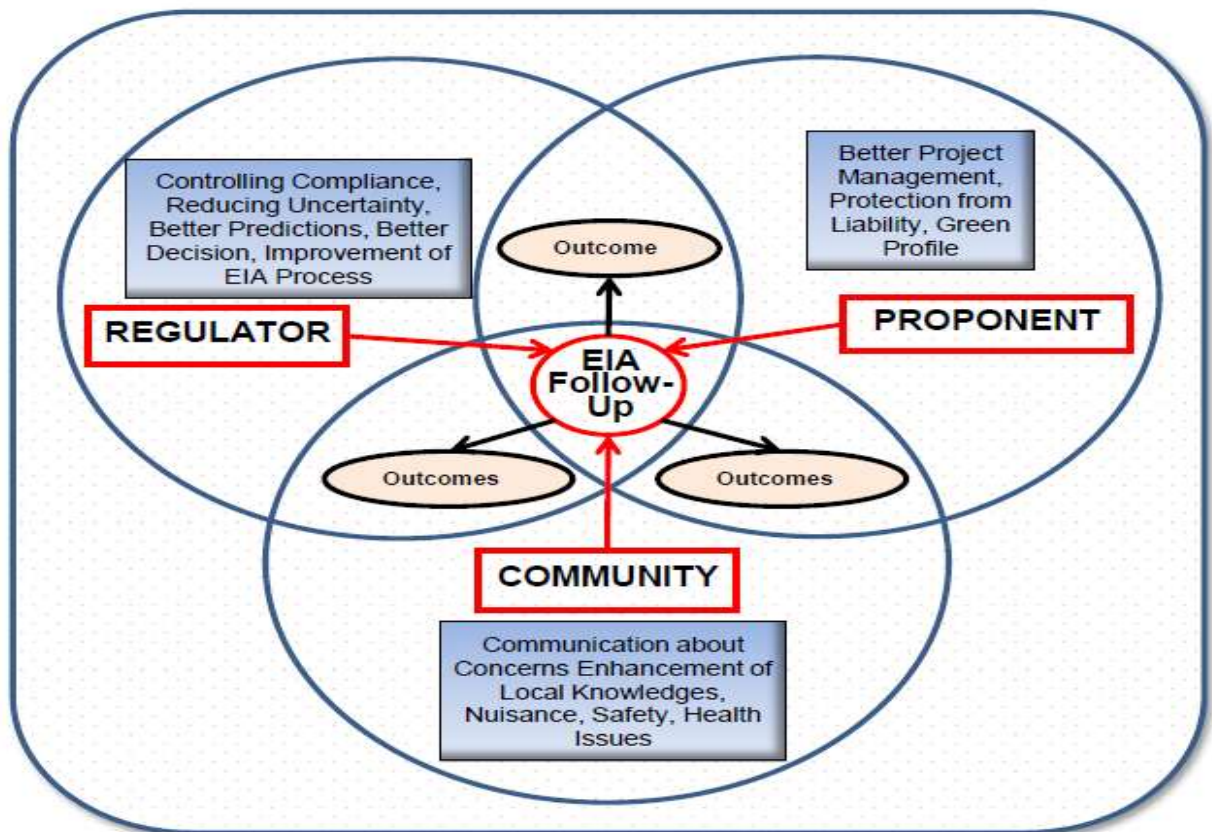


Figure 3-1: Outcomes of follow-up for different stakeholders (adapted from Morrison-Saunders et al., 2001:293)

The role players mentioned above are also stipulated on the NEMA EIA regulations. Regulations 37(1) and (2) as well as regulation 69 specify the on-site role players in post-decision implementation and compliance monitoring of environmental authorisations. These regulations identify other significant role player such as environmental control officer (ECO), environmental liaison officer (ELO), environmental site officer (ESO), an independent environmental auditor (IEA), etc.

The role-players and influencing factors will determine the outcome of follow-up, compliance monitoring and enforcement, as depicted in Figure 3-2 specifically for EIA

follow-up (Morrison- Saunders, et al., 2003). The ‘what’ includes the contextual factors that will influence the follow up and include: regulatory requirements, the approaches and techniques employed, resources and capacity and the project type. The ‘who’ is the stakeholder that will be involved in the follow-up and includes proponents – classified as 1st party follow-up; authorities – 2nd party follow-up and the community – 3rd party follow-up. The ‘how’ is an interaction between the ‘what and the ‘who’.

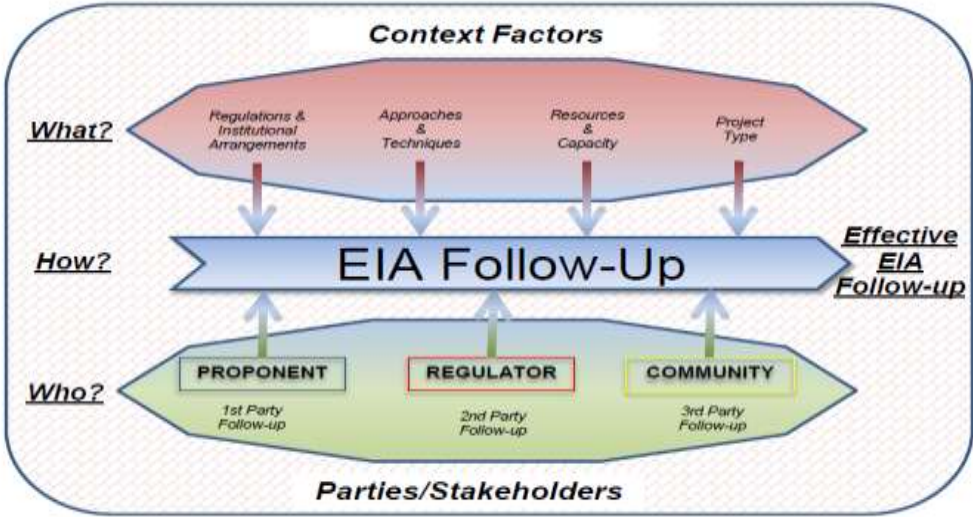


Figure 3-2: Contextual factors and parties relevant for successful EIA follow-up (adapted from Morrison-Saunders et al., 2003:45)

The involvement of various stakeholders in monitoring is considered as crucial. Each stakeholder has different interests and responsibilities important in the implementation of the EIA process. It can therefore be concluded that appropriate coordination between the various parties which includes authorities, investors, developers, operators, and non-governmental organisations, the general public and environmental agencies is essential for effective implementation. A proper institutional and legal arrangement is also crucial (Ahammed and Nixon, 2006).

Hullet and Diab (2002) also identify four broad follow-up classes/models that assist in implementing monitoring in South Africa, namely: legal based, partnership approach (includes environmental monitoring committee), incentive and disincentive approach (incentives and penalties will form part of contractual agreements issued to contractors)

and the self-regulatory approach (implementation of Environmental Management Systems and internal audits). Within the compliance monitoring approach the proponent will, according to Hullet et al. (2002), typically monitor compliance to the environmental authorisation and EMP based mainly on legislation. Hullet et al. (2002) further indicate that the different models of compliance monitoring can be applied depending on the type and scale of the project.

3.1.1 Role of Compliance Monitoring

It is widely accepted that monitoring in the EIA process is essential to verify the performance of the mitigation activities, compliance with regulatory standards and the accuracy of impact predictions. Compliance monitoring is an effective environmental management tool if implemented correctly. Without the use of compliance monitoring the EIA process will stop after authorisation and will become a piece of paper to commence an activity (Morrison-Saunders and Arts, 2004; Morrison-Saunders, A. et al., 2001). Environmental Management as an effective process will become a waste of time and money. Continual monitoring of compliance to an approved EMP has become the basis of managing the environment in a successful way. Abaza et al., 2004 point out that various authors have agreed that compliance monitoring is an essential element of an environmental assessment enforcement process which is crucial to: identify and correct non-compliance; source evidence to support any recommended enforcement actions; and assess the progress of the implementation process by establishing compliance status

Ahammed and Nixon (2006) however argue that despite its undisputed usefulness the EIA process frequently leaves much to be desired. The EIA process is also often viewed as too linear with no real provisions for feedback. Monitoring and auditing are some of the processes that are meant to address this shortfall. It is therefore apparent that monitoring is a very useful activity in EIA follow-up as it can even affect some of the other EIA follow-up components like auditing which would in turn address some of the identified EIA shortcomings (Ahammed and Nixon, 2006).

Monitoring is thus an essential part of post-decision making activities as it is used to assess compliance to standards, guidelines and permits/licence/authorisations and to support management options. Monitoring does not only provide information regarding the actual impact that are occurring but also provides proponents and authorities with the opportunity to implement measures to reduce or prevent further negative impact (Ramos, et al., 2004). The information obtained from the monitoring data and comparison of such will in turn be used to enable the enforcement of environmental performance criteria.

Ramos, et al. (2004) again suggests that a conceptual framework be developed for monitoring where the actual impact is evaluated as per Figure 3-3 below, which illustrates that monitoring post-decision can be compared to the baseline monitoring to provide the actual impact, and indicates the importance of setting monitoring programs along with environmental performance indicators and goals. It is also important to ensure that the indicators with the highest potential risk be highest on the list of monitoring importance.

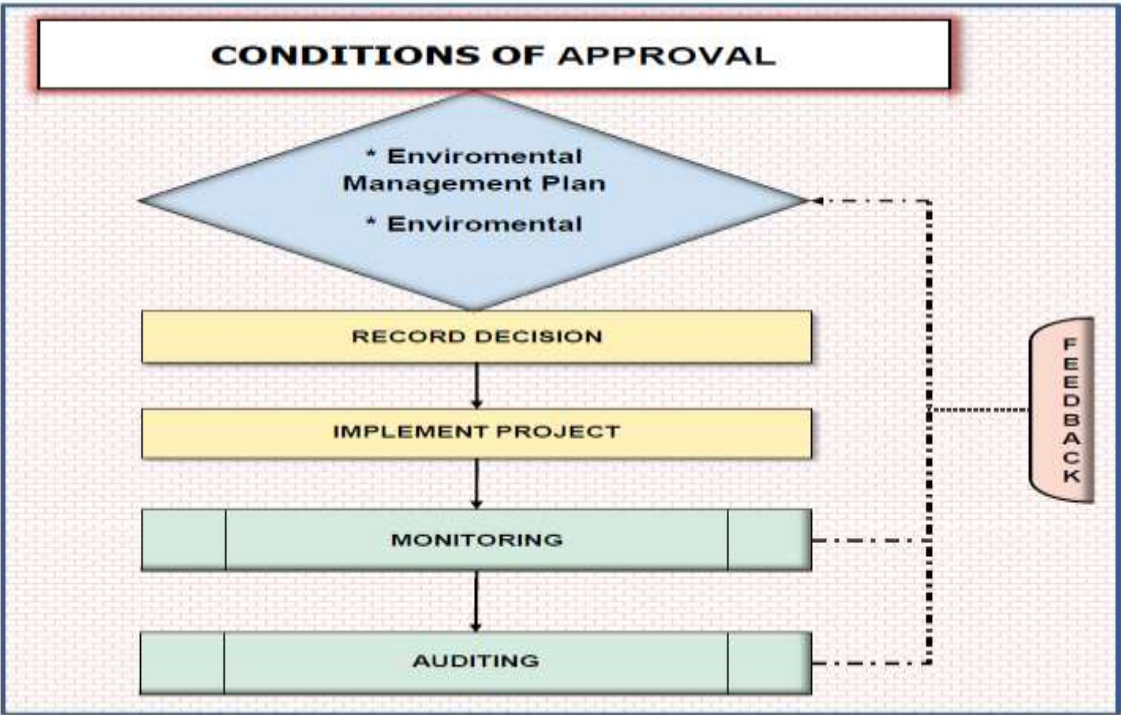


Figure 3-3: Schematic representation of feedback from monitoring and auditing (adapted from Ahammed and Nixon, 2006)

Figure 3-4 below highlight how monitoring and auditing processes can provide feedback to the EIA process to improve conditions of authorisation, environmental management plan (EMP) as well as facilitate better implementation of an activity.

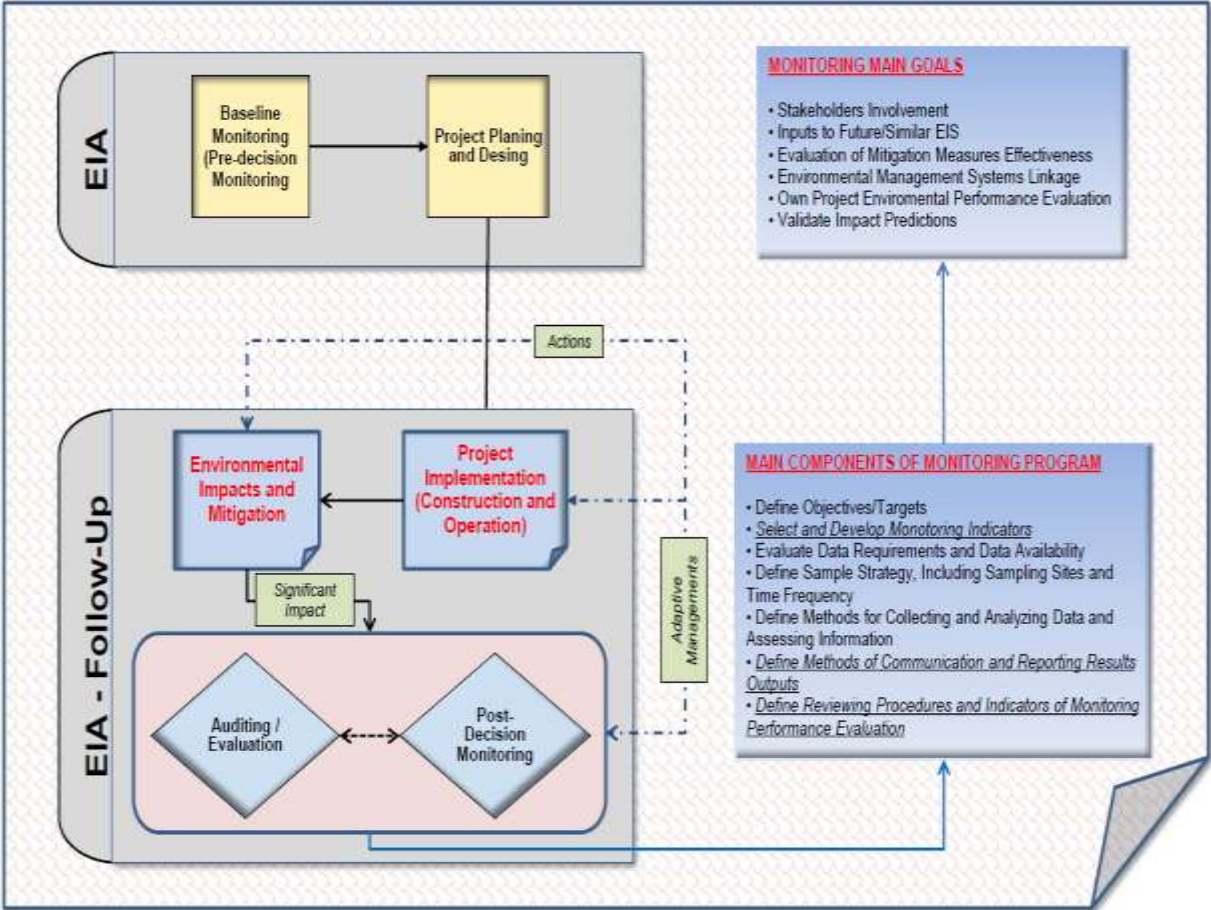


Figure 3-4: Environmental Post-decision Monitoring Program (adapted from Ramos, et al., 2004: 54)

The abovementioned is very important because it correctly identifies monitoring as a key activity in enforcing environmental authorisations. It also identifies the need to ensure that enforcement instruments such as a monitoring programme must be incorporated in the pre-decision stage of an EIA process. This would ensure that EIA follow-up activities are not neglected because they would have been central in the decision making process. Finally, it recognizes the need to ensure proper hand-over of responsibilities, which is crucial. This is important for both the authorities and the

authorised parties. A break in communication in this regard would cripple some critical follow-up activities (Ramos, et al., 2004).

3.2 Compliance monitoring in EIA and EIA Follow-up

Once an environmental authorisation has been issued, and during the beginning stages of construction, environmental compliance monitoring becomes effective. This process should last for the lifetime of the project whereby any non-compliance aspects are identified, noted, reported and rectified. Morrison-Saunders and Arts (2004) and Morrison-Saunders, et al. (2001) stress that without the use of compliance monitoring the EIA process will terminate after authorisation, contradicting the whole aim of an EIA. Using this tool becomes a means of identifying harmful effects and acting as an early warning system whereby detrimental impact may be identified. The aim of this procedure is to identify this impact before it poses an environmental threat resulting in irreversible damage that may become impossible to remediate or place a heavy burden on the financial aspect of an activity. Remedial measure will become the responsibility of the environmental authorisation holder.

Compliance Monitoring has become an integral part of the EIA system of South Africa. According to O' Beirne (2011) this responsibility is rarely taken up by the holder of the authorisation and thus needs to be enforced by governmental organisations for holders of an authorisation to comply. These aspects may be incorporated into the EMP developed for a proposed activity.

Although monitoring and auditing of activities is not considered a legal requirement by South African environmental law, Section 69(8) R. 543 of the 2010 EIA regulations point out that every holder of an environmental authorisation must conduct monitoring and performance assessment of the approved EA and environmental management programme (EMP/EMPr), as may be set out in the conditions of the EA. Without this system compliance of serious environmental impact would become non-void, and would rely on best practice performed by any holder of environmental authorisations. Jennings (2011) asserts that, to achieve compliance, one must have clear instructions to follow

the permit conditions. These must be capable of being interpreted and understood in the same way by both the project proponent and compliance monitoring and enforcement officials. Jennings further emphasizes that the setting of permit conditions needs to take into account the nature and extent of anticipated project effects on the environment and the complexity of their mitigation. Equally the setting of conditions must take into account the physical and financial costs of monitoring compliance with the permit conditions set (Morrison-Saunders et al., 2003). To assist officials in formulating legally defensible, practically enforceable and implementable permit conditions many administrations have produced manuals to guide officials in this aspect of the permitting function.

The fact that environmental monitoring and auditing is not yet a legislative requirement in South African environmental law is considered a major weakness, but also an opportunity for improvement of the effectiveness of regulating activities that may be detrimental to the environment. According to Nel and Wessels (2009) the failures of the South African enforcement process can be attributed to the little attention authorities give to environmental assessment follow-up processes. These authors further indicate that valuable lesson can be learned through a monitoring programme of an authorised activity that was subjected to EIA. The lesson includes designing, plan and amalgamating post-decision enforcement instruments in the pre-decision stages of the EIA process.

3.2.1 Overview of Environmental Impact Assessment

The evolution of environmental assessment has spanned several decades and has taken place in greatly varying contexts. The modern forms of EIA procedures evolved as a response to the increasing recognition of the harmful environmental impact and an upsurge in public environmental activism (Holder, 2004:42). Environmental Impact Assessment (EIA) is considered to be a very young discipline only emerging internationally in the late 1960s as a response to the ecocentric concerns which began to challenge the technocentric view (Petts, 1999:3). Environmental impact assessment is widely known as a process that attempts to identify, predict and mitigate ecological and social impact of development activities. According to Morrison-Saunders et al.,

(2007) EIAs play a role of providing information to developers, managers, planning authorities and the people likely to be affected by projects through identifying and addressing the various aspects of potential environmental impact in the short, medium and long term, and identifying mechanisms which may aid in their mitigation. On the other hand it is also acknowledged that the EIA process undertaken for listed activities may benefit other projects to achieve environmentally sensitive and sustainable development where EIA is not required (IEMA, 2003).

In South Africa EIA started as a voluntary practice in the 1970's (particularly for large projects). It became a statutory requirement only in 1997 to the Environmental Conservation Act, 1989 (Act 73 of 1989) (ECA) regime to the National Environmental Management Act, 1997 (Act 107 of 1997) (NEMA) regime (Glazewski, 2005; Western Cape Department of Environmental Affairs and Development Planning, 2006 and Wood, 1999). Figure 3-5 is below illustrates the development of environmental assessment over the past 40 years.

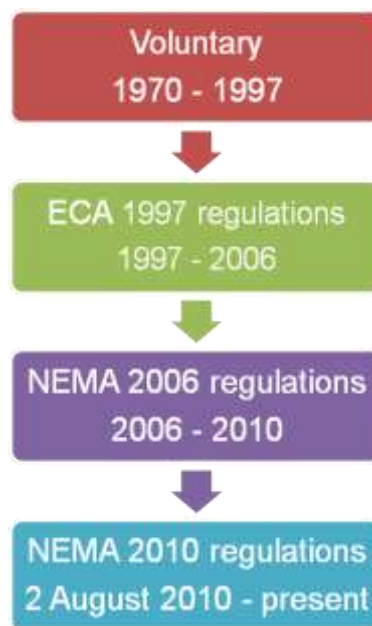


Figure 3-5: Environmental Assessment Evolution

EIA in South African context is currently governed by the National Environmental Management Act (NEMA) (Act 107 of 1998). Within NEMA are regulations that govern

developments which require an EIA study. The 2010 EIA regulations, against which this research assesses the conditions of follow-up in Mpumalanga, were published in the form of General Notices (GN) in the Government Gazette. The General Notices are a list-based screening notices (three listings), with specifications on thresholds. Listing notices 1 (GN. R 544) as well as category A waste activities (GN R 921) require Basic Assessment; Listing notice 2 (GN. R 545), as well as category B waste activities (GN R 921) – Scoping & EIR process and Listing notice 3 (GN R 546) contain activities within sensitive areas for which basic assessment will be required, and application for two or more activities as part of the same development will require Scoping and EIR (full EIA) process. These listing notices specify listed activities that may be harmful to the environment and which will require authorisation from a competent Organ of State or authority as per Section 24 of the NEMA. Other authorisations in South Africa are required in terms of the Specific Environmental Acts (SEMAs) such as the Water Use Licence (WUL) in terms of the National Water Act (Act No 36 of 1998 (NWA), Atmospheric emission licence (AEL) in terms of the Management: Air Quality Act No. 39 of 2004 (NEM:AQA) and also Waste management licence (WML) in terms of the Environmental Management: Waste Act 59 of 2008 (NEM:WA). The Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) also authorise mining related activities by issuing a mining and exploration rights or permits.

Even though the potential of EIA to contribute to environmental governance and sustainable development is generally recognised, its ability to do so is under question. It has also been suggested that constraints on EIA effectiveness could relate more to issues of purpose than to inadequate regulatory framework or poor practice (Deelstra, Nootboom, Kohlmann, Van den Berg and Innanen, 2003). Despite these limitations, procedural forms of EIA which lack in effectiveness continue to dominate. This is due to a number of factors including the circumstances leading to the emergence of EIA practice (as a political response to public concerns), the lack of a solid theoretical basis for EIA, and the difficulty in defining and implementing its substantive goals.

3.2.2 EIA Follow-Up

As a concept EIA deals with uncertainties; it attempts to predict the outcomes of and propose mitigations for a project that has not yet been implemented. EIA follow-up endeavours to address these uncertainties and to provide evidence (via activities such as monitoring and auditing) of the actual environmental outcomes or consequences of a project. Proponents and regulators learn from EIA follow-up, thereby improving the mitigation and preventative measures required to avoid negative effects on the environment. (Morrison-Saunders and Arts, 2004:7&8).

EIA follow-up starts to play its role after the EIA has been conducted and the approvals granted and it serves as an environmental management function as well as a communications role (Noble and Birk, 2011:18). Its primary concerns are to improve environmental protection measures during project implementation and to enhance feedback on the successes or otherwise of EIA processes (Morrison-Saunders, Baker and Arts, 2003:43).

According to Marshall (2005) EIA follow-up 'is no longer an option but a sound precaution and a proactive measure'. Marshall (2005) further argues that the success of development is measured in terms of the final results namely the operational environmental performance, the acceptance of the project by stakeholders, the project's contribution to sustainable development and the scale of the project's environmental impact during its full life cycle. EIA follow-up plays a critical role in monitoring, assessing, verifying and communicating the above mentioned aspects. The control frameworks fostered by EIA follow-up also serves to strengthen the 'overall structure and process of EIA' thereby improving EIA practise and systems (Marshall, Arts and Morrison-Saunders, 2005). Marshall, Arts and Morrison-Saunders (2005) aptly refer to EIA follow-up as 'learning from experience'.

Morrison-Saunders and Arts (2004) record the history of EIA follow-up as starting with scientific and technical aspects concerned with the accuracy and quality of impact

predictions and Environmental Impact Statements (EIS). The second phase moved to management aspects such as the mitigation and project management, with the third (current) phase expanding to also include communication, the roles of involved parties, resources and capacity building (Morrison- Saunders and Art, 2004:9).

In South Africa, as in many other countries, EIA follow-up is only mandatory if so specified in the terms of the environmental authorisation as per EIA regulation 69 (8). EIA follow-up is a vitally important requirement to link the pre- and post-decision phases of projects in order to bridge the gap between project plans and project implementation (Jordaan, 2010:46).

3.2.2.1 EIA Follow-up Definition and Context

Morrison-Saunders, Baker and Arts (2003:44) define EIA follow-up as 'the monitoring and evaluation of the impact of a project or plan (that has been subject to EIA) for management of, and communication about the environmental performance of that project or plan'. EIA follow-up activities include monitoring of the actual impact, compared with predicted ones, as well as monitoring and enforcement of compliance with commitments and conditions of authorisation. EIA follow-up is also defined as the activities that are undertaken during the post-decision stages of the process (Morrison-Saunders et al., 2002: 5). According to the IAIA (2007) and Morrison-Saunders et al. (2003) the EIA follow-up process entails four elements namely:

- Monitoring – involves data collection or measurements with the purpose of providing information on the characteristics and/or functioning of (environmental) variables;
- Evaluation – involves the interpreting/analysing data of the activity to check conformance to standards and predictions, as well as the activity's environmental performance;
- Management – relates to making decisions and taking appropriate action in response to matters arising from monitoring and evaluation processes; and

- Communication – relates to informing/engaging stakeholders about the activity implementation of EIA follow-up in order to provide feedback on project/plan implementation as well as feedback on EIA processes plan.

Morrison-Saunders and Arts (2004:7) describe EIA follow-up as the ‘link between the pre- and post-decision stages of EIA’. While Jordaan (2010:35) describes EIA follow-up as an ‘umbrella term for a range of EIA activities’ that ‘is the dose of common sense to the EIA process by ensuring it is applied’. EIA follow-up can therefore bridge the gap between project plans and their actual implementation (Morrison-Saunders and Arts, 2004:8). Figure 3-6 below illustrates how EIA follow-up links EIA and project implementation (Morrison-Saunders and Arts, 2004:7, and Arts et al., 2000: 177). According to Arts, et al. (2001) Figure 3-6 further illustrates show follow-up does not actually link with compliance monitoring, but compliance monitoring is in actual fact an element of follow-up. In addition, the figure demonstrates the link between the EIA process and the project life cycle. This figure also displays the close relationship between auditing and monitoring.

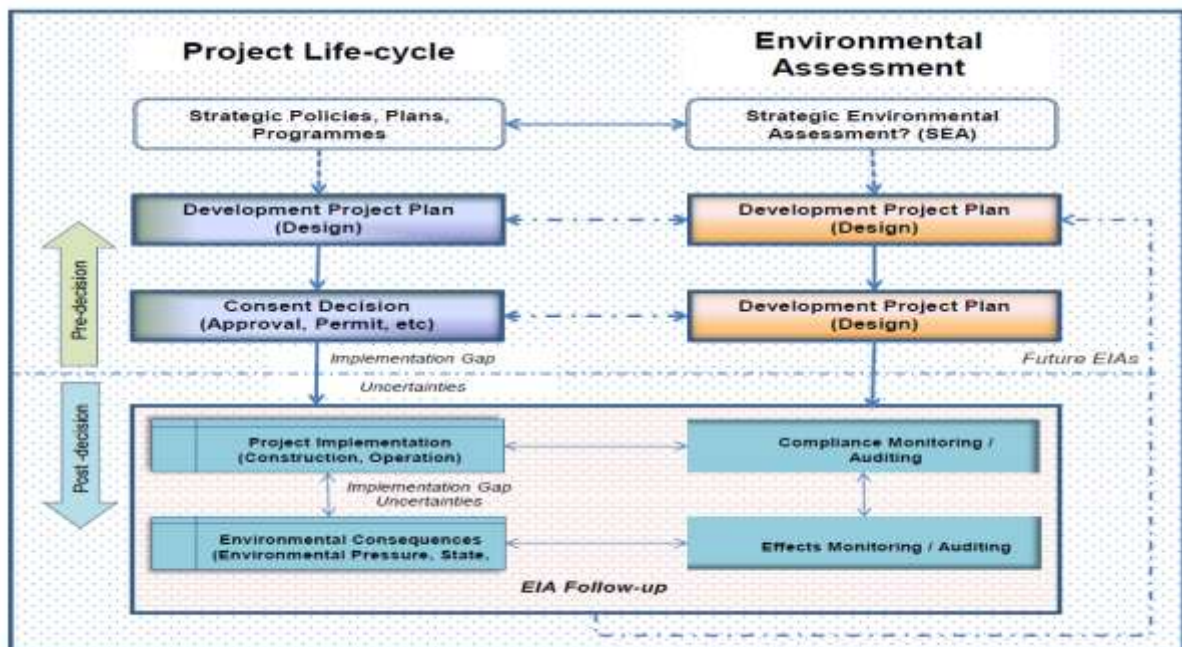


Figure 3-6: EIA follow-up as a link between EIA implementation and project implementation (adapted from Arts et al., 2000: 177)

Arts et al. (2000) indicate that EIA follow-up is usually seen as the complement of EIA. The dividing line between the two is the record of decision (RoD), now known as environmental authorisation. Therefore it may be concluded that EIA might be viewed as a form of pre-decision analysis counterpart (Arts et al., 2000). Moreover it can be stated that EIA and its follow-up relates directly to the planning and development of projects, while EIA follow-up relates more specifically to the implementation of projects (their construction and operation). "Therefore EIA follow-up may relate to the various stages of the project life-cycle after the consent decision has been taken which may include the (final, detailed) designing, the contraction and the operation phases" (Arts et al., 2000: 2).

Although follow-up is important in realising the benefits of EIA, this topic has received less attention in the literature than other aspects of the EIA process. The increase of interest in experience in EIA follow-up has been facilitated at recent annual conferences of the International Association for Impact Assessment (IAIA) held in Cartagena, Colombia (26 May–2 June 2001) (Morrison-Saunders et al., 2001). Various authors such emphasize that EIA literature seldom mention follow-up activities which are often neglected in environmental assessment design and practice despite widespread awareness of their importance for the effectiveness and contributions to the advancement of impact prediction and environmental understanding (Ahammed and Nixon, 2006; Hunsberger et al., 2005).

3.2.2.2 The Need and Importance of EIA follow-up

Regulators require EIA follow-up to govern compliance, moderate uncertainty, verify predictions and improve decision management in future EIA processes and decisions (Marshall, 2005:191). The Australian Environmental Protection Agency (EPA, 1995) indicates that EIA follow-up is needed because relatively little attention is paid to the actual effects arising from project construction and operation.

For project proponents EIA follow-up hold longer term benefits such as (a) gaining knowledge that can be used in future projects via the evaluation of actual impact; (b)

management of monitoring and evaluation activities that can assist with applications for subsequent stages of the project or future projects; (c) management of the risk of future liabilities via monitoring and evaluation of activities; and (d) improved relationships with stakeholders via communication of the results of monitoring and evaluation of activities. (Marshall, 2005:192). The need for EIA follow-up is clearly demonstrated by Marshall's contention (2005:195) that a proactive approach to EIA follow-up can define a proponent's approach to EIA, stakeholder communication and mitigation, as well as improve stakeholder acceptance of developments and reduce opposition to proposals.

3.2.2.3 Objectives of EIA follow-up

There are numerous objectives of follow-up, however the main objectives include that follow up provide information regarding the consequences (actual impacts) of an activity (project), follow-up provides insight into the successfulness of the pre-decision process, follow-up enhance scientific knowledge about environmental systems, follow-up improve the quality and instruments used, follow-up improve project management, follow-up improve public awareness and follow-up could maintain some decision-making flexibility (Arts, et al, 2001 and Morrison-Saunders, et al, 2003).

3.3 Legislative Requirements for environmental impact assessment follow-up

The South African Environmental Management legislation is not known for its EIA follow-up. This process is considered as one of the weakest areas within the EIA system. It has, however, been noted that governmental departments have strengthened their focus on Environmental compliance monitoring and auditing (DEAT, 2004). According to the previous Environmental Legislation (Environmental Conservation Act, Act no 73 of 1978) no compliance monitoring legislative requirements were stipulated. However, compliance monitoring was stipulated in the EA requirements. Companies and organizations obtaining authorisation had no commitment of compliance monitoring. Only recently, with the incorporation of NEMA, have these requirements been included. Prior to 2006 when ECA was still implemented, no compliance monitoring was legally enforced. The only monitoring that took place was that incorporated through best practice (Freemantle, 2008).

Nevertheless, the use of law has undoubtedly been a fundamental means to ensure environmental management. South Africa has adopted a compulsory legal framework by which compliance monitoring becomes obligatory. According to Peterson and Kotze (2009) most environmental management legislation makes provision for compliance monitoring through inspections to verify compliance to conditions of authorisation.

EIA legislation has considerably improved since 1989 by improving/enhancing the regulations and considering follow-up components in the EIA process. However, research has shown the provision of legislation for compliance monitoring has so far not been effective in ensuring the effectiveness of EIA follow-up in the implementation stage. The ECA (2005) argues that in South Africa there is no provision in the legislation and no initiatives to monitor, collect, record and review the implementation of EIAs. There are also no systematic processes at national and provincial government level to record, collect, document and review the performance of EIA administration and practice. In most of the provinces of South Africa the professional staffs spend all their time reviewing and processing applications with no time left for monitoring and enforcing conditions of the approval. The lack of capacity (quality and quantity of human and other resources) in local governments creates a weakness in SA's EIA process and has also been cited to results in-effective administration of EIAs in South Africa (Kidd & Retief, 2009; Sandham, Siphugu & Tshivandekano, 2005 & Wood, 2003).

The most important pieces of legislation affecting this study were examined in the light of insights obtained from literature reviewed and their practical implications for data analysis. These included the Constitution, NEMA and its EIA Regulations. Although there may be some support for interpreting permits as contracts, investigating the realm of contract law is beyond the scope and intent of this study.

3.3.1 The Constitution

The Constitution is the most important piece of legislation that provides a framework for environmental management and promotes sustainability (meeting the needs of the

present generation without compromising the future generation) in South Africa. A constitutional mandate is provided for in Section 24 of the Constitution (Republic of South Africa Act, No. 108 of 1996). Compliance monitoring is essential to ensure that natural resources are protected for future generations as it will depict the depict and come up with measures to remedy the violations or wrong doings of present generation. Therefore, the constitution places a legal duty on developers to ensure that they consider the management of environmental impacts during their operations in order to prevent environmental pollution or degradation (Wessels and Mkhari, 2007).

3.3.2 The National Environmental Management Amendment Act (Act 107 of 1998)

NEMA restates the section 24 Constitutional environmental right and ensures that the principles of sustainability and integrated environmental management are taken into consideration in all environmental decisions. Compliance monitoring is presented within the National Environmental Management Amendment Act (Act 62 of 2008). Section 24 (4) (b) (v) requires the *'investigation and formulation of arrangements for the monitoring and management of consequences for or impacts on the environment, and the assessment of the effectiveness of such arrangements after their implementation'*. Section 24 (4)(f) of NEMA 1998 makes a provision for an investigation and formulation of arrangements for the monitoring and management of impacts, and the assessment of the effectiveness of such arrangements after their implementation (South Africa, 1998: 24). In terms of section 24Q, monitoring and performance assessment, requires that the general terms and conditions of environmental authorisations must require holders of environmental authorisations *'to conduct such monitoring and such performance assessment of the approved environmental management programme as may be prescribed'*. The duty of care requirements of section 28 and specifically section 28 (3) (a) further implicitly strengthen the need for EIA follow-up to be considered whether in the form of compliance, environmental monitoring or environmental auditing. Section 24N of the NEMA Amendment Act 62 of 2008 ensures the protection of the environment by mining activities by forcing the holder of an environmental authorisation to monitor and audit compliance with the requirements of the environmental management programme.

3.3.3 NEMA 2010 EIA Regulations

In the hierarchy of legislation, it is at the level of regulations that the most detailed instructions for implementation are found. It is here that the requirements for permit constants are set out in the greatest detail. Consequently, this is the piece of legislation most likely to be considered in the formulation or permit conditions, although the other pieces of legislation discussed here play (or should play) important roles in decision making on permit conditions (Jennings, 2011).

Regulation 37 (d)(ii) of the EIA Regulations requires that every environmental authorisation ensures, as a minimum, have adequate provision for ongoing management, monitoring and reporting of the impacts of the authorised activity throughout its entire life cycle. The contents of environmental authorisations under the NEMA Regulations 2010 are presented in regulations 37. Sub-regulation 37(2) is a discretionary provision. Through the use of the word “may” the decision making authority is granted wider discretion to set conditions of authorisations pertaining to the identified areas of activity commencement, compliance monitoring and reporting, and the auditing and reporting of project specific environmental impacts. Sub-regulation 37(2)(b), as the case may be, may be interpreted as enabling the competent authority to give practical effect to the “polluter pays” principle by saving society at least part of the financial burden of monitoring the permit holder’s (project proponent’s) compliance with the permit (Jennings, 2011). Sub-regulations 37 (2)(d) and (e) are artefacts of alignment with the Minerals and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA). The aim being ultimately for the environmental management of mines to resort under the Department of Environmental Affairs rather than the Department of Mineral Resources as is currently the case. Nevertheless, these provisions do present an addition to the armory of enforceable environmental management provisions available to the authorities that were not available under the NEMA EIA Regulations, 2006.

Chapter 8, regulation 69 of the EIA Regulations (compliance monitoring) deals with the measures that a competent authority may take if it suspects a contravention of or failure to comply with an authorisation. Regulation 69 (2) *allows that ‘if the competent authority*

reasonably suspects that the alleged contravention or failure has caused, or may cause, harm to the environment, the competent authority may request the person concerned, in writing, to submit an environmental audit report on the harm or suspected harm to the environment or on any specific matter determined by the competent authority’.

Regulation 69 (8) of the EIA Regulations further provides that *‘Every holder of an environmental authorisation must conduct such monitoring and such performance assessment of the approved environmental authorisation and environmental management programme as may be prescribed through conditions of the environmental authorisation’.*

The provisions of the EIA regulations discussed above are similar to the provisions of NEMA in that they imply the need or requirement for EIA follow-up but do not explicitly and unambiguously spell them out as a legislative requirement.

3.3.4 Concluding remarks

The above mentioned legislative frameworks make provisions for monitoring compliance with conditions stipulated in the environmental authorisation. Jordaan (2010) indicates that, as a result in making a decision to grant or refuse an environmental authorisation subsequent to an EIA process, at least three different pieces of legislation must be taken into consideration by the competent authority. The provisions and principles of the Constitution, NEMA and the NEMA EIA Regulations must be weighed and applied to the findings of the EIA undertaken for a particular development project when compiling the authorisation and formulating any associated permit conditions. In the end it is the permit condition which forms the framework within which EIA follow-up is undertaken.

Chapter 4: Research Findings

This chapter describes the research results obtained from the data analysis of the sampled environmental authorisations. The conditions analysed in the sample were mainly to assess if the environmental authorisations made provision for monitoring of impact during the construction and the initial stage of operation of the project activities. Such conditions were assessed in terms of the NEMA regulations 2010 under sub-regulation 37(1)(ii): “...requirements for the management, monitoring and reporting of the impact of the activity on the environment throughout the lifecycle of the activity as contained in the approved environmental management programme”. The analysis solely focused on conditions that relate to project development impact and did not consider general conditions such as those relating to provision of sanitation services and management of stockpiling.

4.1 Monitoring

4.1.1 Conditions for the appointment and specifying the duties of an ECO

Environmental authorisations issued for EIA activities in South Africa frequently include a condition stating the appointment of an independent Environmental Control Officer (ECO) to ensure compliance with the conditions of the authorisation. The first step of assessing the provision of monitoring within the environmental authorisations was to address the conditions that require the appointment and specifying the duties of an environmental control officer (ECO). A large number of EAs specified the appointment of a “qualified or experienced” ECO, whilst others mentioned that the ECO should be “independent”. In the sample 19 EAs mentioned that an ECO must be appointed with no specific duties; twelve (12) EAs clearly specified the tasks which an ECO is expected to carry out besides ensuring the implementation of the EMP; eight (8) EAs had no conditions of the appointment of an ECO. Only one authorisation does not mention the appointment of an ECO; however, the conditions of the ECO appointment and duties are allocated to the project manager. “The project manager is responsible for overseeing that environmental compliance and monitoring is performed and must undertake all correspondence with the relevant authorities.” This condition is very daunting since project managers may not always have the necessary skills related to

environmental management and they manage the entire project implementation process; they might they tend to focus on certain aspects, e.g. engineering, management of contractors and sub-contractors, payment etc., of the project while the environmental compliance monitoring aspect is given limited attention. Further no single duty is mentioned of how the project manager should ensure the implementation of environmental compliance monitoring. The implementation of a project requires a team of experts to be successful. The project manager needs the support of the ECO to monitor compliance, while he needs the support of engineers to execute engineering processes. Examples of conditions for appointing an ECO are provided on Table 4-1.

Only authorisations in geographic areas (sensitive locations like protected areas) had conditions specifying the duties of the ECO. Such duties included:

- The ECO must monitor the contractor's entry into sensitive habitat;
- The ECO must monitor the restriction of construction to designated areas;
- The ECO must oversee the implementation of an alien plant control program; and
- The ECO must oversee and monitor the success of all rehabilitation activities.

All the other EAs requiring the appointment of an ECO only indicate the documents that the ECO should maintain on site for example: a site diary, copies of all reports submitted to the Department and a complaints register of all environmental complaints regarding the proposed project and also the remedies applied to such complaints. No condition with the samples makes provision for the ECO ensuring that the EA that is enforced be kept on site. Experience has shown that such documentation is of serious importance for reference purposes should disputes occur with contractors not complying on site. Although the condition of keeping the EA has been borne to the applicant, experience as an ECO has showed that it is the least that proponents consider and environmental documents are in most cases not available on site unless brought in by the ECO.

Table 4-1: Conditions requiring the appointment and specifying the duties of an ECO

Condition	Analysis of monitorability
<p>The applicant must appoint an Environmental Control Officer (ECO) that will have the responsibility of monitoring and reporting on compliance with the conditions of this environmental authorisation (EA) as well as monitoring and reporting on the implementation of the approved Environmental Management Programme (EMPr).</p>	<p>The condition does not make provision for the timeframe which the ECO should be employed, i.e. whether the ECO should be employed to a specific project implementation phase.</p>
<p>The applicant must appoint an independent ECO that will have the responsibility of monitoring and reporting on compliance with the conditions of this environmental authorisation as well as monitoring and reporting on the implementation of the approved EMPr.</p> <p>3.15.1 The ECO must be appointed before the commencement of construction and the Department must be notified of such an appointment for communication purposes.</p> <p>3.15.2 The ECO must ensure that subcontractors are aware of procedures set out in the EMPr</p> <p>3.15.3 The ECO must oversee on-site environmental sampling during the course of the remediation works</p> <p>3.15.4 The ECO must oversee the handling and disposal of all waste streams and monitoring during the course of decommissioning and remediation works</p>	<p>This provides a good condition for monitorability as it specifies the time frames to appoint an ECO and the duties are clearly defined.</p> <p>From this it is thus evident that this role is very important; however, the independence of this is questionable, there is no clear cut guideline of whether the ECO must be implemented and in many cases in South Africa these are appointed from the existing staff compliment of a company. However even though they are not appointed from within a company the proponent ultimately remains responsible for the payment (if subcontracted) for such a service.</p>
<p>The applicant must appoint an experienced or qualified ECO that will have the responsibility of monitoring and reporting on compliance with the conditions of this EA as well as monitoring and reporting on the implementation of the approved EMPr.</p>	<p>It is evident that there is either no level of independence or very limited independence associated with the proponent. This is alarming as most of the compliance monitoring responsibility falls on the proponent. From experience this has also been seen where, for example, the ECO is mandated to fulfil its role as stipulated in the EA. However, the proponent has the ultimate say and at times neither enforced or monitoring to the authorities as required are undertaken.</p>
<p>The applicant must appoint an independent ECO that will have the responsibility of implementing the approved Environmental Management Plan (EMP) and ensuring compliance with the conditions of this EA.</p> <p>3.14.1 The ECO must be appointed before the commencement of construction and the Department must be notified of such an appointment for communication purposes.</p>	<p>It is evident that there is either no level of independence or very limited independence associated with the proponent. This is alarming as most of the compliance monitoring responsibility falls on the proponent. From experience this has also been seen where, for example, the ECO is mandated to fulfil its role as stipulated in the EA. However, the proponent has the ultimate say and at times neither enforced or monitoring to the authorities as required are undertaken.</p>

3.14.2 The ECO must oversee and monitor the success of all rehabilitation activities.

1.14.3 During the construction phase the ECO must submit monthly compliance reports to the Department in writing and copy the applicant with such reports. Where applicable, the ECO may negotiate the required frequency for the submission of reports with the department, which must be agreed to in writing by the Department. The reports must include a description of all activities on site, problems identified, transgressions noted and remedial action implemented. All reports must reflect the department's reference number of the project on the cover page.

3.14.5 The ECO must remain employed until all rehabilitation measures as well as site clean-up are completed and the site is handed over to the applicant by the contractor for operation

The applicant must appoint an independent ECO that will have the responsibility of monitoring and reporting on compliance with the conditions of this EA as well as monitoring and reporting on the implementation of the approved EMPr.

3.16.1 The ECO must be appointed before the commencement of construction and the Department must be notified of such an appointment for communication purposes.

3.16.2 The ECO must oversee the identification, relocation or removal of plant species of conservation importance.

3.16.3 The ECO must, prior to any site clearing activities, mark shrubs and trees that may be removed.

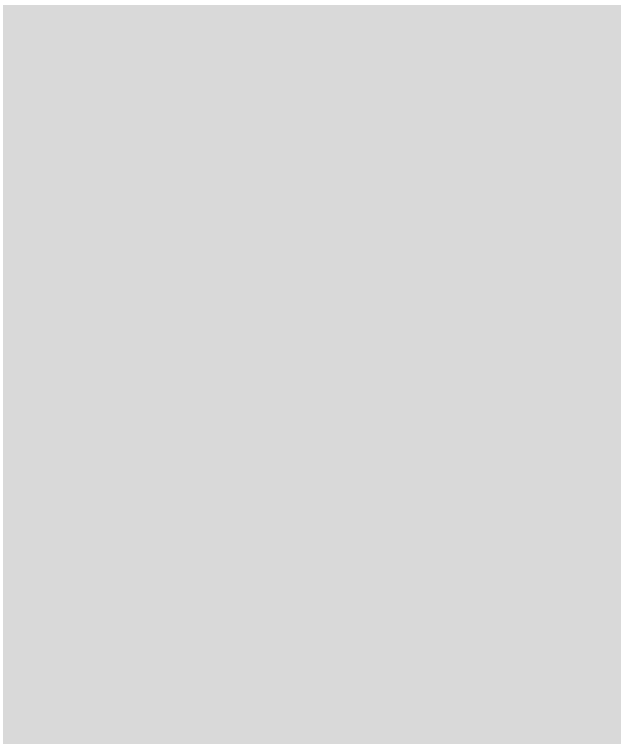
3.16.4 The ECO must monitor contractor's entry into sensitive habitat.

3.16.5 The ECO must monitor restriction of construction to designated areas.

3.16.6. The ECO must oversee the implementation of an alien plant control programme.

3.16.7. The ECO must oversee and monitor the success of all rehabilitation activities.

The applicant must appoint an independent ECO that will have the responsibility of monitoring and reporting on compliance with the conditions of this EA, as well as monitoring and reporting on the implementation of the approved EMPr.



When one sees some of the duties of the ECO outlined in this condition, one expects that the EA should stipulate that the ECO should have *experience* or be *qualified* to carry out such duties. It is important to note that EAs which made provision of such conditions were issued for activities that were proposed in sensitive environments. The issue of a qualified ECO (in terms of relevant qualifications such as Ecology) may appear relevant for this kind of condition. The identification of natural vegetation and its sensitivity requires relevant knowledge and no independent ECO can manage to carry out duties specified in these conditions.

The appointment of the ECO, and the duties of the ECO, are clearly defined which makes monitoring easy to carry out. Furthermore, the ECO's duties are expanded to go beyond the implementation of the EMPr to include involvement in training and awareness. However, the issue of suitable training raises

3.15.1 The ECO must be appointed before the commencement of decommissioning and the Department must be notified of such an appointment for communication purposes

3.15.2 The ECO must ensure that subcontractors are aware of procedures set out in the EMPr.

3.15.3. The ECO must oversee on-site environmental sampling and monitoring during the course of the remediation works.

3.15.4 The ECO must oversee the handling and disposal of all waste streams during the course of decommissioning and remediation works.

3.15.5 The ECO must have qualifications suitable for the management and monitoring of remediation works.

concern in terms of monitorability as the condition does not indicate what qualifications are deemed suitable. The condition of suitable qualification could have been better phrased as suitable experience within the remediation works.

The ECO must have qualifications suitable for the management and monitoring of remediation works.

This is a good condition as it ensures that the person with the right expertise of dealing with the project impact is employed. However, it could also be one of the difficult conditions to monitor as there are no specified qualifications for any ECOs. ECO work is usually carried out by environmental assessment practitioners who have the experience of compiling EIAs. It's only recently that the Centre of Environmental Management in the North-West University has introduced a training course for ECO. The course is, however, not clearly defined for any specific environmental field.

Only areas designated in consultation with the ECO may be used for the storage of materials, machinery and equipment, construction camps, temporary ablution and site offices. Such areas may not be sited in close proximity to steep areas, or within 32m from the edge of any wetland or riparian zone of any watercourse

This condition describes some of the duties that an ECO must carry out on-site to ensure that the contractor does not impact on sensitive environments. However, the determination of a 32m demarcation may sometimes require the expertise of a wetland specialist to clearly demarcate and as result may present problems of monitorability if not properly demarcated. Such conditions could be elaborated by indicating that a site walk down must carried out with a wetland specialist to demarcate all riparian zones as well as demarcate the no-go areas before the ECO can advise anything on site.

The applicant must appoint an independent ECO that will have the responsibility of monitoring and reporting on compliance with the conditions of this EA, as well as monitoring and reporting on the implementation of the approved EMPr.

It is condition like this where it is expected that the ECO should have relevant expertise and/or qualifications. The demarcation of a wetland is not an activity to be carried out with the naked eye; there are scientific techniques involved such as soil sampling,

3.18.6. The ECO must oversee the surveying and demarcation of the wetland buffer zone.
 3.18.7 The ECO must oversee the implementation of an alien plant control programme.

vegetation identification, etc., that requires special training. Managing vegetation also requires specialized knowledge. Similarly the demarcation of geotechnical zones will also require the expertise of a geologist.

The ECO must oversee the surveying and demarcation of designated geotechnical zones that are prohibited from being developed.

These conditions raise difficulty in monitorability unless if relevant specialists can conduct a site walkdown with the ECO before commencement of construction activities. The site walkdown can assist in identifying all areas deemed sensitive which the ECO should make sure that the contractor/s activities do not impact on.

4.1.2 Conditions specifying ECO inspection frequency

All of the 42 EAs sampled did not have a condition that specified when the ECO can carry out site inspections. It can therefore be deduced that the applicant bears the decision of timeframes when inspections can be carried out. The exclusion of a condition specifying frequency does not constitute best practice and makes monitorability difficult to carry out. The EAs range from small to big-scale projects. Based on the environmental sensitivity and activities being applied for, certain projects require a full-time site-based ECO to carry out daily to weekly site inspections. It is therefore important that the competent authority determines the frequency of site inspections based on the activity and location of a project.

Table 4-2: Conditions specifying ECO inspection frequency

Condition	Analysis of monitorability
During the construction phase the ECO must submit monthly compliance reports to the Department in writing and copy the applicant with such reports. Where applicable the ECO may negotiate the required frequency for the submission of reports with the Department, which must be agreed to in writing by the Department. The reports must include a	Fifteen of the sampled EAs contained this condition. It is this kind of condition that makes monitoring easy to implement. The condition clearly specifies the content that the compliance report should contain. However, the frequency of submission of the compliance report should be decided by the competent authority in consideration of the nature and impact caused by each

<p>description of all activities on site, problems identified, transgressions noted and remedial action implemented. All reports must reflect the department's reference number of the project on the cover page.</p>	<p>proposed activity.</p>
<p>During the construction phase the ECO must submit monthly compliance reports to the Department in writing and copy the applicant with such reports. Where applicable the ECO may negotiate the required frequency for the submission of reports with the Department, which must be agreed to in writing by the Department. The reports must include a description of all activities on site, problems identified, transgressions noted and remedial action implemented. All reports must reflect the Department's reference number of the project on the cover page</p>	<p>Although these conditions do not clearly specify the frequency on which the ECO must conduct monitoring, they can to some extent constitute best practice as they indicate when the ECO audit report must be submitted to authorities. However, a best practice condition will be the one that clearly specifies the frequency on which the ECO must do site inspections before submitting the final monthly, bimonthly or quarterly compliance reports to the authorities.</p>
<p>The ECO must submit quarterly compliance reports to the Department in writing and copy the applicant with such reports</p>	

None of the sampled conditions make provision for indicating the frequency according to which the ECO must conduct site inspections to check for compliance except that the ECO must submit monthly, bimonthly or quarterly compliance reports to the authorities. The lack of this condition constitutes bad practice as it is not known when the ECO should be on site and which may in turn make it difficult to see the trend of monitorability of the EA conditions. The conditions only mention that the Environmental Control Officer (ECO) is appointed by the developer as an independent monitor of the implementation of the EMPr.

4.1.3 Project specific monitoring programmes

The sampled EAs were analysed to check if they made provisions for the implementation of project specific monitoring programmes. There are certain projects that require the monitoring of certain programmes to ensure that they are implemented

to operate in an environmental friendly manner and within the required environmental standards or norms. Such projects include industrial activities especially mining (monitoring of air quality, underground water, etc.); waste management (waste water treatment works). Examples of such conditions are provided in Table 4-3 below.

Table 4-3: Examples of conditions requiring the implementation of monitoring programmes

Project Type	Condition	Analysis of monitorability
<p>Housing</p>	<p>Storm water management must adhere to the following principles:</p> <p>3.46.1: No surface storm water generated as a result of the activity may be channelled directly into any wetland or watercourse. All surface runoff generated during both construction and operation phases must be managed prior to entering any natural drainage system or wetland so as not to impact on the natural hydrology and morphology of the watercourse</p> <p>3.46.2 Any point of overland discharge must be located at least 30m away from a watercourse, wetland or dam and overland discharge must occur over areas that have a minimum vegetation cover of 90%.</p> <p>3.46.3. The increase in downstream peak flows must be mitigated by retaining storm water until after peak flows</p> <p>3.46.4. Storm water management must be designed to promote infiltration and slow the release of runoff into wetlands and watercourses.</p> <p>3.46.5 The rate of storm water runoff must be reduced by using mechanisms such as the construction of earth berms, grassed swales and armour flex lined channels to promote infiltration, the vegetation of the buffer zone, and the construction of energy breakers at storm water outlet structures.</p>	<p>These are conditions should form part of the design phase of the project to ensure that the final design layout complies. The implementation of some of the conditions will require the appointment of a specialist to demarcate the buffer zone. A majority of the conditions will be difficult to monitor for compliance as no thresholds for monitoring are indicated</p>

	<p>3.36.6. Where erosion at the base of swales or channels at outlets from piped systems is likely to occur, inverts must be armoured to obviate scour, and where appropriate, swales must be grassed or lined.</p> <p>3.46.7. Surface water rich in sediments and other pollutants must be prevented from entering any watercourse or wetland, and all mechanisms for dissipating water energy must be implemented at the inception of the construction phase.</p>	
Water Transport	The pipeline must be monitored and inspected for leaks and the occurrence of erosion at the crossing site.	The phrasing of this condition makes it possible to monitor for compliance, erosion scars and that leaks can be easily noticeable.
Infrastructure	<p>The construction of the bridge is subject to the permit/licence requirements of the National Water Act, 1998 (Act No. 36 of 1998), and to the following:</p> <p>3.24.1 Construction activities may only take place during low flow periods.</p> <p>3.24.2 The current flow regime of the watercourse may not be altered.</p> <p>3.24.3. Where water flow is required to be diverted, it may only be diverted within the riverbed zone.</p> <p>3.24.4. Disturbance to riparian patches and wetlands in the riverine system must be avoided to ensure bank stability and prevent sedimentation of the river channel and changes in habitat quality and availability.</p> <p>3.24.5. Gabions must be used to stabilise river banks.</p> <p>3.24.5 The quality of water downstream may not deteriorate as a result of construction activities.</p> <p>3.24.6 Access to watercourses must be restructured and construction vehicles must not be allowed to access the river bed.</p> <p>3.24.7 The river channel must not be disturbed and no sand or rocks may be removed from the river or the riparian zone.</p>	<p>These conditions are impressive considering the receiving environment. The damage to the riparian zone may be easily noticeable. Monitoring of some of these conditions may however not be easy to carry out. For example, water monitoring will need to be carried out by a specialist to determine its quality. The condition could be improved by indicating the need for water sampling with certain periods of sampling specified. It may be very difficult not to alter the flow regime as the activity will be constructed across the watercourse.</p>

	3.24.8. Rehabilitation of the in-stream habitat must be undertaken immediately after construction activities. Only indigenous plant species or plants of a non-invasive nature may be used for rehabilitation.	
Hazardous	Spillage contingency or emergency response plans must be drawn up and must include the action that needs to be taken in the event of spillages of chemicals and fuels during the construction phase and this must be reported to this office and other relevant authorities.	Monitoring compliance with this condition can easily be carried out. Proof of the availability of the mentioned documents containing specified content will have to be produced by the applicant.
	Ground water monitoring wells must be installed in the tank area to act as future groundwater monitoring points.	Condition is monitorable but may require a specialist to confirm if the installation is according to the required standards.
	The groundwater quality of the site must be monitored bi-annually and records of such monitoring must be kept on site.	This laudable condition clearly specifying timeframes and record-keeping of monitoring. Good EAs should make use of these kinds of conditions.
	The tanks must comply with the relevant SANS/SABA codes of practice. SANS 10400, 10131, 101801, 1135, and 10089 part of which requires the installation of a leak detection system including observation and monitoring wells situated around the tanks to facilitate early warning that a leak has sprung and the provision of a plastic sheet below the tanks slopes towards an observation well.	
	Hydrocarbon contaminated soils must be remediated <i>in situ</i> unless it is determined by the ECO to be non-viable due to excessive volumes of contamination, in which case the contaminated soils must be removed to a registered site.	The condition can be monitored for compliance.

	<p>To mitigate effluent spillage and soil pollutions the following measures must be implemented:</p> <p>3.35.1 The filling area must be constructed in such a way that no fuel flows into the street, waste water systems or storm water drains without first passing through a separator.</p> <p>3.35.2 The dispensing area must be constructed in such a way as to allow the diversion of clean storm water around the area.</p> <p>3.35.3 Any spilled product must be directed towards a separator pit where fuel should be removed and disposed of at a hazardous waste treatment facility.</p> <p>3.35.4 The tanks must be placed on a hydrocarbon resistant (HDPE) liner to capture spillages from reaching underlying soils.</p> <p>3.35.6 The pump systems must have a leak detector unit which automatically shuts down if a leak is detected.</p> <p>3.35.7 Pumps must be installed on a hard standing area to prevent leaching of the fuel into underlying soil.</p> <p>3.35.8 The person responsible for delivering of the fuel must ensure that no over-filling occurs.</p>	<p>Only one EA of the three EAs for the construction of filling stations made provision of such project-related monitoring programmes. These conditions constitute good practice for ensuring compliance monitoring. The conditions are clear and straightforward as well as relevant for the activity.</p>
	<p>The applicant must appoint an independent specialist to undertake localised soil testing to establish the extent of any local contamination. Such testing must commence within 5 days of tanks and pipelines being exposed. Should contamination be identified, the appointed specialist must recommend measures for remediation, which must be complied with, and must be done in accordance with applicable legislation.</p>	<p>The condition is monitorable as a specialist can be appointed and the fact that it indicates timeframes when the activity must be carried out. Nevertheless, the mentioning of relevant legislation without mentioning the legislation and relevant sections sounds vague and creates difficulty in ensuring compliance.</p>
<p>Waste Management</p>	<p>A Bi-Monthly monitoring of the on-site sewage purification systems must be conducted to ensure the quality of the effluents released and the protection of any watercourses that might be affected by such releases.</p>	<p>The formulation of this condition makes it easy to monitor as it clearly specifies timeframes in which the activity should be carried out and, as such, records will be made available as proof and to indicate the monitoring</p>

		trend.
	A monitoring programme must be compiled and implemented to ensure that the sewage treatment system are functioning properly and the treated waste water conforms to the standards set by the Department of Water Affairs.	The relevant CA will have to approve the monitoring program and will aid compliance monitoring.
Geographic Areas	All sensitive environment, or no-go areas, must be demarcated with a wire and danger tape temporary barrier fence attached to planted wooden or metal posts as a minimum.	
Industries	Ground water monitoring must take place to assess and prevent groundwater contamination.	This condition can be improved for compliance monitoring by specifying timeframes when the monitoring should take place. The condition as it stands is vague and makes it difficult to monitor for compliance.
	A noise monitoring programme must be implemented during the commissioning and decommissioning phase of the mine.	The condition can be monitored for compliance.
	Mine-related machines and vehicles must be serviced on a regular basis to ensure that noise suppression mechanisms are effective.	The condition is difficult to monitor for compliance. Monitoring that vehicles are fitted with noise suppression mechanisms could aid compliance.
	Water monitoring must be carried out as per recommendations of a surface water specialist and the specifications contained in the integrated water and waste management plan.	Compliance with this condition is straightforward; procedure for monitoring can be confirmed on the mentioned documents.
	Blasting schedules must be communicated to local residents to ensure that all residents within the appropriate blast zone are evacuated prior to blasting activities.	The condition is clear-cut for monitoring; documentation to ensure communication with residents should be provided.

4.1.4 Project Specific Measures

The research also analysed conditions that are related to monitoring of project specific conditions. Examples of such conditions are arranged to indicate conditions related to specific project implementation phases. The study found that many of the EAs have less or limited compliance conditions specifically for the design phase, e.g. water transport, industries and waste management projects made no provision for compliance to be enforced during the design phase. Majority of the EAs have most of the project specific conditions to be enforced during the construction phase followed by the operational phase. Like the design phase the decommission phase has very limited generic and vague conditions, which raises difficulty in terms of enforcing compliance monitoring.

Almost 99% of the sample had a condition for the correct disposal of construction waste at a registered landfill site and 20% of those with specific waste-related issues made the provision of waste disposal during the operational phase of the projects. The condition constitutes good practice but it cannot be considered as a project-related condition as a majority if not all projects, generate waste during the construction phase. Monitoring compliance to the condition can be aided by indicating that a proof of proper disposal certificate must be kept on site for record-keeping. However, this condition may on the other hand be difficult to monitor if a proposed project is located in an area with no landfill site close by, especially the remote rural areas.

Table 4-4: Conditions addressing project specific management measures

Project Types	Condition	Analysis of monitorability
Design Phase		
Housing	Before construction activities may commence, geotechnical zones designated D ₁ and D ₂ must be surveyed on-site in consultation with the geotechnical engineer, and must be clearly demarcated on-site for the duration of the construction phase	These conditions can be monitorable. The mentioning of the relevant expertise to carry out the activity ensures that compliance is achieved.
	Development of buildings on slopes exceeding 25%, and the	Compliance to this can be achieved through incorporating

	development of roads on slopes exceeding 12%, is prohibited.	the condition on the design drawing and the CA should have the relevant expertise to approve the design to ensure compliance.
Infrastructure	The bridge design must ensure that a damming or draining effect is not created upstream and that the flow downstream is not concentrated.	The final designs will have to be submitted to the competent authority and checked by a qualified engineer.
Agriculture	Planning and design of all elements of the application must be in accordance with acceptable and approved standards as required by the relevant authorities.	Monitorable as requested documentation must be submitted to the CA for approval before commencement of construction activities. The applicant will also have to ensure that compliance with other legislation in terms of licensing is enforced and submitted to the CA.
	The environmental authorisation, as well as any licence or permits, must be in place before construction commences and any recommendation contained in these permits, licences and/or authorisations must be incorporated into the project design.	These conditions ensure that applicants do not take shortcuts of commencing with an activity before acquiring relevant permits/licences. Therefore, these conditions improve monitorability.
Geographic Areas	No construction activities and any developments are permitted outside the identified “Irreplaceable area” as per the approved Layout in the Environmental Impact Report.	Monitoring compliance with this condition is easy to carry out as the layout has already been approved by the CA and the applicant knows the boundaries where the activities are supposed to take place. However, the boundary will need to be demarcated before the contractor moves to site.
	Natural features on site must be preserved and incorporated into the design as far as practically possible.	This condition is to be straightforward to monitor as it means that the design layout will be approved by the CA to ensure that it includes the requirements stated.
Construction Phase		
Infrastructure	The engineering team must identify and demarcate the exact clearing of the servitude for the contractor to ensure that minimum debushing takes place.	The condition is clearly monitorable.
	Excavations on the road must be	The intent of this condition is

	appropriately demarcated and/or barricaded.	clear which makes it easy to monitor.
Water Storage	Construction must take place within the footprint of the development which is closer to the R545 road (sewerage pipeline) and street in the residential area to lessen the impact on the watercourse.	The intent of the condition is straightforward; however, the footprint can be monitored with the use of area maps indicating the servitude size of the sewerage pipe within the road reserve.
	The proponent must ensure that the commissioning of the pipeline is done with all measures to avoid sewage spillage.	The condition is monitorable to an extent that the applicant will run tests before commissioning to ensure that there are no leakages of the pipes.
Hazardous	Spillage contingency or emergency response plans must be drawn up and must include the action that needs to be undertaken in the event of spillages of chemicals and fuels during the construction phase. This must be reported to this office and other relevant authorities.	Monitoring compliance with this condition can easily be carried out. Proof of the availability of the mentioned documents containing specified content will have to be produced by the applicant.
Industries	Haul roads' construction must occur in the dryer months due to the soils increased susceptibility to compaction during rains.	This condition is straightforward and easy to monitor.
Geographic Areas	The developer must obtain a permit from MTPA or licence from DWA prior to the disturbance or destruction of protected plants and before any clearing takes place.	The condition is straightforward and easy to monitor for compliance.
	Construction activities may not harm or disturb the breeding activities of any animal.	Monitoring of this condition can be improved by adding a requirement to demarcate areas which construction activities should not disturb to avoid disturbing the animal habitats.
	Harming, poaching or snaring of fauna is strictly prohibited.	Compliance monitoring with these conditions is clear.
	Painting or permanent marking of natural features is prohibited.	
	All sensitive environment or no-go areas must be demarcated with a wire and danger-tape temporary	

	<p>barrier fence to be attached to planted wooden or metal posts at a minimum.</p> <p>Prior to clearing activities vegetation, including hollow tree trunks, and ground in all areas that will be physically disturbed, must be searched for nesting birds. If found, such must be reported to the ECO for guidance in terms of rescue.</p> <p>Construction activities must be strictly monitored to ensure that they are confined to the approved footprints.</p> <p>All contractors must be made aware of the site sensitivities and requirements of the EMPr and the Master Plan.</p>	
		<p>Considering the sensitivity of the environment where the activity is to take place, the condition is laudable. The condition can be better improved for monitoring by indicating that the footprint should be demarcated to ensure that the contractor's activities do not cross the footprint boundary. For easy monitoring the condition can further be scheduled as a task of the site ECO.</p> <p>The identification of sensitive environments and educating contractors by the EMPr is better monitored if the task is under the duties of the ECO. This condition can be monitored if proof of awareness is provided in terms of signed attendance registers.</p>
Operational Phase		
Infrastructure	<p>The holder of the authorisation must ensure that the site is inspected annually to determine the need for maintenance.</p>	<p>A clear and direct condition; straightforward compliance a monitoring action.</p>
Industries	<p>Pollution control dams must be lined with an impermeable layer to ensure that no overflow or seepage of water occurs.</p>	<p>The intention of this condition is very clear and compliance with this condition can easily be carried out.</p>
	<p>Ground water monitoring must take place to assess and prevent groundwater contamination.</p>	<p>This condition can be improved for compliance monitoring by specifying timeframes when the monitoring should take place. The condition as it stands is vague and makes it difficult to monitor for compliance.</p>

	An environmental awareness plan must be initiated to educate employees, contractors and visitors on biodiversity and land management principles.	Conditions like this one should include providing evidence of training and/or awareness conducted through attendance registers and proof of training provided to improve compliance monitoring.
	The site must be screened from the surrounding public roads by planting fast growing indigenous trees or using stockpiles for screening.	Compliance monitoring with this condition should be straightforward. Indigenous trees will need to be identified by a person with botanical knowledge.
	The holder of the authorisation must supervise the construction of haul roads in accordance with post-mining topographical plan to ensure that topographical rehabilitation can be achieved with the minimum expenditure.	Although the intention of this condition is clear it is difficult to monitor supervision if no proof of such can be provided. Therefore, the condition is vague and difficult to monitor for compliance.
	Hydrocarbons fuels, lubricants and chemicals must be transported and handled according to relevant SANS codes.	As with the conditions specifying compliance to certain legislation specifying relevant sections of the SANS will improve compliance monitoring.
	Trucks transporting coal must be covered with tarpaulin to prevent coal spillages on the roads	These conditions are straightforward and make monitoring for compliance attainable.
	Dust abatement techniques, such as spraying with water or the use of a dust binding agent, must be used.	
	The applicant is responsible for all relocation of the servitudes; e.g. Eskom power lines, roads, pans, railway lines, gas pipelines and Telkom phone lines.	A condition is easy to monitor by stating that a permit to move the servitude should be acquired before relocations takes place.
	Measures must be implemented to ensure that the impact of mining activities affects the smallest possible footprint area and no additional and unnecessary loss of wetland areas occur.	Demarcating boundaries of the footprint could improve motoring for compliance.
	The applicant must form a Management Committee with relevant stakeholders (DMR, DWA, MTP, Mpumalanga Wetland	In South Africa and internationally there has been an increase in demand from local communities to be included in

	<p>Forum, Belfast Mine lease area, Strathae lease area, etc.) with regard to the establishment of the best possible method for the proposed offsetting programme for the BBC Belfast Project.</p>	<p>post-decision activities. This has been endorsed in South Africa by including community involvement in licences / permits / authorisations. The benefits for the proponent linked to monitoring in terms of involving a variety of stakeholders range from enhanced knowledge about real impact, reduced uncertainties about impact and correspondence regarding complaints and concerns. Proof of the existence and meetings held by the various stakeholders could improve monitoring for compliance.</p>
Hazardous	<p>The groundwater quality of the site must be monitored bi-annually and records of such monitoring must be kept on site.</p>	<p>This is a laudable condition clearly specifying timeframes and record-keeping of monitoring. Good EAs should make use of these kinds of conditions.</p>
	<p>The applicant is responsible for the removal and appropriate disposal at a landfill site of all maintenance waste produced during the operational phase.</p>	<p>The objective of this condition is clear; nevertheless, monitoring for compliance could be aided by including that record of safe disposal must be obtained and kept. Without proof of such compliance cannot be enforced.</p>
	<p>The applicant must by all means ensure safety within the filling station and the following measures must be implemented: 3.46.1. Fire extinguishers must be placed around the tank installation, in a vertical situation, to be ready to control any breakout of fire. 3.46.2 Fire extinguishers must be regularly serviced and record of maintenance and expiry dates must be kept on site. 3.46.3 An emergency response plan must be available and kept on site.</p>	<p>These conditions are readily monitorable, the requirements are can easily be observed.</p>
Agriculture	<p>Chicken house clean-out operation must pay particular attention to the prevailing wind and must avoid days when wind will blow particulate matter to the surrounding properties.</p>	<p>This condition is not monitorable. No form of proof of monitoring can be provided to ensure compliance. Such conditions can be used as general management conditions that the applicant</p>

	<p>An immunization programme based on the knowledge of the diseases to which the chickens are likely to be exposed or susceptible, and degree of their impact on the environment, must be developed and incorporated into the management systems of the flock.</p>	<p>should be aware of.</p>
	<p>Chicken litter must be treated to remove harmful pathogens before it is used as a fertilizer.</p>	
	<p>Dead chickens must be removed from broiler houses daily and must be disposed of at a sealed pit, or digested in a Biogas digester, or frozen immediately for transport to a Crocodile farm. Dead chickens may not be buried elsewhere or digested in the stored manure.</p>	
	<p>Installation of fly and rat traps, as well as regular cleaning with disinfectants, must be take place on-site.</p>	<p>The conditions can be monitored through direct observations, e.g. the mentioned equipment and plants can be verified on-site.</p>
	<p>Biological fly control must be employed through planting of lavender, mint, sweet basil, <i>Lippia javanica</i> or <i>Artemisia afra</i> between and around chicken houses.</p>	
	<p>Records of audits, inspections, tests and monitoring must be maintained and kept on site.</p>	<p>A straight forward and direct condition for compliance monitoring.</p>
	<p>Bio-security measures, agreed to by the State Veterinary Services, including but not limited to the following measures, must be implemented prior to the operation of the facility:</p> <ul style="list-style-type: none"> (a) Restriction of visitors to chicken houses. (b) Controlled movement of people / workers and chicken between different houses. (c) Placing of footbaths at the entrance to each house for employees to wash their boots when entering and 	<p>The objectives of these conditions are clearly to ensure the health and safety of workers and visitors on-site. Only conditions with compliance that can be observed can be monitored.</p>

	<p>exiting the house.</p> <p>(d) Flies, birds and rodents must not have access to chicken houses.</p> <p>(e) Provision of an ablution facility with a change house.</p> <p>(f) PPE signs must be placed at the chicken houses.</p>	
Waste Management	The applicant is responsible for the removal and appropriate disposal at a landfill site of all maintenance waste produced during construction and the operational phase.	This condition raises difficulty to monitor, as stated above; conditions like this should be phrased to include record-keeping to monitor compliance.
Decommissioning Phase		
Infrastructure	Should a cellular base be decommissioned this process must comply with the stipulations of the Occupational Health and Safety Act (Act 85 of 1993) and the decommissioned structures must be removed from the site and be disposed of at a licenced landfill site.	The first part of the condition poses serious difficulty in monitoring as it does not specify the relevant section of the Act. The second part of the condition is monitorable provided that proof of safe disposal can be supplied.
Industrial	A post-mining topographical plan must be formulated by ECO to minimise the loss of agricultural land.	The CA will need to approve the plan to ensure compliance.
	A noise monitoring programme must be implemented during the commission and decommissioning phase of the mine.	The condition can be monitored for compliance.
Hazardous	The applicant is responsible to ensure that the waste material generated during the decommissioning phase is cleared from the site and disposed of at a registered landfill site.	These conditions are monitorable provided that proof of safe disposal can be provided.
Waste Management	The applicant must ensure that the material generated during the decommissioning phase is cleared from the site and disposed of at a registered landfill site.	

4.2 Reporting

4.2.1 Appointment of an Environmental Auditor

The appointment of an environmental auditor is important to identify whether there is a need or opportunity for improving the environmental quality of a site. An environmental audit ensures that local government receives reliable information on the condition of the environment and any risks posed through detecting actual or potential environmental impact, assessing compliance with regulations and understanding specific environmental issues.

All of the sampled EAs did not make set clear condition for appointing an environmental auditor. The condition of appointing an environmental auditor was contained in a condition requiring the applicant to submit an audit report after completion of the construction activities. Table 4-5 provides an example of the condition specifying the appointment of an environmental auditor. None of the EAs specifically stated the duties of the environmental auditor or the frequency on which audits must be carried out.

Table 4-5: Conditions requiring the appointment of independent auditor

Condition	Analysis of monitorability
<p>The holder of an environmental authorisation must submit a post-construction environmental audit report to the Department within 30 (thirty) days after completion of construction activities. <i>The audit report must be compiled by an independent environmental auditor.</i></p>	<p>An independent auditor may only be confirmed through his credentials and registration with a professional body which can be easy to monitor as such information is readily available on relevant information sources.</p> <p>However, the independent auditor could either have no independence or limited independence. The independent auditor is often appointed from within a company’s own staff compliment and even when an external independent auditor is appointed, the proponent ultimately remains responsible for the funding of such.</p>

4.2.2 Audit Reporting

All the sampled EAs contained a condition requiring the submission of an audit report to the authority. A majority specified the time frames (within 30 days of completion of the construction phase) in which the audit report must be submitted, while 15 indicated the content which the audit report should contain. Examples of conditions specifying the submission of audit reports are outlined in Table 4-6.

Table 4-6: Conditions pertaining to the submission of audit reports

Condition	Analysis of monitorability
<p>The holder of the Environmental Authorisation must submit a post-construction environmental audit report to the Department within 30 (thirty) days after completion of construction activity. The audit report must be compiled by an independent auditor.</p>	<p>This condition is clear on the submission of the audit report which makes it easy to monitor. The condition should have further detailed particulars on what the outcome of the audit report should be.</p>
<p>The holder of the authorisation must submit an environmental audit report to the Department upon completion of the construction and rehabilitation activities. The environmental audit must be compiled by an independent environmental auditor and must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the conditions of this authorisation, as well as the requirement of the EMPr.</p>	<p>Monitoring of this condition is easy as it clearly stipulates what is expected of the audit report in terms of the applicant complying with the conditions applicable for monitoring.</p>

4.2.3 Compliance with other legislation

The use of law has undoubtedly been a fundamental means to ensure environmental management. Several of South Africa's environmental legislation makes provision for compliance monitoring which makes it mandatory. According to Murombo, (2008) South Africa is one of many countries worldwide that has considered the global call to implement sustainable development and to mainstream this concept in all development

activities and policies. As a result, this country has passed a number of remarkable environmental legislation and other legislation that are linked to ensuring effective environmental management.

All the sampled EAs contained a condition specifying compliance to other environmental sectors that each proposed project was likely to impact on, e.g. the water, protection and conservation of forests, management of cultural and heritage resources, and the health and safety of personnel working on site. Examples of conditions obligating applicants to comply with other relevant legislation are outlined in Table 4-7 below.

Table 4-7: Compliance with other legislation

Condition	Analysis of monitorability
This authorisation is subject to the requirements of the permit/licence requirements of the National Water Act, 1998 (Act no. 36 of 1998) with respect to the on-site treatment of sewage and, if thresholds are applicable, to the requirements of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008).	This condition indicates that NEMA authorisation only does not give the applicant the right to carry on the applied activities without first getting a permit in terms of the Water Act and/or the Waste Act. Although it is the duty of the applicant to identify all relevant legislation affecting the proposed activity, for best practice the commenting authority should provide clear indications of all legislation to be complied with seeing that applications clearly specify thresholds of the activities being applied for.
The applicant is responsible for compliance with the provision for “Duty of Care” and remediation of environmental damage contained in Section 28 of the National Environmental Management Act.	All EAs made provision for this condition. Although difficult to monitor for compliance, the condition ensures that the applicant will bear the brunt to rectifying or mitigating damage to the environment resulting from the project.
All traffic management must be done in accordance with the National Road Traffic Act No. 93 of 1996.	The condition is difficult to comply with as it does not specifically stipulate the traffic conditions that the applicant should comply with. For best practice the conditions should highlight sections that require compliance within the act.
Construction workers must be provided with the appropriate personal protection equipment in areas required as per the Occupational Health and Safety Act (No. 85 of 1993).	This condition constitutes best practice and monitoring compliance with this condition is straightforward.

This authorisation does not negate the holder of the authorisation of responsibility to comply with any other statutory requirements that may be applicable to the undertaking of the activity, including inter alia, the National Water Act, 1998 (Act No. 36 of 1998), National Forests Act, 1998 (Act 84 of 1998), and the National Environmental Management: Waste Act, 2008

This condition represents best practice and is easy to monitor. However, the competent authority should have elaborated on the sections under obligation for compliance in the acts, e.g. indicate if a water use licence is required and the need for a waste permit to manage the waste that will be generated on-site.

The authorisation does not negate the holder of the authorisation of responsibility to comply with any other statutory requirements that may be applicable to the undertaking of the activity.

Conditions like this one raise a lot of uncertainties and aren't easily enforceable. The competent authority, as the final decision maker, should be able to identify and indicate all pieces of legislation that a proposed activity is required to comply with. The indication of relevant legislation ensures that the applicant pays attention to the impact caused by the activity taking care of not violating legislation.

All activities associated with the storage (including temporary storage) of waste and the storage, treatment or processing of animal manure, are subject to the requirements of the National Environmental Management: Waste Act (Act 59 OF 2008).

In best practice, the thresholds that will subject an activity to comply with legislation are usually indicated on the EIA reports. It is therefore the responsibility of the competent authority to ensure that such conditions are distinct as they are currently vague and difficult to monitor.

The exhuming, removal and disturbance of the archaeological and heritage site must be authorised by SAHRA in terms of the National Heritage Resource Act (Act 25 of 1995).

These conditions comprise best practice for monitoring as they are straightforward; the applicant can only commence with the applied activities provided he/she has obtained the stipulated permit/licence.

An amendment of an Atmospheric Emission Licence must be done prior to the construction of Urea Plant.

Permission in terms of the relevant provisions of the Mine Health and Safety Act (29 of 1996) for the use surface use of land on which mining had previously taken place must be obtained prior to construction.

Atmospheric emission licence

must be obtained prior to the construction and operation of the activity.

If any tree protected in terms of the National Forests Act, 1998 (Act 84 of 1998) is intended to be cut, disturbed, damaged or destroyed, a licence must be obtained from the relevant authority prior to any disturbance, damage or destruction taking place.

Please draw the applicant's attention to the fact that the activity may not commence prior to the obtaining of an integrated Water Use Licence application from the leading authority, DWA.

A waste Licence must be obtained prior to the operation of the activity.

Construction personnel must be sensitized for the requirements of the South African Heritage Resource Act. Should any material of cultural or archaeological significance be encountered during construction, all activities must cease immediately and the South African Resources Agency (SAHRA) must be informed accordingly.

The contractor must be familiar with and adhere to any local by-laws and regulations regarding the generation of noise and hours of operation

The applicant must comply with policies and guidelines of the South African Bureau of Standards (SABS) which deals with environmental issues associated with the installation,



Although the EIA process requires the heritage assessment within a proposed property this conditions constitutes best practice as it acknowledges the protection of archaeological features that could have been missed by the specialist due to being buried deep underground.

Only two EA within the sample makes provision of compliance to local legislation in the project locality. However, this condition could have been phrased well if the responsibility of identifying relevant by-laws was scheduled for the ECO. Experience has shown that contractors easily comply with conditions that are enforceable by the ECO and in most cases do not have the interest of identifying any law that is out of their construction activities.

Monitoring compliance with these conditions is rather straightforward; it entails simply making sure that relevant SABS standards documents are available and verified.

construction, use and decommissioning of tanks and pumps of filling stations; SABS 0131:1997

The proposed development must conform to the requirements of the Emakhazeni Environmental Management Framework (EMF) in terms of the protection.

A condition like this is effectively difficult to monitor. It is expected that EIA reports will indicate whether the applied activity is in line with a region's EMF and no development opposing it can be authorised. Again, it is the responsibility of the competent authority to ensure that proposed activities do not jeopardise the region's policies in terms of environmental protection.

Monitoring of this condition can be improved by referring to the relevant sections and/or sub-sections of the EMF.

Chapter 5: Discussion

This chapter demonstrates that the following overall research aim has been addressed: “To critically analyse the effectiveness of Environmental Authorisation by assessing the extent to which they are contributing to improving environmental compliance monitoring as an EIA follow-up process.”

The chapter discusses the findings presented in Chapter 4. In terms of the scope, this discussion applies to Mpumalanga and is exclusively related to EAs conditions for various project types that specify the requirement of environmental compliance monitoring during the implementation of a project that has undergone the EIA process. It will touch on matters relating to legal interpretation and that have implications for best practice. It will also address matters of best practice to improve the phrasing of conditions dealing with compliance monitoring.

5.1 Conditions requiring the appointment and specifying duties of an ECO

Although environmental authorisations in the sample, and South Africa in general, usually include a condition which requires the appointment of an ECO, not all EAs in the sample had this condition. A deficiency with the requirement of this condition is that the ECO are usually only required for the construction phase of a development project, resulting in the lack of monitoring of a project during its operational phase. Whether or not compliance monitoring should be done by an independent party is still an issue in question. Wessels and Morrison-Saunders (2011) however indicate that one of the international best practice principles of EIA follow-up is that the process should be carried out by professionals and it should be subject to independent checks as well as verification. It is believed that some form of independence and of dependence on the developer is exercised when these role players perform their roles and responsibilities.

It is however, important to note that the appointment of an ECO can be seen to depend on the nature as well as sensitivity of the project. As mentioned earlier the type of compliance monitoring to be implemented will be determined by type and scale of the project or activity. A small project (like the installation of a telecommunication mast) due

to the fact that it has low anticipated impact will focus mainly on compliance monitoring with regards to legal aspects. Such a project according to Wessels (2012) will not include the appointment of an ECO and compliance monitoring will therefore, be done by the applicant with government monitoring and enforcement.

A majority of the EAs in the sample did not have conditions specifying the duties of an ECO on site. The lack of duties that an ECO is supposed to carry out constitutes bad practice. Morrison-Saunders et al., (2007) emphasize that a clear division of roles, tasks and responsibilities should be established in EIA and EIA approval. This will ensure that all involved parties know exactly what is required of them during the compliance monitoring and enforcement process. They further state that the roles and responsibilities of the various role players in the compliance monitoring and enforcement process are included in the operating principles of EIA follow-up. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and the associated environmental impact. In this respect the ECO is to conduct periodic site inspections, attend regular site meetings, pre-empt problems and suggest mitigation, and be available to advice on incidental issues that arise. According to the research conducted by Wessels and Morrison-Saunders (2011:27-48), environmental practitioners viewed environmental compliance monitoring and ensuring legal compliance as the core roles of ECOs. In addition the ECO is responsible for:

- Monitoring and verifying that the EMP is adhered to at all times and taking action if the specifications are not followed;
- Monitoring and verifying that environmental impact are kept to a minimum during the planning and design and construction phases of the project;
- Assessing the project proponent in ensuring that all environmental authorisations have been obtained;
- Ensuring that environmental awareness training is implemented as specified through environmental training needs analysis; and
- Assisting the contractor in finding environmentally responsible solutions to problems.

From this it is evident that the role of an ECO is very important. However, the independence of the ECO is questionable. There is no clear-cut guideline of whether the ECO must be implemented and, in many cases in South Africa, these are appointed from the existing staff compliment of a company. However, even though they are not appointed from within a company the proponent ultimately remains responsible for the payment (if subcontracted) for such a service.

5.2 Conditions for Specifying ECO Frequency

Almost 90% of the sampled environmental authorisations made provision for the appointment of the ECO. However, none of them had a condition indicating the regularity on which the appointed ECO should conduct site inspections. For good practice environmental authorisations should specify the regularity of conducting site inspections during the construction phase for the reason that the very nature of the construction industry is hazardous and negative towards the receiving environment. The regularity required for each inspecting project will depend on a number of factors such as the sensitivity of the receiving environment; nature of the project; the anticipated environmental impact; the expected duration of the construction phase and other factors that may be deemed important for implementing the EIA, e.g. the cost involved in the construction of the project.

Different inspection requirements apply to different types of equipment and to different types of projects. The requirements should generally be aimed to ensure that the environment is protected from harm and deliver environmental improvements. For example, medium and high risk sites, or those that are more technically complex, will require site inspections to be carried out very often – daily or weekly depending on the factors mentioned above while low risk sites may require less inspection to be carried out during the construction phase. Such high risk projects include projects located in high sensitive environments such as protected areas, projects constructed in or in close proximity to watercourses and projects dealing with hazardous substances.

5.3 Conditions requiring the monitoring of project specific programmes

Approximately thirty (30) of the EAs, which constitute the majority of the EAs sampled, have most of the project specific conditions to be enforced during the construction phase followed by the operational phase. Only eight (8) EAs in the sample did not contain a condition of enforced compliance during the design phase of the project. Such projects include water transport, industries and waste management projects. Like the design phase, the decommissioning phase has very limited generic and vague conditions which are difficult to monitor.

It is important to note that some projects are not developed for decommissioning as they are meant to provide services throughout their lifecycles. Such projects include water storage projects, infrastructure such as bridges, roads and telecommunication masts. Thus, their EAs do not cover the decommissioning phase and even if they do the conditions just specify that “In case of decommissioning, a detailed Rehabilitation Plan must be submitted to this Department for approval at six (6) months prior to the decommissioning phase.” However, one does not expect this condition in all project types like industries (e.g. mines), filling stations and other projects that are not expected to last a lifetime. For example, mines usually have a lifespan that is in most cases indicated on the EIA (Environmental Assessment Report) and should expect that their EAs should clearly stipulate key conditions referring to the decommissioning of the project.

5.4 Conditions requiring Implementation of project specific programmes

It is widely accepted that monitoring in the EIA follow-up process is essential to verify the performance of the mitigation activities, compliance with regulatory standards, and the accuracy of impact predictions. Very few of the EAs stated the importance of compliance whereby certain variables and activities were designated to be monitored and evaluated according to the acceptable standards. Amongst these variables were the following: ground water monitoring; vibration monitoring; hydrocarbons leakages; and noise impact. These variables become important tools during the construction phase. Compliance monitoring of the above mentioned aspects could evaluate the

possible impact that construction and operation of an activity would have on the receiving environment. Monitoring of these important possible threats to the environment demonstrate the effect this operation has on the environment as well as the safety of communities.

A majority of the environmental authorisations, even those with activities, require monitoring of certain parameters/aspects (e.g. water quality, air, dust, noise impact, etc.) during both the construction and operational phase but did not have conditions specifying the need to monitor such aspects. According to Jennings (2011) they did not consider follow-up or predictions, which is a crucial element of EIA follow-up according to Morrison-Saunders et al. (2007). Therefore the need of learning from experience is not realised, as Morrison-Saunders et al. (2005) explains, knowledge of learning from previous experiences can be used by regulators and proponents similarly to improve future EIAs. Therefore, for best practice, projects where monitoring of certain aspects of detecting environmental change is required, conditions specifying the baseline monitoring requirements should be included indicating the frequency of carrying out such monitoring.

5.5 Conditions requiring the appointment of an independent auditor and audit reporting

Monitoring is only beneficial if the observations are recorded, evaluated and reported so that appropriate action can be taken. Environmental auditing (environmental compliance/performance audits) – which are specifically designed to test compliance – ensure that the results of the monitoring are compared with standards and set criteria of acceptability so that decisions may be taken as to whether further action is needed. By making value judgements a subjective component is added to the auditing process (Arts & Nooteboom, 1999). None of the EAs in the sample contained a condition clearly specifying the appointment of an independent auditor. The appointment of an environmental auditor is indirectly contained in the condition requiring that an audit report compiled by an independent auditor must be submitted to the competent authority with an audit report at the end of the construction phase. The ambiguity of this condition emanates from regulation 37 (2) (b) which does not clearly indicate that the

holder of the authorisation must appoint an auditor but mentions that an audit report must be compiled by an independent person, while regulation 37(2)(c) requires that the holder of an authorisation should furnish the competent authority with an audit report.

In contrast to the continuous nature of monitoring, auditing is a periodic activity depending on the sensitivity of the project. However, all the EAs requiring the submission of an audit report after the construction phase has been completed regardless of project complexity and sensitivity and no auditing is required during the operational phase of the project. The condition of only requiring the submission of an audit once is in conflict with the requirements of auditing. "Auditing is a systematic process which needs to occur at determined intervals to ensure that the results obtained are comparable, quantifiable and qualifiable. There are different types of environmental audits. However, the objective is always to determine their performance of the environmental criteria (DEAT, 2004a). Environmental impact auditing, or follow-up auditing, involves comparing the impact predicted in the EIA with those that have actually occurred after implementation of the project. In this way it may be ascertained whether the impact prediction has performed satisfactorily. The audit may be of both the EIA impact predictions or of the conditions and mitigation measures attached to the EMP. Therefore auditing should take place during and after implementation. It is also important to audit periodically throughout the operation and decommissioning phases. In this way it is ensured that follow-up continues throughout the project's life cycle and that all the recommendations and mitigation measures are brought to fruition.

Given the explanation of auditing to constitute good practice, the requirement of an audit report in each project EA should not be similar for all projects, but should be dependent on the nature and sensitivity of the project in order to continuously assess the situation. This is because each development or project requires different auditing specifications. A less sensitive project may only require a once-off audit, whereas a more sensitive development may necessitate very frequent audits. This is the case with projects in high biodiversity sensitive areas, waste management and landfill sites. For example, once the EIA has been approved and a hazardous landfill site is established the Minimum Requirements for Waste Disposal by landfill (DWAF, 1998) state that

stringent audits have to take place every three months in order to continuously assess the situation (Lombard, 2001). The same applies to the establishment of a mine.

5.6 Compliance with other legislation

All the EAs sampled made provision specifying that proposed developments must comply with other relevant legislation. It must be emphasized that the stipulation of conditions specifying compliance with other legislation serves as a good reminder to the applicant to consider other relevant legislation as well as to obtain the necessary permits/licences that may be deemed important for the activity. This condition is in compliance with section 24(5) of NEMA, which stipulates that “Compliance with the procedure laid down by a Minister or MEC does not remove the need to obtain authorisation for that activity from any other organ of state charged by law with authorizing, permitting or otherwise allowing the implementation of the activity”. The majority of the conditions included conditions stipulating compliance to specific legislation such as the National Heritage Act, National Environmental Management Waste Act, the Forestry Act, Water Act and the Occupational Health and Safety Act. Only the condition referring to the Water Act was specific in indicating the application of a water use licence, and only those with waste management activities specified the obtaining of a waste licence before activities commences. Although some of the conditions made reference to specific legislation that the applicant must be aware of, it can be argued that the mentioning of the relevant laws without making reference to specific sections in the acts makes it ambiguous and difficult to comply. Currently one of the challenges for EAs is the ambiguous and unclear legal requirements which cause uncertainty and different interpretations of the legislation. This results in inconsistent behaviour.

Chapter 6: Conclusion

The aim of this study was to critically assess EIA follow-up conditions formulated for Environmental Authorisations in Mpumalanga Province. Forty-two (42) environmental authorisations, formulated under the NEMA EIA Regulations 2010, were reviewed to evaluate which conditions intended for compliance monitoring are ambiguous or unclear, and those that constitute good practice as well as provide recommendations to strengthen the practice of formulating conditions requiring compliance monitoring.

6.1 Concluding remarks on objectives

In terms of objective one that aimed to assess strengths and weaknesses related to compliance monitoring and enforcement of the authorisation conditions, the research found that the EAs in Mpumalanga do make provision of EIA Follow-up. The EAs fulfil the requirements of regulation 37 of the NEMA EIA regulations 2010 by promoting compliance monitoring of impacts. The competent authority's responsibility is to ensure that the EIA follow-up process takes place where a need for compliance monitoring is required. Therefore, the MDEDET's three regions' are fulfilling their responsibility of ensuring that the environmental authorisations include conditions requiring compliance monitoring by the applicant or proponent. However, as mentioned in Chapter 4, some of the conditions raises difficulty in terms of monitoring of compliance due to the impracticality thereof and therefore may result in the authorised project/s not able to comply with all the conditions.

Another weakness of the EAs is that compliance monitoring focus more on construction related impacts and pays very little attention to the operational and decommissioning impacts. Very few EAs, including the ones formulated for activities with detrimental environmental impacts during their operational stages, contained conditions required for monitoring during the operational and decommissioning stages. Authorisations for projects/activities dealing with handling of hazardous products, waste treatment works and projects located in sensitive areas should include monitoring conditions for operational purposes. This will ensure the continued environmental protection throughout the project's life cycle.

In relation to objective two - the practicability of the authorised conditions for environmental compliance monitoring, the analyses results show that compliance monitoring cannot be effectively implemented because some of the conditions formulated to monitor compliance, especially those intended to mitigate the adverse environmental impacts, were too generic and vague and do not apply to specific projects or activities being authorised. These included conditions such as: ground water monitoring must take place to assess and prevent groundwater contamination; the current flow regime of the watercourse may not be altered; hazardous substances must be stored properly; water monitoring must be carried out as per recommendations of a surface water specialist and the specifications contained in the integrated water and waste management plan; all mitigation measures must be implemented, etc. I also find that conditions included in EAs are often a cut and paste exercise. In addition, the EAs do not have clearly defined timeframes or frequencies for conditions requiring repetitive monitoring.

Objective three was to identify the gaps in monitoring of the authorised conditions. The results indicate that the gaps exist in the appointment of an ECO, implementation of auditing and provision of compliance to other relevant legislation. In most of the sampled EAs, the importance of appointing an ECO has been raised repeatedly. However, majority of the EAs did not have conditions specifying the duties of an ECO on site and none of them had a condition indicating the regularity on which the appointed ECO should conduct site inspections. The lack of duties that an ECO is supposed to carry out constitutes bad practice. Morrison-Saunders et al., (2007) state that a clear division of roles, tasks and responsibilities should be established within EIA and EIA approval. This ensures that all stakeholders involved during the compliance monitoring and enforcement process know what they are expected to do.

Although the EAs require that audit report be submitted to the authorities during the construction phase, none required the submission of an audit report during the operational phase of the project regardless of project complexity and sensitivity and no auditing is required during the operational phase of the project. The provision of

compliance to other legislation is seen as best practise that ensure that proponents adhere to other legal requirements critical to the execution of the authorised projects. Reference to oblige to other relevant legislation does not make mention of relevant sections within the statutory obligations. This is a challenge as the requirements are ambiguous and unclear which cause uncertainty and different interpretations of the legislation which may in turn results in inconsistent behaviour. When making decisions on applications for environmental authorisations, the competent authority should not only focus on providing conditions requiring compliance with the NEMA EIA regulations but should also consider the NEMA provisions, its inter-relation with the Constitution and other sectoral legislation.

The critical assessment of the EIA follow-up conditions formulated for Environmental Authorisations in Mpumalanga Province indicate that the formulation of conditions have implications in ensuring that compliance is effectively implemented. Clearly defined conditions will ensure proper interpretation and correct implementation for compliance purposes.

Linked to the abovementioned, objective three also aimed to provide suggestions for improvement based on the findings of the analysis. It is recognized that all development projects have adverse biophysical consequences. Ideally these will be kept to a minimum through the proper implementation of conditions set by the environmental authorisation obtained by means of the EIA process. The study therefore concludes by providing recommendations that can improve the practice of formulating compliance monitoring conditions in the future:

- There is a need to ensure that project specific conditions are also attached so as to realise the protection of identified environmental concerns rather than attaching generic conditions. Some conditions are too generic and do not apply to specific projects or activities being authorised.
- When setting a limit that is associated with monitoring, a requirement must also be considered. Best practice is for the permit or other legislation to clarify/highlight that

the monitoring is an inherent and legally enforceable requirement. It is as necessary to comply with the monitoring obligation as with the limit value.

- In the case where monitoring of certain aspects, e.g. water quality, is required to determine changes in the natural or required state, timeframes or frequencies of required tests must be stipulated.
- Conditions referring to other legal obligations must state the relevant sections applicable to each activity as well as indicating the relevant licences or permits to be obtained, should any be required.
- The requirement to use a specialist should the need arise should be clearly stipulated, e.g. demarcation of a wetland, identification of sensitive or threatened species.
- It should be ensured that conditions that require proof of compliance through provision of documentation are clearly phrased to indicate the type of document/s required. For example, monitoring of water quality can be proved by providing monitoring data.

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