A comparative analysis of EIA report quality before and after 2006 in South Africa

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TABLE OF CONTENTS

ABSTRACT

On 18 June 2010 new NEMA 2010 EIA Regulations were promulgated and came into effect on 2 August 2010 in order to improve the effectiveness of EIA. The question of effectiveness, therefore still remains. The quality of EIRs under the 1997 regulations in South Africa has been researched, although not as extensively as in other parts of the world. It was concluded that the quality of EIRs in South Africa are generally satisfactory, although a number of problems were identified, e.g. timing of the EIA, the identification of activities which require authorization or not, the consideration of alternatives, the absence of any time limits, the absence of requirements for monitoring and enforcing compliance, and objectivity. The National Environmental Management Act (NEMA), (Act no 107, 1998) was amended and new regulations promulgated in 2006. No research has been published regarding the quality of EIRs produced in South Africa under the 2006 regulations.

Since it was the intent of the new regulations to improve EIA effectiveness, it is necessary that the quality of EIRs produced under the new EIA system be investigated. As in the other studies in South Africa, the Lee and Colley review model was used as basis for the comparative analysis of the EIRs before and after 2006. A sample of 26 EIRs, 11 under the 1997 EIA system and 15 under the 2006 EIA system, obtained from the then Impact Assessment Directorate of the National Department of Environmental Affairs and Tourism (DEAT) archives in Pretoria were reviewed. The main conclusions were that the majority of the EIRs under the 1997 system were of an acceptable standard and that the overall quality of the EIRs did not improve after the promulgation of the 2006 regulations. The descriptive and presentational parts of the EIRs were more satisfactorily addressed, while the analytical parts such as impact significance were addressed less satisfactorily. EIR quality appears to be on par with international standards, but there are areas of distinct weaknesses. As the 2006 EIRs

included some of the first EIRs conducted under the new regulations, there is potential for the quality to improve over time. However, the areas that still need attention are the identification and evaluation of impacts, impact magnitude and monitoring programmes.

Key words: Environmental Impact Assessment, Effectiveness, National Environmental Management Act, Environmental Impact Assessment Report, EIA report quality.

OPSOMMING

Op 18 Junie 2010 is die nuwe NEMA 2010 regulasies rakende Omgewingsinvloedbepaling (OIB) uitgevaardig met effek vanaf 2 Augustus 2010. Die doel van die nuwe regulasies is om die effektiwiteit van OIB te verbeter. Dus is die vraag oor effektiwiteit nog steeds geldig. Die kwaliteit van Omgewingsinvloedverslae (OIV) onder die 1997 regulasies is nagevors en die gevolgtrekking is dat die kwaliteit van OIV in Suid Afrika oor die algemeen bevredigend was, alhoewel ‘n aantal probleme geïdentifiseer is, naamlik die tydstip waarop die OIV gedoen word, die identifikasie van aktiwiteite wat magtiging benodig, die oorweging van alternatiewe, die gebrek aan enige tydsbeperkings, die gebrek aan vereistes vir monitoring, die toepassing van meedoening asook objektiwiteit. Die Nasionale Wet op Omgewingsbestuur (Wet no. 107 van 1998) (bekend as NEMA) is in 2006 gewysig en nuwe regulasies in dieselfde jaar uitgevaardig. Geen navorsing is nog in Suid Afrika gepubliseer oor die kwaliteit van OIV onder die 2006 regulasies nie.

Omdat die doel van die nuwe regulasies was om die effektiwiteit van die Omgewingsinvloedbepaling (OIB) te verbeter, is dit noodsaaklik om die kwaliteit van die OIV opgestel onder die nuwe OIB-sisteem te ondersoek. Soos met die ander navorsing in Suid-Afrika, is die Lee en Colley evalueringsmodel gebruik as basis vir die vergelykende analise van die OIV voor en na 2006. ‘n Monster van 26 OIV, 11 opgestel onder die 1997 OIB-sisteem en 15 onder die 2006 OIB-sisteem is geëvalueer. Die monster is verkry van die argiewe van die destydse Direktoraat Invloedbepaling van die Nasionale Departement van Omgewing en Toerisme in Pretoria. Die gevolgtrekking is dat die grootste hoeveelheid van die OIV onder die 1997-sisteem van ’n aanvaarbare standaard is en dat die kwaliteit van die OIV nie verbeter het na die instelling van die 2006-regulasies nie. Die beskrywende- en voorstellingsgedeeltes van die OIV is bevredigend aangespreek, terwyl die analitiese dele soos invloedbetekenis minder

bevredigend is. Dit blyk dat die kwaliteit van OIV goed vergelyk met internasionale standaarde, alhoewel daar nog steeds areas is wat opmerklik swak vertoon. Die 2006-OIV sluit van die eerstes in wat onder die nuwe regulasies saamgestel is, en die verlede het bewys dat die kwaliteit van die verslae verbeter met tyd, daarom die geloof dat die kwaliteit van die verslae sal verbeter. Areas wat aandag vereis sluit in die identifikasie en evaluasie van impakte, die omvang van impakte en moniteringsprogramme.

Sleutelwoorde: Omgewingsinvloedbepaling, Effektiwiteit, Nasionale Wet op Omgewingsbestuur, Omgewingsinvloedverslae, Kwaliteit van Omgewingsinvloedverslae.

LIST OF ACRONYMS AND ABBREVIATIONS

ACRONYM / ABBREVIATION	DESCRIPTION
ACSA	Airports Company of South Africa
DEAT DEA	Department of Environmental Affairs and Tourism (since 1997) Department of Environmental Affairs (2009 onwards) *Acronym will be referred to as the one being used at that time*
DME DMR	Department of Minerals and Energy (since 1997) Department of Mineral Resources (2009 onwards) *Acronym will be referred to as the one being used at that time*
EA (*see ROD*)	Environmental Authorization from 2006
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, Act no. 73 of 1989
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EIS	Environmental Impact Statement
EMF	Environmental Management Framework
EMPR	Environmental Management Programme Report
ES	Environmental Statement
Eskom	Electricity supply commission
I&APs	Interested and affected parties
IEM	Integrated Environmental Management
MPRDA	Minerals and Petroleum Resources Development Act of 2002
NEMA	National Environmental Management Act, Act no. 107 of 1998
NEPA	National Environmental Policy Act
OIB	Omgewingsinvloedbepaling
OIV	Omgewingsinvloedverslae
POS	Plan of study
PPP	Public Participation Process
RA	Relevant authority
ROD (*see EA*)	Record of Decision changed to Environmental Authorization in 2006.
SADC	Southern African Development Community

SANRAL	South African National Roads Agency Limited
SAIEA	Southern African Institute for Environmental Assessment
SEA	Strategic Environmental Assessment
SIA	Social Impact Assessment
SP	Scoping report
USA	United States of America

LIST OF GRAPHS AND TABLES

PREFACE

For this dissertation, the article format was used. The dissertation contains the following:

Chapter 1: Introduction and problem statement

Since the amendment of the National Environmental Management Act (NEMA), Act no. 107 of 1998 and the promulgation of new regulations in 2006, no research has been published regarding the quality of EIA reports produced in South Africa. As it was the intent of the new regulations to improve EIA effectiveness, it is necessary that the quality of EIRs produced under the new EIA system be investigated, which is the aim of this study. This chapter contains a brief description of EIA report quality review in South Africa under the 1997 EIA system by the use of adaptations of the Lee and Colley review model.

Chapter 2: Literature review

The literature review includes the history of EIA since the origin in the USA in 1969 as well as the history of EIA in South Africa since the 1970s and early 1980s when EIA was practiced on a non-mandatory basis as part of Integrated Environmental Management (IEM). This chapter includes examples of research conducted in South Africa and abroad in order to determine EIA effectiveness and report quality.

Chapter 3: EIR quality review methodology

This chapter explains the approach to the research and the methods used in the adaptation of the Lee and Colley review model and its application.

Chapter 4: Article Manuscript

Chapter 4 contains the article manuscript consisting of the following:

- Article abstract providing information about the aim of the study, a discussion of the results and conclusions of the study;
- The introduction providing the problem statement leading to the study and the aim of the study;

- Materials and methods providing information on the data used, the adaptation of the Lee and Colley review package, the review methodology applied and the review process;
- Discussion and conclusion provide the results of the quality review of a sample of EIRs as well as a summary of the conclusions derived from the results of the quality review; and
- References according to the style stipulated by the journal *Environmental Impact Assessment Review.*

The article will be submitted to the journal *Environmental Impact Assessment Review* after the examination of the dissertation is completed. The supervisors and the student will be cited as co-authors. For reader friendliness, the tables and figures have been placed in the text of the manuscript at appropriate locations, but for manuscript submission they will be placed in appendices.

Chapter 5: Conclusion

This chapter discusses the findings and sets out the conclusions of the results and their analysis.

References:

References appear at the end of each chapter in order to comply with the requirements of the North- West University.

Appendices:

The appendices contain data that could not be included in the main text due to the amount of detail, but is necessary for the purpose of the dissertation. The following appendices are included:

Appendix A: The adapted review package

Appendix B: The adapted collation sheet

Appendix C: EIA guidelines

- C1 – 1997 guidelines
- C2 – 2006 guidelines

Appendix D: Raw data

- D1 - Raw data of EIRs under 1997 EIA system
- D2 – Raw data of EIRs under 2006 EIA system
- D3 – Summary of results

CHAPTER 1: Introduction and problem statement

1.1 Introduction

Environmental Assessment is defined as a policy tool to reduce the negative environmental consequences of development activities and to promote sustainable development. It refers to both the assessment of individual development projects, known as Environmental Impact Assessment (EIA) and the assessment of policies, plans and programmes, known as Strategic Environmental Assessment (SEA) (Lee, 2000).

EIA is a systematic process used to identify the environmental and social impacts of development activities well in advance (Wood, 2003; Glasson *et al.,* 2005). The aim is therefore to identify and evaluate environmental impacts (both negative and positive) at an early stage, find ways to reduce or avoid the negative impacts and ensure that these consequences are taken into account, both when planning the appropriate action(s), and at the authorization stage. Another important role of EIA is to set out directions for managing and monitoring the actions during implementation (Lee, 2000).

The effectiveness of EIA is a concern amongst practitioners (Barker & Wood, 1999; Christensen *et al*., 2005). Effectiveness can be defined as "whether the EIA process achieved its purpose" (Sadler, 2004: 249). Jay *et al.,* (2007:287) also support this definition, and Pölönen *et al.,* (2010) describe EIA effectiveness as "whether the instrument works". One component of effectiveness deals with the quality of the information that decision makers need. This information is submitted in the form of a report; in South Africa known as the Environmental Impact Assessment Report (EIR).

Evaluation of the quality of any environmental assessment report (review) can be performed by the use of a set of criteria or standards, called a review package or a review model. Such a review package is compiled to evaluate how well a number of assessment tasks have been performed (Lee, 2000:139). The authorities do the review of the reports in order to determine if the report is adequate, and an Environmental Authorization (EA) will be issued (DEAT, 1998). If not, the report must be corrected and re-submitted. However, specialists and interested and affected parties (I&APs) may review the report, as part of the public participation process (PPP). For the EIA to meet its purpose it is imperative that the report be of a good quality.

EIA report review can be seen as a quality control function within the EIA process in order to assess the adequacy of the report for consultation and decision-making (Lee, 2000).

1.2 EIA and review in South Africa

EIA in South Africa has been conducted on a mandatory basis since 1997 under the Environment Conservation Act, Act no. 73 of 1989 (ECA) (South Africa, 1989), and since 2006 under the National Environmental Management Act, Act no. 107 of 1998 (NEMA) (South Africa, 1998).[1]

Since the beginning of EIA as a systematic process, which started with the passage of the National Environmental Policy Act 1969 (NEPA) in the United States of America (Peckham, 1997; Wood, 2003), several methods have been used to determine the quality of reports, e.g. the matrix system used in Taiwan (Leu *et al.,* 1996). The method most commonly used is a review package or checklist, e.g. the Lee and Colley Review Package for the review of EIA reports in the UK (Lee *et al*., 1999) and the European Commission checklist (European Commission, 2001).

Several review packages or review checklists have been developed or adapted to determine the quality of EIRs under the 1997 regulations, including the checklist used by the Southern African Institute for Environmental Assessment (SAIEA) to review the completeness of an EIA (Tarr & Tarr, 2003). The Lee and Colley model has been adapted and applied in a number of South African studies, e.g. the study regarding wetlands in South Africa (Moloto, 2005), the study regarding the release of biological agents for the control of *Lantana camara* (lantana) (Carroll, 2006), the study regarding the quality of EIRs in the North West Province (Pretorius, 2006), the study to determine quality of EIRs in the mining industry (Hoffmann, 2007), the study by Van der Vyver (2008) to determine the quality of EIRs for explosive industry projects, and the study by Mbhele (2009) to determine the quality of EIA reports for housing developments.

It was concluded that the quality of EIRs in South Africa is generally satisfactory, except for the biological control EIRs (Carroll, 2006) where the overall report quality was poor. However,

[1] A comprehensive description of EIA in South Africa appears in Chapter 2

some of the problems that were identified related to the consideration of alternatives, the definition of key impacts, and the prediction of impact magnitude.[2]

Since the National Environmental Management Act (NEMA), Act no. 107 of 1998 was amended and new regulations promulgated in 2006 (South Africa, 1998; South Africa, 2006 a,b,c) no research has been published regarding the quality of EIRs produced in South Africa under these new regulations. As it was the intent of the new regulations to improve EIA effectiveness, it is necessary that the quality of EIRs produced under the new EIA system be investigated, which is therefore the main aim of this study.

1.3 Research questions.

1.3.1 The following research question was formulated:

- How does EIA report quality compare between the 1997 and 2006 EIA systems?

1.3.2 To answer this question the following sub-questions were formulated:

- What is the status of research on EIR quality in South Africa?
- What is the quality of EIRs produced in the 1997 and 2006 EIA systems?
- To what extent has the new EIA system improved EIA effectiveness in terms of EIR quality?

1.4 Research approach

A sample of 26 EIRs, 11 under the 1997 EIA system and 15 under the 2006 EIA system, obtained from the Impact Assessment Directorate of the National Department of Environmental Affairs and Tourism (DEAT)[3] archives in Pretoria was investigated. An adaptation of the Lee and Colley model was used.

In order to answer the above mentioned research questions the following research methods were applied:

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[2] A more detailed description of the strengths and weaknesses of the different case studies appear in Chapter 2.

[3] Department of Environmental Affairs and Tourism (DEAT) changed to the Department of Environmental Affairs (DEA) in 2009. The acronym will refer to the one as being used at that time.

- A literature study was undertaken to determine the status of research on EIA report quality in South Africa as well as the differences between the 1997 and the 2006 EIA system.

- A sample of EIRs produced under the 1997 and 2006 EIA systems was reviewed using an adapted version of the Lee and Colley model.

- The findings were analysed to assess changes in the EIA report quality and EIA effectiveness.

1.5 Format of study

The article format has been used for this study. It consists of the following five chapters:

- Chapter 1 deals with the introduction and problem statement;
- Chapter 2 deals with the literature review component;
- Chapter 3 describes the EIR quality review methodology;
- Chapter 4 is the article manuscript, providing the data analysis and interpretations of the quality of the EIA reports; and
- Chapter 5 reflects the discussion and conclusion.

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CHAPTER 2: Literature review

2.1 Development of EIA

EIA as a systematic process started with the passage of the National Environmental Policy Act 1969 (NEPA) in the United States of America (Peckham, 1997; Wood, 2003). It developed slowly in the beginning with developed countries such as Australia and Canada adopting the process first and other countries like New Zealand, Columbia, Thailand, France, West Germany and the Netherlands following suit (Barker & Wood, 1999; Wood, 2003). Thereafter a major expansion took place during the mid-1980s in almost all the developed countries where each `had their own mandatory EIA procedures.

At present more than 150 countries world-wide have "domestic environmental assessment law" (Kidd & Retief, 2009: 986), including many developing and transitional economies (Lee, 2000; Sadler, 2004).

However, the EIA process in developing countries commenced much later and at a slower pace, but extended substantially after the Rio Earth Summit in 1992 (Lee, 2000; Wood, 2003). In most of the African countries, EIAs were mainly required or conducted by donor, multilateral agencies, non-governmental organizations and private institutions until the adoption of EIA legislation in the mid-1980s (Tarr & Tarr, 2003).

The EIA systems vary greatly. Some are in the form of mandatory regulations, acts or statutes, while others only have EIA guidelines or ad-hoc procedures (Glasson *et al*., 2005; Aucamp, 2008).

2.2 EIA in South Africa

The following paragraphs provide an overview of EIA in South Africa, with particular reference to the historical evolution, the legal contents and the performance of EIA. The unique situation regarding EIA for mining and mining related activities is presented in section 2.2.5.

2.2.1 Non-mandatory EIA in South Africa

Following the origin and establishment of EIA in the United States of America (USA) and Europe since 1969, EIA was discussed among professionals and academics in South Africa from 1974,

and was practiced on a non-mandatory basis as part of an increasing environmental awareness (Wood, 1999; Kidd & Retief, 2009).

At that stage, the term “environment” only referred to the “biophysical or natural environment” (Kidd & Retief, 2009). In the White Paper on a National Policy regarding Environmental Conservation of 1980, EIA was seen as a decision making tool related to project level EIA. The main concern was how to address the apparent conflict between decisions concerning development and conservation (Kidd & Retief, 2009). It was also recognized that South Africa needed a philosophy that was “flexible, generally applicable, widely accepted and practical to implement” (Kidd & Retief, 2009: 976). A draft bill on environmental conservation was proposed followed by the promulgation of the Environment Conservation Act (Act no. 100) in 1982, although EIA was not mentioned explicitly in this legislation as a mechanism for achieving policy objectives (Sowman *et al.,* 1995). The intention was primarily to co-ordinate environmental matters (Glazewski, 2005). Under this Act the Council for the Environment was set up in 1983, as well as various sub-committees, in particular the EIA Committee that played a significant role in the development of environmental evaluation procedures in South Africa (Sowman *et al*., 1995; Wood, 1999; Kalima, 2005). Following research and consultation, a working group, including members of the EIA Committee of the Council published a report entitled Integrated Environment Management (IEM) in 1989. The IEM report provided a description of the environmental evaluation procedure for South Africa (Sowman *et al*., 1995; Kidd & Retief, 2009), and also included the first proposed procedure for assessment of policies and programmes as well as definitions. The IEM procedures not only stressed the importance of assessment, but also the importance of implementation and monitoring (Kidd & Retief, 2009).

The publication of the IEM procedural document in 1989 coincided with the promulgation of the new Environment Conservation Act (Act no.73) (ECA) of 1989 that replaced Act 100 of 1982 (South Africa, 1989). This publication gave EIA the force of law, although this lay dormant until 1997 (Wood, 1999; Wood, 2003). Under this Act the Minister of Environmental Affairs had the power to identify activities which may have a detrimental effect on the environment and for which an EIR had to be completed. Interestingly, the term “environmental assessment” is never mentioned in Part 5 of the 1989 Act (South Africa, 1989; Glazewski, 2005). It only states that the Minister may require reports “concerning the impacts of activities on the environment” (Glazewski, 2005:236).

After a review of the 1989 IEM proposals, IEM guidelines in the form of six guideline documents were published by the Department of Environmental Affairs in 1992 (DEA, 1992; Wood, 2003; Glazewski, 2005; Kidd & Retief, 2009). It contained minor amendments to the 1989 proposal and were also a more detailed and practical guidance. The guideline series were the basis for a large number of voluntary EIAs in South Africa (Wood, 1999; Wood, 2003; Kidd & Retief, 2009) and also formed the basis for departmental standards (Peckham, 1997), and played a major role in ensuring that environmental considerations were incorporated in the planning process as well as development decisions (Glazewski, 2005).

A number of problems were associated with IEM, including its non-enforceable nature, its use of a first world philosophy in a third world context, the variations in perceptions between developers and environmentalists, and the reluctance of private landowners to consider alternative sites for development (Wood, 1999:86). These problems as well as continuing pressure to implement the dormant EIA requirements of the ECA of 1989 led to the promulgation of EIA regulations which came into effect between 1 September 1997 and 1 April 1998 (South Africa, 1997a,b,c).

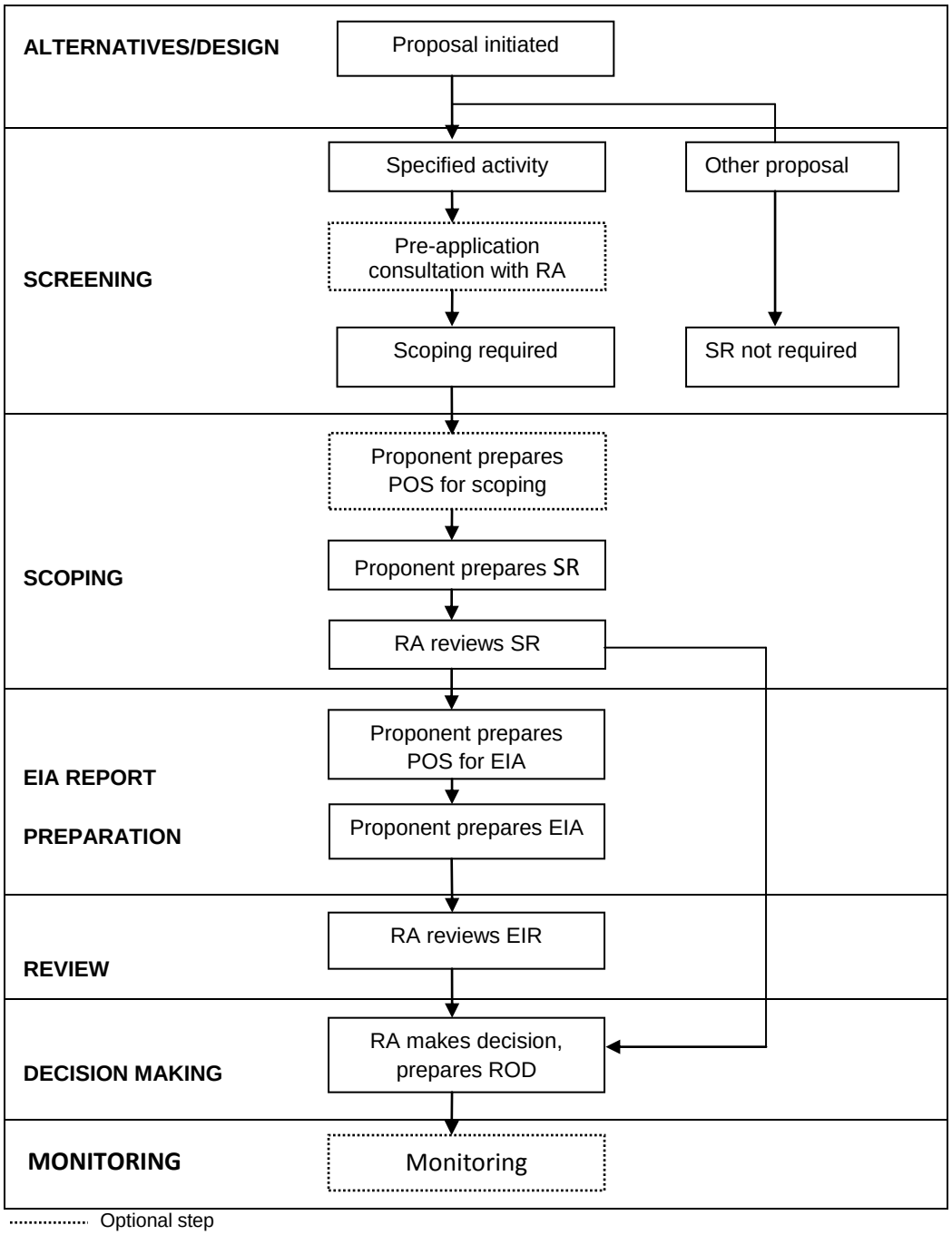
2.2.2 First era of mandatory EIA: ECA 1997 - 2006

The following EIA regulations were promulgated in terms of Sections 21, 22, and 26 of the ECA:

- Section 21 of the ECA empowered the Minister of Environmental Affairs and Tourism to identify activities that would have a definite detrimental effect on the environment and for which an EIA would be required, and Regulation 1182 (South Africa, 1997a,b,c) identified the list of activities which were subject to EIA procedures;
- Section 22 of the ECA referred to the undertaking of such an identified activity and the need for authorization by the relevant competent authority, and Regulation 1183 (South Africa, 1997a,b,c) described the rules regarding the conduct and contents of environmental assessments; and
- Section 26 of the ECA referred to the submission and consideration of reports where the impacts of the proposed activity and alternative activities were discussed (South Africa, 1989), and Regulation 1184 described the competent authority (South Africa, 1997a,b,c; Basson 2003; Glazewski, 2005). The competent authority was designated as the nine provincial government departments concerned with environmental matters. However, where the activity was of national importance, international environmental commitments

or where the activity may affect the environment in other provinces as well, the application had to be submitted to the National Department of Environment and Tourism. The EIA regulations were supplemented by EIA guidelines in 1998 (DEAT, 1998).

The EIA process under the 1997 regulations was in accord with the generic EIA approach in the rest of the world, but with comprehensive scoping and emphasis on public participation. It required a Plan of Study for scoping, followed by a Scoping Report and an Environmental Impact Assessment Report (EIR). However, the majority of assessments were authorized on the basis of an extended Scoping Report as stated in Regulation no. 6(3) (a) "after a scoping report has been accepted, the relevant authority may decide that the information contained in the scoping report is sufficient for the consideration of the application without further investigation" (South Africa, 1997a), and illustrated by Wood (2003) in Figure 1. In these cases the content of the Scoping Report was extended to include more information than usually envisaged for a Scoping Report, but less than that for a formal full EIR as required by the 1997 regulations and international best practice. Sandham *et al.* (2005: 51) refer to it as the "beefed-up" Scoping Report or "mini-EIA". This was done, as stated by Sandham *et al.* (2005:52), in order to "short circuit a potentially drawn-out administrative procedure". The applications were approved in a much shorter time than going through the whole EIA-process with all the bureaucracy, delays, extra costs and paperwork. The applicants saved both time and money, as construction may only commence once the Record of Decision (ROD) has been issued and after the 30-day period of appeal has expired (Glazewski, 2005; Kidd & Retief, 2009). Appeals on the ROD could be directed to the Minister or provincial authority. Apart from the time specified for responding to the advertisement, this was the only other time limit provided for in the regulations (Wood, 2003; Kidd & Retief, 2009). It is worth noting that the authorities also encouraged this "shorter" process.



Optional step

RA	Relevant authority
EIR	Environmental impact assessment report
ROD	Record of decision
POS	Plan of study
SR	Scoping report

Figure 1: Main steps in the 1997 South African EIA process (Wood, 2003:87)

The ECA regulations had been in effect for just over a year when the first comprehensive environmental management legislation was promulgated in 1998 by the new South African government in the form of the National Environmental Management Act (NEMA), Act no. 107 of

1998. NEMA was assented to on 19 November 1998 and came into force on 29 January 1999. NEMA replaced some, but not all of the provisions of the ECA. Specifically it did not replace the environmental assessment provisions contained in Part 5 of the ECA, and preserved those sections dealing with the declaration of activities and all notices and regulations made pursuant to these sections (Glazewski, 2005).

Chapter 5 of NEMA described the EIA process under the heading of "Integrated Environmental Management" (IEM), and also set out the general objectives of IEM. While Sections 21, 22 and 26 of the ECA were replaced by section 50(2) of NEMA, the provisions relating to EIA continued in force until NEMA EIA regulations were promulgated in 2006 (South Africa, 1998; Wood, 2003; Glazewski, 2005; Kidd & Retief, 2009). The NEMA regulations were more detailed than those under the ECA system, and NEMA extended the coverage of EIA to projects not included in the 1997 EIA regulations, e.g. mining projects, and to policies, plans and programmes (Wood, 2003; Kidd & Retief, 2009). These regulations ushered in the second era of mandatory EIA in South Africa.

2.2.3 Second era of mandatory EIA: NEMA 2006 – 2010

In order to improve the efficiency and effectiveness of EIA in South Africa, amendments to the National Environmental Management Act (NEMA), Act no. 107 of 1998 were promulgated in April 2006 and implemented in July 2006. New regulations under the relevant sections of NEMA were published for comment in June 2004, promulgated in April 2006 and came into effect on 1 July 2006 (South Africa, 2006 a,b,c). One of the main objectives of these regulations was the expedition of the authorization process by the introduction of time frames, e.g. the new regulations make provision for specified decision-making time frames; namely 14 days for administration actions, 45 days for review of minor reports and 60 – 105 days for review on complex reports. The regulations also provide for the exclusion of certain types of activities from the authorization processes through the establishment of thresholds (Kidd & Retief, 2009).

A major change in the 2006 EIA system was that the new Regulations (Regulations 385, 386 and 387) made provision for two types of assessment processes i.e. a Basic Assessment process and a Full Assessment process. The Basic Assessment process was required for activities listed in Government Notice R 386. The aim of this process was to supply a mechanism for a complete but condensed assessment of smaller and less complex activities; therefore limiting the number of interactions between the Environmental Assessment

Practitioner (EAP) and the competent authority. The new two tier process essentially formalized the beefed-up scoping practice as the Basic Assessment process. The more detailed Full Assessment process included a Scoping and EIA process, and was required for activities listed in Government Notice R 387, which have the potential to result in significant impacts (both negative and positive) on the environment. These activities were normally of a larger scale and of a more complex nature. This process, therefore, provided a mechanism for a comprehensive and intensive assessment of activities that are likely to have significant impacts on the environment (South Africa, 2006 a,b,c).

2.2.4 Third EIA regime

On 18 June 2010 new NEMA 2010 EIA Regulations were promulgated and came into effect on 2 August 2010 (DEA, 2010), introducing an approach where impacts associated with the sensitivity of the receiving environment are treated with more care. This is achieved through the introduction of a listing notice dedicated to activities planned for predefined sensitive areas.

The lists of activities requiring environmental authorization (EA) prior to commencement have also been revised. This was the focus of the amendment process as the EIA system was overburdened by large numbers of applications associated with insignificant activities; the comprehensive scoping and EIA process with its associated costs was (in some instances) unjustifiably required for activities for which the impacts were known, and some critical activities were omitted.

Other amendments include the land owner consent that has been replaced with land owner notification; amendments to ensure a fair public participation process (PPP), e.g. the period from 15 December to 2 January has been excluded from deadlines for both decisions and lodging of appeals. There were previously no consequences for the environmental authority when it does not meet the regulatory time frames, it is now compelled to reach a decision after a reasonable prescribed extension to the regulated time frames has lapsed; and Environmental Management Frameworks (EMFs) are recognized as an environmental instrument in its own right, hence the EMF regulations which were published on 18 June and which also came into effect on 2 August 2010 (DEA, 2010).

It appears that the 2010 regulations are more of a fine-tuning of the 2006 regulations, whereas the 2006 regulations were a far more drastic change from 1997. As these 2010 regulations are

so recent, it has not been possible to conduct any research to determine the effect of the 2010 regulations on EIA report quality.

2.2.5 EIA for mining and mining related activities

Due to the historically important role of mining in the economy of South Africa, a unique duality emerged in EIA. Mineral extraction was excluded from the EIA regulations, but mining and mining related activities required Environmental Assessment in terms of the Minerals Act of 1991 (so called Environmental Management Programme Reports or EMPRs). These reports included a description of the impact of the proposed mining activity on a standard list of 17 environmental elements which served as the basis for a management plan that had to be approved before authorization could be granted (Wood, 2003). The EMPR was a diluted form of EIA and was largely ineffective because the legal requirements were less stringent and were rarely enforced (Sandham *et al*., 2008). Moreover, the EMPR was approved by the same agency that awarded the mining authorization.

The Minerals Act of 1991 was replaced in 2002 with the Minerals and Petroleum Resources Development Act of 2002 (MPRDA). The MPRDA applies to minerals and petroleum, while gas is dealt with under the Gas Act of 2001 (Glazewski, 2005).

The sections dealing with environmental concerns were promulgated in 2004 with a new set of regulations (R527) that provide guidelines regarding the EIA process in the mining sector (South Africa, 2002). The old set of regulations (Aide Memoire) was not updated and became obsolete. The new EIA system is a much improved and comprehensive process and closer to the international norms for best practice. The controlling authority remains the Department of Minerals and Energy (DME) (Sandham *et al*., 2008), while appeals are handled by the Minister of Environmental Affairs (Aucamp, 2008).

The development of mining EIA in comparison to EIA for all other activities in South Africa is summarized in Table 1.

Table 1: Development of mining EIA in comparison to EIA (in general) in South Africa

DATE	EIA	MINING
1974	Commencement of EIA in SA. Voluntary EIAs.	No formal set of legislation to govern environmental aspects of mining activities.
1980	White Paper on a National Policy regarding Environmental Conservation.	
1982	Environment Conservation Act of 1982	
1983	EIA Committee for the Council of Environment	
1989	Integrated Environment Management (IEM) report. Environment Conservation Act of 1989.	
1991		Minerals Act of 1991 DME provided set of guidelines (Aide Memoire) to produce EMPRs.
1997-1998	Promulgation of Regulations R1182, R1183, R1184 Mandatory EIAs	
1999	NEMA promulgated.	
2002		Replacement of Minerals Act of 1991 by Minerals and Petroleum Resources Development Act of 2002.
2004		Promulgation of Regulations R527 for EIA
2006	Implementation of National Environmental Management Amendment Act. Promulgation of NEMA Regulations R385, R386, R387.	
2007	Amendments to new EIA regulations – to refine definition and listed activities (Kidd & Retief, 2009)	
2008 / 2009	Implementation of National Environmental Management Amendment Act of 2008 (NEMAA) on 1 May. (DEA&DP, 2009).	Mining EIAs conducted according to NEMA legislation. Controlling authority changed to Department of Mineral Resources (DMR) in 2009.
2010	New NEMA regulations, R543, etc.	
2012	New regulations?	One process and one competent authority where mining will be treated the same as other projects requiring EIA.

The current situation is a proposal that mining EIA is conducted according to NEMA while the competent authority remains the DMR. Eventually mining EIRs will also be conducted under NEMA. This however will only take effect at some time in the future to be indicated by the Minister of Environmental Affairs (Kidd & Retief, 2009).

Sandham *et al.,* (2008) found that despite the extraordinary position of mining EIA, EIA report quality was on a par with the EIA report quality under NEMA, as well as with results internationally[4].

2.2.6 Summary of EIA in South Africa

After almost 40 years of voluntary and mandatory EIA in South Africa, and four EIA regimes, EIA is currently well established under DEA and DMR (for mining and mining related activities). However, the question of the effectiveness of EIA still remains, hence the focus of the next section.

2.3 EIA effectiveness

Sadler (2004: 249) define EIA effectiveness as "whether the EIA process or elements has measured up to its procedural requirements and substantive purpose", while Pölönen *et al.,* (2010) define it as "whether the instrument works, is used as intended to and meet the purposes for which it is designed". The evaluation of effectiveness is therefore, intended to determine how EIA is impacting on decision making and environmental protection.

Effectiveness is a broad yardstick of the manner of performance and includes concepts such as efficiency of operations, fairness of procedures, cost-effectiveness of the operation and the potential to deliver a particular result (Sadler, 2004; Retief, 2008). Effectiveness therefore includes evaluation of EIA compliance with specific procedural requirements, evaluation of EIA criteria to determine whether EIA met its purpose and objectives, and whether EIA delivered these outcomes at least cost and with minimum delay and without bias or prejudice (Sadler, 2004).

Wood (1999) developed a set of review criteria in order to evaluate and compare EIA systems. Since then it has been used for review of EIA systems in a number of developed countries, including the evaluation of EIA system performance in eight EU countries (Barker & Wood, 1999). Pölönen *et al*. (2010) evaluated the effectiveness of the Finnish EIA system, and Heinma & Põder (2010) evaluated the EIA system in Estonia. EIA system evaluation in developing countries includes assessments in Hong Kong (Wood & Coppell, 1999), Egypt, Turkey and Tunisia (Ahmad & Wood, 2002), and the island of Mauritius (Ramjeawon &

[4] See Section 2.3.2 for results of mining EIR quality

Beedassy, 2004). Zeremariam and Quinn (2007) modified the 1995 evaluation criteria of Wood to assess the EIA system in Eritrea. A comparative assessment of EIA systems in twenty one Middle East and North Africa (MENA) countries was conducted by EL-Fadl & El-Fadl (2004). Nadeem and Hameed (2008) evaluated the EIA system in Pakistan, and Badr (2009) evaluated the EIA system in Egypt. Recent research on the EIA systems in developing countries include the study by Ruffeis *et al,* (2010) who evaluated the impact assessment process in Ethiopia; the study by Haydar & Pediaditi (2010) who evaluated the EIA system in Syria; and the study by Toro *et al*. (2010) who evaluated the Columbian EIA system. Constraints for both developed and developing countries included legal provisions for EIA, the adequacy of resources (in some cases the lack of resources - both human and environmental information), the lack of political will, the centrality of EIA in decision-making and provision for SEA of programmes, plans and policies, and insufficient monitoring or post-EIA action.

Minimal research has been conducted on EIA systems in South Africa. Wood (1999) conducted a review of the 1997 South African EIA system, using the same criteria as in international studies, and concluded that seven of the review criteria were met, two partially met, and five were not met. The main areas of weakness included report review, the centrality of the full range of impacts to decision-making, impact monitoring, public participation, EIA system monitoring and the SEA of programmes, plans and policies.

The study conducted by Kruger and Chapman (2005) in the Free State Province concluded that the compliance with regulations was poor, socio-economic impacts were neglected, the assessment methodology was highly subjective, specialist input was poor, consideration of alternatives as well as public involvement were inadequate, and there was a lack of integration of EIA findings into authorization decisions. Kruger and Chapman (2005:56) also concluded that the quality of the EIA performance was affected by the Scoping Reports being regarded as “mini EIAs”, and recommended that “the EIA process in South Africa reverts back to the traditional scoping report, where scoping solely involves a thorough identification of issues”.

The study conducted by Sandham, Siphugu & Tshivhandekano (2005) in the Limpopo Province, focused on baseline information, specialist studies, duration of review period prior to authorization and the Record of Decision (ROD), and revealed that factors like understaffing and the inability to conduct thorough reviews were restricting factors. It was concluded that although EIA practice in the Limpopo Province conformed fairly well to regulations and

guidelines, there were still reports that contained unsatisfactory data, e.g. poor or no baseline information.

According to Wood (1999) the quality of EIA practice in South Africa is satisfactory, while Sandham *et al*. (2005), and Kruger and Chapman (2005) regarded the lack of compliance due to deficiencies as the biggest problem influencing the quality of EIA practice in South Africa. In developing countries, including South Africa, the lack of capacity seems to be affecting the quality of EIA practice.

Another component of effectiveness is the cost-effectiveness of the EIA system. As EIA has become increasingly expensive (Marshall, 2009:119), debates on "EIA costs" raised once more questions on the need for EIA, and its value for environmental protection. It is almost impossible to precisely determine either the cost or the benefit of EIA. Research dealing with "EIA costs" is limited, mainly due to the difficulties associated with the definition of terms like "cost". However, a study on the direct cost of EIA in relation to overall project cost in South Africa was conducted by Retief and Chabalala (2009).

The data was obtained from a survey of 148 EIAs conducted in the Free State, North West and the Northern Provinces of South Africa. The results indicated that the average direct cost of EIA within these provinces is particularly low compared to international EIA systems (Kidd & Retief, 2009; Retief & Chabalala, 2009). The study also indicated that a large number of EIAs in South Africa are being conducted for relatively small projects. The ideal would be for EIA to focus on the bigger projects with more detrimental effect on the environment (Kidd & Retief, 2009).

Another way, in which the effectiveness of EIA can be evaluated, is by the evaluation of the Environmental Impact Report (EIR), also referred to as an Environmental Impact Statement (EIS), or simply Environmental Statement (ES). It is therefore imperative that the EIR be of good quality. There is also a general assumption that a "good quality report would lead to effectiveness" (Retief, 2008:124), hence the emphasis on the evaluation of the quality of EIA reports.

Evaluation of the quality of any EIR, referred to as report quality review, can be conducted by the use of a set of criteria or standards, called a review package. Such a review package is compiled to evaluate how well a number of assessment tasks have been performed (Lee, 2000).

2.3.1 Overview of EIR quality review

Extensive research has been conducted in Europe and other developed countries to evaluate the quality of EIRs since the beginning of the EIA process, including Barker & Wood (1999) who compared the quality of EIRs in eight Member States of the European Union. The main review mechanism was the Lee and Colley review model. It was found that the quality of EIRs had improved over time; the use of other review methodologies such as the Oxford Brookes review framework also produced similar results (Lee *et al*., 1999). However, a study by Pardo in Spain (1997) revealed that the quality of reports were poor due to poor mitigation measures, poor public participation and timing of the EIA, as well as an absence of monitoring. A study of EIR quality in the Scottish forest sector (Gray & Edwards-Jones, 1999) revealed that the overall quality of the reports was poor with key weaknesses being the absence of a full scoping phase, inadequate investigation of key issues, inadequate collection of baseline data making the assessment of significance and magnitude of impacts extremely difficult, and poor coverage of mitigation methods.

More recent research on the quality of EIRs includes the studies by Canelas *et al*. (2004) in Portugal and Spain, and Androulidakis & Karakassis (2005) in Greece. Tzoumis (2007) compared the quality of Draft Environmental Impact Statements (EIS) by agencies in the United States since 1998 to 2004. Pinho *et al*. (2007) assessed the quality of EIRs carried out for small hydropower plants in Portugal. Kruopienė *et al*. (2009) assessed the quality of EIRs in Lithuania and Jalava *et al.* (2010), not only assessed the quality of EISs in Finland, but also the opinions of EIA professionals. Peterson (2010) also assessed the quality of EISs in Estonia as well as the quality of assessment by different reviewers. Some of the problems still encountered are: insufficient capacity of environmental authorities and incompetence of authorities involved, weak public participation, cursory description of the methods used, vague impact prediction, absence of EIA follow-up monitoring, and insufficient consideration of alternatives and cumulative impacts.

Clearly, EIA report quality remains a relevant issue on the EIA research agenda. The following section therefore, deals with EIR quality review in South Africa.

2.3.2 EIR quality review in South Africa

The EIA Regulations in South Africa require that an EIR must be prepared by an independent consultant and submitted to the relevant authority for review in order to determine whether the

report is adequate or not and whether additional information is required before an Environmental Authorization (EA) can be issued (DEAT, 1998). The report may also be reviewed by other individuals, such as specialists and interested and affected parties (I&APs) as part of the public participation process (PPP). EIA report quality review is, therefore, an important function within the EIA process in order to assess the adequacy of the report for consultation and decision-making (Lee, 2000).

Several review packages have been used in South Africa in order to determine the quality of EIRs under the 1997 regulations, including the checklist used by the Southern African Institute for Environmental Assessment (SAIEA) to review the completeness of an EIR (Tarr & Tarr, 2003). The review packages of Moloto, Carroll, Hoffmann, Pretorius, Van der Vyver and Mbhele as described below, are all adaptations of the Lee and Colley model for application to South Africa. These adapted packages were applied to the following case studies in order to determine the quality of the EIA reports:

- The South Africa wetlands study (Sandham *et al*., 2008) where four EIRs of large projects with the potential to impact on wetlands were assessed;
- The study on the release of biological control agents for the control of the invasive *Lantana camara* (lantana) (Sandham *et al*., 2010). An EIA review package specifically adapted to the requirements of biological control agents was used to review the quality of six approved EIA reports;
- Sandham and Pretorius (2008) assessed a sample of twenty eight EIRs to determine the quality of EIRs in the North West Province;
- A review model specifically adapted to the needs of the mining industry was used to review the quality of a sample of twenty EIRs in the mining industry (Sandham *et al*., 2008);
- Van der Vyver (2008) used the adopted review checklist of Sandham and Pretorius (2008) to review the quality of four EIRs for explosive industry projects; and
- Mbhele (2009) used the adopted review checklist of Sandham and Pretorius (2008) to review the quality of fifteen housing EIRs in the Nkangala district of the Mpumalanga province in South Africa.

Certain strengths and weaknesses can be identified by observing review category grades in each review area[5]. Therefore, the percentage A and B grades were calculated for strengths, and percentage E and F grades for weaknesses. The categories scoring a proportion of A and B grades over 50% could be regarded as strengths where the categories scoring a proportion of E and F grades over 50% could be regarded as weaknesses. In order to provide a synthesis of EIA report quality findings in South Africa, the strengths and weaknesses from the six research studies comprising a total of seventy seven EIRs are compared in Table 2. As there were no weaknesses (categories scoring a proportion of E and F grades over 50%) in the six research studies, the poorest performances were listed.

Table 2: Strengths and weaknesses per Review Areas for the different research studies

	Strengths	**Weaknesses: no categories with only E and F grades. Poorest performances listed instead**
RA1: Description of the development and environment	Description of the development (M,H,NW,E, W) Wastes (M) Description of the environment (W,H,NW,E) Baseline conditions (W,M,NW) Proposed target invasive alien plant species/pests (B)	Site description (M,W,H) Baseline conditions (M,H) Wastes (NW,W, E) Receiving environment (B)
RA2: Identification and evaluation of key impacts	Scoping (M,NW,H,E)	Prediction of impact magnitude (M,NW,W,E) Impact significance (NW,W,H,B) Mitigation measures (NW,H) Identification of impacts (NW,W,H,B) Definition of impacts (W,H) Scoping (W,B)
RA3: Alternatives and mitigation	Scope and effectiveness of mitigation measures (W,NW,H) Consideration of alternatives (B,E)	Consideration of alternatives (M,NW,H) Scope and effectiveness of mitigation measures (B) Commitment to mitigation (B)
RA4: Communication of results	Layout of report (M,W,E,NW,B) Presentation (W,M,H,NW,E) Emphasis (W,H,NW) Executive summary (M,B)	Executive/non-technical summary (W,E,B) Layout of report (H) Emphasis (M,H,B)
Case studies: **B = Biological control agents (Carroll, 2010)** **H = Housing (Mbhele, 2009)** **M = Mining (Sandham *et al*., 2008)** **E = Explosives (Van der Vywer, 2008)** **NW = North West Province (Sandham & Pretorius, 2008)** **W = Wetland (Sandham *et al*., 2008)**		

[5] Review starts at the lowest level (sub-categories) moving upwards to the next level (categories). The evaluation of the review areas is based on the review of the categories. The overall grade is completed through the review of the review areas (Refer to section 3.1.1)

Note that although mining EIAs are conducted under separate regulations, they are included in the above mentioned studies for comparison purposes.

The studies revealed that most of the reports were graded as satisfactory, except for the biological control EIRs where all the reports were graded as poor. On the other hand, few of the reports could be graded as well performed.

Review Areas that performed the best were RA 1 and RA 4 (see Table 2). Strengths identified relate to the description of the development as well as the receiving environment. Scoping was well performed in four of the six research studies, and the layout of the report and presentation were strengths in five of the six research studies. In general the poorest performances relate to site description and wastes, impact magnitude, impact significance, the identification of impacts and mitigation measures. Consideration of alternatives was also the problem area in RA 3. In RA 4 problem areas relate to the non-technical summary and emphasis.

The quality of EIRs under the 1997 system has been determined, highlighting a number of problem areas as described in the previous paragraph. The National Environmental Management Act (NEMA), Act no. 107 of 1998 was amended and new regulations promulgated in 2006 (South Africa, 2006 a,b,c). Since then, no research has been published regarding the quality of EIRs produced under the more detailed 2006 regulations in South Africa. The intent of the new regulations was to improve EIA effectiveness therefore it is necessary to investigate the quality of EIRs produced under the new EIA system.

In order to determine the impact of the new regulations a comparative analysis of the quality of EIRs before and after 2006 needs to be done. The methodology used to investigate or review the quality of EIRs will be explained in the next chapter.

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CHAPTER 3: EIR quality review methodology

Chapter 2 presented an overview of EIA report quality research in South Africa and internationally. As the findings are based on the use of the quality review model of Lee and Colley, it is necessary to direct attention to the nature and application of the Lee and Colley model.

This chapter explains the structure of the Lee and Colley model as well as the materials and methods used in the adaptation of the Lee and Colley review model for the comparative analysis of EIRs before and after 2006 in South Africa.

3.1 The Lee and Colley review model

The Lee and Colley review model was developed in the United Kingdom in 1989 for use in assessing the quality of project Environmental Impact Statements (EISs) in the UK, submitted under the 1988 UK Environmental Assessment Regulations. Since then it has undergone a number of revisions and refinements and has been widely used in the assessment of the quality of EIA (Lee *et al*., 1999) and subsequently SEA Reports (Simpson, 2001).

3.1.1 Structure of the Lee and Colley review model

The Lee and Colley review package is designed to be self-contained and consists of advice for the reviewers (i.e. necessary background information and guidance on the use of review criteria), a list of criteria to be used to evaluate each EIA report, and a collation sheet on which the findings should be recorded (Lee *et al*., 1999).

The review is done in a hierarchical/pyramid structure as shown in Figure 1.

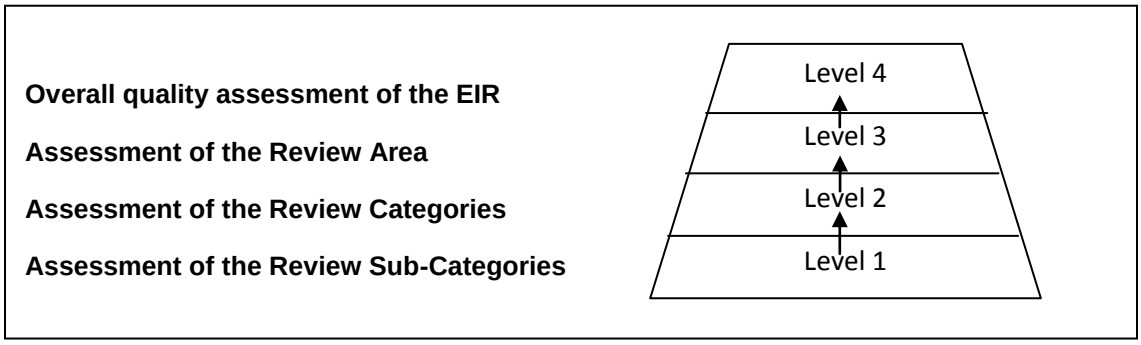

Figure 1: The hierarchical structure of the Lee and Colley review model (Lee *et al.*, 1999:6)

The review is started at the lowest level (sub-category level) which contains simple criteria relating to specific tasks and procedures. Drawing upon the assessment of the sub-categories, the reviewer progressively moves upwards to the next level (categories), which involves more complex criteria to broader tasks and procedures. The evaluation of the review areas is based on the review of the categories while the overall grade of the EIA report is completed through the review of the review areas (Lee *et al.*, 1999). A schematic diagram of this hierarchy is presented in Figure 2.

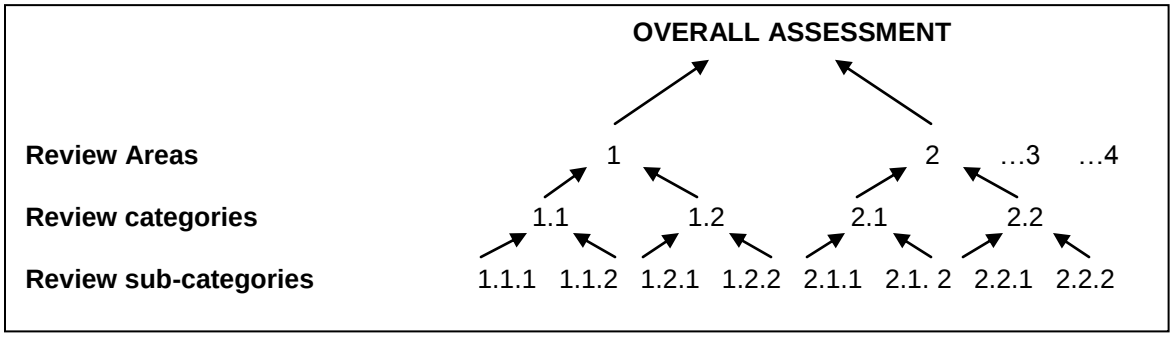

Figure 2: Schematic representation of the Review Topic Hierarchy (Lee, et al. 1999:24)

Grades are assigned in the form of symbols ranging from A to F, depending on how well a specific task is performed (Lee, 2000). A description of the assessment symbols is shown in Table 1. Letters, rather than numbers are used as assessment symbols to discourage reviewers from "crude aggregation to obtain assessments at the higher levels in the pyramid" (Lee *et al.*, 1999:6), and they cannot easily be added or subtracted, thereby distorting the results (Simpson, 2001).

Table 1: List of assessment symbols (Lee *et al*., 1999)

Symbol	Explanation
A	Relevant tasks well performed, no important tasks left incomplete
B	Generally satisfactory and complete, only minor omissions and inadequacies.
C	Can be considered just satisfactory despite omissions and/or inadequacies.
D	Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies.
E	Not satisfactory, significant omissions or inadequacies.
F	Very unsatisfactory, important task(s) poorly done or not attempted.
N/A	Not applicable. The Review topic is not applicable or is irrelevant in the context of this statement.

Letters A-C represent generally satisfactory performance, i.e. sufficient information is provided for decision-making purposes, while D-F represent generally unsatisfactory performance. N/A represents a review topic irrelevant in the context of the EIR.

3.1.2 Implementation of the Lee and Colley model

It is recommended that at least two reviewers work independently in order to reduce subjectivity (Lee, 2000; Wood, 2003). The review commences on the lowest level (assessment of the review sub-categories: Figure 1). Grades for the higher levels are determined by an overall performance grade based on the lower levels. The final grade is given after the reviewers have discussed their evaluations at every level to arrive at a consensus. The Collation sheet should be used to record the assessment symbols. It is recommended that the strengths and weaknesses of the EIR that has been assessed be recorded to support the overall grade awarded (Lee *et al.,* 1999).

3.2 Adaptation of the Lee and Colley model to assess the quality of EIRs before and after 2006 in South Africa.

The Lee and Colley review model was chosen as the basis for the development of the package used for the comparative analysis of EIRs before and after 2006 as it has been extensively used since its origin in 1989 (Lee *et al.*, 1999), because of its adaptability, its ease of use and consistency, and because it provides a systematic, structured and objective approach to quality review (Wood, 1999; Sandham *et al*., 2005; Sandham & Pretorius, 2008). It also allows for comparison with findings from research internationally.

The following literature was analyzed to adapt the review criteria and to create a review package that was tailored to the 1997 regulations as well as the 2006 regulations in South Africa, in order to allow assessment of EIA quality changes from 1997 to 2009:

- Lee and Colley review package (Lee *et al.,* 1999);
- Requirements in terms of the Environment Conservation Act (ECA), Act no. 73 of 1989 (South Africa, 1989);
- The associated regulations: R1182-R1184 (South Africa, 1997a,b,c);
- Requirements in terms of the National Environmental Management Act (NEMA), Act no. 107 of 1998 as amended (South Africa, 2006a,b,c); and
- The associated regulations: R385 – R387 (South Africa, 2006a,b,c).

Table 2 compares the minimum information required for an EIA report under the 2006 regulations with the 1997 regulations in South Africa. The more comprehensive set of information required for the 2006 EIA regulations is notable. The empty cells indicate that there were no equivalent requirements for 1997. As the 1997 requirements are compared with the more detailed 2006 regulations, the 1997 numbers are in a different sequence.

Table 2: Comparison of the minimum requirements for EIRs under the 1997 and 2006 EIA regulations

2006 regulations: Regulation 32(2) (a-q) Government Notice R385 (South Africa, 2006)	**1997 regulations: Regulation 8 (a-c) Government Notice R1182 (South Africa, 1997b).**
a) details of EAP who prepared the report; and expertise of EAP to carry out an EIA	
b) detailed description of proposed activity	c) Appendices containing descriptions of the (ii) activity to be undertaken
c) description of property on which the activity is undertaken and location of activity on the property, or if it is – (i) linear activity, a description of the route of the activity; (ii) ocean-based activity, the coordinates where the activity is to be undertaken	
d) description of environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity	c) Appendices containing descriptions of the (i) environment concerned
e) details of public participation process conducted	c) Appendices containing descriptions of (iii) the public participation process, including a list of interested parties and their comments (iv) media coverage given to the proposed activity
f) description of the need and desirability of the proposed activity and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity	
g) indication of the methodology used in determining the significance of potential environmental impacts	
h) description and comparative assessment of all alternatives identified during the EIA process	b) A comparative assessment of feasible alternatives
i) summary of the findings and recommendations of any specialist report or report on a specialized process	
j) description of all environmental issues that were identified during the EIA process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures	a) A description of each feasible alternative including: (i) extent and significance of each identified environmental impact (ii) the possibility for mitigation of each identified impact
k) an assessment of each identified potentially significant impact: (i) cumulative impacts; (ii) nature of the impact; (iii) extent and duration of the impact; (iv) probability of the impact occurring; (v) degree to which the impact can be reversed; (vi) degree to which the impact may cause irreplaceable loss (vii) the degree to which the impact can be mitigated	

2006 regulations: Regulation 32(2) (a-q) Government Notice R385 (South Africa, 2006)	1997 regulations: Regulation 8 (a-c) Government Notice R1182 (South Africa, 1997b).
l) description of any assumptions, uncertainties and gaps in knowledge	
m) opinion as to whether the activity should /should not be authorized, and any conditions in respect of authorization	
n) an environmental impact statement which contains – (i) summary of key findings of environmental impact assessment;	
(ii) comparative assessment of positive and negative implications of the proposed activity and identified alternatives	
o) draft EMP that complies with regulation **34**	
p) copies of specialist reports/ reports on specialized processes	
q) any specific information that may be required by the competent authority	c) Appendices containing descriptions of (v) any other information included in the accepted Plan of Study

Previous experience had shown that no review topics should be removed since the Lee and Colley model evaluates best practice, therefore no changes were made to the overall structure of the Lee and Colley model (Lee *et al*., 1999). All the review areas, categories and assessment symbols from the original Lee and Colley model were retained. Only modifications of wording, or addition of new topics took place in order to comply with the South African EIA legislation (both 1997 and 2006), but also to comply with the requirements for best practice. The four review areas retained are:

1. Description of the development, the local environment and the baseline conditions;

2. Identification and evaluation of key impacts;

3. Alternatives and mitigation of impacts; and

4. Communication of results.

The review categories were also retained. However, ten sub-categories were changed by adding or changing descriptions to fit both the 1997 and 2006 regulations, and four sub-categories were added; thus increasing the total to fifty six. The following four sub-categories were added:

1.1.6 Identification of applicant - as it forms part of the description of the development. It is specifically required in the 2006 regulations, as no development can commence without identification of ownership;

1.1.7 Details of the Environmental Assessment Practitioner (EAP) to carry out the EIA, including declaration of independence of EAP and description of expertise of EAP. Regulations 386 (South Africa, 2006a) define and EAP as a person with no "(a) business, financial, personal or other interest in the activity, application or appeal in respect of which that EAP or person is appointed other than fair remuneration for work performed in connection with that activity, application or appeal; or (b) that there are no circumstances that may compromise the objectivity of that EAP in performing such work". This is required because of the fear that some consultants may not act independently and produce inexpensive "sweetheart reviews" in order to receive a positive Record of Decision (ROD) rather than be objective (Wood, 2003). In the SADC (Southern African Development Community) countries, including Malawi, Mozambique, Zimbabwe, Botswana, Lesotho, Zambia, Tanzania, Seychelles and Mauritius, the majority of the EIA processes are conducted by the developer (Kalima, 2005);

3.1.4 Comparative assessment of all alternatives identified – both the 1997 and the 2006 regulations require not only a description of all identified alternatives including advantages and disadvantages, but also a comparative assessment thereof. However, the 2006 regulations are more descriptive; and

4.3.3 Opinion of the EAP as to whether the activity should/should not be authorized. This is rather strange, as EIRs must be unbiased and should not lobby for any particular point of view. However, this is the only time where an opinion of the EAP is explicitly required.

Table 3: Adaptation of the Lee and Colley model (Adapted from Lee *et al*., 1999).

Review sub-categories	Applicability of criteria	Review sub-categories	Applicability of criteria
1.1.1 Purpose and objectives	**AWC**	2.4.1 Data to estimate magnitude of main impacts	NC
1.1.2 Design and size	NC	2.4.2 Methods used to predict impact magnitude	NC
1.1.3 Presence and appearance of completed development	NC	2.4.3 Predictions of impact in measureable quantities	NC
1.1.4 Nature of production processes	NC	2.5.1 Significance of impacts on affected community and society in general	**AWC**
1.1.5 Nature and quantity of raw materials	NC	2.5.2 Significance of impacts in terms of national and international quality standards	NC
1.1.6 Identification of applicant	**CA**	2.5.3 Justification of proposed method of assessing significance	**AWC**

Review sub-categories	Applicability of criteria	Review sub-categories	Applicability of criteria
1.1.7 Details of EAP	CA	3.1.1 Description of alternative sites	NC
1.2.1 Area of development site	AWC	3.1.2 Description of alternative processes, designs and operating conditions	NC
1.2.2 Demarcation of land use area	NC	3.1.3 For severe adverse impacts rejected alternatives identified	NC
1.2.3 Duration of phases	NC	3.1.4 Comparative assessment of all alternatives identified	CA
1.2.4 Number of workers/ visitors	NC	3.2.1 Consider mitigation of all significant adverse impacts	AWC
1.2.5 Means of transporting raw materials/products and quantities	NC	3.2.2 Mitigation measures	NC
1.3.1 Types and quantities of wastes	NC	3.2.3 Extent of effectiveness of mitigation when implemented	AWC
1.3.2 Treatment, disposal and disposal routes	NC	3.3.1 Record of commitment to mitigation measures	AWC
1.3.3 Methods of obtaining quantity of wastes	NC	3.3.2 Monitoring arrangements	NC
1.4.1 Area to be affected by development	NC	4.1.1 Introduction	NC
1.4.2 Effects occurring away from immediate affected environment	NC	4.1.2 Information logically arranged	NC
1.5.1 Important components of the affected environment	NC	4.1.3 Chapter summaries for very short chapters	NC
1.5.2 Existing data sources	NC	4.1.4 External sources acknowledged	NC
1.5.3 Local land use plans, policies consulted and other data collected	NC	4.2.1 Presentation of information	NC
2.1.1 All possible effects on environment	NC	4.2.2 Technical terms, acronyms, initials defined	NC
2.1.2 Interaction of effects	NC	4.2.3 Statement presented as an integrated whole	NC
2.1.3 Impacts from non-standard operating conditions	NC	4.3.1 Emphasis to potentially severe impacts	NC
2.1.4 Impacts from deviation from Baseline conditions	NC	4.3.2 Statement must be unbiased	NC
2.2.1 Impact identification methodology	NC	4.3.3 Opinion as to whether activity should/should not be authorized	CA
2.2.2 Impact identification method used	NC	4.4.1 Non-technical summary of main findings and conclusions	NC
2.3.1 Contact general public and special interest groups	AWC	4.4.2 Summary must cover all main issues	NC
2.3.2 Collect opinions and concerns of I&APs	AWC	**KEY: NC – No changes in criteria**	
2.3.3. Key impacts	AWC	**CA – Criteria added**	
		AWC - Accepted With Changes	

- **AWC**: The definition of the sub-categories was changed or extended in order to comply with the South African regulations.

The changes, as described above, were incorporated into the review topics and collation sheet as illustrated in Figure 3.

EIR:_____

Overall Assessment _____

1. ____	**2.** ____	**3.** ____	**4.** ____
1.1 ____	**2.1** ____	**3.1** ____	**4.1** ____
1.1.1 ____	2.1.1 ____	3.1.1 ____	4.1.1. ____
1.1.2 ____	2.1.2 ____	3.1.2 ____	4.1.2 ____
1.1.3 ____	2.1.3 ____	3.1.3 ____	4.1.3 ____
1.1.4 ____	2.1.4 ____	3.1.4 ____	4.1.4 ____
1.1.5 ____			
1.1.6 ____			
1.1.7 ____			
1.2 ____	**2.2** ____	**3.2** ____	**4.2** ____
1.2.1 ____	2.2.1 ____	3.2.1 ____	4.2.1 ____
1.2.2 ____	2.2.2 ____	3.2.2 ____	4.2.2 ____
1.2.3 ____		3.2.3 ____	4.2.3 ____
1.2.4 ____			
1.2.5 ____			
1.3 ____	**2.3** ____	**3.3** ____	**4.3** ____
1.3.1 ____	2.3.1 ____	3.3.1 ____	4.3.1 ____
1.3.2 ____	2.3.2 ____	3.3.2 ____	4.3.2 ____
1.3.3 ____	2.3.3 ____		4.3.3 ____
1.4 ____	**2.4** ____		**4.4** ____
1.4.1 ____	2.4.1 ____		4.4.1 ____
1.4.2 ____	2.4.2 ____		4.4.2 ____
	2.4.3 ____		
1.5 ____	**2.5** ____		
1.5.1 ____	2.5.1 ____		
1.5.2 ____	2.5.2 ____		
1.5.3 ____	2.5.3 ____		

Figure 3: Adapted Collation Sheet

3.3 Pilot study review

The modified review package was tested through its application to two case studies; one under the 1997 regulations and one under the 2006 regulations. Two independent reviewers took part in the pilot study. Each reviewer reviewed the chosen reports independently using the adapted review package and collation sheet. The two reviewers then compared their review findings as recorded on the collation sheets. Differences in their assessment at sub-category, category and area level were re-examined to arrive at a consensus.

Based on the results of the pilot study, no amendments to the review package were required. The adapted review package was therefore applied to the full sample of EIRs, although only a single reviewer was used for the rest of the reviews.

3.4 Sample selection and data gathering

A total of 26 EIRs, 11 under the 1997 EIA system and 15 under the 2006 EIA system, were obtained from the then Impact Assessment Directorate of the National Department of Environmental Affairs and Tourism (DEAT) archives in Pretoria and reviewed. The Impact Assessment Directorate deals with four project types:

1. Parastatal projects, including projects like the establishment and/or decommissioning of transmission lines and substations by the Electricity supply commission (Eskom), the expansion of railway lines and toll roads by the South African National Roads (SANRAL), and developments by the Airports Company of South Africa (ACSA);

2. Sensitive areas, including projects like the development of lodges and nature trails in national parks, the development of an entertainment area in Durban, and the installation of a water purification plant in the Golden Gate Highland National Park;

3. National departmental projects, including projects like the installation of underground storage tanks and the establishment of a forensic science laboratory; and

4. Territories off the African continent such as Marion Island and Antarctica. However, no EIRs were available in this project type.

The application dates of the EIRs under the 1997 EIA system range from October 1997 up to February 2006, and for the EIRs under the 2006 EIA system from October 2006 to February 2008. The sample was drawn from completed EIRs available at the archives. As almost 90% of the applications under the 1997 EIA system ended in scoping reports being authorized, not that many full EIRs were available to choose from. Table 4 indicates the number of the sample EIRs in the different project types.

Table 4: EIR sample grouped by project types

Project types	EIR sample: 1997 system				EIR sample: 2006 system			
Parastatal (e.g. Eskom, SANRAL, ACSA)	Eskom	SANRAL	ACSA	TOTAL	Eskom	SANRAL	ACSA	TOTAL
	3	1	3	7	8	1	2	11
Sensitive areas	4				1			
National departments	0				3			
Off shore	0				0			
TOTAL	11				15			

ACSA (Airports Company South Africa)
SANRAL (South African National Roads Agency Limited)
Eskom (Electricity Supply Commission)

Each report was evaluated individually and the different scores compared in table format in order to identify trends and patterns, and to draw out key issues and themes in practice. The analysis is presented in Chapter 4.

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CHAPTER 4: Article manuscript

A comparative analysis of EIA report quality before and after 2006 in South Africa.

Abstract

The Environmental Impact Assessment (EIA) regulations that came into effect on 2 August 2010 focused renewed attention on the question of EIA effectiveness in South Africa. The efficiency and effectiveness of the previous system, the 2006-system, has not been established and no research has been published regarding the quality of EIRs produced in South Africa since the amendment of the National Environmental Management Act (NEMA), Act no. 107 of 1998 and new regulations promulgated in 2006. The intent of the 2006 regulations were to improve EIA effectiveness, therefore it is necessary that the quality of EIRs produced under the 2006 system be investigated. The Lee and Colley review model was chosen as basis for the development of the package used for the comparative analysis of EIRs before and after 2006. A sample of 26 EIRs, 11 under the 1997 system and 15 under the 2006 system were obtained from the DEAT archives in Pretoria and reviewed. Overall, 80% of the reports under the 2006 EIA system achieved satisfactory grades comparing to 91% of the 1997 EIA reports, with the descriptive and presentational elements of the EIRs more satisfactorily addressed, and the analytical components such as impact significance addressed to a less satisfactory degree. EIR quality appears to be on par with international standards, but there are also areas of distinct weaknesses. EIA effectiveness includes also other aspects such as monitoring and post-auditing, therefore further research is needed in order to determine the effect of the new regulations on EIA effectiveness in South Africa.

Key words: Environmental Impact Assessment, Effectiveness, National Environmental Management Act, Environmental Impact Assessment Report, EIA report quality

1. Introduction

The new EIA regulations that came into effect on 2 August 2010 aimed at, not only a more streamlined process, but also at improving the effectiveness of EIA in South Africa. In order to test this claim, the effectiveness of the EIA process in South Africa needs to be investigated.

The effectiveness of EIA is a particular concern amongst EIA practitioners (Barker and Wood, 1999; Christensen *et al.*, 2005; Retief & Chabalala, 2009; Heinma & Põder, 2010). EIA effectiveness can be established through the evaluation of the EIA system in order to determine EIA compliance with procedural regulations. Extensive research has been conducted in Europe and other developed countries such as Finland (Pölönen *et al*., 2010), as well as developing countries to evaluate EIA systems (Barker & Wood, 1999; Wood, 2003; Ahmad & Wood, 2002; Ramjeawon & Beedassy, 2004; Kruger & Chapman, 2005; Sandham *et al*., 2005; EL-Fadl & El-Fadl 2004; Nadeem & Hameed 2008; Badr, 2009). Another component of EIA effectiveness deals with the cost-effectiveness of the EIA system. Minimal research has been conducted on the cost of EIA in South Africa, however the study by Retief & Chabalala (2009) indicated that the average direct cost of EIA in South Africa is relatively low compared to other international EIA systems. A study by Macintosh (2010) in Australia confirms the belief that the costs of EIAs are high. It was concluded that the costs associated with projects receiving approval between 1 July 2000 and 10 June 2009 varied between AU$ 130 000 and AU$ 2 200 000.

A third important component of effectiveness deals with the quality of the Environmental Impact Report (EIR) also referred to as the Environmental Impact Statement (EIS) or simply the Environmental Statement (ES). As the term effectiveness can be defined as “whether the EIA process or elements has measured up to its procedural requirements and substantive purpose” (Sadler, 2004:249), there is a general assumption that poor quality reports would invariably lead to ineffectiveness since they contain the information related to the project and decision-making (Glasson *et al.,* 2005; Wood, 2003).

Extensive research has been conducted in both developed and developing countries to evaluate the quality of EIRs (Barker & Wood, 1999; Pardo, 1997; Gray & Edwards-Jones, 1999; Canelas *et al*., 2004; Androulidakis & Karakassis, 2005; Pinho *et al*., 2007; Tzoumis, 2007; Zeremariam & Quinn 2007; Kruopienė *et al*., 2009; Jalava *et al.,* 2010; Peterson, 2010). Some of the problems still encountered relate to capacity of authorities involved, public participation,

description of the methods used, impact prediction, EIA follow-up monitoring, and consideration of alternatives and cumulative impacts.

The EIA process in South Africa started on a non-mandatory basis in the 1970s and early 1980s when EIA was practiced as part of Integrated Environmental Management (IEM). The mandatory period started in September 1997 with the promulgation of EIA regulations in terms of the Environment Conservation Act (ECA) of 1989 (South Africa, 1989; South Africa, 1997a,b,c). The second phase of mandatory EIA commenced in April 2006 with the promulgation of a new set of more detailed EIA regulations (South Africa, 2006a,b,c), in terms of the National Environmental Management Amendment Act of 1998.

The third phase of mandatory EIA started on 2 August 2010 when the third set of EIA regulations came into effect. The main change includes a revision of the lists of activities requiring Environmental Authorization (EA) prior to commencement as the EIA system was overburdened by applications associated with insignificant activities. Some other amendments include the replacement of land owner consent with land owner notification; amendments to ensure a fair public participation process (PPP), and the recognition of Environmental Management Frameworks (EMFs) as an environmental instrument in its own right, hence the publication of the EMF regulations on 18 June 2010 which also came into effect on 2 August 2010 (South Africa, 2010).

A limited amount of research has been conducted on the quality of EIRs under the 1997 (ECA) system in South Africa. These include EIRs for projects affecting wetlands (Sandham *et al*., 2008), in the North West Province (Sandham & Pretorius, 2008), for the explosive industry projects in South Africa (Van der Vyver, 2008), housing developments in the Nkangala district of the Mpumalanga province (Mbhele, 2009), and for the release of biological agents for the control of *Lantana camara* (lantana) (Sandham *et al.,* 2010). Other research includes the quality of Social Impact Assessment (SIA) in South Africa (Du Pisani & Sandham, 2006), and the quality of EIRs in the mining industry (Sandham *et al*., 2008).

Adaptations of the Lee and Colley model were used in all the above mentioned research projects, and it was concluded that the quality of EIRs under the 1997 system was generally satisfactory. However, the biological control EIRs were all graded as poor. Overall, a number

of problem areas were identified. In Review Area (RA) 1[6] it related to the estimated duration of the different phases, the expected number of workers and visitors to the site and the means of transport, the means of transporting raw materials as well as the estimated quantities, and description of the infrastructure required. Weaknesses in RA 2 included the prediction of impact magnitude, methods for identification of impacts, methods used for determining impact significance, secondary and cumulative impacts, methods used for prediction and evaluation of impacts, criteria to predict impact magnitude in measurable quantities, and impacts form non-standard operation procedures. In RA 3 the only weakness identified related to measures used to identify alternatives, and weaknesses identified in RA 4 related to the executive or non-technical summary and emphasis. These findings are in general accord with the results of EIR quality findings elsewhere (Barker & Wood, 1999; Lee, 2000; Canelas *et al*., 2004; Pölönen *et al*., 2010).

Since the first phase of mandatory EIA was ended in 2006 by the promulgation of new EIA regulations in terms of NEMA, with the stated aim of improving EIA performance, no research has been published regarding the quality of EIRs produced in South Africa under those regulations. The advent of even newer regulations in July 2010 has exacerbated the need to investigate EIR quality in order to determine the extent to which the new regulations have succeeded in improving the quality of EIRs, hence the subject of the study.

The paper is structured around five sections. Firstly the EIA process in South Africa is defined, followed by an explanation of the methodology, after which the analysis and results are presented. This is followed by a discussion of the research findings, and by conclusions regarding the effect of the new regulations on the quality of EIA reports.

2. EIA in South Africa

The EIA system in South Africa consists of the following main steps:

- Submission of application to competent authority for authorisation to undertake activity;
- Scoping Report (including public involvement and plan of study for EIA);

[6] Review starts at the lowest level (sub-categories) moving upwards to the next level (categories). The evaluation of the review areas is based on the review of the categories. The overall grade is completed through the review of the review areas (Refer to Methodology in Section 3)

- Environmental Impact Assessment Report (EIR) (including public involvement, specialist reports and Draft Environmental Management Plan);
- Review of EIRs by the competent authority; and
- Environmental Authorization (including conditions of approval) (South Africa, 2006b).

3. Methodology

Internationally the use of so-called review packages or checklists has been the main methodological approach to review the quality of EIRs. For this research the Lee and Colley review package was chosen for the comparative analysis of EIR quality before and after 2006, because it is adaptable, easy to use, and it also provides a systematic, structured and objective approach to quality review (Lee *et al.*, 1999; Wood, 1999; Sandham *et al.,* 2005; Sandham & Pretorius, 2008). It also allows for comparison to findings from international research.

3.1 The structure and use of the Lee and Colley review model

The Lee and Colley model is hierarchically structured with the review sub-categories in the lowest levels as illustrated in Figure 1.

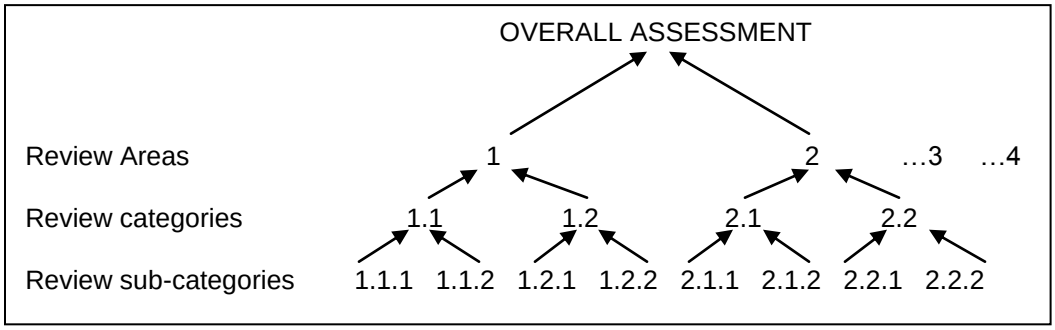


Figure 1: Hierarchical structure of the Lee and Colley review model (Lee *et al*., 1999:6)

Review Area 4 – overall assessment of EIR; Review Area 3 – assessment of review areas; Review Area 2 – assessment of review categories; Review Area 1 – assessment of review sub-categories.

The review of an EIR starts at the lowest level, and a grade is rewarded ranging from A to F, depending on how well a specific task was performed. The results are then recorded on a collation sheet. The assessment symbols are shown in Table 1.

Table 1: List of assessment symbols (Lee *et al*., 1999; Lee, 2000).

Symbol	Explanation
A	Relevant tasks well performed, no important tasks left incomplete
B	Generally satisfactory and complete, only minor omissions and inadequacies.
C	Can be considered just satisfactory despite omissions and/or inadequacies.
D	Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies.
E	Not satisfactory, significant omissions or inadequacies.
F	Very unsatisfactory, important task(s) poorly done or not attempted.
N/A	Not applicable. The Review topic is not applicable or is irrelevant in the context of this statement.

3.2 Adaptation of the review model

Due to certain unique features of the SA EIA system, such as extensive public participation, it was evident that the original Lee and Colley review model needed to be adapted. Previous experience had shown that no review topics should be removed during adaptation, since the Lee and Colley model evaluates best practice. Therefore no changes were made to the overall structure of the Lee and Colley model (Lee *et al*., 1999), and all the review areas, categories and sub-categories of the original model were retained. The only modifications included change in the descriptions of sub-categories, and addition of new topics in order to allow for proper review of the South African EIA systems in 1997 and 2006, while assessing best practice.

Consequently, ten sub-categories were modified by adding or changing descriptions to fit both the 1997 and 2006 regulations, and four sub-categories were added, increasing the total to fifty six. The four sub-categories added are:

1.1.6 Identification of applicant – it is a requirement in the 2006 regulations as no development can commence without identification of ownership.

1.1.7 Details of the Environmental Assessment Practitioner (EAP) to carry out the EIA, including declaration of independence of the EAP and description of the expertise of the EAP. This is only a requirement of the South African regulations, because of the concern that consultants may not act independently and produce “sweetheart reviews” in order to obtain a positive Record of Decision (ROD)[7] rather than be objective (Wood,

[7] Changed to Environmental Authorization (EA) in 2006

2003). In other African countries like the SADC (Southern African Development Community) countries, the majority of the EIAs are conducted by the developer (Kalima, 2005).

3.1.4 Comparative assessment of all alternatives identified – although both the 1997 and the 2006 regulations require a description of all identified alternatives, more emphasis is placed in the 2006 regulations on the description of the advantages and disadvantages, as well as the comparative assessment thereof, as many of the EIRs under the 1997 regulations contained no alternatives except for the proposed activity; and

4.3.3 Opinion of the EAP as to whether the activity should/should not be authorized. It is the only time that an opinion of the EAP is explicitly required. This is an interesting requirement of the South African regulations, as emphasis is placed on the report to be unbiased and without lobbying for any view point.

Table 2 shows the adaptation of the Lee and Colley model, with changes in *italics.*

Table 2: Adapted package appropriate to both the 1997 and 2006 South African EIA regulations

1. Description of the environment	2.4 Prediction of impact magnitude
1.1 Description of the development	2.4.1 Data to estimate magnitude of main impacts
1.1.1 Purpose and objectives (C)	2.4.2 Methods used to predict impact magnitude
1.1.2 Design and size	2.4.3 Predictions of impact in measureable quantities
1.1.3 Presence and appearance of completed development	2.5 Assessment of impact significance
1.1.4 Nature of production processes	2.5.1 *Significance of impacts on affected community and society in general* (C)
1.1.5 Nature and quantity of raw materials	2.5.2 Significance of impacts in terms of national and international quality standards
1.1.6 Identification of applicant (A)	*2.5.3 Justification of proposed method of assessing significance (C)*
1.1.7 Details of EAP (A)	**3. Alternatives and mitigation**
1.2 Site description	3.1 Alternatives
1.2.1 Area of development site (C)	3.1.1 Description of alternative sites
1.2.2 Demarcation of land use area	3.1.2 Description of alternative processes, designs and operating conditions
1.2.3 Duration of phases	3.1.3 For severe adverse impacts rejected alternatives identified
1.2.4 Number of workers/ visitors	*3.1.4 Comparative assessment of all alternatives identified* (A)
1.2.5 Means of transporting raw materials/products and quantities	3.2 Scope and effectiveness of mitigation measures
1.3 Wastes	*3.2.1 Consider mitigation of all significant adverse impacts (C)*
1.3.1 Types and quantities of wastes	3.2.2 Mitigation measures
1.3.2 Treatment, disposal and disposal routes	3.2.3 *Extent of effectiveness of mitigation when implemented (C)*
1.3.3 Methods of obtaining quantity of wastes	3.3 Commitment to mitigation

1.4 Environment description	3.3.1 *Record of commitment to mitigation measures* (C)
1.4.1 Area to be affected by development	3.3.2 Monitoring arrangements
1.4.2 Effects occurring away from immediate affected environment	**4. Communication of results**
1.5 Baseline conditions	4.1 Layout of report
1.5.1 Important components of the affected environment	4.1.1 Introduction
1.5.2 Existing data sources	4.1.2 Information logically arranged
1.5.3 Local land use plans, policies consulted and other data collected	4.1.3 Chapter summaries for very short chapters
2. Identification and evaluation of key impacts	4.1.4 External sources acknowledged
2.1 Definition of impacts	4.2 Presentation
2.1.1 All possible effects on environment	4.2.1 Presentation of information
2.1.2 Interaction of effects	4.2.2 Technical terms, acronyms, initials defined
2.1.3 Impacts from non-standard operating conditions	4.2.3 Statement presented as an integrated whole
2.1.4 Impacts from deviation from Baseline conditions	4.3 Emphasis
2.2 Identification of impacts	4.3.1 Emphasis to potentially severe impacts
2.2.1 Impact identification methodology	4.3.2 Statement must be unbiased
2.2.2 Impacts identification method used	4.3.3 *Opinion as to whether activity should/should not be authorized (A)*
2.3 Scoping	4.4 Non-technical summary
2.3.1 Contact general public and special interest groups (C)	4.4.1 Non-technical summary of main findings and conclusions
2.3.2 Collect opinions and concerns of I&APs (C)	4.4.2 Summary must cover all main issues
2.3.3. Key impacts (C)	

- Adaptations in italics: A = added , C = change in wording

3.3 Access to data and review sample

Previous research on EIA report quality in South Africa made use of EIRs from a number of different sectors and provincial authorising agencies. In order to optimise comparison of EIR quality in the two regulatory regimes, it was decided to take the sample only from the national authorising agency. Access to data therefore was requested from the Impact Assessment Directorate of then national Department of Environmental Affairs and Tourism (DEAT), in terms of the Promotion of Access to Information Act, Act No. 2 of 2000 (South Africa, 2000).

This Directorate deals only with four project types:

1. Parastatal projects, including projects by the Electricity Supply Commission (Eskom), the South African National Roads Agency Limited (SANRAL), and Airports Company South Africa (ACSA);

2. Projects located in sensitive areas, e.g. the establishment of lodges and nature trails in national parks;

3. Projects by government departments, e.g. the installation of underground storage tanks and the establishment of a forensic science laboratory; and

4. Projects on off-shore territories such as Marion Island and Antarctica. However, no EIRs were available in this project type.

The sample could only be drawn from completed EIRs available at the archives in Pretoria. As almost 90% of the applications under the 1997 EIA system were authorized on the basis of extended scoping reports, only a limited number of full EIRs were available to choose from. Application dates of the EIRs under the 1997 EIA system range from October 1997 to February 2006. The EIRs under the 2006 EIA system included some of the first EIRs compiled under the new regulations, with application dates ranging from October 2006 to February 2008. A total of 26 EIRs, 11 under the 1997 EIA system and 15 under the 2006 EIA system were finally selected for review on the basis of availability. Table 3 indicates the number of the sample EIRs in the different project types.

Table 3: EIR sample grouped by project types

Project types	EIR sample: 1997 system				EIR sample: 2006 system			
Parastatal (e.g. Eskom, SANRAL, ACSA)	Eskom	SANRAL	ACSA	TOTAL	Eskom	SANRAL	ACSA	TOTAL
	3	1	3	7	8	1	2	11
Sensitive areas	4				1			
National departments	0				3			
Off shore	0				0			
TOTAL	11				15			

ACSA (Airports Company South Africa)
SANRAL (South African National Roads Agency Limited)
Eskom (Electricity Supply Commission)

3.4 Review methodology

The adapted review model was tested through its application to two case studies; one under the 1997 regulations and one under the 2006 regulations. A pair of independent reviewers took part in the pilot study. Each reviewer reviewed the chosen reports independently using the adapted review package and collation sheet. A consensus discussion was held where the reviewers compared their review findings as recorded on the collation sheets. There were small differences between the reviewers' allocated scores at the lower levels, but none on the overall scores, therefore it was agreed that the review could be conducted by a single reviewer.

Due to the results of the pilot study, no amendments to the review package were required. The adapted review package was therefore used to review the full sample of EIRs.

4. Results and analysis

Assessment symbols A (well performed), B (satisfactory and complete), and C (just satisfactory), were grouped together in order to interpret the scores. As these symbols reflect that the tasks were completed to a satisfactory standard, it can be regarded as providing sufficient information for a decision. However, the critical boundary is between C and D, as these grades are awarded to tasks that are just satisfactory or just unsatisfactory. In order to identify strengths and weaknesses, the A-B grades and E-F grades were also calculated (Table 4). Detailed results appear in Van Heerden (2010).

Table 4: Summary of results: overall scores, review areas and review categories.

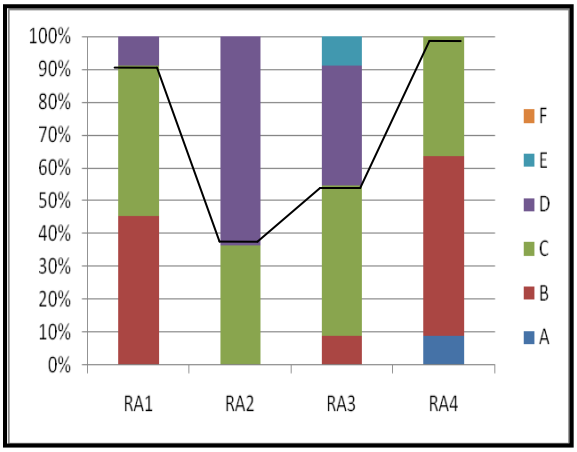
Review area/ category/ sub-category	Summary of all review categories	%C or better	%A-B	%E-F	%C or better	%A-B	%E-F
		1997 EIRs [n= 11]			2006 EIRs [n= 15]		
Overall Score		**91**	**18**	**0**	**80**	**7**	**0**
RA 1	**Description of development, local environment & baseline conditions**	**91**	**45**	**0**	**80**	**13**	**0**
1.1	Description of the development	100	45	0	100	27	0
1.2	Site description	82	36	0	53	7	20
1.3	Wastes	9	9	45	53	20	40
1.4	Environment description	91	64	0	93	67	0
1.5	Baseline conditions	100	64	0	100	67	0
RA 2	**Identification and evaluation of key impacts**	**36**	**0**	**0**	**33**	**0**	**13**
2.1	Definition of impacts	45	27	0	47	0	7
2.2	Identification of impacts	36	9	45	27	13	53
2.3	Scoping	91	55	0	80	47	7
2.4	Prediction of impact magnitude	0	0	91	0	0	87
2.5	Assessment of impact significance	64	18	9	53	13	20
RA 3	**Alternatives and mitigation**	**55**	**9**	**9**	**53**	**13**	**7**
3.1	Alternatives	64	9	0	67	47	20
3.2	Scope and effectiveness of mitigation measures	82	64	0	87	53	0
3.3	Commitment to mitigation	18	18	36	33	13	33
RA 4	**Communication of results**	**100**	**64**	**0**	**100**	**40**	**0**
4.1	Layout of the report	100	73	27	80	60	7
4.2	Presentation	100	82	0	93	73	0
4.3	Emphasis	100	82	0	100	67	0
4.4	Non-technical summary	82	82	18	100	60	0

4.1 Overall quality of EIR sample

The analysis of the overall quality of the EIRs in the 1997 system reveals that 91% of the reports were graded as satisfactory (A-C) compared to 80% of the EIRs in the 2006 system.

None of the reports could be described as well performed. In the 2006 system, 62% of reports achieved C grades (just satisfactory despite omissions and/or inadequacies), a decline from 73% in the 1997 system.

Compared to the 1997 reports, the 2006 reports show poorer performance with a decrease in B scores and an increase in D scores (Figures 2A and 2B). The changes in performance are described in more detail below by focusing on the review area scores.



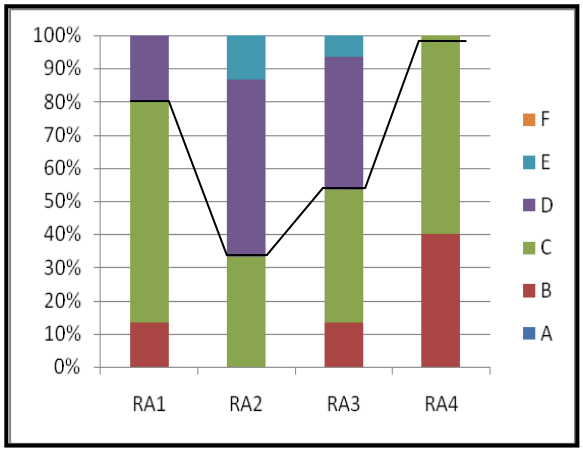


Figure 2A: Grades for Review Areas (1997) **Figure 2B: Grades for Review Areas (2006)**

Note: the line demarcates the boundary between "satisfactory" (A-C) and "unsatisfactory" (D-F)

A – well performed, B – generally satisfactory, C – just satisfactory, D – just unsatisfactory, E – not satisfactory, and F – very unsatisfactory.

4.2 Quality of the Review Areas

Review Area 1 (Project and environmental description) and Review Area 4 (Communication of results) were addressed to a satisfactory degree in both the 1997 and 2006 reports, with 91% of the 1997 reports scoring C or higher, compared to 80% of the 2006 reports for Review Area 1. 100% of the 1997 and 2006 reports scored C or higher for Review Area 4. Review Area 2 (Identification and evaluation of key impacts) and Review Area 3 (Alternatives and mitigation) were the two review areas with the lowest satisfactory scores. This can be ascribed to the greater complexity and greater interpretation skills required, not only in the study and description of the environment, but also in the prediction of impacts based on scientific data. The description of the Review Areas (RA) that follows will only refer to category and sub-category scores where applicable.

Review Area 1 – Description of the development and the environment

Table 5: Results of Review Area 1

Review area/ category/ sub-category	Summary of all review categories	% C or better	%A-B	%E-F	% C or better	%A-B	%E-F
		1997 EIRs [n= 11]			2006 EIRs [n= 15]		
Overall Score		**91**	**18**	**0**	**80**	**7**	**0**
RA 1	**Description of development, local environment & baseline conditions**	**91**	**45**	**0**	**80**	**13**	**0**
1.1	Description of the development	100	45	0	100	27	0
1.1.1	Purpose and objectives	91	40	0	93	93	0
1.1.2	Design and size	100	73	9	100	93	0
1.1.3	Presence/appearance of completed development	82	82	18	60	47	40
1.1.4	Nature of production processes	0	0	100	27	20	13
1.1.5	Nature and quantity of raw materials	36	0	45	60	13	27
1.1.6	Identification of applicant	73	64	27	80	60	13
1.1.7	Details of EAP to carry out assessment	55	45	27	67	40	7
1.2	Site description	82	36	0	53	7	20
1.2.1	Area of development site	91	91	0	93	93	0
1.2.2	Demarcation of land use areas	73	82	9	73	67	13
1.2.3	Duration of different phases	27	27	73	20	13	67
1.2.4	Estimated number of workers and/or visitors	9	9	64	20	13	73
1.2.5	Means of transporting raw materials / product and quantities	45	0	55	27	7	73
1.3	Wastes	9	9	45	53	20	40
1.3.1	Types and quantities of wastes	45	9	27	53	27	33
1.3.2	Treatment, disposal and disposal routes	18	9	64	47	40	40
1.3.3	Methods of obtaining quantity of wastes	9	9	73	27	20	53
1.4	Environment description	91	64	0	93	67	0
1.4.1	Area to be affected by development	100	100	0	100	93	0
1.4.2	Effects occurring away from immediate affected environment	73	64	9	80	40	0
1.5	Baseline conditions	100	64	0	100	67	0
1.5.1	Important components of the affected environment	82	73	9	93	60	0
1.5.2	Existing data sources	100	100	0	100	87	0
1.5.3	Local land use plans, policies consulted / other data	82	64	9	80	60	7

1997 system

91% of the 1997 sample scored C or higher, indicating that this Review Area is relatively well conducted. For the description of the development (1.1)[8] and the baseline conditions (1.5), 100% of the cases scored a C or more, for the site (1.2) the score was 82%, and for the

[8] The numbers in brackets refer to the relevant review topic i.e. category or sub-category.

environment (1.4) 91%. Particular problem areas related to waste (1.3)[9], in particular the description of the methods used of obtaining the quantity of wastes (1.3.3) and information on the treatment of wastes as well as the disposal and disposal routes to the environment (1.3.2). In most of the EIRs the nature of production processes (1.1.4), the nature and quantity of raw materials (1.1.5), the duration of the different phases (1.2.3), and the estimated number of workers and/or visitors (1.2.4) were poorly attempted or not even attempted.

2006 system

The percentage of the EIRs scoring C or more is 80%, which is lower than the 1997 score of 91%. For the description of the development (1.1) and the baseline conditions (1.5), 100% of the cases scored a C or more, and for the environment (1.4) 93% of the cases scored C or more. However, only 53% of the site (1.2) and waste (1.3) descriptions were satisfactory. Particular problem areas related to the nature of production processes (1.1.4), the duration of the different phases (1.2.3), the estimated number of workers and/or visitors (1.2.4), means of transporting raw materials and products to and from the site and the approximate quantities involved (1.2.5) as well as the description of the methods used of obtaining the quantity of wastes (1.3.3). For sub-category 1.1.7 (details of EAP to carry out the EIA, declaration of independence of EAP and description of expertise of EAP) 67% of the reports scored a C or more. This is somewhat disturbing, as this information is specifically required by the 2006 requirements.

Review Area 2 – Identification and evaluation of key impacts.

1997 system

Table 6 shows that only 36% of the reports were rated as satisfactory in Review Area 2. The majority of the reports (64%) scored a D, making it the least well-performed review area. Scoping (2.3) is satisfactory with 91% of the reports scoring a C or more. One of the problem areas related to the definition and identification of impacts (2.2). In many cases the impacts were identified for the project as a whole and not separately for each of the phases (i.e. planning, construction, operational and decommissioning). The worst scores were allocated for information on impacts from non-standard operating conditions (2.1.3), information on impacts

[9] Wastes include all residual process materials, effluents and emissions, waste energy, waste heat, noise etc.

deriving from deviation from baseline conditions (2.1.4), and a description of the impacts identification method being used (2.2.2), the prediction of impact magnitude (2.4), data to estimate the magnitude of the main impacts (2.4.1), methods used to predict impact magnitude (2.4.2) and the predictions of impacts in measurable quantities with ranges or confidence limits (2.4.3).

Table 6: Results of Review Area 2

Review area/ category/ sub-category	Summary of all review categories	% C or better	%A-B	%E-F	% C or better	%A-B	%E-F
		1997 EIRs [n= 11]			2006 EIRs [n= 15]		
Overall Score		**91**	**18**	**0**	**80**	**7**	**0**
RA 2	**Identification and evaluation of key impacts**	**36**	**0**	**0**	**33**	**0**	**13**
2.1	Definition of impacts	45	27	0	47	0	7
2.1.1	All possible effects on environment	73	73	0	93	60	7
2.1.2	Interaction of effects	91	82	0	87	73	0
2.1.3	Impacts from non-standard operating conditions	9	0	82	27	0	7
2.1.4	Impacts from deviation from baseline conditions	18	0	82	33	7	0
2.2	Identification of impacts	36	9	45	27	13	53
2.2.1	Impact identification methodology	36	18	45	40	33	40
2.2.2	Impacts identification method used	27	27	45	20	13	80
2.3	Scoping	91	55	0	80	47	7
2.3.1	Contact general public & special interest groups	100	100	0	87	87	0
2.3.2	Collect opinions and concerns of I&APs	100	82	0	73	67	0
2.3.3	Key impacts	73	45	9	60	27	7
2.4	Prediction of impact magnitude	0	0	91	0	0	87
2.4.1	Data to estimate magnitude of main impacts	0	0	64	13	0	80
2.4.2	Methods used to predict impact magnitude	9	9	82	13	0	87
2.4.3	Predictions of impact in measureable quantities	0	0	91	0	0	100
2.5	Assessment of impact significance	64	18	9	53	13	20
2.5.1	Significance of impacts on affected community & society in general	73	64	9	67	33	20
2.5.2	Significance of impacts in terms of national and international quality standards	64	45	18	53	27	20
2.5.3	Justification of proposed method of assessing significance	36	18	55	40	27	40

2006 system

Review Area 2 represents the weakest performance in the entire sample, with most of the reports (67%) scoring D – F. Scoping (2.3) is satisfactory with 80% of the EIRs scoring a C or more, but lower than the 1997 score of 91%. One of the problem areas related to the definition and identification of impacts (2.2), and the impact identification method used (2.2.2). Impacts from non-standard operating conditions received a slightly higher score (27%). The worst scores were, as in the 1997 system, allocated to the prediction of impact magnitude (2.4), data

to estimate the magnitude of the main impacts (2.4.1), methods used to predict impact magnitude (2.4.2) and the predictions of impacts in measurable quantities with ranges or confidence limits (2.4.3).

Review Area 3 – Alternatives and mitigation

Table 7: Results of Review Area 3

Review area/ category/ sub-category	Summary of all review categories	% C or better	%A-B	%E-F	% C or better	%A-B	% E-F
		1997 EIRs [n= 11]			2006 EIRs [n= 15]		
Overall Score		**91**	**18**	**0**	**80**	**7**	**0**
RA 3	**Alternatives and mitigation**	**55**	**9**	**9**	**53**	**13**	**7**
3.1	Alternatives	64	9	0	67	47	20
3.1.1	Description of alternative sites	73	36	9	73	67	13
3.1.2	Description of alternative processes, designs and operating conditions	91	64	0	53	53	27
3.1.3	For severe adverse impacts rejected alternative identified	0	0	0	0	0	27
3.1.4	Comparative assessment of all alternatives identified	64	45	27	67	40	20
3.2	Scope and effectiveness of mitigation measures	82	64	0	87	53	0
3.2.1	Consider mitigation of all significant adverse impacts	91	73	0	100	73	0
3.2.2	Mitigation measures	100	82	0	100	80	0
3.2.3	Extent of effectiveness of mitigation when implemented	64	45	18	67	47	13
3.3	Commitment to mitigation	18	18	36	33	13	33
3.3.1	Record of commitment to mitigation measures	27	18	36	67	27	33
3.3.2	Monitoring arrangements	18	18	36	33	20	47

1997 system

55% of the reports were rated as satisfactory (A-C). The best scores were allocated to the description of alternatives processes, designs and operating conditions (3.1.2), consideration of mitigation of all significant adverse impacts (3.2.1), and mitigation measures (3.2.2). The worst scores were allocated to the commitment to mitigation (3.3), record of commitment to mitigation measures (3.3.1), and monitoring arrangements (3.3.2).

2006 system

53% of the reports reviewed were rated as generally satisfactory. The best scores were allocated to the consideration of mitigation of all significant adverse impacts (3.2.1) and mitigation measures (3.2.2) (both 100%). The worst scores were allocated to the commitment to mitigation (3.3), and monitoring arrangements (3.3.2).

Weak spots in this review area seem to be commitment to mitigation and monitoring arrangements. As the role of EIA is to prevent or minimise environmental degradation, it is somewhat disturbing that these issues are not addressed satisfactory.

Review Area 4 – Communication of results

Table 8: Results of Review Area 4

Review area/ category/ sub-category	Summary of all review categories	% C or better	%A-B	%E-F	% C or better	%A-B	%E-F
		1997 EIRs [n= 11]			2006 EIRs [n= 15]		
Overall Score		**91**	**18**	**0**	**80**	**7**	**0**
RA 4	**Communication of results**	**100**	**64**	**0**	**100**	**40**	**0**
4.1	Layout of the report	100	73	27	80	60	7
4.1.1	Introduction	91	82	0	100	73	0
4.1.2	Information logically arranged	100	91	0	100	93	0
4.1.3	Chapter summaries for very short chapters	18	18	0	13	13	27
4.1.4	External sources acknowledged	82	82	18	77	73	3
4.2	Presentation	100	82	0	93	73	0
4.2.1	Presentation of information	100	91	0	100	87	0
4.2.2	Technical terms, acronyms, initials defined	82	82	18	85	67	20
4.2.3	Statement presented as an integrated whole	100	100	0	100	80	0
4.3	Emphasis	100	82	0	100	67	0
4.3.1	Emphasis to potentially severe impacts	100	91	0	100	67	0
4.3.2	Statement must be unbiased	100	91	18	100	93	0
4.3.3	Opinion as to whether activity should/should not be authorized	82	55	18	67	60	33
4.4	Non-technical summary	82	82	18	100	60	0
4.4.1	Non-technical summary of main findings & conclusions	82	82	18	100	73	0
4.4.2	Summary must cover all main issues	82	73	18	93	60	0

1997 system

This was the best performed review area, and all of the reports reviewed scored a C or higher. It was the only review area where the majority of the scores are in the well performed zone (A-B). Only for the non-technical summary (4.4), did two reports receive F grades.

2006 system

This was also the best performed review area in the 2006 system, and all of the reports reviewed scored a C or higher. The layout of the reports (4.1) and presentation (4.2) received lower scores at 80% and 93% compared to 100% of the 1997 system.

With the results obtained from the EIRs in both the 1997 and 2006 systems, it is clear that good reports are submitted with regards to layout, presentation and emphasis, although the slightly lower scores of the reports in the 2006 system indicate room for improvement.

4.3 Key findings

The review category grades in each review area can be used to identify strengths and weaknesses within an EIA report. The percentage A and B grades were calculated as a measure of strengths, and the percentage E and F grades for weaknesses. The categories scoring a proportion of A and B grades over 50% could be regarded as strengths, and the proportion of E and F grades over 50% could be regarded as weaknesses. These values are shown in Table 9.

Table 9: Strengths and weaknesses in the 1997 and 2006 EIA reports (EIRs).

	1997 EIRs	2006 EIRs
Strengths	1.4 Environment description (64%) 1.5 Baseline conditions (64%)	1.4 Environment description (67%) 1.5 Baseline conditions (67%)
	2.3 Scoping (55%)	
	3.2 Scope and effectiveness of mitigation measures (64%)	3.2 Scope and effectiveness of mitigation measures (53%
	4.1 Layout of the report (73%) 4.2 Presentation (82%) 4.3 Emphasis (82%) 4.4 Non-technical summary (82%)	4.1 Layout of the report (60%) 4.2 Presentation (73%) 4.3 Emphasis (67%) 4.4 Non-technical summary (60%)
Weaknesses	2.4 Prediction of impact magnitude (91%)	2.2 Identification of impacts (53%) 2.4 Prediction of impact magnitude (87%)

It is evident from the distribution of A-B grades in the 1997 reports that there are some areas of strength in all the Review Areas (RA). Interesting to note is that RA 2 also hosts one of the weakest areas. The weakest area (E-F grades) in both the systems appears to be the prediction of impact magnitude (2.4).

The grades for the reports from both the 1997 and 2006 systems confirm that tasks are better performed in Review Areas 1 and 4 relating to the description of the activity and environment, and the presentation of the report than the more analytic tasks required in Review Areas 2 and 3, such as impact identification, alternatives and mitigation measures. Scoping performed slightly weaker, probably due to the more detailed information needed under the new regulations of the 2006 EIA system. However, it is believed that the quality of EIRs will improve over time as Environmental Assessment Practitioners (EAPs – also known as consultants) and

environmental officials become more confident with the new process. The worst scores in both the 1997 and 2006 EIA systems were allocated to monitoring arrangements, indicating room for improvement in the effectiveness of the EIA systems.

5. Discussion

5.1 What is revealed about EIA practice in South Africa after the promulgation of the 2006 EIA regulations?

The research results indicate that 91% of the 1997 EIRs were of satisfactory standard, compared to 80% of the EIRs in the 2006 system. The findings also reveal that the results of the EIRs from both the 1997 and the 2006 systems are similar to those from other South African studies on EIA quality (Sandham & Pretorius, 2008; Sandham *et al.,* 2008; Sandham *et al.,* 2010) as well as internationally (European Commission, 1996; Barker & Wood, 1999; Lee, 2000; Pölönen *et al.,* 2010) with lower scores in the analytical areas (Review Areas 2 and 3) compared to the higher scores in the more descriptive and presentational areas (Review Areas 1 and 4). This can be ascribed to the greater complexity required, not only in the study and description of the environment, but also the effect of the development on the environment, as well as in the prediction of impacts based on scientific data.

The aim of this study is to distinguish to what extent the new EIA regulations have improved EIA effectiveness in terms of EIR quality, i.e. whether the (more detailed) 2006 EIA regulations have resulted in better quality reports. The results do not support such a finding. However, a comparison of scores at lower levels of the hierarchy reveals some areas of improvement, such as the following:

- 9% of the 1997 EIRs rated satisfactory for the description of wastes (1.3) compared 53% of the 2006 reports.
- 18% of the 1997 EIRs rated satisfactory in relation to the commitment to mitigation measures (3.3) compared to the 33% of the 2006 EIRs.
- Prediction of impact magnitude (2.4) increased from 9% rated A-C in the 1997 reports to 13 % in the 2006 reports.
- The scores for the non-technical summary (4.4) improved from 82% to 100%. Although it wasn't required under the 1997-regulations, it was included in all the 1997 reports. It is likely that the formal requirement for a non-technical summary in the 2006 regulations contributed to the improved quality of the non-technical summary.

On sub-category level some of the biggest improvements in rating were:

- Nature of production processes (1.1.4) were better described in the 2006 EIRs (0% to 27%).
- Nature and quantity of raw materials (1.1.5) increased from 36% to 60% scoring A-C grades.
- Identification of applicant (1.1.6) and Details of EAP[10] to carry out the assessment (1.1.7) increased from 73% to 80% and 55% to 67% respectively. This information is included because of the requirements of the 2006 regulations, although it is not really a factor that will influence the outcome of the report. It is interesting to note that the scores for 1.1.7 (details of the EAP) are still relatively low.
- The quality of description of wastes increased in all three the sub-categories (1.3.1, 1.3.2 and 1.3.3), although the description of the methods of obtaining the quantity (27%) is still very unsatisfactory.
- The description of the important components of the affected environment (1.5.1) changed from 82 % to 93% of the reports receiving A-C scores.
- The description of the impacts deriving from non-standard operating conditions and from deviation from baseline conditions (2.1.3 and 2.1.4) also performed better (9% to 27% and 18% to 33% respectively), although the scores are still very unsatisfactory.
- The consideration of mitigation of all significant adverse impacts changed from 91% to 100% receiving A-C scores.

5.2 Minimum requirements vs best practice

As there is very little change in the quality of EIRs in spite of the more detailed 2006 regulations, the first question to be debated is whether the EIA reports under both the 1997 and the 2006 EIA systems complied with the minimum requirements set out in the South African regulations. As all of the twenty six EIRs of the sample were approved, it is an indication that they complied with the minimum requirements of both the 1997 and 2006 EIA systems, although the research reveals that the quality can be improved, especially in Review Areas 2 and 3. Furthermore, if the EIA regulations are being followed and conducted in the prescribed manner, weak spots can be eliminated, leading to an improvement in the overall quality of EIAs in South Africa.

[10] Environmental Assessment Practitioner: the independent consultant conducting the EIA on behalf of the developer/applicant

The second question to be asked is why are there issues of best practice that are still not covered in the South African regulations, and how do we move towards best practice? The research has shown that the problem areas regarding best practice identified in the 1997 reports still remain, namely:

- The nature and quantity of raw materials, the duration of the different phases, the estimated number of workers and/or visitors to the site, a description of the methods used for obtaining the quantity of wastes as well as information on the treatment, disposal and disposal routes of wastes were poorly attempted. The South African regulations (1997 or 2006) require no information about any of the above mentioned matters, neither in the compilation of the Specialist Reports, nor in any description of impacts.
- Data to estimate the magnitude of the main impacts, methods used to predict impact magnitude, and the predictions of impacts in measurable quantities with ranges or confidence limits were poorly attempted, or in some cases not attempted at all. The South African regulations only prescribe that a potential impact must be assessed in terms of its extent, duration, intensity, probability and significance (DEAT, 1998). A description of impact magnitude is not required by the 1997 nor the 2006 regulations.
- Commitment to mitigation measures, and monitoring arrangements were still poorly attempted. This however, is not primarily an issue that can be addressed in an EIA report and belongs more properly in the domain of post decision monitoring.

The third question to be asked is what route needs to be taken: only compliance with the regulations set by the relevant EIA system or recognition as an EIA system that complies with best practice standards. South Africa is recognised as a leading developing country in terms of the introduction of EIA (Retief and Chabalala, 2009:51), therefore the possibility exists to increase the standard of EIA in South Africa, becoming a leader on the continent in terms of sustainable development. Either way, much more needs to be done to ensure effective EIA practice in South Africa. It is therefore recommended that a forum/forums be established where issues regarding EIR quality or EIA practice can be discussed.

6. Conclusion and recommendations

Experience has shown that the overall quality of EIRs generally improves with time, but the somewhat disturbing conclusion from this investigation is that the quality of the EIA reports has

not improved following implementation of the new regulations in 2006. Aspects such as the identification of key impacts, the magnitude of impacts and monitoring still need to be improved. The accreditation and training of Environmental Assessment Practitioners (EAPs) (also called consultants) and other role players such as project managers and specialists, guidance on good practice and continuing research are likely to increase the standard of practice in an EIA system (Wood, 2003). Currently, there is still no formal accreditation of EAPs, nor any official criteria for qualifying as an EAP therefore this factor is still a weakness within the South African legislation. Although independence of EAPs (consultants) is required by law, the lack of accreditation means that also unqualified individuals may conduct EIAs. This issue needs to be addressed in order to ensure EIRs of a high quality.

Two types of assessment processes, namely the Basic Assessment process and the Full Assessment or EIA process were identified in the 2006 EIA system. The aim of the Basic Assessment process was to supply a process for assessment of smaller and less complex activities, and to limit the number of interactions with the competent environmental authority in order to expedite the process. As this study only focussed on the quality of the reports of the Full Assessment or EIA process, the Basic Assessment process needs to be investigated in order to determine the effectiveness of the process, and by implication the quality of the Basic Assessment Reports.

Finally, the question must also be raised as to whether effectiveness wider than report quality has shown a similar lack of improvement. As effectiveness includes other aspects such as the effect on decision making, the effectiveness of prediction and management of the impacts and monitoring and post-auditing, these issues must be the subject of further research in order to gauge the effect of the new regulations on EIA effectiveness in South Africa.

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CHAPTER 5: Conclusion

The focus of this study was to compare the quality of EIA reports before and after implementation of the 2006 EIA system in South Africa in order to determine EIA effectiveness in terms of EIR quality. The dissertation started with a brief description of EIA report quality review in South Africa under the 1997 EIA system, and continued with a description of the history of EIA, in South Africa and abroad, as well as examples of EIA report quality review. It then continued with a description of the relevant legislation and regulations in order to adapt the Lee and Colley review model to review a sample of 26 EIRs, 11 under the 1997 EIA system and 15 under the 2006 EIA system. The article manuscript contained the findings and analysis of the results.

The analysis of the results revealed that 91% of the EIRs in the 1997 system were of an acceptable standard, compared to 80% in the 2006 system, implying that the process of EIA is effective in achieving its goals. However, none of the reports could be described as well performed, indicating room for improvement in the quality of EIRs. The findings also revealed that the results of the EIRs from both the 1997 and the 2006 systems were similar to those from other South African studies on EIA quality as well as internationally, with lower scores in the analytical areas and higher scores in the more descriptive and presentational areas.

The same weaknesses in both the 1997 and 2006 reports were identified namely, the description of wastes, the prediction of impact magnitude, commitment to mitigation measures, and monitoring arrangements. These matters relate to best practice, but are not addressed in the amended EIA regulations that came into effect on 2 August 2010, therefore it is recommended that a forum or forums be established in order to address the issue of best practice to ensure that South Africa can be compared internationally in terms of best practice.

The aim of this study was also to distinguish to what extent the new EIA regulations have improved EIA effectiveness in terms of EIR quality. The somewhat disturbing conclusion is that the implementation of the new regulations in 2006 has not improved the quality of the EIA reports. The 2006 sample included some of the first EIRs conducted under the new 2006 regulations, and experience showed that EIR quality is likely to improve over time. A study by Wood (2003) indicated that the standard of practice in a mature EIA system may increase through training of project managers and specialists, guidance on good practice and continuing

research. These activities can also be implemented in South Africa through accreditation and training of Environmental Assessment Practitioners (EAPs) and other role players, therefore this issue needs to be addressed in order to take EIA in South Africa to a higher level.

EIA-effectiveness is determined not only by the quality of EIRs, but also includes other aspects such as the effect on decision making, the effectiveness of prediction and management of the impacts, and monitoring and post-auditing programmes. Monitoring arrangements received weak scores in both the 1997 and 2006 EIRs, therefore it is recommended that better measures for follow-up actions be included in the EIA regulations, not only in order to give a stronger regulatory backing, but also to enhance the role of EIA in sustainability.

APPENDIX A: The review package used for the comparative analysis of EIA report quality before and after 2006 in South Africa

SA guidelines added/altered in original Lee and Colley model printed in italics.

1. DESCRIPTION OF THE DEVELOPMENT, LOCAL ENVIRONMENT AND BASELINE CONDITIONS.

1.1 Description of the development: the purpose(s) of the development should be described as should the physical characteristics, scale and design. Quantities of materials needed during construction and operation should be included, and where appropriate, a description of the production processes.

1.1.1 The purpose(s) and objectives of the development should be explained, *as well as the need and desirability.*

1.1.2 The design and size of the development should be described. Diagrams, plans or maps will be necessary for this purpose.

1.1.3 There should be some indication of the physical presence and appearance of the completed development within the receiving environment.

1.1.4 Where appropriate, the nature of the production processes intended to be employed in the completed development should be described and the expected rate of production.

1.1.5 The nature and quantities of raw materials needed during both the construction and operational phases should be described.

1.1.6 *Identification of applicant, including name, address and contact numbers.*

1.1.7 *Details of EAP to carry out environmental impact assessment, including declaration of independence and expertise of EAP.*

1.2 Site description: On site land requirements of development and duration of each land use

1.2.1 The land area taken up by the development site should be defined and its location clearly shown on a map. *Including description of route of linear activity/coordinates of ocean based activity*

1.2.2 The uses to which this land will be put should be described and the different land use areas demarcated.

1.2.3 The estimated duration of the construction phase, operational phase and, where appropriate, decommissioning phase should be given.

1.2.4 The numbers of workers and/or visitors entering the development site during both construction and operation should be estimated. Their access to the site and likely means of transport should be given.

1.2.5 The means of transporting raw materials and products to and from the site and the approximate quantities involved should be described.

1.3 Wastes: Estimated types and quantities of wastes which might be produced and proposed disposal routes to the environment described

[Wastes include all residual process materials, effluents and emissions, waste energy, waste heat, noise etc]

1.3.1 The types and quantities of waste matter, energy and other residual materials, and the rate at which these will be produced should be estimated.

1.3.2 The ways in which it is proposed to handle and/or treat these wastes and residual should be indicated, together with the routes by which they will eventually be disposed of to the environment.

1.3.3 The methods by which the quantities of residuals and wastes were obtained should be indicated. If there is uncertainty this should be acknowledged and ranges of confidence limits given where possible.

1.4 Environment description: Area and location likely to be affected by development proposal

1.4.1 The environment expected to be affected by the development should be indicated with the aid of a suitable map of the area.

1.4.2 The affected environment should be defined broadly enough to include any potentially significant effects occurring away from the immediate construction site. These may be caused by the dispersion of pollutants, infrastructural requirements of the project, traffic, etc.

1.5 Baseline conditions: Description of effected environment as it is currently, and as it could be expected to develop if project were not to be proceed

1.5.1 The important components of the affected environments should be identified and described. The methods and investigations undertaken for this purpose should be disclosed and should be appropriate to the size and complexity of the assessment task. Uncertainty should be indicated.

1.5.2 Existing data sources should have been searched and where relevant utilized, including local authority records and studies carried out by, or on behalf of, conservation agencies and/or special interest groups.

1.5.3 Local land use plans and policies should be consulted and other data collected as necessary to assist in the determination of the "baseline" conditions, i.e. the probable future state of the environment, in the absence of the project, taking into account natural fluctuations and human activities.

2. IDENTIFICATION AND EVALUATION OF KEY IMPACTS

2.1 Definition of impacts: Potential impacts of development on the environment should be investigated and described. Impacts should be broadly defined to cover all potential effects on the environment and should be determined as the predicted deviation from the baseline state.

2.1.1 A description of the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project should be given.

2.1.2 The above types of effect should be investigated and described with particular regard to identifying effects on or affecting human beings, flora and fauna, soil, water, air, climate, landscape, material assets, cultural heritage (including architectural and archaeological heritage) and the interactions between them.

2.1.3 Consideration should not be limited to events which will occur under design operating conditions. Where appropriate, impacts which might arise from non-standard conditions or due to accidents should be described.

2.1.4 The impacts should be determined as the deviation from baseline conditions, i.e. the difference between the conditions which would obtain if the development were not to proceed and those predicted to prevail as a consequence of it.

2.2 Identification of impacts: Methods used for identification of all significant impacts

2.2.1 Impacts should be identified using a systematic methodology such as project specific checklists, matrices, panels of experts, consultations, etc. Supplementary methods (e.g. cause-effect or network analyses) may be needed to identify secondary impacts.

2.2.2 A brief description of the impact identification methods should be given as should the rational for using them.

2.3 Scoping: Key impacts should be identified, taking into account the views of interested parties, and main investigation centred on these.

2.3.1 There should be a genuine attempt to contact the general public and special interest groups to appraise them of the project and its implications, *including a description of the advertisement, notification in the relevant provincial gazette, newspaper (local, regional, national) on site advertisement, advertisement of public meeting(s) and notification of availability of the EIR.*

2.3.2 Arrangements should be made to collect the opinions and concerns of relevant public agencies, special interest groups and general public. Public meetings, seminars, discussing groups, etc. may be arranged to facilitate this. *Steps undertaken must be in accordance with plan of study*. *Included must be a list of registered I&AP's, summary of comments received, summary of issues raised, date of receipt of comments, response of EAP and copies of any representations, objections and comments received from registered I&APs.*

2.3.3 Key impacts should be identified and selected for more intense investigation. Impact areas not selected for thorough study should be identified and the reasons why they

require less detailed investigation be given. *Summary of the findings and recommendations of any specialist report should be included.*

2.4 Prediction of impact magnitude: Likely impacts should be described in exact terms where possible

2.4.1 The data used to estimate the magnitude of the main impacts should be sufficient for the task and should be clearly described or their sources clearly identified. Any gaps in the required data should be indicated and the means used to deal with them in the assessment be explained.

2.4.2 The methods used to predict impact magnitude should be described and be appropriate to the size and importance of the projected impacts.

2.4.3 Where possible should predictions of impacts be expressed in measurable quantities with ranges and/or appropriate confidence limits. Qualitative descriptions, where these are used, should be fully defined.

2.5 Assessment of impact significance: Estimation of expected significance of impacts for society. The sources of quality standards, together with the rationale, assumptions and value judgements used in assessing significance should be described.

2.5.1 The significance to the affected community and society in general should be described and clearly distinguished from impact magnitude. Where mitigation measures are proposed *an indication must be given of the degree to which the impact can be mitigated, reversed or to which the impact may cause irreplaceable loss of resources.* The significance of any impact remaining after mitigation should also be described.

2.5.2 The significance of an impact should be assessed taking into account appropriate national and international quality standards where available. Account should also be taken of the magnitude, location and duration of the impact in conjunction with national and local societal values.

2.5.3 The choice of standards, assumptions and value systems used to assess significance should be justified and any contrary opinions should be summarized. *Indication of the methodology used should be indicated.*

3. ALTERNATIVES AND MITIGATION

3.1 Alternatives: Feasible alternatives should be considered. These should be outlined, the environmental implications of each presented and the reasons for their rejection briefly discussed, particularly where the preferred project is likely to have significant adverse environmental impacts.

3.1.1 Alternative sites should be considered where these are practicable and available to the developer. The main environmental advantages and disadvantages of these should be discussed and the reasons for the final choice given.

3.1.2 Where available, alternative processes, designs and operating conditions should be considered and the environmental implications of these investigated and reported where the proposed project is likely to have significant adverse environmental impacts.

3.1.3 If unexpectedly severe adverse impacts are identified during the course of the investigation, which are difficult to mitigate, alternatives rejected in the earlier planning phases should be re-appraised.

3.1.4 A description and comparative assessment of all alternatives identified during the environmental impact assessment process.

3.2 Scope and effectiveness of mitigation measures: All significant adverse impacts should be considered for mitigation. Evidence should be presented to show that proposed mitigation measures will be effective when implemented.

3.2.1 The mitigation of all significant adverse impacts should be considered and where practicable, specific mitigation measures should be put forward. Any residual or unmitigated impacts should be indicated and justified*. Indication of extent to which impacts could be addressed by the adoption of mitigation measures*

3.2.2 Mitigation methods considered should include modification of the project, compensation and the provision of alternative facilities as well as pollution control.

3.2.3 It should be clear to what extent the mitigation methods will be effective when implemented. Where the effectiveness is uncertain or depends on assumptions about operating procedures, climatic conditions, etc. data should be introduce to justify the

acceptance of these assumptions. *A clear description of uncertainty, assumptions, and gaps in knowledge must be included.*

3.3 Commitment to mitigation: Developers should be committed to and capable of carrying out the mitigation measures and should present plans of how they proposed to do so.

3.3.1 There should be a clear record of the commitment of the developer to the mitigation measures presented in the EIR. Details of how the mitigation measure will be implemented and function over the time span for which they are necessary should be given. *The draft EMP must comply with regulations and must include specific information required by the competent authority.*

3.3.2 Monitoring arrangements should be proposed to check the environmental impacts resulting from the implementation of the project and their conformity with the predictions within the EIR. Provision should be made to adjust mitigation measures where unexpected adverse impacts occur. The scale of the monitoring arrangements should correspond to the likely scale and significance of deviations from expected impacts.

4. COMMUNICATION OF RESULTS

4.1 Layout of the report: the layout should enable the reader to find and assimilate data easily and quickly. External data sources should be acknowledged.

4.1.1 There should be an introduction briefly describing the project, the aims of the environmental assessment and how the aims are to be achieved.

4.1.2 Information should be logically arranged in sections or chapters and the whereabouts of important data be signalled in a table of contents or index.

4.1.3 Unless the chapters are very short, there should be chapter summaries outlining the main findings of each phase of the investigation.

4.1.4 Where data, conclusions or quality standards from external sources are introduced, the original source should be acknowledged at that point in the text. A full reference should be included either with the acknowledgement, at the bottom of the page or in a list of references.

4.2 Presentation: Presentation of the information should be accessible to the non-specialist

4.2.1 Information should be comprehensible to the non-specialist. Tables, graphs and other devices should be used as appropriate. Unnecessarily technical or obscure language should be avoided.

4.2.2 Technical terms, acronyms and initials should be defined, either when first introduced into the text or in a glossary. Important data should be presented and discussed in the main text.

4.2.3 The EIR should be presented as an integrated whole. Summaries of data presented in separately bound appendices should be introduced in the main body of the text.

4.3 Emphasis: Information should be represented without bias and receive the emphasis appropriate to its importance in the context of the assessment.

4.3.1 Emphasis should be given to potentially severe adverse, as well as potentially substantial favourable environmental impacts.

4.3.2 The report should be unbiased. It should not lobby for any particular point of view. Adverse impacts should not be disguised by euphemisms or platitudes.

4.3.3 *Opinion as to whether the activity should/should not be authorized.*

4.4 Non-technical summary: Clearly written non-technical summary of main findings

4.4.1 There should be a non-technical summary of the main findings and conclusion of the study. Technical terms, lists of data and detailed explanations of scientific reasoning should be avoided.

4.4.2 The summary should cover all main issues discussed, a brief description of the project and the environment, an account of the main mitigation measures to be undertaken, and any significant residual impacts. A brief explanation of the methods by which these data were obtained and an indication of the confidence which can be place in them should be included.

APPENDIX B: Adapted collation sheet

EIR:_____

Overall Assessment _____

1. ____	**2.** ____	**3.** ____	**4.** ____
1.1 ____	**2.1** ____	**3.1** ____	**4.1** ____
1.1.1 ____	2.1.1 ____	3.1.1 ____	4.1.1. ____
1.1.2 ____	2.1.2 ____	3.1.2 ____	4.1.2 ____
1.1.3 ____	2.1.3 ____	3.1.3 ____	4.1.3 ____
1.1.4 ____	2.1.4 ____	3.1.4 ____	4.1.4 ____
1.1.5 ____			
1.1.6 ____			
1.1.7 ____			
1.2 ____	**2.2** ____	**3.2** ____	**4.2** ____
1.2.1 ____	2.2.1 ____	3.2.1 ____	4.2.1 ____
1.2.2 ____	2.2.2 ____	3.2.2 ____	4.2.2 ____
1.2.3 ____		3.2.3 ____	4.2.3 ____
1.2.4 ____			
1.2.5 ____			
1.3 ____	**2.3** ____	**3.3** ____	**4.3** ____
1.3.1 ____	2.3.1 ____	3.3.1 ____	4.3.1 ____
1.3.2 ____	2.3.2 ____	3.3.2 ____	4.3.2 ____
1.3.3 ____	2.3.3 ____		4.3.3 ____
1.4 ____	**2.4** ____		**4.4** ____
1.4.1 ____	2.4.1 ____		4.4.1 ____
1.4.2 ____	2.4.2 ____		4.4.2 ____
	2.4.3 ____		
1.5 ____	**2.5** ____		
1.5.1 ____	2.5.1 ____		
1.5.2 ____	2.5.2 ____		
1.5.3 ____	2.5.3 ____		

APPENDIX C: Regulations

C1: 1997 EIA regulations: Regulation 8 (a-c) Government Notice R1182 (South Africa, 1997b)

8. After the plan of study for the environmental impact assessment has been accepted, the applicant must submit an environmental impact report to the relevant authority, which must contain-

(a) a description of each alternative, including particulars on-

(i) the extent and significance of each identified environmental impact; and

(ii) the possibility for mitigation of each identified impact;

(b) a comparative assessment of all the alternatives; and

(c) appendices containing descriptions of-

(i) the environment concerned;

(ii) the activity to be undertaken;

(iii) the public participation process followed, including a list of interested parties and their comments;

(iv) any media coverage given to the proposed activity; and

(iv) any other information included in the accepted plan of study.

C2: 2006 EIA regulations: Regulation 32 (2) (a-q)

Government Notice R385 (South Africa, 2006)

32. **(2)** an environmental impact assessment report must contain all […] the information that is necessary for the competent authority to consider the application and to reach a decision […] and must include –

(a) details of –

(i) the EAP who prepared the report; and

(ii) the expertise of the EAP to carry out an environmental impact assessment;

(b) a detailed description of the proposed activity;

(c) a description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is –

(i) a linear activity, a description of the route of the activity; or

(ii) an ocean-based activity, the coordinates where the activity is to be undertaken;

(d) a description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity;

(e) details of the public participation process conducted in terms of sub-regulation (1), including –

(i) steps undertaken in accordance with the plan of study;

(ii) a list of persons, organisations and organs of state that were registered as interested and affected parties;

(iii) a summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments; and

(iv) copies of any representations, objections and comments received from registered interested and affected parties;

(f) a description of the need and desirability of the proposed activity and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity;

(g) an indication of the methodology used in determining the significance of potential environmental impacts;

(h) a description and comparative assessment of all alternatives identified during the environmental impact assessment process;

(i) a summary of the findings and recommendations of any specialist report or report on a specialized process;

(j) a description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;

(k) an assessment of each identified potentially significant impact, including –

(i) cumulative impacts;

(ii) the nature of the impact;

(iii) the extent and duration of the impact;

(iv) the probability of the impact occurring;

(v) the degree to which the impact can be reversed;

(vi) the degree to which the impact may cause irreplaceable loss of resources;

(vii) the degree to which the impact can be mitigated;

(l) a description of any assumptions, uncertainties and gaps in knowledge;

(m) an opinion as to whether the activity should or should not be authorized, and if the opinion is that it should be authorized, any conditions that should be made in respect of that authorization;

(n) an environmental impact statement which contains –

(i) a summary of the key findings of the environmental impact assessment; and

(ii) a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives;

(o) a draft environmental management plan that complies with regulation **34**;

(p) copies of any specialist reports and reports on specialized processes complying with regulation **33**; and

(q) any specific information that may be required by the competent authority.

APPENDIX D: Raw data

D1: Raw data of EIRs under 1997 system

EIR ECA	216 Togo Sun	288 Upgrading N17 toll road	381 Power lines	364 Power lines	412 Rooisand Nature Reserve	226 Portnet iron ore handling fac	472 Knysna River Nature Reserve	740 Aries Carona Power lines	757 Upgrade of berths	105 hiking route	Mdluli Lodge	TOTAL:11
Over All Score	**C**	**C**	**B**	**B**	**C**	**C**	**C**	**C**	**C**	**C**	**D**	
1	**C**	**C**	**C**	**B**	**B**	**C**	**C**	**B**	**B**	**B**	**D**	
1.1	D	B	B	B	B	D	B	B	C	B	C	
1.1.1	E	A	A	A	B	C	C	A	A	A	B	
1.1.2	B	B	A	A	A	A	C	B	A	A	A	
1.1.3	A	B	A	A	A	B	F	A	F	A	A	
1.1.4	N	N	N	N	N	F	F	N	N	N	E	
1.1.5	F	C	C	E	C	F	F	F	D	C	D	
1.1.6	F	A	B	B	A	A	B	F	E	A	C	
1.1.7	E	B	B	B	E	B	C	F	D	B	E	
1.2	C	F	B	B	B	D	C	C	C	B	C	
1.2.1	A	B	B	A	A	C	A	A	A	A	B	
1.2.2	A	N	B	B	A	D	A	A	A	A	B	
1.2.3	E	F	A	A	F	F	F	E	B	F	F	
1.2.4	F	F	F	F	B	D	F	E	F	D	D	
1.2.5	F	F	C	C	E	C	F	F	C	C	E	
1.3	D	E	D	E	E	E	D	D	A	D	E	
1.3.1	C	E	D	E	E	D	C	C	A	C	D	
1.3.2	E	F	E	E	F	D	C	D	A	E	F	
1.3.3	D	D	F	F	F	F	F	F	A	F	F	
1.4	B	C	B	B	B	D	C	B	A	A	C	
1.4.1	B	B	A	A	A	B	B	A	A	A	B	
1.4.2	B	D	B	B	B	E	C	B	A	A	D	
1.5	C	C	B	B	B	C	B	B	A	A	C	
1.5.1	D	C	B	B	B	B	B	A	A	A	E	
1.5.2	B	B	A	A	A	A	B	A	A	A	A	
1.5.3	C	C	A	A	B	D	B	C	A	A	E	
2.	**D**	**D**	**C**	**C**	**D**	**D**	**D**	**C**	**D**	**C**	**E**	
2.1	D	D	B	B	D	D	C	B	D	C	D	
2.1.1	B	D	A	A	D	B	A	B	A	A	D	
2.1.2	B	B	A	A	D	B	A	A	B	A	C	
2.1.3	F	F	F	F	F	D	F	C	F	F	F	
2.1.4	F	F	F	F	F	F	F	C	C	F	F	
2.2	F	C	E	E	E	B	D	C	C	E	D	
2.2.1	F	D	E	E	E	B	B	C	C	F	D	
2.2.2	F	B	E	E	E	B	F	D	B	D	D	
2.3	B	C	B	B	C	B	C	C	B	B	D	
2.3.1	A	A	A	A	A	A	A	B	A	A	B	
2.3.2	B	C	A	A	B	B	B	A	B	B	C	
2.3.3	B	E	B	B	C	A	C	D	B	C	D	
2.4	F	F	F	F	F	F	E	D	F	E	F	
2.4.1	F	F	F	F	F	D	D	D	E	D	F	
2.4.2	F	F	F	F	F	F	F	B	F	D	F	
2.4.3	F	F	F	F	F	F	F	D	F	F	F	
2.5	D	B	C	C	E	C	D	C	B	C	D	
2.5.1	E	B	B	B	D	B	B	B	A	C	D	
2.5.2	C	B	C	C	E	B	B	B	A	D	F	
2.5.3	F	B	F	F	F	D	F	C	B	C	F	
3	**C**	**D**	**C**	**C**	**D**	**C**	**D**	**C**	**B**	**D**	**E**	

EIR ECA	216 Togo Sun	288 Upgrading N17 toll road	381 Power lines	364 Power lines	412 Rooisand Nature Reserve	226 Portnet iron ore handling fac	472 Knysna River Nature Reserve	740 Aries Carona Power lines	757 Upgrade of berths	105 hiking route	Mdluli Lodge	TOTAL:11
3.1	C	B	C	C	C	B	D	A	B	D	C	
3.1.1	C	A	A	C	C	A	D	A	A	B	F	
3.1.2	C	B	B	B	C	B	D	A	A	C	A	
3.1.3	N	N	N	N	N	N	N	N	N	N	N	
3.1.4	C	N	D	F	C	B	F	A	B	F	A	
3.2	C	B	B	B	D	A	C	B	A	B	D	
3.2.1	C	A	A	A	C	A	A	B	A	A	D	
3.2.2	C	A	A	A	C	A	A	B	A	A	B	
3.2.3	D	C	B	B	F	A	F	C	A	B	D	
3.3	D	F	D	D	D	E	B	D	B	F	F	
3.3.1	D	F	D	D	E	D	B	C	B	F	F	
3.3.2	D	F	D	D	D	F	B	D	B	F	F	
4.	**C**	**C**	**B**	**A**	**C**	**B**	**B**	**B**	**B**	**B**	**C**	
4.1	C	C	A	A	B	A	B	B	B	A	C	
4.1.1	C	B	A	A	B	A	B	A	A	A	D	
4.1.2	B	A	A	A	C	A	A	B	B	A	B	
4.1.3	N	N	N	N	N	N	N	N	A	A	N	
4.1.4	A	F	A	A	B	A	F	A	A	A	A	
4.2	C	C	A	A	B	A	B	B	B	A	B	
4.2.1	A	A	A	A	B	A	A	A	B	A	C	
4.2.2	F	F	A	A	B	A	B	A	A	A	A	
4.2.3	B	A	A	A	B	A	A	B	A	A	B	
4.3	B	B	A	A	C	A	B	B	B	B	C	
4.3.1	B	B	A	A	C	A	A	A	B	A	B	
4.3.2	B	A	A	A	B	A	B	B	A	A	C	
4.3.3	B	C	A	B	F	A	C	C	A	F	B	
4.4	F	B	B	B	B	F	A	A	A	A	B	
4.4.1	F	A	A	A	A	F	A	A	A	A	B	
4.4.2	F	C	B	B	B	F	A	B	A	A	B	

D2: Raw data of EIRs under 2006 system

EIR NEMA	Blue Ridge Power line	1100 Sea Cable	855 Philippi Munitions Fac	1041 Smokey Hill Power lines	890 Ibhubesi gasfield	842 Forensic Science Lab	874 Crossing Loop	968 Power line	976 Power line	900 Power line	892 Small craft Harboour	858 Pump Storage facility	610/7/9 Sewerage plant	863 ACSA landside	772 diesel tank	TOTAL:15
Over All Score	**C**	**B**	**C**	**C**	**C**	**C**	**C**	**D**	**D**	**D**	**C**	**C**	**C**	**C**	**C**	
1	**C**	**B**	**B**	**C**	**C**	**C**	**C**	**D**	**D**	**D**	**C**	**C**	**C**	**C**	**C**	
1.1	B	B	B	C	C	C	C	C	C	C	C	B	C	C	C	
1.1.1	A	A	A	D	B	A	A	B	B	B	A	A	A	A	B	
1.1.2	A	A	A	B	B	A	B	C	A	B	A	A	B	A	A	
1.1.3	B	B	A	F	F	A	B	F	A	F	A	C	F	F	C	
1.1.4	N	F	B	N	C	N	N	N	N	N	N	A	B	F	D	
1.1.5	F	C	C	C	C	C	C	D	C	E	D	B	F	F	B	
1.1.6	A	A	A	A	D	E	C	A	C	A	B	A	A	E	C	
1.1.7	D	A	A	D	B	D	C	D	C	C	B	B	B	E	C	
1.2	E	C	C	D	B	C	C	E	D	D	C	C	D	C	E	
1.2.1	A	A	A	B	B	A	B	D	B	B	A	A	B	A	A	
1.2.2	B	A	B	B	C	B	B	E	D	B	B	B	D	A	E	
1.2.3	F	F	E	E	C	F	B	D	B	E	F	D	F	F	F	
1.2.4	F	F	E	C	B	F	B	E	F	F	F	D	F	F	F	
1.2.5	F	C	F	C	A	F	F	E	C	E	F	E	E	F	F	
1.3	E	E	A	C	B	C	B	D	F	F	C	E	C	F	C	
1.3.1	E	C	A	C	B	B	A	C	F	E	D	E	D	F	C	
1.3.2	E	F	A	B	A	B	A	C	F	F	D	F	B	F	N	
1.3.3	F	F	A	F	B	C	F	E	F	F	B	D	D	F	N	
1.4	C	A	A	C	B	B	B	D	C	C	B	B	B	B	B	
1.4.1	A	A	A	B	A	A	A	C	B	B	A	A	A	A	B	
1.4.2	D	A	A	D	C	B	C	D	C	C	C	B	C	B	B	
1.5	C	A	A	C	B	B	B	C	B	C	B	B	B	B	C	
1.5.1	B	A	A	B	B	C	B	C	C	D	B	C	B	B	C	
1.5.2	B	A	A	A	A	A	A	B	A	C	A	A	A	A	C	
1.5.3	D	A	A	F	A	B	A	D	C	C	A	A	B	A	C	
2.	**C**	**C**	**C**	**D**	**D**	**D**	**D**	**E**	**D**	**E**	**D**	**D**	**D**	**C**	**C**	
2.1	D	C	C	C	C	D	C	D	E	D	D	C	D	C	D	
2.1.1	B	E	B	A	A	A	B	C	C	C	C	B	B	B	C	
2.1.2	A	B	A	B	A	C	B	B	C	B	A	D	B	B	D	
2.1.3	D	C	F	E	C	F	F	C	F	F	C	F	F	F	F	
2.1.4	D	C	F	F	C	F	F	F	F	B	F	F	F	C	C	
2.2	F	A	C	F	E	D	C	F	F	F	E	F	A	D	D	
2.2.1	F	A	B	F	D	C	B	F	F	F	D	F	A	D	B	
2.2.2	F	A	F	F	F	F	C	F	F	F	F	F	A	F	F	
2.3	B	B	C	D	B	B	C	E	C	C	C	B	D	B	A	
2.3.1	A	A	A	B	A	A	B	D	A	B	A	A	D	A	A	
2.3.2	A	A	C	D	B	A	B	D	B	D	B	A	D	B	A	
2.3.3	B	C	D	D	C	C	B	E	D	C	D	C	D	B	A	
2.4	F	F	F	F	F	D	D	F	F	F	F	F	F	F	F	
2.4.1	D	F	F	F	F	C	C	F	F	F	F	F	F	F	F	
2.4.2	F	F	F	F	F	C	C	F	F	F	F	F	F	F	F	
2.4.3	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
2.5	E	B	C	E	C	C	C	E	D	E	C	B	D	C	D	
2.5.1	E	A	B	E	C	C	C	D	C	E	B	B	D	C	B	
2.5.2	F	B	C	D	B	C	C	F	D	D	B	B	D	C	F	
2.5.3	F	B	B	F	C	B	D	F	D	E	C	B	D	E	F	
3	**C**	**B**	**C**	**D**	**C**	**C**	**D**	**E**	**D**	**D**	**C**	**B**	**D**	**C**	**D**	
3.1	B	A	A	D	B	B	C	F	D	E	B	B	F	C	C	
3.1.1	A	A	A	A	A	A	A	F	B	C	F	A	N	D	A	

EIR NEMA	Blue Ridge Power line	1100 Sea Cable	855 Philippi Munitions Fac	1041 Smokey Hill Power lines	890 Ibhubesi gasfield	842 Forensic Science Lab	874 Crossing Loop	968 Power line	976 Power line	900 Power line	892 Small craft Harboour	858 Pump Storage facility	610/7/9 Sewerage plant	863 ACSA landside	772 diesel tank	TOTAL:15
3.1.2	A	A	N	F	A	B	A	F	F	E	A	N	N	A	B	
3.1.3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	F	
3.1.4	B	A	A	C	C	B	F	F	D	F	A	A	N	C	C	
3.2	C	B	B	C	A	B	B	D	B	C	B	B	C	C	D	
3.2.1	C	B	B	B	A	B	B	C	B	B	B	A	C	B	C	
3.2.2	B	A	A	B	A	B	A	C	B	C	A	A	A	B	C	
3.2.3	C	A	B	D	A	A	B	D	A	D	B	C	F	C	F	
3.3	D	A	F	C	C	E	F	D	F	E	D	B	D	C	D	
3.3.1	C	A	F	C	B	C	F	C	F	F	E	B	B	C	C	
3.3.2	D	A	F	C	D	F	F	E	F	D	B	B	F	C	F	
4.	**B**	**B**	**B**	**C**	**B**	**C**	**B**	**C**	**C**	**C**	**C**	**B**	**C**	**C**	**C**	
4.1	B	A	B	B	B	D	A	C	B	D	C	A	B	C	E	
4.1.1	A	A	A	B	A	C	A	C	A	B	A	A	C	B	C	
4.1.2	B	A	A	A	B	B	A	B	B	C	B	A	A	A	B	
4.1.3	N	A	F	N	A	N	N	N	N	N	F	N	F	F	N	
4.1.4	A	A	A	A	A	F	A	D	A	E	B	A	A	A	F	
4.2	B	A	A	D	B	C	B	C	B	B	B	A	B	B	C	
4.2.1	A	A	A	C	B	C	B	B	A	A	B	A	B	A	A	
4.2.2	B	A	A	F	A	A	B	E	C	C	A	A	A	A	F	
4.2.3	B	A	A	C	A	B	B	B	B	C	A	A	B	C	A	
4.3	C	A	A	B	B	B	B	C	C	B	A	B	C	C	B	
4.3.1	C	A	A	B	A	C	C	B	C	C	A	B	B	B	A	
4.3.2	C	A	A	A	A	A	A	B	A	A	A	A	A	A	A	
4.3.3	A	A	A	A	F	A	A	C	F	B	A	A	F	F	F	
4.4	B	B	A	C	B	C	C	B	C	C	B	B	B	B	C	
4.4.1	B	A	A	C	B	C	B	A	C	C	B	B	B	B	A	
4.4.2	B	B	A	D	B	C	C	B	C	C	B	B	B	B	C	

D3: Summary of results: Scores of EIRs per Review area, Review Category and Review Sub-categories

The following table summarizes the complete results gathered and also indicates the number of EIRs per Review Area, Review Category and Review Sub-categories, and also indicates the number of EIRs scoring C or better, indicating that the EIRs are of a satisfactory standard.

Review area/ category/ sub-category	Summary of all review categories	A	B	C	D	E	F	N/A	% Scoring C or better	A	B	C	D	E	F	N/A	% Scoring C or better
		1997 EIRs								2006 EIRs							
Overall score		**0**	**2**	**8**	**1**	**0**	**0**		**91**	**0**	**1**	**11**	**3**	**0**	**0**		**80**
RA 1	**Description of the development, local environment and baseline conditions**	**0**	**5**	**5**	**1**	**0**	**0**		**91**	**0**	**2**	**10**	**3**	**0**	**0**		**80**
1.1	Description of the development	0	7	2	2	0	0		82	0	4	11	0	0	0		100
1.1.1	Purpose and objectives	6	2	2	0	1	0		91	9	5	0	1	0	0		93
1.1.2	Design and size	7	3	1	0	0	0		100	9	5	1	0	0	0		100
1.1.3	Presence and appearance of completed development	7	2	0	0	0	2		82	4	3	2	0	0	6		53
1.1.4	Nature of production processes	0	0	0	0	1	2	8	0	1	2	1	1	0	2	8	27
1.1.5	Nature and quantity of raw materials	0	0	4	2	1	4		36	0	2	7	2	1	3		60
1.1.6	identification of applicant	4	3	1	0	1	2		73	8	1	3	1	2	0		80
1.1.7	Details of EAP to carry out assessment	0	5	1	1	3	1		55	2	4	4	4	1	0		67
1.2	Site description	0	4	5	1	0	0		82	0	1	7	4	3	0		53
1.2.1	Area of development site	7	3	1	0	0	0		91	8	6	0	1	0	0		93
1.2.2	Demarcation of land use areas	6	3	0	1	0	0	1	82	2	8	1	2	2	0		73
1.2.3	Duration of different phases	2	1	0	0	2	6		27	0	2	1	2	3	7		20
1.2.4	Estimated number of workers and/or visitors	0	1	0	3	1	6		9	0	2	1	1	2	9		20
1.2.5	Means of transporting raw materials/product and quantities	0	0	5	0	2	4		45	1	0	3	0	4	7		27
1.3	Wastes	1	0	0	5	5	0		9	1	2	5	1	3	3		53
1.3.1	Types and quantities of wastes	1	0	4	3	3	0		45	2	2	4	2	3	2		53
1.3.2	Treatment, disposal and disposal routes	1	0	1	2	4	3		18	3	3	1	1	1	5	1	47
1.3.3	Methods of obtaining quantity of wastes	1	0	0	2	0	8		9	1	2	1	2	1	7	1	27

Review area/ category/ sub-category	Summary of all review categories	A	B	C	D	E	F	N/A	% Scoring C or better	A	B	C	D	E	F	N/A	% Scoring C or better
		1997 EIRs								2006 EIRs							
1.4	Environment description	2	5	3	1	0	0		91	2	8	4	1	0	0		93
1.4.1	Area to be affected by development	6	5	0	0	0	0		100	10	4	1	0	0	0		100
1.4.2	Effects occurring away from immediate affected environment	2	5	1	2	1	0		73	2	4	6	3	0	0		80
1.5	Baseline conditions	2	5	4	0	0	0		100	2	8	5	0	0	0		100
1.5.1	Important components of the affected environment	3	5	1	1	1	0		82	2	7	5	1	0	0		93
1.5.2	Existing data sources	8	3	0	0	0	0		100	11	2	2	0	0	0		100
1.5.3	Local land use plans, policies consulted / other data collected	4	2	3	1	1	0		82	7	2	3	2	0	1		80
RA 2	**Identification and evaluation of key impacts**	**0**	**0**	**4**	**6**	**1**	**0**		**36**	**0**	**0**	**5**	**8**	**2**	**0**		**33**
2.1	Definition of impacts	0	3	2	6	0	0		45	0	0	7	7	1	0		47
2.1.1	All possible effects on environment	5	3	0	3	0	0		73	3	6	5	0	1	0		93
2.1.2	Interaction of effects	5	4	1	1	0	0		91	4	7	2	2	0	0		87
2.1.3	Impacts from non-standard operating conditions	0	0	1	1	0	9		9	0	0	4	1	1	9		27
2.1.4	Impacts from deviation from baseline conditions	0	0	2	0	0	9		18	0	1	4	1	0	9		33
2.2	Identification of impacts	0	1	3	2	4	1		36	2	0	2	3	2	6		27
2.2.1	Impact identification methodology	0	2	2	2	3	2		36	2	3	1	3	0	6		40
2.2.2	Impacts identification method used	0	3	0	3	3	2		27	2	0	1	0	0	12		20
2.3	Scoping	0	6	4	1	0	0		91	1	6	5	2	1	0		80
2.3.1	Contact general public and special interest groups	9	2	0	0	0	0		100	10	3	0	2	0	0		87
2.3.2	Collect opinions and concerns of I&APs	3	6	2	0	0	0		100	5	5	1	4	0	0		73
2.3.3	Key impacts	1	4	3	2	1	0		73	1	3	5	5	1	0		60
2.4	Prediction of impact magnitude	0	0	0	1	2	8		0	0	0	0	2	0	13		0
2.4.1	Data to estimate magnitude of main impacts	0	0	0	4	1	6		0	0	0	2	1	0	12		13
2.4.2	Methods used to predict impact magnitude	0	1	0	1	0	9		9	0	0	2	0	0	13		13
2.4.3	Predictions of impact in measureable quantities	0	0	0	1	0	10		0	0	0	0	0	0	15		0
2.5	Assessment of impact significance	0	2	5	3	1	0		64	0	2	6	3	4	0		53

Review area/ category/ sub-category	Summary of all review categories	A	B	C	D	E	F	N/A	% Scoring C or better	A	B	C	D	E	F	N/A	% Scoring C or better
		1997 RIRs								2006 EIRs							
2.5.1	Significance of impacts on affected community and society in general	1	6	1	2	1	0		73	1	4	5	2	3	0		67
2.5.2	Significance of impacts in terms of national and international quality standards	1	4	3	1	1	1		64	0	4	4	4	0	3		53
2.5.3	Justification of proposed method of assessing significance	0	2	2	1	0	6		36	0	4	2	3	2	4		40
RA 3	**Alternatives and mitigation**	0	1	5	4	1	0		55	0	2	6	6	1	0		53
3.1	Alternatives	1	3	5	2	0	0		82	2	5	3	2	1	2		67
3.1.1	Description of alternative sites	5	1	3	1	0	1		82	9	1	1	1	0	2	1	73
3.1.2	Description of alternative processes, designs and operating conditions	3	4	3	1	0	0		91	6	2	0	0	1	3	3	53
3.1.3	For severe adverse impacts rejected alternative identified	0	0	0	0	0	0	11	0	0	0	0	0	0	4	11	0
3.1.4	Comparative assessment of all alternatives identified	2	2	2	1	0	3	1	55	4	2	4	1	0	3	1	67
3.2	Scope and effectiveness of mitigation measures	2	5	2	2	0	0		82	1	7	5	2	0	0		87
3.2.1	Consider mitigation of all significant adverse impacts	7	1	2	1	0	0		91	2	9	4	0	0	0		100
3.2.2	Mitigation measures	7	2	2	0	0	0		100	7	5	3	0	0	0		100
3.2.3	Extent of effectiveness of mitigation when implemented	2	3	2	2	0	2		64	4	3	3	3	0	2		67
3.3	Commitment to mitigation	0	2	0	5	1	3		18	1	1	3	5	2	3		33
3.3.1	Record of commitment to mitigation measures	0	2	1	4	1	3		27	1	3	6	0	1	4		67
3.3.2	Monitoring arrangements	0	2	0	5	0	4		18	1	2	2	3	1	6		33
RA 4	**Communication of results**	1	6	4	0	0	0		100	0	6	9	0	0	0		100
4.1	Layout of the report	4	4	3	0	0	0		100	3	6	3	2	1	0		80
4.1.1	Introduction	6	3	1	1	0	0		91	8	3	4	0	0	0		100
4.1.2	Information logically arranged	6	4	1	0	0	0		100	7	7	1	0	0	0		100
4.1.3	Chapter summaries for very short chapters	2	0	0	0	0	0	9	18	2	0	0	0	0	4	9	13
4.2	Presentation	4	5	2	0	0	0		100	3	8	3	1	0	0		93
4.2.1	Presentation of information	8	2	1	0	0	0		100	8	5	2	0	0	0		100
4.2.2	Technical terms, acronyms, initials defined	7	2	0	0	0	2		82	8	2	2	0	1	2		80

Review area/ category/ sub-category	Summary of all review categories	A	B	C	D	E	F	N/A	% Scoring C or better	A	B	C	D	E	F	N/A	% Scoring C or better
		1997 EIRs								2006 EIRs							
4.2.3	Statement presented as an integrated whole	7	4	0	0	0	0		100	6	6	3	0	0	0		100
4.3	Emphasis	3	6	2	0	0	0		100	3	7	5	0	0	0		100
4.3.1	Emphasis to potentially severe impacts	6	4	1	0	0	0		100	5	5	5	0	0	0		100
4.3.2	Statement must be unbiased	6	4	1	0	0	0		100	13	1	1	0	0	0		100
4.3.3	Opinion as to whether activity should/should not be authorized	3	3	3	0	0	2		82	8	1	1	0	0	5		67
4.4	Non-technical summary	4	5	0	0	0	2		82	1	8	6	0	0	0		100
4.4.1	Non-technical summary of main findings and conclusions	8	1	0	0	0	2		82	4	7	4	0	0	0		100
4.4.2	Summary must cover all main issues	3	5	1	0	0	2		82	1	8	5	1	0	0		93