

# Understanding independent Environmental Control Officers: learning from major South African construction projects

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- To Mikah, Daddy's princess and the source of my passion. I sacrifice myself willingly for your future;
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## ABSTRACT

An independent industry of Environmental Control Officers (ECOs) is active on various construction sites across South Africa. It forms part of a global network of verifiers, such as Environmental Impact Assessment (EIA) and EIA follow-up verifiers. This network authenticates statements about and the implementation of sustainability commitments made during the planning phase of major construction projects. International studies show that the construction industry is experiencing many challenges to deliver sustainability commitments, including inadequate collaboration between role players, ill-defined roles and responsibilities, and insufficient use of environmental governance approaches. On-site verifiers like ECOs may aid in restraining these challenges by bridging ineffective governance approaches, such as classic EIA with new governance approaches, for instance self-responsibility (e.g. Environmental Management Systems (EMSs)) and involvement of third parties. Moreover, an “independent from all” verification function may be vital in developing countries such as South Africa, where trust between the government, market and public is particularly fragile due to historical injustices. Interestingly, limited learning has been drawn and shared from this function’s real-world experience. There are also differing views on the role, independence and value of ECOs, due to roles, frequent interaction with persons responsible for delivering sustainability commitments, and collaboration with third parties being ill-defined. The overarching purpose of this study is *to advance understanding of independent ECOs in major South African construction projects*. Three lines of inquiry are followed. The first is to define what the role is, or ideally should be, of an ECO in the South African compliance monitoring and enforcement effort. The second is to identify what factors might influence the independence of verifiers. The third is to appraise how and to what extent independent EIA follow-up verifiers add value in major construction projects in the developing country context of South Africa.

This study’s research assumptions are based on the real world of ECOs and uses a mixed method research approach to draw knowledge from the industry. The strategies of inquiry include a survey, interviews, and multiple case study evaluations. The methods for data collection include literature review, a self-administered survey questionnaire, semi-structured interviews, video material, observations of practice at case studies, and the collection of project documentation. The methods used for data

analysis are the categorisation and measuring of opinions and statements of survey participants, the analysis of video material and project documentation, and the nominal categorisation and ordinal scaling of case study results. Three journal articles capture the essence of the research results and form part of the thesis report, as prescribed by the North-West University's rules for doctoral theses in article format. All three articles were peer-reviewed and published in journals aimed at international audiences. Article 1 of the thesis highlights that an industry of ECOs fulfils numerous roles at various construction sites across South Africa. The results identify the importance of ECOs functioning independently of all role-players, but warn that obsessing about independence may compromise the ability of ECOs to fulfil their roles. The results also show that industry is in need of competence and the regulation thereof, as well as support from all role players. By drawing from the research results, the thesis defines an ECO.

Article 2 of the thesis reiterates that independence is central to internationally acclaimed verification fields and important to ensure the credibility of EIA. The study identifies 18 factors that might influence the independence of EIA follow-up verifiers and divides the factors into five categories: financial, commercial, professional, personal, and other. By identifying and sharing these factors, this thesis aids in anticipating and avoiding potential conflict of interest between environmental role players. Article 3 strengthens the continuum between environmental governance approaches by conceptualising a framework for appraising the value of independent EIA follow-up verifiers. The framework provides for inter-linking principles and objectives of sustainability to the performance areas of EIA, EIA follow-up and the EMS. The appraisal results indicate that independent verifiers add most value when they are involved in screening, checking compliance, influencing decisions, community engagement, and integrating environmental governance approaches. The study confirms the benefits of adaptable, proactive, experienced, and independent EIA follow-up verifiers, such as ECOs, on major South African construction projects.

**Key words:** Independent Environmental Control Officer, verification, Environmental Impact Assessment, EIA follow-up, environmental governance, major construction projects

by Jan-Albert Wessels

## OPSOMMING

’n Onafhanklike industrie van Omgewingskontroleerbeampes (OKB’s) is huidig werksaam op verskeie konstruksiereine regoor Suid-Afrika. Dit vorm deel van ’n wêreldwye netwerk van onafhanklike kontroleerders soos Omgewingsimpak-assessering (OIA) en OIA-opvolgkontroleerders wat stellings oor en die implementering van volhoubaarheidsverpligtinge waarmerk wat opgestel was tydens die beplanningsfase van groot konstruksieprojekte. Internasionale studies wys egter dat die konstruksie-industrie verskeie uitdagings ondervind in die lewering van volhoubaarheidsverpligtinge, insluitend onvoldoende samewerking tussen rolspelers, swak gedefinieerde rolle en verantwoordelikhede, en ontoereikende gebruik van omgewingsbestuursbenaderings. Terrein-gebaseerde kontroleerders soos OKB’s kan bydra tot die beheer van die uitdagings deur die oorbrugging teweeg te bring tussen ondoeltreffende bestuursbenaderings soos klassieke OIA, met nuwe bestuursbenaderings, soos self-verantwoordingsbenaderings (bv. Omgewingsbestuurstelsels (OBS)) en insluiting van derde partye. Daarenbove, ’n “onafhanklik-van-almal” kontrolerende funksie, kan essensieel wees in ontwikkelende lande soos Suid-Afrika, waar vertroue tussen die staat, markte en die publiek besonder broos is as gevolg van geskiedkundige ongeregthede. Belangwekkend is dat daar beperkte kundigheid ontgin en onthul is vanuit die OBB-funksie se ondervinding in die reële wêreld. Daar is ook verskillende beskouinge oor die rol, onafhanklikheid en waarde van OBB’s as gevolg van swak-gedefinieerde verwagtinge oor rolle, herhaalde interaksie met persone verantwoordelik vir die lewering van volhoubaarheidsverpligtinge, en samewerking met derde-partye. Die oorkoepelende doel van die studie is *om die begrip van onafhanklike OBB’s in groot konstruksieprojekte in Suid-Afrika te bevorder*. Drie rigtings van ondersoek word gevolg. Die eerste is om die rol, of wat die rol behoort te wees, van ’n OBB in die Suid-Afrikaanse wetlike nakomingsmonitering en handhawing te definieer. Die tweede is om die faktore te bepaal wat die onafhanklikheid van kontroleerders kan beïnvloed. Die derde is om te beoordeel hoe en tot watter mate OIA-opvolgkontroleerders waarde toevoeg in groot konstruksieprojekte in die ontwikkelende-land-konteks van Suid-Afrika.

Die studie se navorsingsaannames is gebaseer op die reële wêreld van OKB’s en maak gebruik van ’n gemengde navorsingsmetode-benadering om kennis vanuit die industrie

te ontgin. Die ondersoek-strategieë behels 'n opname, onderhoude, en veelvuldige gevallestudie-evaluerings. Die metodes vir dataherwinning sluit in 'n literatuurstudie, 'n self-gedadministreerde opname-vraelys, semi-gestruktureerde onderhoude, filmmateriaal, waarnemings oor praktyk in gevallestudies, asook die versameling van projekdokumentasie. Die metodes van dataverwerking behels die kategorisering en meting van opinies en stellings van opnamedeelnemers, die verwerking van filmmateriaal en projekdokumentasie, asook die nominale en ordinale skalering van gevallestudie-resultate. Drie joernaalartikels vervat die wese van die navorsingsresultate en vorm deel van die oorhoofse proefskrif-verslag, soos voorgeskryf deur die Noordwes-Universiteit se reëls vir doktorsale proefskrifte in artikelformaat. Al drie artikels was eweknie-geëvalueer en gepubliseer in joernale gerig op internasionale gehore.

Artikel 1 van die proefskrif bring na vore dat 'n industrie van OKB's talle rolle vervul by verskeie konstruksieterreine regoor Suid-Afrika. Die resultate identifiseer die belangrikheid van OKB's wat onafhanklik van alle rolspelers funksioneer, maar waarsku dat behepthed met onafhanklikheid die vermoë van OKB's om hul take te verrig in gevaar kan stel. Die resultate dui ook aan dat die industrie bekwaamheid, asook die regulering daarvan, sowel as ondersteuning van alle rolspelers, benodig. Met inagneming van die navorsingsresultate definieer die proefskrif 'n OKB. Artikel 2 van die proefskrif bevestig dat onafhanklikheid die kern is van internasionaal-gerekende verifikasievelde en belangrik is vir die versekering van die kredietwaardigheid van OIA. Die studie identifiseer 18 faktore wat die onafhanklikheid van OIA-opvolgkontroleerders kan beïnvloed en verdeel die faktore in vyf kategorieë: finansieel, kommersieel, professioneel, persoonlik en ander. Deur die identifisering en bekendmaking van die faktore, dra die proefskrif by tot die voorsiening en voorkoming van moontlike belangekonflikte tussen rolspelers in omgewingsbestuur. Artikel 3 versterk die kontinuum tussen omgewingsbestuur-benaderings deur 'n begripsvoorstellingsraamwerk te ontwerp vir die waardebeplanning van onafhanklike OIA-opvolgkontroleerders. Die raamwerk maak voorsiening vir die ineenskakeling van volhoubaarheidsbeginsels en -doelwitte met prestasie-areas van OIA, OIA-opvolg en OBS. Die waardebeplanningresultate dui aan dat onafhanklike kontroleerders die meeste waarde toevoeg wanneer hulle betrokke is in sifting, kontrolering van nakoming van wetlike verpligtinge, beïnvloeding van besluite, gemeenskapsbetrokkenheid, en die

integrering van omgewings-bestuursbenaderings. Die studie bevestig die voordele van aanpasbare, proaktiewe, ervare en onafhanklike OIA-opvolgkontroleerders, soos OKB's, op Suid-Afrikaanse konstruksieprojekte.

**Kernwoorde:** Onafhanklike Omgewingsbeheerbeamptes, kontrolering, Omgewingsimpak-assessering, OIA-opvolg, omgewingsbestuursbenaderings, groot konstruksieprojekte

deur Jan-Albert Wessels

## PREFACE

- This thesis is presented in an article format, in accordance with the General Rules A.7.5.7; A.7.5.7.4; and A.8.2, as prescribed by the North-West University (NWU) (NWU, 2010: 6 & 30; NWU, 2013: 1-2). According to these rules, there is no prescribed number of articles for this model; but as required, only articles that flowed forth directly from the doctoral degree at NWU were used for this thesis (NWU, 2012: 2).
- The thesis consists of the following sections and chapters as required by General Rule A.7.5.7.4 (NWU, 2010: 30) (refer to Annexure P):
  - Title page
  - Acknowledgement
  - Table of contents
  - Abstract
  - Preface
  - Chapter 1: Introduction: problem statement, research aim, objectives and structure
  - Chapter 2: Research design and methodology
  - Chapter 3: Literature review
  - Chapter 4: Article 1
  - Chapter 5: Article 2
  - Chapter 6: Article 3
  - Chapter 7: Summary, conclusions and recommendations
  - Bibliography
  - Annexures (A – P)
- The three articles comprising the thesis (presented as Chapters 4, 5 and 6) were drafted, reviewed, submitted for publication in the following manner:
  - *Article 1: Defining the Role of the Independent Environmental Control Officer (ECO) in Compliance Monitoring and Enforcement.* The content of this article was initially prepared for and presented at the Annual Meeting of the International Association for Impact Assessment – South African affiliate (IAIASa) on 29 August 2011 in Wild Coast Sun, South Africa (Wessels, 2011). The paper

was updated and thereafter submitted for consideration for publication to the South African Journal of Environmental Law and Policy (SAJELP) and was subsequently published in Volume 18 Number 1 of 2011 (Wessels and Morrison-Saunders, 2011). The student drafted the survey questionnaire, collected and analysed the results, and drafted the article under the guidance of the co-promoter. The co-promoter guided in the design of the survey questionnaire and reviewed the article and was, therefore, included as the co-author of the article.

- *Article 2: Factors that influence the independence of EIA follow-up verifiers – a developing country perspective.* This article was initially prepared for and presented at the Annual Meeting of the International Association of Impact Assessment (IAIA) on 30 May 2012 in Porto, Portugal (Wessels, Retief, and Morrison-Saunders, 2012). The conference paper was re-worked and submitted for consideration for publication to the journal Impact Assessment and Project Appraisal (IAPA) in 2012 and published in Volume 31 Number 3 of 2013 (Wessels, 2013a). The article was then presented for the South African environmental practitioner audience at the Annual Meeting of the IAIAAsa on 16 September 2013 in Thaba 'Nchu, South Arica (Wessels, 2013b). The student did the literature review, case study preparation, fieldwork, the first drafts for the conference paper in Porto, Portugal and wrote the Article. Both promoters made recommendations during the abstract submission for the conference in Portugal and contributed to the article in the form of recommendations and quality review for submission purposes.
- *Article 3: Appraising the Value of Independent EIA follow-up verifiers: Learning from major South African construction projects.* This article was initially prepared as a conference paper for presentation at the Annual Meeting of the IAIAAsa on 28 August 2012 in Somerset West, South Arica (Wessels, 2012). The presentation was re-worked and an updated version was presented at the Society of South African Geographers' 10th Conference held at The University of Fort Hare, East London Campus, South Africa on 27 June 2014 (Wessels, 2014). The conference presentations were re-worked by the student, reviewed by both promoters, and submitted for consideration for publication to the journal Environmental Impact Assessment Review (EIR) and published in Volume 50 of 2014 (Wessels, Retief, and Morrison-Saunders, 2014).

- The student is the primary author of the ideas and concepts of this study and was supported by the promoter and co-promoter who provided strategic guidance on identification of international literature, review of articles and recommendations on research methodology and related methods. Both the promoter and the co-promoter also attributed in a guiding and supervising capacity in the drafting and publication of the articles in this thesis as indicated in the NWU's General Rules A.7.3 and A.8.3 (NWU, 2010: 16).
- Professors F.P. Retief and A. Morrison-Saunders, the co-authors of Articles 1 and 2, have provided consent (refer to Annexure M) for the submission of these articles for examination purposed regarding a PhD degree, in accordance with the NWU guidelines for submitting a thesis in article format (NWU, 2010: 30).
- Permission from the technical editors of the journals concerned was obtained as required by the NWU guidelines for submitting a dissertation/thesis in article format (NWU, 2010: 30) (refer to Annexure N).
- To present this thesis as a scientific unit, the format and style in accordance with Rule A.7.5.7.4 of the NWU (NWU, 2010: 30) was followed. The page numbering is therefore consecutive, starting from the introduction and proceeding to the glossary. For submission purposes however, the pages of each of article were individually numbered and the styles according to the journal layout were followed. A copy of the guidelines for authors for each concerned journal are made available as required by the NWU Manual for Postgraduate Studies (NWU, 2010: 30) (refer to Annexure O).
- The guidelines of Harvard as set out in the NWU's Referencing Guide (NWU, 2012), the NWU's Templates to be used for Dissertation/Mini-Dissertation/Thesis (NWU, 2013) and the NWU's Manual for the Postgraduate MS Word Template (NWU, 2014), were adhered to for referencing and editorial style of Chapters 1, 2, 3, 7 and complete Bibliography. However, the three articles' (Chapters 3, 4 and 5) and accompanying reference lists were compiled according to the guidelines of the journal to which the articles were submitted (see Annexure O).

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## LIST OF ACRONYMS

BHPB	BHP Billiton Diamonds Inc.
BREEAM	Building Research Establishment Environmental Assessment Methodology
CBEAPSA	Certificate Board for Environmental Assessment Practitioners for South Africa
CCMA	Commission for Conciliation, Mediation and Arbitration
CEEA	Canadian Environmental assessment Agency
CEEQUAL	Civil Engineering Environmental Quality Assessment Award Scheme
CEM	Centre for Environmental Management, North-West University
CEMP	Construction Environmental Management Plan
CIB	International Council for Building
DEA	Department of Environmental Affairs, South Africa
DEA&DP	Western Cape Department of Environmental Affairs and Development Planning, South Africa
DEAT	Department of Environmental Affairs and Tourism, South Africa
DMR	Department Mineral Resources, South Africa
DWA	Department of Water Affairs, South Africa
DWAF	Department of Water Affairs and Forestry, South Africa
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPSA	Environmental Assessment Practitioners Association of South Africa

ECA	Economic Commission for Africa
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIAM	Environmental Impact Assessment and Management
EIAMS	Environmental Impact Assessment and Management Strategy
EIP	Environmental Implementation Plan
EIR	Journal Environmental Impact Assessment Review
EIS(R)	Environmental Impact Statement (or Report)
EM	Environmental Manager
EMC	Environmental Monitoring Committee
EMI	Environmental Management Inspectorate
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EMS	Environmental Management System
ENPO	Environmental Project Office, Hong Kong
EO	Environmental Officer
EPD	Environmental Protection Department, Canada
ET	Environmental Team, Hong Kong
GA	General Authorisation (in terms of the National Water Act 36 of 1998)
GNR	Government Notice Regulation
HSE	Health, Safety and Environment

HSEQ	Health, Safety, Environment and Quality
IA	Impact Assessment
IACC	Ingula Advisory Committee, Conservation
IAIA	International Association of Impact Assessment
IAIAsa	International Association of Impact Assessment, South African affiliate
IAPA	Journal Impact Assessment and Project Appraisal
IEM	Integrated Environmental Management
IEC	Independent Environmental Checker
IECO	Independent Environmental Control Officer
IEMA	Independent Environmental Monitoring Agency, Canada
ISO	International Organization for Standardization
I&AP	Interested and Affected Party
KPA	Key Performance Area
KPI	Key Performance Indicator
KZN	KwaZulu-Natal
LEED	Leadership in Energy and Environmental Design
MC	Monitoring Committee
MS	Microsoft
NCC	Nature Conservation Corporation
NEMA	National Environmental Management Act, Act 107 of 1998
NEM:AQA	National Environmental Management: Air Quality Act 39 of 2004

NEM:WA	National Environmental Management: Waste Act, Act 59 of 2008
NGO	Non-governmental Organisation
NWA	National Water Act, Act 36 of 1998
NWU	North-West University (Potchefstroom Campus)
OED	Oxford English Dictionary
PADC	Project Appraisal for Development Control, United Kingdom
PDCA	Planning, Doing, Checking and Acting
PhD	Doctor of Philosophy
PSS	Pumped Storage Scheme
RE	Resident Engineer
RoD	Record of Decision
PwC	PricewaterhouseCoopers
SA	South Africa
SANS	South African National Standards
SAJELP	South African Journal of Environmental Law and Policy
SECO	Site Environmental Control Officer
SEMA	Specific Environmental Management Act
SHE	Safety, Health and Environment
TNA	Training Needs Analysis
TR	Trunk Road
UK	United Kingdom

UN	United Nations
UNCED	United Nations Department of Economic and Social Affairs – Division for Sustainable Development
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNEP-IETC	United Nations Environmental Programme: International Environmental Technology Centre
WCPA	Western Cape Provincial Department, South Africa
WMCO	Waste Management Control Officer
WUL	Water Use License
WULA	Water Use Licence Application

# CHAPTER 1: INTRODUCTION

## 1.1 Background and research problem

Independent verifiers in various professions across the world are constantly authenticating the truth of legal, financial, social and environmental statements. These verifiers include judiciaries, arbitrators, financial auditors and auditors of internationally recognised systems such as ISO 14001 as an Environmental Management System (EMS). There are also independent Environmental Impact Assessment (EIA) follow-up verifiers, such as Environmental Supervisors (World Bank, 2014); Environmental Checkers (Au & Hui, 2004); Environmental and Ecological Clerks of Works (AEECoW, 2015), and Environmental Control Officers (ECOs) (Singapore National Environment Agency, 2001), that specialise specifically on the construction phase of major construction projects. This is vital, as the International Council for Building (CIB) and the United Nations Environmental Programme (UNEP) recognises that the construction industry is central to how humans shape their future (International Council for Building (CIB), 1999: 17-25; Du Plessis, 2002). South Africa with its established yet challenged EIA system, focuses on major construction development, and an ECO industry provides an ideal opportunity to explore the independent EIA follow-up verifier concept.

EIA follow-up is viewed as a crucial weakness in EIA systems worldwide (Dipper *et al.*, 1998: 734-747; Hill, 2000: 50; Sadler, 1996; Wood, 2003: 7 & 255). There are many interrelated factors contributing to this weakness, but the lack of effective environmental governance may be highlighted as a critical contributor in developing countries (Craigie *et al.*, 2009: 101; DEA, 2011: 7-12; Wood, 2003: 105). Moreover, the classic EIA (and related activities of follow-up) approach on its own, is argued by Arts & Faith-Ell (2012: 3240) to be ineffective in delivering sustainable outcomes on construction sites. To strengthen environmental governance, South Africa has been deploying various strategies, including on-site ECOs, for a number of years. The ECOs have varying EIA follow-up roles and responsibilities such as monitoring and auditing legal compliance (Barker, 1996; Hill, 2000: 51; Wood, 2003: 255, Mostert, 2014: 2-4). The independent verification phenomenon is also noted in countries such as Canada (Ross, 2009), Hong Kong (Au & Hui, 2004), China (Wang, 2013), Latin America (Acerbi *et al.*, 2014), the UK (AEECoW, 2015) and Singapore (Singapore National Environment Agency, 2002).

However, a notable challenge experienced by verifiers worldwide is the relationship of independent verifiers, not directly involved in implementing a project, with those persons who are (Everett *et al.*, 2005: 416; Hill, 2000; Hong Lin & Shore, 2003; Ross, 2004). Independence is therefore, viewed as a cornerstone of the ethical foundations of various verification fields (Everett *et al.*, 2005: 416; Hong Lin & Shore, 2003: 935; ISO, 2006: 2) and of particular concern in countries where roles and responsibilities of environmental management are ill-defined. In South Africa, Hill (2000: 52) notes that the “Responsibility for EIA implementation was commonly assigned to an environmental control officer, who reported to, and was assisted by, an environmental management team specifically constituted for the duration of the construction process”. The role of the South African ECO, however shifted notably from implementation to independent verification in recent years, due to debates centred on the independence of environmental practitioners and specialists in EIA and EIA follow-up (DEA, 2011: 1-44; DEA, 2014: 151-72; IAIAsa KZN, 2012: 1-4; Mostert, 2014: 2). In Canada, Ross (2004: 178) mentions an independent watchdog body that carried out the monitoring of EIA follow-up conditions and mentions the challenge experienced of “sacrificing the ability to work more closely with the proponent and government agencies” by being independent.

In consideration of the above, there appears to be a correlation between the role that EIA follow-up verifiers should play, the expected value that they add to environmental management and governance approaches such as EIA, EMS and EIA follow-up; and the ethical independence considerations of being a verification function. Of particular interest to me is that, although independent EIA follow-up verifiers such as ECOs are active across the world, little learning about governance strategies for delivering sustainability commitments has been drawn and shared from this function’s real world experience. There is thus a need to understand independent EIA follow-up verifiers, such as South African ECOs, in major construction projects.

## **1.2 Research aim**

In the light of the aforementioned problem statement, the research aim of this PhD is:

*To advance understanding of independent Environmental Control Officers in major South African construction projects.*

### **1.3 Objectives of the research**

My experience as an ECO in a major construction project from 2005 to 2009 incited an expectation that ECOs may be a unique value adding environmental compliance monitoring and enforcement mechanism in South Africa. Personal discussions with various other South African ECOs and environmental assessment practitioners indicated, however, a lack of uniform understanding of what exactly their role is or should be. As a result, this PhD thesis was initiated in 2011 and I eagerly set out to define the role of ECOs in the South African compliance monitoring and enforcement through investigating practitioner's perspectives.

The results from the survey study (see Chapter 4: Article 1) supported my expectations but also indicated that the independence issue influenced what an ECO might do on a construction site. This discovery encouraged the investigation of the independence of ECOs in more detail, especially the factors that might influence their independence (refer to Chapter 5: Article 2). However, the results left me with the sense of gaining an understanding of perceptions and theory related to the role and independence of EIA follow-up verifiers, but not with the confidence of truly understanding their essential value in the real world. As a result, I focused my attention to compiling evaluation criteria, and consequently set out cautiously to evaluate how and to what extent independent EIA follow-up verifiers, such as ECOs add value to major construction projects.

In essence, it is argued that, by defining the role of ECOs, identifying the factors that influence verifier independence and appraising their value, will contribute to understanding the worth of ECOs in major South African construction projects. The specific objectives and related chapters (presented as articles) of the study are therefore:

- 1 to define what the role is, or ideally should be, of an ECO in the South African compliance monitoring and enforcement effort during the construction phase of a project (Chapter 4: Article 1);
- 2 to identify what factors might influence the independence of verifiers (Chapter 5: Article 2); and

3 to appraise how and to what extent independent EIA follow-up verifiers add value in major construction projects in the developing country context of South Africa (Chapter 6: Article 3).

As seen from the objectives above the scope of the study is restricted to South Africa as a developing country. In this context, this research might help guide future enhancements and directions for the ECO profession in South Africa. I also hope that the learning gained from the South African industry may be of value to academics and practitioners involved with in EIA and EIA follow-up in other countries.

#### 1.4 Structure of the thesis

In consideration of the objectives and drawing from Arts (1998: 12), Leedy & Ormrod (2010: 298) and North-West University (NWU, 2012: 2), I compiled the thesis structure as depicted in Figure 1-1 below.

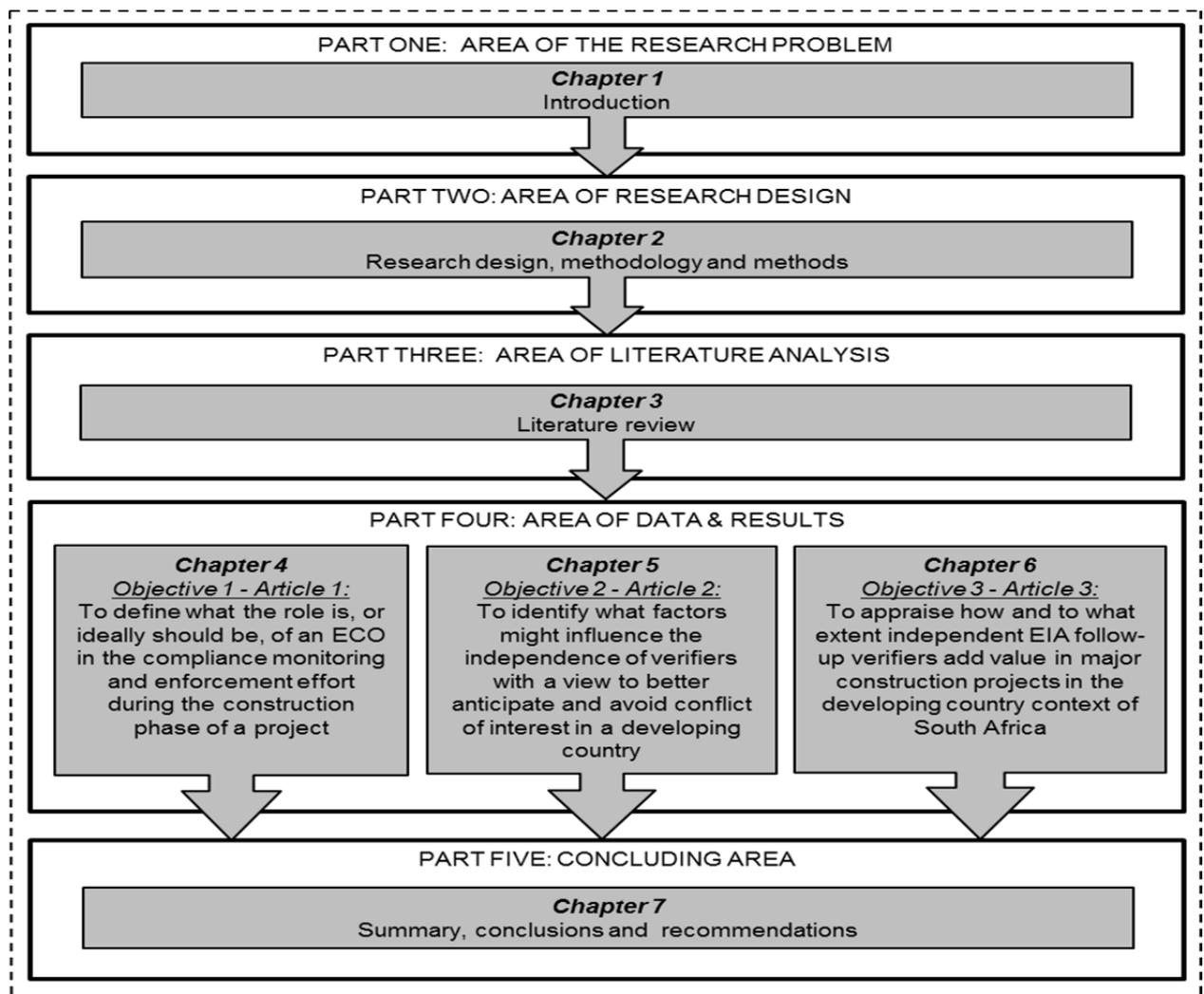


Figure 1-1: Structure of the thesis

The thesis consists of five parts: an introductory part (this Chapter as part *One*) that establishes the research problem, background and rationale of the research. Part *Two* of the thesis (Chapter 2) discusses the overall research design of, and methodology and methods used in the study. Part *Three* (Chapter 3) provides a focused literature review and builds on the topics related to the study objectives of Articles 1, 2 and 3. The three areas of the review are:

- 1 the role of ECOs as independent EIA follow-up verifiers in compliance monitoring and enforcement of major construction projects;
- 2 independent verification and the factors that might influence the independence of EIA follow-up verifiers; and
- 3 sources reviewed for establishing appraisal criteria to determine how and to what extent EIA follow-up verifiers add value in major construction projects.

Part *Four* comprises of Chapters 4, 5 and 6 that covers each objective of the study and is presented as Articles 1, 2 and 3, respectively. Chapter 4 provides a theoretical overview of the EIA process, compliance monitoring and enforcement challenges facing the South African EIA system, the principle of a credible EIA process and the role of the ECO in the latter. The overview is followed by an analysis of environmental practitioners' perceptions of the role and independence of the ECO function, before defining the role of the independent Environmental Control Officer. Chapter 5 provides an overview of the importance of independence in recognised verification fields, the EIA follow-up frameworks that may influence independence requirements, some international examples of independent EIA follow-up verification, and factors that might influence the independence of verifiers from a developing country. Chapter 6 investigates theoretical perspectives on concepts such as sustainability in construction, EIA, EMS and EIA follow-up, and presents a framework for appraising the role and value of independent verifiers in performance areas. These areas include planning, doing, checking, acting (PDCA), public participating and integration on major construction projects. The chapter finally provides appraisal results of independent verifiers on four South African case studies.

The final part, part *Five* (Chapter 7), provides an integral summary of the thesis, and summative concluding remarks on results achieved in each of the three objectives and the overall research aim. The chapter also links the findings in the objectives to

previous knowledge, as discussed in the literature review (Chapter 3), and reflects on the methodological learning from conducting the study. The chapter further discusses the potential implications on practice, policy and the industry, and suggest for future research topics. The thesis concludes with a summative understanding of the value of independent ECOs in major South African construction projects.

## **CHAPTER 2: RESEARCH DESIGN, METHODOLOGY AND METHODS**

### **2.1 Research design**

A research design is viewed as “the logical sequence that connects empirical data (collection and analysis) to a study’s initial research objectives and, ultimately to its conclusions” (David & Sutton, 2011: 631). This “blueprint of research”, as described by Yin (2003: 20-21), is highly desirable in a complex and relatively poorly controlled real world research study such as this thesis. The choice for this PhD design framework is based on three elements of inquiry, suggested by Creswell (2003: 3):

- 1 philosophical assumptions about what constitutes knowledge claims (epistemology);
- 2 general research approaches called methodologies; and
- 3 detailed procedures of data collection, analyses and writing called methods.

As advised by David & Sutton (2011: 75), a brief description of my philosophical assumption located in sociological theory is provided, followed by a discussion on the research methodology and methods. A summarised schematic presentation of the philosophical assumption, methodology and methods is provided (Figure 2-1), before concluding on the limitations, trustworthiness and relevant ethical considerations of the research.

### **2.2 Philosophical assumptions**

Interestingly, Mckenzie (2005) penned, “It is not about influences, Schools or movements, Isms or ologies. ... It is not even about the poem itself. It is about a sentient being Alone Making something of the world And leaving a trail”. This excerpt of a poem summarises my “making something of the world” of sociological theory. In “-ism and -ology” terminology David and Sutton (2011: 625) explain that “in the narrow sense the origin of the word ‘theory’ parallels ‘ontology’ which is the branch of philosophy concerned with questions of what exists, or questions of being”. The term “theory” in the broader sense, however, refers to “linkages between general ontologies and related theories of knowledge or ‘epistemology’ which is: the branch of philosophy dealing with the grounds by which knowledge about the world can be gained and assessed” (David

& Sutton, 2011: 615). Creswell (2003: 6) simplifies the above by arguing that “Stating a knowledge claim means that, philosophically researchers start a project with certain assumptions about what they will learn (ontology), how they will learn it (epistemology), and the process of studying it (methodology)”. Four broad schools of thought about knowledge claims are mentioned by Creswell (2003: 6-12): post-positivism (the heir of quantitative traditions); constructionism (heir of qualitative traditions); advocacy/participatory knowledge claims (that critiques post-positivism and constructivism); and pragmatism (real world practice-orientated claims). The philosophical assumption of this thesis was based on pragmatism (also see Robson, 2003: 26-44). The rationale of this claim is that pragmatism supports the use of whatever philosophical assumption, methodology or method to collect and analyse data from practice that works best for a particular research problem. This is of great value in the ill-defined world of the ECO industry as a pragmatic research design helps the researcher to say something sensible in a complex, relatively poorly controlled and general ‘messy’ *real world research* study (David and Sutton, 2011: 631; Robson, 2003: 29-44; Yin, 2003: 21). It also aids the researcher to avoid a situation in which the evidence does not address the initial research question” (Yin, 2003: 2). Moreover, pragmatism, according to Johnson *et al.* (2007: 128), “leads to a mixed methods methodology, wherein the use of both quantitative and qualitative approaches is supported”.

### **2.3 Methodology**

Mixed methods research is “a research methodology in which a researcher collects, analyses, and mixes both quantitative and qualitative data in the same research project” (Creswell, 2003: 15). Johnson *et al.* (2007: 119), also note that this methodology “recognizes the importance of traditional quantitative and qualitative research, but offers a powerful third paradigm choice that often will provide the most informative, complete, balanced and useful research results”. The rationale of following this approach is that it opened the door to different methodologies that worked best for each research objective of the study. The mixed methods methodology also aided in the triangulation and collaboration of the research findings. To “define what the role is, or ideally should be, of an ECO in the South African compliance monitoring and enforcement effort during the construction phase of a project” (Objective 1), a survey methodology was used that mixed qualitative and quantitative data to evaluate the perceptions of 50 survey

participants. To “identify what factors might influence the independence of verifiers” (Objective 2), a mixed method research methodology and some quantitative survey results collected from Objective 1 was used. This was combined with qualitative data obtained through interviews with eight individuals in the Medupi case study (refer to Annexures D, E, F, and I). To “appraise how and to what extent independent EIA follow-up verifiers add value in major construction projects in the developing country context of South Africa” (Objective 3), a multiple case study research methodology was used in the four case studies (refer to Annexures I, J, K and L).

## **2.4 Methods of data collection, analyses and writing**

The mixed method approach allowed the use of different methods of data collection, analyses and writing, because it could change as required. In relation to writing for mixed audiences, Creswell (2003: 23) advises, “researchers have to be sensitive to audiences to whom they report their research”. Writing the thesis report in a formal scientific manner (as prescribed by the NWU’s rules and guides) and at the same time considering the different audiences of the journals, was challenging (see NWU, 2010: 6 & 30; NWU (2013: 1-2). However, the mixed methods approach proved valuable in accomplishing this feat, as the different methods allowed the flexible presentation of results (e.g. different article styles and the NWU’s thesis report style). The methods used for data collection and analysis are described in more detail in the following chapters but, in essence entail a focused, integrative literature analysis (Chapter 3), a literature review for each article (Chapters 4, 5 and 6) and various other methods for achieving each objective, as briefly described below.

### **2.4.1 Methods used for achieving objectives**

The primary means of data collection to achieve Objective 1 was by way of a self-administered survey questionnaire that assisted in capturing respondents’ experiences in ECO practice, with particular reference to the role of the industry. The survey questionnaire contained questions related to demographic data, open-ended questions (that generated qualitative data) and closed choice questions (that generated quantitative data). Analyses methods opted for, was Likert and nominal scales that provided quantitative results related to attitudes and opinions, as well as qualitative

interpretive results in the form of participants' quotations. A formal formal-legal writing style was used for presenting and publishing the results in the journal SAJELP.

To achieve Objective 2, a mixed method research approach was used to collect and analyse both quantitative and qualitative data. A literature review was firstly done on professions with independence challenges such as legal and arbitration professions, business and financial professions, environmental management systems (EMS) and quality management audit professions, and the EIA and EIA follow-up professions. Some quantitative data collected during the survey of Objective 1 was also used to support arguments made in Chapter 5. In 2012, the literature review was followed by face-to-face, semi-structured interviews with eight key individuals and field observational methods in the Medupi case study. The interviews involved mainly unstructured and generally open-ended questions with some closed-ended questions. Moreover, the outcome of a workshop on independence arranged by the KZN branch of the South African Chapter of IAIA was obtained for analyses purposes (IAIA KZN Branch, 2012a: 1-8). The audio-visual material was valuable in that over-and-above the literature review and interviews conducted; it provided unobtrusive information as well as an opportunity for participants to share their reality in my absence. Creswell (2003: 187) supports the use of this research technique. All the data collected by the methods described above were considered and entered into an Excel spreadsheet for analysis purposes. This was done to keep track of and analyse the information collected in the mixed method design, as suggested by Leedy and Ormrod (2010: 314). The results of the research was written in article format, by using the scientific and literary style of writing, and published in the journal IAPA.

Considering the advice of Silverman (2006: 306), Yin (2003: 53) and Retief (2007: 91), four case studies were purposively chosen for analyses in order to achieve Objective 3. Of particular importance was that the method allowed for a full variety of data collection techniques. The rationale of the choice of cases is provided in Chapter 6: Article 3. The case study visits were pre-empted by a literature review and the drafting of a research protocol, as suggested by Yin (2009: 130). The review provided reliance for the research based on theoretical propositions, identified the relevant principles of Sustainable Development, EIA, EIA follow-up, and the principles enacted in the National Environmental Management Act (Act 107 of 1998) (NEMA). The Act aided in linking the principles with the relevant objectives that were used for developing performance

standards. The case studies were visited for three days each, from March 2012 to April 2013. During the visits, qualitative data was collected through face-to-face semi-structured interviews with 16 employees, various site visits, and the sourcing of numerous project documents. Case study reports were drafted for each case to aid the appraisal process, as suggested by Yin (2003: 67) (see Annexures I, J, K and L). The results of the case study analysis was written in article format, by using the scientific and literary style of writing, and published in the journal EIR.

The following section gives an overview of the literature review method followed before schematically presenting the research approach followed in this study (see Figure 2-1).

#### **2.4.2 Literature review as a research method**

To review is 'to view, inspect, or examine a second time or again' (Oxford English Dictionary, 2008). Considering this wisdom and the NWU's rules and guidelines for submission of a PhD in article format, Chapter 3 presents the focused literature review of the thesis (NWU, 2012: 2). The review aims to provide a clear and balanced picture of current leading concepts, theories and data relevant to the ECO topic, as advised by Hart (2009: 173). Furthermore, the review shows that many relevant published and unpublished documents were identified and analysed, and that this study is built on previous research and is not simply "reinventing the wheel", as motioned by Silverman (2006: 340).

For the literature review, I chose, from what Grant and Booth (2009: 91-106) refer to as "the plethora of review types", the scoping review approach. Arksey and O'Malley (2005: 8-9) describe this review approach which, according to them, involves five stages:

- 1 identifying the research aim;
- 2 identifying relevant studies;
- 3 selecting studies [or sources],
- 4 charting and analysing the data; and
- 5 collating, summarising and reporting the results.

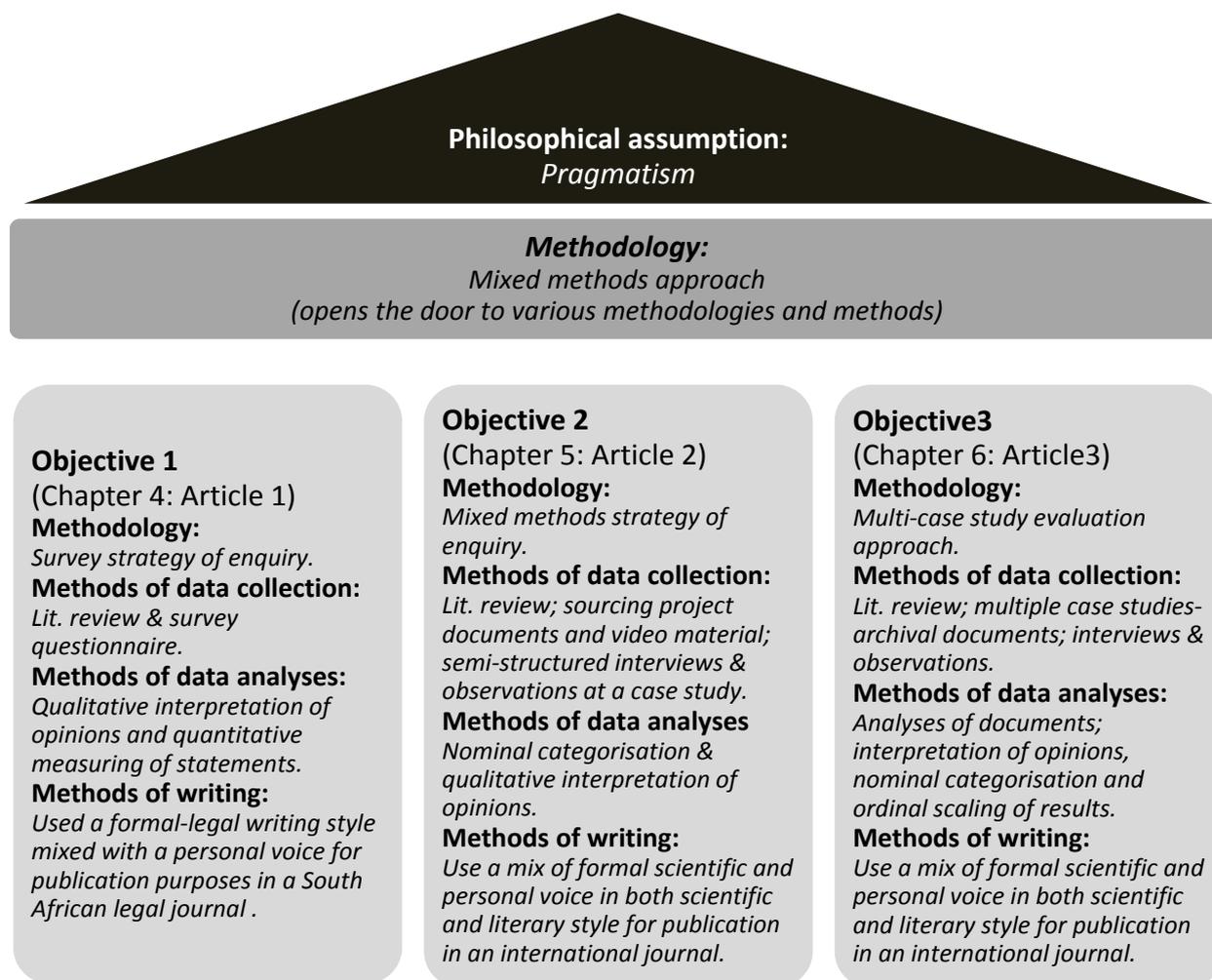
A brief explanation of the approach to each stages follows. The process of identifying the research aim (Stage 1) is described in section 1.2 of the thesis. For Stage 2, an

array of studies and sources were identified, including primary sources, such as peer-reviewed books, journals, theses and dissertations from scholars; and secondary sources, such as government publications, conference presentations, working papers and Internet sources. The main search tools used in this study were the North-West University's online catalogue that provides access to databases such as Google Scholar, JUTA Law, LexisNexis, and Science Direct. Apart from the tools mentioned above, active sourcing of relevant project documentation was done on the four case studies. The case study documents were listed in the case study research protocol document for each case study, as suggested by Yin (2003: 67) (see Annexures I, J, K and L). The complete list of literature cited for the entire PhD appears in the Bibliography as required by the NWU (NWU, 2012: 2).

The studies and sources initially used in the articles (Chapters 4, 5 and 6) were screened (Stage 3) by reading titles and abstracts and focusing on direct relevant sources and studies, and those that could provide some context to the thesis and its objectives. Further screening of additional studies and sources for the focused analysis (Chapter 3) was done by using criteria questions: "Does the study/text relate directly to the topic of the thesis?" and "If not, does the study/text provide context to the topic?". The sources and studies that met the criteria questions, together with the key sources used in the articles, were analysed in further detail in Chapter 3, which essentially reports on Stage 4 (charting and analysing the data), and Stage 5 (collating, concluding and summarising) of the review.

## **2.5 Schematic presentation of the research design**

Figure 2-1 aims to present the research approach followed in this study. The figure demonstrates that the study followed a mixed methods methodology that collaborates with the philosophy of pragmatism (real world practice-orientated claims). As stated before, pragmatism opens the door to different branches of philosophy, different methodologies and different methods of data collection, analyses and writing that works best for each research objective.



**Figure 2-1: Philosophical assumption, methodology and methods**

## **2.6 Methodological limitations and ensuring trustworthiness of data**

According to Robson (2002: 93), “Validity and generalizability are central concepts for making a study believable and trustworthy”. As a social researcher, I had to be aware of these concepts and risks to the data collected and results gained from the mixed method study. The fact that there are both limitations and advantages to the research design, methodology and methods used for achieving the objectives of this research, was therefore, acknowledged. The primary limitations experienced in the design were the lack of financial and time resources as I personally funded the research whilst fulfilling full-time employment duties. Due to these constraints, results were obtained from a relevant small sample of survey participants and interviewees with low level of experience. This design weakness might have limited the theoretical generalization of the findings. The strength in the latter, however, is that the thesis’s findings open up this area for more detailed research. Moreover, the case studies were limited to four in

order to cater for different scales and types of construction projects, experienced ECOs being active at the sites, appropriate advancement of construction, and accessibility for research. (refer to Chapter 6: Article 3 for the rationale for case study selection). However, the limitations of the research might, to an extent, be marginalised by various strategies that could ensure the effective use of credible research methodologies and associated methods proposed in the research design.

A strategy used to ensure internal validity of data generated during the survey approach of Objective 1, was to test the survey questions with the research promoters to ensure that they were understandable and unambiguous. Moreover, the involvement of targeted participants was ensured, by engaging participants in a scheduled period, whilst attending a training course on the research topic and by making the questionnaire easy to read and complete. A focused sampling of survey participants were done to gather data from at least 50 environmental practitioners interested in, and involved in the ECO industry in order to reduce generalizability risks of data and results.

The strategy for ensuring the validity of Objective 2's data was to follow the well-established and recognised mixed method methodology. This methodology ensures the external validity of the data, by collecting and analysing quantitative and qualitative data from various sources that compliments each other, as encouraged by Robson (2002: 93). This methodology also enhances the generalizability of data, by allowing a researcher to obtain data through a variety of data collection techniques.

To increase the basis for scientific generalisation of data in Objective 3, a multiple-case study approach was followed, as suggested by Yin (2003: 53). Moreover, although data was sourced from a relevant small number of cases, the smaller scope enabled the in-depth exploration of data and cases, whilst not losing robustness and generality of results, as advised by Huberman and Miles (2002: 1182-1185). To ensure validity of data and results from cases used for achieving Objective 2 and 3, a case study database was created for each case study, as previously mentioned (see Annexures I, J, K and L). By means of a case study protocol, a chain of evidence was maintained to show the evidence collected and circumstances of data collected for each case, as recommended by Yin, (2003: 114-124). Moreover, all interviews were voice-recorded in order to analyse and represent the information with accuracy, as suggested by Silverman (2006: 272).

Another strategy used to ensure validity was the constant reviewing of research results by the PhD promoters and journal reviewers of the articles submitted for publication purposes.

## **2.7 Adhering to ethical principles**

Due to researching the human phenomenon “Environmental Control Officers”, ethical implications of the research had to be considered. Creswell (2009: 89-91) and Leedy and Ormrod (2010: 101) list a number of considerations and guides that I followed in this research, namely:

- I confirmed that the research did not need ethical approval from the Research Ethics Committee through verification with the Chairperson of the Committee; Prof L. van Rensburg, Research Director of the School of Biological Sciences.
- I revealed to all participants and respondents my identification, the reason for their selection in the research.
- I obtained approval from the relevant organisations and project managers to approach the cases and use the information sourced from the case studies in the research.
- No results were falsified or invented for personal gains.
- All trail of evidence collected and analysed is available as case study reports (refer to Annexures I, J, K and L).

I am confident that research design, methodology and methods used to gain knowledge from the complex and relatively poorly controlled real world of ECOs, ensures a logical sequence that connects the research data to the study's initial research objectives and, ultimately to the conclusions.

## **CHAPTER 3: LITERATURE REVIEW**

### **3.1 Introduction**

The literature review focuses on advancing the understanding of independent ECOS in major South African construction projects. The review also aims to integrate, collate and build on the literature reviewed in the three study objectives (refer to Articles 1, 2 and 3). As stated before (section 1.4), the review essentially includes three areas:

- 1 the role of ECOs as independent EIA follow-up verifiers in compliance monitoring and enforcement of major construction projects;
- 2 independent verification and the factors that might influence the independence of EIA follow-up verifiers; and
- 3 sources reviewed for establishing appraisal criteria to determine how and to what extent EIA follow-up verifiers add value in major construction projects.

The literature review of the thesis ends with a concluding summary before presenting Part *Four* comprises of three Chapters (Articles 1, 2 and 3) respectively.

### **3.2 Summary of literature reviewed**

#### **3.2.1 Understanding the role of Environmental Control Officers in compliance monitoring and enforcement of major construction projects**

Independent verifiers are active in various arenas across the globe. They include ECOs (Hill, 2000 and Singapore National Environment Agency, 2001), Environmental Checkers (Au and Hui, 2004), Environmental Supervisors (Wang, 2013; Acerbi *et al.* 2014; World Bank, 2012 and 2014), systems (International Organisation for Standardization, 2002) and financial auditors (Bakar *et al.*, 2005; and Everett *et al.*, 2005), arbitrators (Hong-Lin & Shore, 2003), and the Judiciary (United Nations, 1985). In essence, they verify the truth of compliance and conformance statements such as “we comply or conform to sustainability and environmental commitments and rules”. Paterson and Kotzé (2009: 2) note, “Sustainable development depends on good governance, good governance depends on the rule of law, and the rule of law depends

on effective compliance”. It is argued in this study (see Chapter 4: Article 1) that independent verifiers may enhance compliance monitoring and thus, contribute to enhancing environmental governance.

There are many challenges to effective compliance, the rule of law, good governance and ultimately sustainable development. Article 1 (Chapter 4) identified compliance monitoring and enforcement of environmental commitments in the thousands of approved Environmental Management Plans (EMPs) and Environmental Assessment (EA) conditions as one of the most significant challenges facing the South African EIA system. This weakness is also identified in other developing countries in sources such as Wood (2003: 255) and the Economic Commission for Africa (ECA) (2011: 46-47). Coupled to this challenge is what Hill (2000: 51-52) refer to “as the most significant weaknesses of EIA and Integrated Environmental Management (IEM) in project implementation relate to ill-defined allocation of responsibility of environmental management and insufficient use of method in exercising this responsibility”. Hill (2000: 52) also notes, “Specific problems relating to these weaknesses are inadequate institutional and organizational arrangements and the emphasis on monitoring and enforcement by environmental specialists who are not directly involved in implementing a project”. The lack of effective environmental governance in developing countries as referred to by Craigie *et al.* (2009: 101), South Africa (DEA) (2011: 7-12), and Wood (2003: 105), was also highlighted in Chapter 1 as a critical contributor to EIA follow-up weakness experienced in EIA systems worldwide (also see Dipper *et al.* 1998: 734-747; Hill, 2000: 50; Sadler, 1996; Wood, 2003: 7 & 255).

Environmental governance, as defined by Kotzé *et al.* (2007: 57), is “...the collection of legislative, executive and administrative functions, processes and instruments used by any organ of state to ensure sustainable behaviour by all as far as governance of activities, products, services, processes and tools are concerned”. Arts and Faith-Ell (2012: 3239) note, “there seems important changes in the classic role division between government (overseeing); market (executing) and public (looking from aside) which might be called a change from government to governance”. This idea of Faith-Ell and Arts (2011) (as cited by Arts & Faith-Ell, 2012: 3239) supports, but also builds on the definition of Kotzé *et al.* (2007: 57) as it includes many role-players in the concept of environmental governance. In relation to governance of major construction and infrastructure projects many sources such as the International Council for Building

(CIB), the United Nations Environmental Programme (UNEP), and UNEP's International Environmental Technology Centre (IETC) recognizes that the construction industry is central to how humans shape their future and to sustainability (UNEP, 1992; CIB, 1999; and Du Plessis, 2002). This is critical in what Barrow (2006: 6) and Steffen *et al.* (2010: 842) refer to as the “epoch change from the Holocene (previous geological unit) to the new Anthropocene (human-altered period)”. Modern society demands that major project planning and the implementation thereof meets legal requirements but that they also go beyond the legal bottom-line in order to deliver sustainable development (Barrow, 2006: 6; Arts & Faith-Ell, 2012: 3240).

Sustainable development has a rich evolutionary history (see Hill & Bowen, 2010) and the United Nations Environmental Programme (UNEP, 1992) eventually formulated principles for sustainable development. Following the principles, the international community adopted the Millennium Declaration in 2000 that essentially serves as a framework for the sustainable development mission that sets goals and targets for eradicating poverty and promoting human development by various governance strategies and instruments such as the Agenda 21 (UNDP, 2006). Part G of Agenda 21 (see Section 7.69): Promotes Sustainable Construction Industry Activities and requires that all countries should be (amongst other things): “(a) establishing, (b) formulating and (c) adopting: standards, programmes and regulatory measures to promote the use of local materials, and energy-efficient designs and technologies in construction” (UNCED, 1992). In principle, these environmental management and governance standards, regulatory measures, programmes, and approaches (described by Fuggle & Rabie, 1992; Glasson, 1994; and Sadler, 1996), should collectively support sustainable development as argued by Barrow (2006: 6). It should also ensure sustainable behaviour by all (government; market and public) as argued by Kotzé *et al.* (2007: 57) and Arts & Faith-Ell (2012: 3239).

However, “studies show that infrastructure projects have problems to deliver sustainability commitments” (Arts & Faith-Ell, 2012: 3239). Of particular concern in developing countries, as highlighted in Chapter 6: Article 3, is the reluctance of the private sector, especially the construction industry, to commit itself to sustainability (Craigie *et al.*, 2009; Du Plessis, 2002; Nel & Wessels, 2010). Apart from the “reluctance challenge” the South African Department of Environmental Affairs (DEA) (2011: 10) and Arts and Faith-Ell (2012: 3239) identifies other challenges to delivering,

monitoring and enforcing sustainability commitments. These include “the scale of projects, enforcement capacity; decisions influencing project design and environmental performance made after the planning process and consent decision; lack of information transfer (follow-up) from planning stages to construction and implementation; the many parties involved; and the lack of authority coordination”. Interestingly, various sources such as Hill (2000) the South African Department of Environmental Affairs (DEA, 2014) and Arts and Faith-Ell (2012: 32340) argue that traditional (or “classic”) approaches such as EIA on their own do not seem to deliver on critical sustainable development commitments and issues (refer to Chapter 4: Article 1 for a description of the EIA process).

To curb these challenges Arts and Faith-Ell (2012: 3239) proposes, “Moving towards more collaborative relationship between various parties (governmental, private and public)”. Hill (2000: 54) refers to this as “the trend of co-regulation” in South Africa and with Perdicoúlis *et al.* (2012), Uttam (2014) and Arts and Faith-Ell (2012: 3239) explore and compare “new” approaches that may aid in the achievement of this approach. These include: “*Life cycle integration* (e.g. life cycle management); *Earlier involvement of market parties* (Design & Contract etc.); *Self-responsibility* (e.g. environmental management systems (EMS) such as ISO 14001); *Broader scope* (e.g. rating or labelling instruments such as green procurement, CEEQUAL, LEED, BREEAM); and *Involvement of third parties* (e.g. license to operate)”. The use of these new approaches, along with the use of “classic” EIA follow-up approaches such as permitting, contracting and auditing approaches, may collectively aid in achieving even more environmental and sustainability outcomes of projects (see Chapter 6: Article 3).

Interestingly, none of the approaches refers particularly to on-site 3<sup>rd</sup> party, “independent from all” EIA follow-up verifiers as an approach to enhance compliance monitoring, enforcement and delivering sustainability commitments of major construction projects. Moreover, although sources such as Acerbi *et al.* (2014), Au and Hui (2004), Hullet and Diab, 2002, Hill (2000), Singapore National Environment Agency (2001), Ross (2004), Wang (2013), AEECoW (2015), and the World Bank (2012 & 2014) mentions the use of independent verifiers, little learning about EIA, EMS and EIA follow-up has been drawn and shared from this industry. Building on this gap is a key focus of this study. The results of Chapters 4,5 and 6 indicate that “independent from all” 3<sup>rd</sup> party EIA follow-up verifiers that are continuously involved in major construction

developments aid in enhancing collaborative relationship between various parties and strengthening the continuum of “classic” EIA and “new” *Self-responsibility* approaches (e.g. EMS). To understand the role of independent EIA follow-up verifiers such as the South African ECO, it is, therefore, necessary to firstly, identify the factors that may influence the independence of EIA follow-up verifiers (see Chapter 5: Article 2), and to make the theoretical link between independent verification, sustainable construction, EIA and EMS (see Chapter 6: Article 3). The following sections aim to provide theoretical perspectives on the factors and the link between independent verification, sustainable construction and EIA and EMS.

### **3.2.2 Independent verification and the factors that might influence the independence of EIA follow-up verifiers**

According to the Oxford English Dictionary (OED, 2001: 422) ‘independent’ is defined as: “free from outside control or influence; self-governing; having or earning enough money to support oneself; not connected to another; separate”. Independence is viewed as a cornerstone of the ethical foundations of various verification fields (refer to Chapter 5: Article 2 and Everett *et al.*, 2005: 416; Hong Lin & Shore, 2003: 935; ISO, 2006: 2). Verification in essence “aims to identify the truth of statements such as: ‘we conform to standards’ and/or ‘we are legally compliant’ with its verifiability” (Engel, 2002: 9-40). Independent verification in environmental performance and conformance evaluation may thus, be understood to mean, “Identifying the truth about sustainability and environmental statements of a person (or an organisation) by a separate person free from control, influence and not connected to the first person”.

As indicated before, there are many individuals and groups of independent verifiers in the environmental profession that often do independent verification (Au & Hui, 2004; Acerbi *et al.* 2014; Ross, 2004; Singapore National Environment Agency, 2001; Wang, 2013; World Bank, 2012 & 2014). Moreover, the International Association of Impact Assessment (IAIA) identify independent verification as an important component of the basic principle of a ‘credible EIA’ and state that “a credible EIA process should be carried out with professionalism, rigor, fairness, objectivity, impartiality and balance, and be subject to independent checks and verification” (IAIA, 1999: 3) (see argument in Chapter 5: Article 2). Moreover, independent checks and verification forms an integral part of EIA follow-up and the related activities of monitoring; auditing; evaluation;

management; and communication (see Arts, 1998: 26; Lee & George, 2000: 6; Wood, 2003: 7; Morrison-Saunders & Arts, 2004: 2).

The benefits of independent EIA and EIA follow-up verification are numerous, in particular the “vetting of monitoring results” that according to Au and Hui (2004: 221) “help to instil confidence and facilitate informed discussion among stakeholders”. Other benefits include for example: truthful disclosure of information to ensure that both the proponent and government is held accountable for not meeting performance targets (Ross, 2004: 194); instilling confidence and trust in self-regulatory and EIA follow-up approaches referred to by South Africa (2011(a): 16, 25) and Craigie *et al.* (2009: 50).

In South Africa, responsibility for EIA implementation was historically assigned to an ECO (Hill, 2000: 52). ECOs, according to a more recent source “act primarily as quality controllers regarding environmental concerns in construction” (Department of Water Affairs and Forestry (DWAF), South Africa, 2005). As mentioned above (also refer to Chapter 1), the role of ECOs has shifted notably from implementation to independent verification in recent years. This may be due to strong opposing views and debates centred on the independence of environmental practitioners and specialists in EIA and EIA follow-up (South Africa (DEA), 2011(b): 12; South Africa (DEA), 2014: 151-72; IAIAasa KZN, 2012: 1-4; Mostert, 2014: 2). These opposing views on independence include views on the independence of the ECOs (from developers, government and other parties) (see Chapter 5: Article 2); and views on unprofessional conduct by some environmental practitioners, argued by some to be caused by independence issues (see Department of Environmental Affairs (DEA), South Africa, 2014: 47). There are also currently different views on the independence of Environmental Assessment Practitioners (EAPs); responsible for compiling the EIA, with other specialists such as ECOs (responsible for monitoring compliance to commitments) (see Department of Environmental Affairs (DEA), South Africa, 2014: 151-152; and IAIAasa KZN Branch, 2012)

The shift of roles and responsibilities of ECOs aligns with the recent review of the South African Environmental Impact Assessment and Management Strategy (EIAMS). The Strategy, referred to the importance of an independent party with “no vested interest in the outcome of a particular activity” as being the best way of implementing an effective compliance and enforcement regime (Department of Environmental Affairs, 2011: 16-25). The opposing views on independence of EIA follow-up verifiers such as ECOs,

coupled with the weakness of ill-defined roles of implementers and persons not directly involved with implementation mentioned by Hill (2000: 52) and Griffiths & Swanepoel (2012),, creates the potential for a conflict of interests between parties involved. This potential conflict of interest is reiterated by South Africa (DEA) (2014: 152) that also warns, “Independence requirement for EAPs and environmental specialists militates against an active role for environmental practitioners in the processes of project planning and design”.

The Code of Conduct of the International Association for Impact Assessment (IAIA) requires members “to disclose to employers and clients and in all written reports, any personal or financial interest that could reasonably raise concerns as to a possible conflict of interest” (IAIA, 2013). This, therefore, may also include factors that may influence mandatory independence of verifiers. Interestingly, the new South African IEM strategy requires “that environmental practitioners, officials and specialists are professional, ethical, objective and independent in their conduct” (DEA, 2014: 46). The literature review of Chapter 5: Article 2 enabled the understanding that, various contextual factors may influence the type of EIA follow-up framework required, which in turn influences the independent verification requirements of verifiers. This wisdom was drawn from Morrison-Saunders *et al.* (2003: 44-45), Marshall (2004: 118-124), Craigie *et al.* (2009: 50-51), Nel and Wessels (2010: 50), and Lehmann (2009: 269-273). The review also showed that it is possible to identify the factors that may influence independence, as independence is an external manifestation of certain characteristics, usually in the form of relationships with another (Hong-Lin & Shore, 2003: 936).

With the aid of consulting a wide variety of sources from the legal, business and finance, systems audit, South African EIA, and EIA follow-up professions, I identified 18 factors that might influence the independence of verifiers. Based upon the assessment of the research results, the 18 factors were divided into five categories: financial; commercial; professional; personal; and 'other'. Sources from the legal profession included the United Nations (UN) Rule of Law (1985), the United Nations (UN) Office on Drugs and Crime (2006), and South African case law, regulations, guides and legal interpretations (South Africa, 1997; South Africa, 1998; South Africa, 2010; Cameron Cross Inc., 2006). Sources from the financial profession (Bakar *et al.* 2005: 808; Blakistan & Crabb, 2007; Everett *et al.*, 2005: 416-429; Siblin, 1975; and PricewaterhouseCoopers, undated) and the arbitration profession (Hong-Lin & Shore,

2003; and Jajbhay, 1999) provided invaluable information. In relation to the systems audit profession, several International Organisation for Standardization (ISO) documents were reviewed for the identification of factors including ISO1400 (2004), ISO17021 (2006), ISO17024 (2003), and ISO19011 (2002). Moreover, case examples in EIA follow-up (Ross, 2004; ), information generated from a workshop dedicated to independence of EIA follow-up verifiers (IAIAsa KZN Branch, 2012) and project documentation from a case study (Medupi), also provided valuable information on factors that may influence EIA follow-up verifiers.

It is hoped that, by identifying and understanding the factors and categories of factors that the research may aid in anticipating and avoiding potential conflict of interest in major construction projects related to independence issues. The next section of the review provides the theoretical link between independent verification, sustainable construction, EIA and EMS. It also provides a summary of the sources reviewed that provided the criteria for appraising how and to what extent independent EIA follow-up verifiers add value in major construction projects in the developing country context of South Africa.

### **3.2.3 Sources of appraisal criteria for determining how and to what extent EIA follow-up verifiers add value to major construction projects**

As mentioned earlier (section 3.1.1), literature sources show that construction projects experience challenges to deliver sustainability commitments. The South African government (DEA, 2011: 10) identify several challenges to delivering, monitoring and enforcing sustainability commitments. To curb these challenges Hill (2000), Perdicoúlis *et al.* (2012), Uttam (2014), and Arts and Faith-Ell (2012: 3239), supports more collaborative relationship between various parties (governmental, private and public) and combining environmental management and governance approaches over and above the traditional EIA approach. Early pioneers such as Holling (1978: 133), Hill (2000: 54) and Perdicoúlis *et al.* (2012: 1) advocates a closer connection of EIA and EMS and in the form of an EIA-EMS continuum that was, according to Perdicoúlis *et al.* (2012: 11) "...originally brought forward through the pollution and environmental degradation initiatives in the 1960s". The following section provides a brief background to EIA, EMS, EIA follow-up and sustainable development before discussing the

integration of these processes into the appraisal framework used to determine the value of ECOs on major construction projects (see Chapter 6: Article 3).

According to Jay *et al.* (2007), “the original principles for EIA were developed in the 1970s because of the support of a pro-rationalist approach to decision making”. EIA has many different definitions but is broadly defined by the International Association of Impact Assessment (IAIA, 1999) as “the process of identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of development proposals prior to major decisions being taken and commitments made”. The two main purposes and objectives of EIA are to: “1) minimize or avoid adverse environmental effects before they occur; and 2) incorporate environmental factors into decision making” (CEAA, 2011). Some authors, including Sadler (1996: 1) believes that “environmental assessment has achieved its goal of helping us reach better decisions”. However, EIA as an environmental governance approach has also been severely scrutinised and authors such as Dipper *et al.* (1998: 732) mentions, “The focus of pre-decision stages of EIA, and the neglect of monitoring and post-auditing stages, has severely constrained the maturation of EIA systems world-wide”. More recently, writers such as Morgan (2012) notes, “...despite its successes the past 40 years in the world, EIA may now be facing its biggest challenge since it came into being in 1970 with the US National Environmental Policy Act”. Bond *et al.* (2014: 52) also note that, “With respect to the perceived value of Impact Assessment (IA) as an early warning instrument, IA has recently been argued to be a major time and resource constraint in major jurisdictions (Canada, South Africa, Western Australia and the UK)”. It is, therefore, evident that EIA has achieved its primary goal of “helping us make better decisions”, but failed to deliver (as a stand-alone approach) on sustainability commitments made during the planning phase of major construction projects. The integration of EIA with other approaches such as Self-regulatory (e.g. ISO 14001-based Environmental Management Systems) may enhance environmental governance internationally and in South Africa.

EMS followed the development of EIA later and, according to Steger (2000), “the roots of EMS can be traced back to the mid-80s in the United States of America (USA), when a need to ensure compliance with rapidly increasing environmental legislation became apparent”. The formalisation of EMS was through the publication of the British Standard (BS7750), the subsequent publication of ISO 14001 in 1996 (Perdicoúlis *et al.* 2012:

12), and the update thereof in 2004 (ISO, 2004). ISO 14001 use the PDCA approach developed by Deming (1986) and is defined by Heras-Saizarbitoria *et al.* (2011:192) as a “systematic process that corporations and other organisations use in order to implement environmental goals, policies and responsibilities, as well as regular auditing of its elements”. Since its origins, sources such as Pun and Hui (2001) and Ann *et al.* (2006), notes impressive implementation of the EMS the approach in both manufacturing and non-manufacturing sectors. However, as with EIA, ISO 14001: 2004-based EMSs, also experienced recent criticism internationally and in South Africa (Nel and Wessels, 2010: 61). As noted in Chapter 5: Article 2, the merit of, and trust in, the ISO 14001 certification scheme and the “independent” bodies that carry out the certification in South Africa was dealt a severe blow in 2007 by revelations of serious environmental legal non-compliances at high-profile certified facilities (Craigie *et al.* 2009: 60). Moreover, Nel and Wessels (2010: 60) highlights various inherent weaknesses of ISO 14001: 2004-base management systems identified in international studies such as the ENDS Reports (2006).

Following the development of EIA and EMS, an early piece by Holling (1978), proposed that, “environmental assessment and management should be a continuum”. Perdicoulis *et al.* (2012: 12) also notes that the early work of Holling (1978) was followed by “innovative work in the 1980’s that explored the need for follow-up and monitoring in EIA to extent it into environmental management (EM)”. Others including, Eccleston (1998), Arts (1998), Dipper *et al.* (1998: 732), McKillop and Brown (1999), Sánchez and Hacking (2002), and Marshall (2004) also aided in building on the follow-up concept. The work of Morrison-Saunders and Arts (2004) proved to be one of the more notable publications on the topic. Morrison-Saunders & Arts (2004: 3-4) notes “EIA follow-up is at times used as an umbrella term for various EIA activities including: monitoring, auditing, ex-post evaluation, post decision analyses and post decision management”. They define EIA follow-up as “The monitoring and evaluation of the impacts of a project or plan (that has been subject to EIA) for management of, and communication about, the environmental performance of that project or plan.” The results of a South African study conducted by Hullet and Diab (2002) indicates confusion amongst the respondents on, who should take responsibility for EIA follow-up, which also correlated with the findings of Hill (2000: 53) with regards to ill-defined roles on implementation and follow-up.

Because of the challenges experienced in EIA, EMS and EIA follow-up, South Africa undertook to develop an EIAMS to address the shortcomings within the current IEM system. Through the “Review of Effectiveness and Efficiency of EIA in South Africa” (DEA, 2011: 16), South Africa realised (DEA, 2011: 16) that “An ineffective IEM system in South Africa currently promotes EIA, through a regulated authorisation process, as the main compulsory tool to ensure IEM.” The latest document drafted by the Department of Environmental Affairs (2014) calls for “All IEM systems and processes are directed towards achieving sustainability (Building Platform 1)” and recognise that “IEM is a cyclic process and should take place within a management paradigm with relevant PDCA phases”. The latter forms the core of Building Platform 3, which advocates “Monitoring and evaluation of socio-economic, ecological and IEM systems and processes lead to adaptive management”. In this document, the South African Department of Environmental Affairs (DEA, 2014: 39) admits, “In the current system, the ‘Check’ and ‘Act’ phases were neglected” the past 10 years”. Interestingly, Hill (2000: 54) drew similar conclusions, suggested a merger of IEM and EMS, and proposed a new acronym “IEMS”.

As stated previously and as argued by various sources (Hill, 2000; DEA, 2014; and Arts & Faith-Ell, 2012; and Nel and Wessels, 2010) no approach, either “classic” (such as EIA) or “new” (Self-regulatory such as EMS) deliver on sustainability commitments on its own. However, the important, yet “obvious continuum” between the classic EIA strategy (before implementation) and the “Self-responsibility” (e.g. EMS) strategy (after project implementation) has gained support and clarification for a number of years by sources such as Holling (1978), Eccleston (1998), McKillop and Brown (1999), Sánchez and Hacking (2002), and Marshall (2003 and 2004). Sadly, Perdicoúlis *et al.* (2012) note that this vital connection “...rarely happens well in practice and EIA runs the risk of being of only limited significance unless follow-up measures are carried out”. In Chapter 6: Article 1, the Key Performance Areas (KPA) were developed by connecting and combining the ISO 14001 management system’s elements of Planning, Doing, Checking and Acting with EIA and EIA follow-up frameworks source from Baker (2004) and Arts *et al.* (2001).

The review of literature was also crucial for the establishment of linkages between the principles of Sustainable Development (UNEP, 1992), EIA (IAIA, 1999) and EIA follow-up (Marshall *et al.* 2005), and the principles enacted in NEMA (South Africa, 1998). The

review also served to provide the linkages between various objectives sourced from international and South African sources. These include objectives of Sustainable Construction (UNEP-ITC, 2002: 59-67; and Du Plessis, 2002) and EIA follow-up (Morrison-Saunders and Arts, 2004) and objectives of the ECO code of practice (Singapore Environmental Agency, undated). It also includes NEMA's IEM objectives (South Africa, 1998), and the objectives contained in the "Best Practice Specifications for Construction Sites" of DWAF (DWAF, 2005). By drawing from the sources mentioned above, a framework for appraising the role of independent verifiers was established (see Chapter 6: Article 3).

### **3.3 Conclusions**

The review firstly shows that independent verifiers that focus on the authentication of sustainability statements and commitments are active across the globe. They include ECOs, Environmental Checkers, Environmental Supervisors, and EMS auditors. In South Africa, the role of the ECO changed largely from implementing to verification due to the need for an "independent from all" 3<sup>rd</sup> party. Interestingly, the literature highlights the importance of verifier independence and suggests that independence in many verification fields, including EIA follow-up verification is a cornerstone of the ethical foundations of these fields. The review also showed that a conflict of interests might be created in scenarios, or EIA follow-up frameworks, where there is opposing views on independence and ill-defined roles of role-players implementers and verifiers. The review aided in identifying 18 factors that should be considered to avoid potential conflicts of interests in volatile scenarios.

The review indicates that sustainability, sustainable construction, and effective environmental governance are intertwined and dependent on each other. The review highlights that there are many challenges to the delivery of sustainable commitments. These challenges include inadequate collaboration between role players, ill-defined roles and responsibilities, and insufficient use of governance approaches. The latest literature suggests combining "classic" governance approaches with "new" approaches to aid in collaborative relationship between various parties and that the relatively unexplored approach of continuous on-site "independent from all" 3<sup>rd</sup> party verification may enhance this co-regulation approach through the many benefits of independent verification.

The literature however, does not provide adequate information on; what the role is or should be of independent ECOs in environmental governance approaches during the construction phase of projects; what factors may influence their independence; and how and to what extent do they add value in major South African construction projects. The objectives of the following chapters are to provide information on these three lines of inquiry in the form of three peer reviewed journal articles.

## **CHAPTER 4: ARTICLE 1**

### **DEFINING THE ROLE OF THE INDEPENDENT ENVIRONMENTAL CONTROL OFFICER IN COMPLIANCE MONITORING AND ENFORCEMENT**

Objective 1: To define what the role is of an ECO in the compliance monitoring and enforcement effort during the construction phase of a project.

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# DEFINING THE ROLE OF THE INDEPENDENT ENVIRONMENTAL CONTROL OFFICER IN COMPLIANCE MONITORING AND ENFORCEMENT

Jan-Albert Wessels\* and Angus Morrison-Saunders\*\*

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## Abstract

Currently an entire unregulated industry of Environmental Control Officers (ECOs) is active at various construction sites across South Africa. While the role of ECOs generally is to ensure that environmental authorisation (EA) conditions and performance specifications for development are monitored and implemented in practice, differing views on the role and independence of the industry exist between practitioners. This paper presents quantitative and qualitative response results from a questionnaire survey of 50 South African environmental practitioners on the role and independence of the ECO industry with an emphasis on practitioner comments reproduced in their own words and 'voice'. The practitioners identified: compliance monitoring; implementation and enforcement; ensuring legal compliance; advising and/or consulting; communicating; reporting; and raisings awareness as the key roles of an ECO. It was also noted that competency and independence of an ECO should be consistently reflected in EA and EMP requirements to avoid confusion on these issues in practice. They also identified competence and the regulation thereof, as well as support from developers, government, and other role-players as core needs of the industry to successfully fulfil their roles. Furthermore, independence to all role-players was held in high regard and they had a cautionary message to avoid obsessing the independence issue to such an extent that it compromises the ability to fulfil their roles. This paper concludes with a proposed definition for the role of an independent ECO by drawing together the material presented by the practitioners.

## 4.1 Introduction

One of the most significant challenges facing the South African Environmental Impact Assessment (hereafter EIA)<sup>1</sup> system is compliance monitoring<sup>2</sup> and enforcement<sup>3</sup> of

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<sup>1</sup> Many notable works describe the elements of a generic EIA process, which includes: firstly a preliminary assessment phase that consists of screening and scoping; secondly a detailed assessment phase consisting of impact analyses, drafting mitigation and management plans as well as an environmental impact statement/report, the review of the report and a decision on the application; and finally an implementation and follow-up phase, which consists of post-decision management and implementation, monitoring and auditing of implementation and post decision analyses. More specific details of the South African EIA process can be found in s 24 (1)(a), (4)(a)(i) to (iv) and s (4)(b)(i) to (vii) of

Environmental Management Plan (hereafter EMP) and EA conditions<sup>4</sup> of the thousands<sup>5</sup> of approved EIA applications per year. There are many interrelated factors contributing to this challenge such as: the scale of the task and enforcement capacity (number of projects compared to number of resources); the scale of projects (including verification of EIA findings, authorisation fixation, ineffectual Monitoring Committees (hereafter MCs), lack of response to reported transgressions, and ambiguity of EMPs); quality and ambiguity of EAs; extension of function; bureaucratization; poor communication; and

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the National Environmental Management Act 107 of 1998 (hereafter the NEMA). See also the Environmental Impact Assessment Regulations in GN R543 GG 33306 of 18 June 2010; J Glazewski (ed) *Environmental Law in South Africa* (2<sup>nd</sup> ed 2005) at 249; and PJ Aucamp *Environmental Impact Assessment: A Practical Guide for the Discerning Practitioner* (2009) at 6. For international literature see for example: the International Association for Impact Assessment and Institute for Environmental Assessment (IAIA) UK 1999 *Principles of Environmental Impact Assessment Best Practice* at <http://www.iaia.org/publications/> (accessed 21 December 2011); J Arts *EIA Follow-up* (1998) at 26; N Lee and C George *Environmental Assessment in Developing and Transitional Countries* (2000) at 6; C Wood *Environmental Impact Assessment: A comparative Review* (2<sup>nd</sup> ed 2003) at 7; and A Morrison-Saunders and J Arts (eds) *Assessing Impact: Handbook of EIA and SEA Follow-up* (2004) at 2.

<sup>2</sup> According to the Department of Environmental Affairs (DEA) 'Environmental Impact Assessment and Management Strategy: Sub-Theme 4: Compliance and Enforcement' (prepared by SE Solutions Pty Ltd, Sean O'Beirne for Department of Environmental Affairs, Pretoria) (04 August 2011) at 10, 'the principle is that Compliance Monitoring identifies on an on-going basis: activities that are in breach of the law and conditions of the EA; improperly authorised activities; and so forth'.

<sup>3</sup> The DEA (n2) at 12 describe the role of enforcement in the context of government as: 'enforcement serves to take the action required to maintain compliance through various means such as issuing warning letters; pre-compliance and compliance notices; and launching criminal investigations that may result in enforcement'.

<sup>4</sup> Internationally and nationally, it is well established that compliance monitoring and implementation is one of the weakest areas of EIA activity. See amongst others C Wood (n1) at 255 and Economic Commission for Africa (ECA) *Review of the Application of Environmental Impact Assessment in Selected African Countries* (2005) at xiv and 46-47 at [www.uneca.org](http://www.uneca.org) (accessed 1 October 2011). The ECA found that in spite of many countries making implementation of the EMP or an appropriate permit a legal requirement, more often than not implementation and follow-up are neglected and grossly ineffective in most African countries. With regards to South Africa the DEA (n2) at 7 states that 'compliance and enforcement is inadequate' and set a goal of 'ensuring that compliance monitoring and enforcement procedures within the organisational structure of Integrated Environmental Management (IEM) are adequate and effective'.

<sup>5</sup> South African developers conduct more than a 1000 Environmental Impact Assessments (EIA) per year. For example N Rossouw and others, 'Country Reports - South Africa' in P Tarr (ed) *Environmental Impact Assessment in Southern Africa* (2003) report that since the promulgation of the EIA regulations in 1997 the six South African provinces investigated in the study received a total of 5367 applications in less than 5 years. Furthermore, this number is significantly escalated by the fact that environmental assessments are also conducted in terms of several other environmental Acts such as the National Water Act 36 of 1998, the National Environmental Management: Waste Act 59 of 2008 (hereafter the NEMWA), the National Environmental Management: Air Quality Act 39 of 2004 (hereafter the NEMAQA), and the Mineral and Petroleum Resources Development Act 28 of 2002.

lack of authority and authority coordination.<sup>6</sup> However, the lack of effective environmental governance<sup>7</sup> may be highlighted as a critical contributor in developing countries such as South Africa.<sup>8</sup> In response to situations where government cannot govern effectively on a particular matter on its own, a government may impose certain governance duties onto civil society to assist in the particular governance effort. In terms of the NEMA<sup>9</sup> for example, a developer has to apply for an EA for listed activities and as part of the conditions, the competent authority may require the developer to appoint an ECO<sup>10</sup> with specific environmental responsibilities.<sup>11</sup> In relation to contents and conditions of EAs; regulation 37 (1) of the EIA regulations<sup>12</sup> states that 'an authorisation must specify- (d) the conditions subject to which the activity may be

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<sup>6</sup> See DEA (n2) 1-44.

<sup>7</sup> LJ Kotzé *et al.* 'Strategies to Integrate Environmental Policy at the Operational Level: Towards an Integrated Framework for Environmental Authorisations' (2007) *South African Journal of Environmental Law and Policy* at 57, defines environmental governance as ...the collection of legislative, executive and administrative functions, processes and instruments used by any organ of state [and the private sector] to ensure sustainable behaviour by all as far as governance of activities, products, services, processes and tools are concerned.

<sup>8</sup> A specific weakness of the South African EIA system mentioned by Wood is 'the problem of crippling under-funding and under-staffing of provincial and local authorities means that they must rely on the complaints of neighbours and the integrity of developers and their consultants for information about non-compliance. M Kidd and FP Retief 'Environmental Assessment', in HA Strydom and ND King (eds) *Environmental Management in South Africa* (2009) at 1030, argues that 'this still holds true today' and also mention that 'even where there are complaints, authorities are sometimes reluctant to take steps to address such problems due to the lack of capacity or other reasons that are less clear. The setting of conditions, therefore, presupposes the enforcement of such conditions and absence of monitoring seriously undermines the entire system.' Furthermore, F Craigie *et al.* 'Environmental Compliance and Enforcement Institutions' in A Paterson and LJ Kotzé (eds) *Environmental Compliance and Enforcement in South Africa: Legal Perspectives* (2009) at 101 concludes the chapter by stating: 'Finally, a discussion of the institutions responsible for undertaking environmental compliance and enforcement functions would not be complete without reflecting on the serious challenge regarding resource challenge regarding resource and capacity constraints... there is a pressing need to increase the number and geographical spread of such officials.'

<sup>9</sup> Section 24(1) states that '...the potential impact on the environment of listed activities must be considered, investigated, assessed and reported to the competent authority...'

<sup>10</sup> In response to the importance of follow-up, many countries in Africa (see ECA n(4) at 46-47) and the rest of the world (see Morrison-Saunders and Arts (n1) at 154-220) have legislated or put in place different procedures (apart from the ECO function) to guide the implementation of the EMP and/or conditions of the EA.

<sup>11</sup> Roles of an ECO may include (if considering some roles contained in EAs): oversee and monitor adherence to EMP conditions; implementation of the construction and EMP conditions; ensuring compliance with the relevant conditions contained in the EA; ensuring mitigation measures are complied with; and induction of all contractors on contents of the EMP and EA.

<sup>12</sup> Government Notice R548 in *Government Gazette* 33306 of 18 June 2009.

undertaken including conditions determining- (ii) requirements for the management, monitoring and reporting of the impacts of the activity on the environment throughout the life cycle of the activity as contained in the approved environmental management programme'. These EAs are the principle mechanism for compliance and enforcement in terms of implementing Chapter 5 of the NEMA.<sup>13</sup> The enforcement of these conditions once set, however, is frequently not carried out effectively.<sup>14</sup>

One of the international best practice principles of EIA is that the process should be credible meaning that it 'should be carried out with professionalism, rigor, fairness, objectivity, impartiality and balance, and be subject to independent checks and verification'.<sup>15</sup> The role of the ECO fits the latter part of this principle especially. In other parts of the world, especially Hong Kong<sup>16</sup> and Canada,<sup>17</sup> provision is made for independent monitoring and auditing agencies to oversee follow-up of EIA decisions and mitigation implementation by persons employed to operate independently of the developer (even though they are required to pay for these services). In Canadian

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<sup>13</sup> Chapter 5 deals with IEM and s 24(c) requires that 'the holder and any person issued with an EA must manage all environmental impacts (i) in accordance with his or her approved environmental management programme, where appropriate;' and in terms of s 24(d) 'must monitor and audit compliance with the requirements of the environmental management programme'. See also DEA (n2) at 16 and 18.

<sup>14</sup> See Wood 'Pastiche or Postiche? Environmental Impact assessment in South Africa' (1999) *South African Geographical Journal* at 56 as quoted by Kidd and Retief (n8) at 1030; and DEA (n2) at 9, which state that 'officials from the Department continue to detect non-compliances with conditions of authorizations issued to para-statal such as the Central Energy Fund, Transnet, Armscor, Aventura Resorts, Denel, Eskom, Johannesburg Water, Portnet, Necsa, Safcol, PetroSA, and Transtel (and others)'. The DEA also mentions that 'the Department is beginning to identify institutions and persons that continue to contravene environmental legislation...' and that in terms of verification of EIA findings the DWA (n2) at 18 states that 'the EIA process did not effectively identify all impacts associated with proposed activities. This was particularly true of the construction and commissioning phases of the projects...'

<sup>15</sup> See IAIA (n1) at 1-4.

<sup>16</sup> In Hong Kong, the proponent is required to appoint an Independent Environmental Checker (IEC) who audits the overall Environmental Monitoring and Audit program required under the EIA Ordinance to be put in place by the Environmental Team appointed by the proponent. The IEC must have at least seven years of professional experience and be independent of the proponent and Environmental Team. See E Au and S Hui 'Learning by doing: EIA follow-up in Hong Kong', in Morrison-Saunders and J Arts (n1) at 197-223.

<sup>17</sup> For major EIA projects in Canada, an Independent Environmental Monitoring Agency (as in the case of the Ekati Diamond Mine) is established to report on the activities of both the proponent and government with respect to project implementation and environmental management. See W Ross 'The independent environmental watchdog: a Canadian experiment in EIA follow-up', in Morrison-Saunders and Arts (n1) at 178-196.

practice, independence is also required from government too. In Western Australian practice, it is the EIA regulator responsible for designing and administering the EIA process (including follow-up) as well as providing publicly disclosed advice and recommendations to the Minister for Environment on each project assessed prior to the approval decision being made (by the Minister) that is established as being statutorily independent of government. This means that the Minister is not able to direct their activities.<sup>18</sup> The ongoing review of EIAM in South Africa reiterates the importance of having ‘an independent third party with no vested interest in the outcome of a particular activity [as being] the best way of implemented an effective compliance and enforcement regime.’<sup>19</sup>

One of the findings to emerge from the research conducted for this paper is that, despite the ECO industry being active in South Africa for almost twenty years,<sup>20</sup> there are still significantly differing views between practitioners on the role and the independence of an ECO.<sup>21</sup> The resultant implications of these differing views may include: substantial variation across EA conditions between individual authorisations; appointment of inexperienced or inappropriately qualified persons to carry out the ECO functions; lack of trust in the effectiveness of these compliance monitoring and implementation functions; poor communication and reporting channels between the developer, the relevant authorities and Interested and Affected Parties (I&APs) and the

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<sup>18</sup> Section 8 of the Environmental Protection Act 1986 (Western Australia) establishes the statutory independence of the Environmental Protection Authority (EPA) stating that: ‘neither (a) the Authority; nor (b) the Chairman [of the EPA], shall be subject to the direction of the [Environment] Minister’. This feature of EIA in Western Australia is a particular strength noted in an international comparative evaluation of a dozen or so EIA systems around the world. See C Wood ‘Lessons from Comparative Practice’ (1999) 20, *Built Environment* at 332-344. A full account of the EPA’s approach to follow-up in Western Australia can be found in A Morrison-Saunders, B Jenkins and J Bailey ‘EIA follow-up and adaptive management’, in Morrison-Saunders and Arts (n1) at 154-177.

<sup>19</sup> DEA (n2) at 16 and 25.

<sup>20</sup> Barker as quoted by Wood (n1) at 255, noted in 1996 already that monitoring conditions were implemented in approvals under the voluntary IEM procedure of the 1992 IEM guidelines of South Africa. These conditions often included amongst others; requirements for an environmental management plan to be implemented and independently audited, for an on-site environmental control officer to be appointed during construction and for subcontractors to be penalised if environmental safeguards were violated. However, these guideline requirements of post-decision monitoring were not included in the first era of mandatory EIA regulations of 1997. Hill, as quoted by Wood (n1) at 255, felt that ‘the lack of regulations on EIA follow-up constitutes a retrograde step for environmental management in South Africa’.

<sup>21</sup> These roles may range from independent compliance monitoring, auditing and reporting to hands-on post decision implementation and enforcement. See roles identified (n11) above.

ECO; poor enforcement support from government; and poor implementation of the EMP and EA conditions; all of which ultimately contribute to failure in compliance monitoring and enforcement on a construction site.<sup>22</sup>

The confusion surrounding the role of an ECO may be fuelled by the fact that the ECO concept, although widely used the past 20 years, has not been explicitly and formally defined in South African legislation and where it was attempted, the definitions do not reflect practitioner sentiment and/or reality. For example, the Department of Water Affairs and Forestry (DWAF) identifies in their Environmental Best Practice Specifications for Construction various role players in monitoring and auditing including an Environmental Officer (EO); an ECO; and an Independent Environmental Control Officer (IECO), each with various functions and roles during construction.<sup>23</sup> The primary role of an ECO as viewed by DWAF is to “act as quality controller regarding all environmental concerns’ and suggests that the ECO in this respect should: conduct periodic site inspections; attend regular site meetings; pre-empt problems and suggest mitigation, verify monitoring reports submitted by the EO and be available to advise on incidental issues that arise. DWAF also state that an ECO should conduct compliance audits. However, auditing forms only a part of a much wider compliance monitoring and enforcement programme on a construction site and should not be conducted by an ECO in situations where an ECO is responsible for implementation and enforcement as this compromises independence.<sup>24</sup> In this situation an independent “external auditor” should

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<sup>22</sup> Also refer to factors contributing to failure in compliance monitoring and enforcement as listed by DEA (n2) 1-44.

<sup>23</sup> The Department of Water Affairs and Forestry (DWAF) aims to define roles for efficient implementation of Performance Specifications, effective Monitoring and Auditing for construction or implementation of a project in their Environmental Best Practice Specifications for Construction. DWAF identifies various role players in monitoring and auditing including: the land owner/custodian of the land; the developer / implementing agent, environmental consultant; project manager; design engineer; environmental planner; contractor; site engineer; environmental officer; environmental control officer; independent environmental control officer; operator of water supply and/or infrastructure; and environmental manager. An interesting statement by DWAF is that the contractor and EO are answerable to the ECO, thus implying that the ECO has a position of authority. On competence DWAF recommend that the role of an ECO be fulfilled by any person (department or professional service provider), well versed in environmental studies and construction processes. See Department of Water Affairs and Forestry (DWAF) *Integrated Environmental Management Series – Environmental Best Practice Specifications: Construction* (3<sup>rd</sup> ed 2005) at 48-51.

<sup>24</sup> Audit is defined as ‘systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled. Independence: being the basis for the impartiality of the audit and objectivity of the audit conclusions; is viewed by the

perform the auditing function and DWAF compares an IECO to an external auditor. Again the latter comparison in terminology that adds to the confusion as an auditor is an individual skilled and competent with auditing principles and practice whereas an IECO may not necessarily be. Moreover, in terms of compliance monitoring,<sup>25</sup> the competent authority may require a person in question (a person that contravened or failed to comply with a condition of an environmental authorisation), to appoint an independent person approved by the authority to perform an environmental audit. Does this mean an IECO or an external auditor? Ultimately the situation regarding the abovementioned is unclear.

Furthermore, the NEMA, defines an environmental assessment practitioner (hereafter EAP), when used in Chapter 5 as ‘the individual responsible for the planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management plans or any other appropriate environmental instruments introduced through regulations.’ This might be interpreted to imply that an EAP is deemed to be an ECO when considering the management, implementation and/or coordination of an EMP. However, the EAP definition do not include ECOs having the role of monitoring compliance to EA and EMP conditions, as monitoring is not included in the ambit of the definition. The EIA regulations also define independent in relation to an EAP and include in this description ‘a person compiling a specialist report or undertaking a specialised process...’ The latter may include compliance monitoring as a specialised process and thus imply that an ECO may be deemed to be an EAP.<sup>26</sup> However, this argument is contradicted by the Certificate Board for Environmental Assessment Practitioners for South Africa (hereafter

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International Organization for Standardization (ISO) as one of the principles of auditing and state that ‘auditors should be independent of the activity being audited and also be free from bias and conflict of interest.’ See South African National Standards (SANS) *SANS 19011: 2003 / ISO 19011: 2002 – Guidelines for quality and/or environmental management systems auditing* (2003) at 1-4. Furthermore, the ISO notes that in terms of an independent audit ‘in many cases, particularly smaller organisations, independence can be demonstrated by the freedom from responsibility for the activity being audited.’ See South African National Standards *SANS 14001: 2005 / ISO 14001:2004 Environmental Management Systems – Requirements with guidance for us.* (2<sup>nd</sup> ed 2005) at 3.

<sup>25</sup> Regulation 69 of Government Notice R548 (n12).

<sup>26</sup> According to GN R 543 a “specialised process” means a process to obtain information which-

- (a) is not readily available without undertaking the process; and
- (b) is necessary for informing an assessment or evaluation of the impacts of an activity, and includes risk assessment and cost benefit analysis.

CBEAPSA) which states that: ‘an EAP is someone who, co-ordinates, manages, and integrated various components of environmental assessment throughout the planning process. CBEAPSA also adds that the term does not apply to specialists in particular fields who may be involved in, or asked to give input to, particular stages of an environmental assessment from the perspective of his/her field of expertise.’<sup>27</sup>

The DEA also argues that relatively less compliance and enforcement authority activity are made by government during project implementation and operations and that the later compliance and enforcement function will be ultimately driven by Specific Environmental Management Acts (hereafter SEMAs) such as the NEMAQA and the NEMWA.<sup>28</sup> Designation of control officers in SEMAs are, therefore, provided for with the tasks of: working towards the development and introduction of cleaner technologies; identifying measures in respect of waste minimisation; taking all reasonable measures to ensure compliance; and promptly reporting on non-compliances to licence conditions. For example an ‘Emission Control Officer’<sup>29</sup> should be designated by a licence holder in terms of s 48(1) of the NEMAQA, if required by an air quality officer.<sup>30</sup> A similar SEMA compliance officer function is the ‘Waste Management Control Officer’, which should be designated by a holder of a waste management licence in terms of s 58(1) of the NEMWA, if required by a waste management officer.<sup>31</sup> Although some roles and

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<sup>27</sup> Certification Board for Environmental Assessment Practitioners of South Africa (CBEAPSA). 2012. Information Booklet at 7. Available at [www.eapsa.co.za/downloads.html](http://www.eapsa.co.za/downloads.html) (accessed 05 June 2012).

<sup>28</sup> See DEA (n2) at 17-18.

<sup>29</sup> H Von Blottnitz, C Fedorsky and W Bray in *in* HA Strydom and ND King (eds) *Environmental Management in South Africa* (2009) at 579, notes that in terms of s 48(2)(a) to (c) of the NEMAQA, the emission control officer must have the requisite competence to work toward the development and introduction of cleaner production technologies and practices and should take reasonable steps to ensure compliance by the holder with the licence conditions and requirements, and promptly report on non-compliance to the licensing authority. See also section 48 of the NEMAQA for roles

<sup>30</sup> In terms of section 1(1) of the NEMAQA an air quality officer means an officer appointed (by government) in terms of section 14 as an air quality officer. This is an appointee in the DEA responsible for co-ordinating matters pertaining to waste management in the national government.

<sup>31</sup> In terms of s 1 of the NEMWA, the waste management officer means ‘a waste management officer designated in terms of section 10’. This is also an appointee in the DEA responsible for co-ordinating matters pertaining to waste management in the national government. Section 58 of the Act requires that a waste control officer must-

(a) Work toward the development and introduction of clean production technologies and practices to achieve waste minimisation;

competencies are alluded to, both the 'Emission and Waste Control Officer' concepts have also not been defined by this particular SEMAs or any other policy. These SEMA designated control officers also raise questions such as: may an ECO designated under NEMA also act as a SEMA control officer during construction phase of a project?; is a SEMA designated control officer competent to act as an ECO?; and what are the overlapping responsibilities and timeframes of these different control officers? These issues surround these currently unresolved likely add to the confusion regarding the expected roles of the NEMA designated ECOs.

In light of the previous discussions on the independence and role of an ECO, this paper reports on an initial attempt to define; by way of evaluating environmental practitioner perspectives in a survey, what the role is of an ECO in the compliance monitoring and enforcement effort during the construction phase of a project is or ideally should be. This paper also reveals practitioner perspectives on key roles, core need for and needs of the industry before concluding with reflections on these issues. The lessons distilled from the survey may serve to aid legislators, legal practitioners, decision-makers, EAPs, developers, ECOs, I&APs and other role-players in understanding the role of the ECO and in being able to work towards more effective implementation of EAs in South Africa into the future.

## **4.2 Study context and methodology**

The principle author, as an employee of the Centre for Environmental Management (CEM),<sup>32</sup> was sub-contracted as an ECO for a period of five years from September 2006 until August 2011 for a large-scale mall development project in Potchefstroom. During this period the project as well as the ECO function was used as a best-practice

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(b) Identify and submit potential measures in respect of waste minimisation, including the reduction, recovery, re-use and recycling of waste to the waste management licence holder and the licencing authority;

(c) Take all reasonable steps to ensure compliance by the holder of the waste management licence with the licence conditions and requirements and the provisions of this Act; and

(d) Promptly report any non-compliance with any licence conditions or requirements or provisions of this Act to the licensing authority through the most effective means reasonably available.

<sup>32</sup> The core activities of the CEM are to build capacity and facilitate change by amongst others: developing and conducting flexible and appropriate training programmes in environmental and occupational health and safety management and related fields. See Centre for Environmental Management (CEM), *2011 Yearbook* (Potchefstroom 2011).

environmental enforcement case example<sup>33</sup> and practical exercise application for various environmental courses<sup>34</sup> hosted by the CEM. In these courses heated debates and discussions were entertained between practitioners and presenters with regards to post-decision environmental compliance monitoring, implementation, and enforcement of EMP and EA conditions and at the heart of the discussions were the role and independence of an ECO. As a result of the latter and various requests for training by organisations on the particular subject, the CEM started developing a five day course in 2007.<sup>35</sup> During 12-16 September 2011 at the North-West University in Potchefstroom, the course with the theme 'Post-decision Environmental Monitoring and Enforcement: An Introduction to the Role and responsibilities of an Environmental Control Officer (CEM-05.1.5)' (hereafter 'the course') was successfully presented to 29 students from various organisations by 11 presenters from the CEM and other leading role-players<sup>36</sup> in the ECO industry.<sup>37</sup>

We identified this rare and historical gathering of 40 environmental practitioners interested in and involved with the ECO industry as a unique opportunity to gather data

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<sup>33</sup> According to JG Nel and JA Wessels 'How to use Voluntary, Self-regulatory and Alternative Environmental Compliance Tools: Some Lessons Learned' (2010) 13 *PER* 189 at 65, the MooiRivier Mall development aimed to integrate a seamless portfolio of environmental enforcement tools designed to deliver sustained, reliable and demonstrated legal compliance throughout the life cycle of the project.

<sup>34</sup> Courses that used and are still using the MooiRivier Mall development as a case example and practical exercise includes: Introduction to Environmental Management – An Overview of Principles, Tools and Issues (CEM-01.1); Environmental Impact Assessment: A Practical Approach (CEM-05.1); Introduction to Integrated Waste Management for Environmental Managers (CEM-06.2.1); Water Quality Monitoring: Principles, Approaches and Techniques (CEM-06.4.3) and the newly developed Post-decision Environmental Monitoring and Enforcement: An Introduction to the Role and Responsibilities of an Environmental Control Officer (CEM-05.1.5). See CEM (n26).

<sup>35</sup> As a result of the factors mentioned above, the principle author developed a keen interest in the ECO topic and enrolled for a PhD at the Department of Geography and Environmental Management, North-West University in 2011 and is currently conducting an in-depth investigation of the role and independence of ECOs.

<sup>36</sup> The key organisations involved in the development and delivery of the course were: Trans-Caledon Tunnel Authority (TCTA); NCC Environmental Services (Pty) Ltd.; Department of Geography and Environmental Management of the North-West University; SE Solutions (Pty) Ltd and Ecoleges.

<sup>37</sup> Although the course is probably the most comprehensive ECO training to be conducted in South Africa to date, we acknowledge that other training courses are currently provided by training service providers such as the one day 'Environmental Control Officer (ECO) & Contractor Training for Environmental Management Plan (EMP) Implementation' by Future Works. Details are available at [www.futureworks.co.za](http://www.futureworks.co.za) (accessed 31 September 2011).

for an interpretive-empirical research evaluation<sup>38</sup> of current perceptions on the role and independence of the ECO function. Our primary means of data collection was by way of a survey questionnaire of all parties involved (presenters and participants) in the course.<sup>39</sup>

### 4.3 Survey design

The survey questionnaire was distributed to the practitioners at the commencement of the course<sup>40</sup> as well as the presenters, and other identified role-players in the industry during the course to probe participants' understanding of and perspectives on the ECO industry.

For the purpose of this paper, two aspects of the original questionnaire<sup>41</sup> are presented; these address the role of the industry and independence of the industry. The parts of the questionnaire used in the survey relevant to these fundamentally important issues for the industry are reproduced in Box 1. They are divided into three components namely; demographic data, open or qualitative questions, and closed or quantitative questions.

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<sup>38</sup> WL Neuman *Social Research Methods, Qualitative and Quantitative Approaches* (2000) at 72, states that 'interpretive research tries to capture reality as it is, namely as seen and experienced by the respondents' and also mentions that 'for the interpretive researcher, social reality is based on people's definitions of it'. Furthermore, M David and CD Sutton *Social Research – the Basics* (2004) at 361, defines empirical research as 'the collection of data (by various means), rather than drawing conclusions only from the manipulation of theoretical propositions'.

<sup>39</sup> Surveys as commonly used to great effect within the EIA research field to understand how practice unfolds in a legal or policy context. See for example; A Morrison-Saunders and J Baily 'Practitioner Perspectives on the Role of Science in Environmental Impact Assessment (2003) 31(6) *Environmental Management* at 683-695; S Waldeck, A Morrison-Saunders & D Annandale. 'Professional Practice: Effectiveness of non-legal EIA guidance from perspective of consultants in Western Australia' (2003) 21(3) *Impact Assessment and Project Appraisal* 251-256; A Morrison-Saunders and B Sadler 'The art and science of impact assessment: results of a survey of IAIA members' (2010) 28(1) *Impact Assessment and Project Appraisal* 77-82; and V Sok *et al.* 'Addressing Climate Change through Environmental Impact Assessment: International Perspectives from a Survey of IAIA Members' (Unpublished) Scheduled for publication in *Impact Assessment and Project Appraisal* 29(4) in December 2011.

<sup>40</sup> The idea of the survey was to obtain the perspectives of the course participants before being influenced by opinions, theories and ideas from the presenters and the training materials.

<sup>41</sup> The original questionnaire developed for the survey contained eight components: general perspectives on ingredients for effective post-decision monitoring and enforcement; the need for ECOs; the role of the industry; independence of the industry; the role of ECOs in influencing behaviour; future directions of the industry; demographic data and any further comments. A large volume of data was generated on these topics, in excess of what can be presented and analysed in this paper.

**Box 1. Survey questions concerning the role and independence of an ECO**

Note: the numbering below do not indicate the original sequence of the survey questions.

**Demographic data**

1. *Approximately how much of your working time do you spend directly on ECO-related activities? (Choose 1 only)*  
*None / Up to 25% / Between 25 and 50% / Between 50 and 75% / Between 75 and 100% / 100%*
2. *How many years have you worked in the ECO industry? (Choose 1 only)*  
*None / Up to 5 years / 5 to 10 years / 10 to 15 years / more than 15 years*
3. *What best describes your role in the ECO industry? (Choose 1 only)*  
*Academic research / Competent authority / Consultant (EAP) / Developer (Proponent) / Non-governmental Organisation (NGO) / ECO*

**Open/Qualitative Questions**

4. *List up to five key roles of an ECO.*
5. *In one sentence explain what you consider to be the core need for the ECO industry?*
6. *Explain the importance of independence of an ECO.*

**Closed/Quantitative Questions**

[In the following closed or quantitative structured questions, respondents were asked to rate each of the statements below according to the supplied response scale (strongly agree, agree, partly agree, partly disagree, disagree, strongly disagree, unable to judge). They were also asked to respond on the basis of; 7 their own opinion what should be; and 8 their own experience of ECO practices].

7. *In your opinion an ECO should be independent of?*
  - a) *Developer.*
  - b) *Competent authority.*
  - c) *Environmental Assessment Practitioner (EAP).*
  - d) *Interested and Affected Parties (I&APs).*
8. *In your experience of ECO practice an ECO is independent of?*
  - a) *Developer.*
  - b) *Competent authority.*
  - c) *Environmental Assessment Practitioner (EAP).*
  - d) *Interested and Affected Parties (I&APs).*

Component one pertains to the demographic characteristics of survey participants (Questions 1-3) concerning percentage working time, experience and role as an ECO.

The second component consists of a series of open or free choice questions (Questions 4-6) which yielded content rich qualitative data derived from written responses. While a diverse range of views were presented, common themes emerged. Rather than simply summarise and generalise these themes, a selection of un-edited comments of practitioners relevant to each theme is presented so as to capture the 'voice' of survey participants.

The third component consists of closed or defined choice questions (Questions 7-8), which yielded a quantitative data set derived from seven point rating Likert response scales<sup>42</sup> relevant to independence of the ECO industry. A continuum of ‘Strongly Agree’ to ‘Strongly Disagree’ and an option of ‘Unable to Judge’ were used. This data is content-simple but structured and readily analysed to extrapolate frequency and distribution of practitioner views on the particular matter.<sup>43</sup>

Through surveying practitioners in the field, the intention was to understand how the current legal provisions in South Africa have been interpreted and applied in practice. This provides an opportunity to reflect back on the utility of the current legal framework and what might need amendment in the future; a topic addressed at the end of the paper.

#### **4.4 Survey results and key findings**

The response rate in the survey was relatively high due to the ‘captive’ audience at the course and the survey was returned by 30 of the 40 practitioners involved in the course.<sup>44</sup> Additionally, the survey was also posted online to two additional practitioners

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<sup>42</sup> Quantitative data was obtained in the questionnaire through the deployment of closed ended questions in the form of a Likert scale (rating scales are sometimes referred to as Likert scales), constructed in order to provide information on the practitioner’s opinions and attitudes on the topic of ‘independence’. See David and Sutton (n36) at 167; as well as PD Leedy and JE Ormond *Practical Research – Planning and Design* (9<sup>th</sup> ed 2010) at 189. The scale was constructed through the assignment of two statements (see 7 and 8) on ‘ECO independence to role-players’ (or scale items) followed by the same set of responses for each item indicating varying degrees of agreement with or disagreement with the statement. The responses entailed a seven-point Likert scale, with the end point of the scale a non-attitude choice, termed ‘Unable to Judge’. By offering a non-attitude choice, it was possible to identify those without positions, therefore, addressing the difficulty of aggregation of ratings in the middle range between ‘Partly Agree and Partly Disagree’. See David and Sutton (n36) at 167.

<sup>43</sup> Non-numerical data derived from the seven-point Likert scales enabled the strength of opinion of the practitioners on the topic of ‘independence to role-players’ to be determined. See T Greenfield *Research Methods – Guidance for Postgraduates* (1996) at 54 and 182.

<sup>44</sup> It was acknowledged at the commencement of this research, that it was not possible to collect data from the entirety of the population of environmental practitioners involved in the ECO industry. As verified with Glaudin Kruger (IAIA Secretariat) on 25 October 2011, a variable total of 1076 environmental practitioners are members of International Association of Impact Assessment - South African Affiliate and are involved in some way in the EIA industry. Unfortunately there is currently no data or databases available that indicate how many practitioners are directly involved in the ECO industry (unlike the National Environmental Agency of Singapore’s list of 1747 active registered ECOs). Available at <http://app2.nea.gov.sg/data/cmsresource/20110706896769665932.pdf> (accessed 26 October 2011). As a result purposive sampling (also termed theoretical sampling) was chosen to select sample units, which

and 20 completed surveys were returned due to one of the practitioners<sup>45</sup> distributing the survey to colleagues involved with the ECO industry.<sup>46</sup>

#### **4.4.1 Demographic data**

The 50 participants for the three demographic questions (Questions 1 to 3 in Box 1) revealed the following characteristics:

- A large proportion of the respondents (84%) of the respondents spent some time directly on ECO activities, with some 20% spending more than 75% of their working time on these.
- The survey was completed by relatively inexperienced ECO practitioners; with most (66%) having less than 5 years' experience and a further 20% either indicating no response to the experience question or having no ECO experience. Only 8% of the respondents indicated having '5 to 10 years' experience and only 6% of the practitioners responded to have '10 to 15 years' experience. No respondent practitioners had more than 15 years' experience in the ECO industry. Given that EIA practices have been in place in South Africa for over 40 years (since early 1970s), these results underscore points made previously, that implementation and follow-up aspects of EAs have in large part been neglected and also the emerging nature of the ECO industry.
- With respect to role in the ECO industry, most respondents were 'Practicing ECOs' (46%), followed by 'Consultants / EAPs' (18%), 'Developer / Proponent' (16%), 'Competent authority' (14%), and lastly 'Academic' (2%) with 4% having no response to the question.

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in this case were the course participants. According to David and Sutton (n36) at 152 'purposive sampling is a form of sampling technique available to social researchers to select sample units according to their knowledge and opinion to be ones appropriate to the topic area'.

<sup>45</sup> Managing Director of NCC Environmental Services (Pty) Ltd.

<sup>46</sup> The data generated by these practitioners is relevant for the research topic as the experience of the practitioners make them appropriate respondents to the research topic. See David and Sutton (n36) at 152. Furthermore, additional surveys were returned, which will be used in further research on the ECO topic.

#### 4.4.2 The role of environmental control officers

This section of the paper illustrates the key roles of the industry and the core need for the industry, before concluding with the needs of the industry as identified by the participating practitioners.

##### 4.4.2.1 Key roles of the ECO industry

Regarding the roles within the ECO industry (Question 4 in Box 1) the practitioners were asked to list five key roles in order of priority with 1 as the highest priority. A total of 226 statements were made on the roles that an ECO may have. The key roles listed by the practitioners are clustered into categories and are listed below in order of highest to lowest number of times recorded:

**Table 4-1: Key roles of the ECO industry in descending order of number of times recorded**

Rating	Category	No. of times recorded
1	Compliance monitoring	48
2	Implementation and enforcement	34
3	Advising and/or consulting	27
4	Ensuring legal compliance	26
5	Reporting	21
6	Communicating and/or liaising	17
7	Raising awareness and/or educating	13
8	Auditing	12
9	Environmental protection and sustainable development	7
9	Risk assessment and identification of environmental issues	7
10	Independence	5
11	Conflict management	2
11	Document control	2
12	Influencing behaviour	1
12	Acting as a team player	1
12	Providing assurance	1
12	Driver for continual improvement	1
12	Acting on behalf of government	1

Compliance monitoring, which includes: the monitoring of activities; monitoring of enforcement actions; legal compliance; and inspections, were listed as the number one priority 18 (8%) times and was considered to be the top two ECO tasks a total of 30 (13%) times. Furthermore, being identified 48 times, monitoring contributes to a total of 21% of the total listed roles that an ECO may have.

The clustering of the category 'implementation and enforcement' (Which was mentioned 34 times and is thus being considered the second highest priority role of ECOs) provided to be a challenge as the practitioners listed various roles that deals with implementation and enforcement. For example, the following words or phrases were provided: enforcement; management; implementation of law; developing method statements; approving method statements; reviewing reports; regulating; controlling; and preventing impacts, emergencies and incidents. Interestingly, in contrast and in addition to our responses, the DEA<sup>47</sup> view enforcement as the actions required to maintain compliance. Therefore, one may add 'ensuring compliance' to the category of implementation and enforcement. If this is done, it will mean that 60 (27%) of the responding practitioners viewed implementation and enforcement (including ensuring legal compliance) as the primary role of an ECO.

A role mentioned by 27 (12%) practitioners was the 'advisory function' of an ECO. Practitioners were of the opinion that an ECO add value in a project by facilitating and assisting role-players in the interpretation of EA and EMP conditions, as well as other legal requirements. Additional noteworthy roles identified in this category is consulting with and providing guidance for contractors to minimise environmental impacts.

The role of 'reporting' on issues such as: legal compliance; incidents; and non-compliances; were mentioned by 21 (9%) practitioners and was followed closely by 'communicating and/or liaising' identified 17 (8%) times. In the latter category practitioners viewed an ECO as playing an important role in mediating differences and facilitating better relationships between role players such as government and developers. It must be noted that the line of and/or method of reporting and communicating is a key component of the ECO function and should be designed

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<sup>47</sup> DEA (n2) at 12.

correctly by the developer, environmental implementation agent or any other person/s of authority to enhance the reporting and communication 'voice' of an ECO on a project.

The practitioners also listed 'raising awareness and/or educating' 13 (6%) times and stated that an ECO should promote issues such as environmental protection and sustainability (also refer to rating number 9 where 'promoting environmental protection and sustainable development were listed 7 times). Some practitioners also stated that, 'where practicable ECOs should train contractors'.

Only 12 (5%) of the practitioners viewed auditing as a role to be fulfilled by an ECO. This may be attributed to practitioner's views that independence or 'freedom' from responsibility for the specific activity being audited cannot be guaranteed in practice. Additional to the latter is that ECOs may not necessarily be competent to conduct audits and a final factor to take cognisance of in considering the results is that many practitioners do not accurately distinguish between inspections and audits.

Finally, at the bottom of the ratings were: environmental protection and sustainable development 7 (3%); risk assessment and identification of environmental issues 7 (3%); independence 3 (1%); conflict management 2 (less than 1%); and document control 2 (also less than 1%) followed by: influencing behaviour: acting as a team player; providing assurance; driver for continual improvement; and acting on behalf of government identified once respectively.

#### **4.4.2.2 The core need for the ECO industry**

Sections 3.2.2 and 3.2.3 built on the roles identified in Table 1 and reflect on the written interpretation of the open Questions 5 in component 2 of the survey regarding the core need for the ECO industry. The qualitative responses are grouped according to the specific theme related to the questions posed in the survey. The general analyses of main findings are presented on a question-by-question basis followed by a presentation of key statements in the original words of the practitioners. The latter is done to convey the essence and passion of the practitioners. As a large volume of responses were received, this section will only focus on selected usable and unambiguous responses.<sup>48</sup>

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<sup>48</sup> See also qualitative statements at the end of section 3.3 of the paper.

Question 5 of the survey was interpreted by the practitioners as having one of two meanings; firstly: 'what the ECO industry is needed for' (this was the original intent of the survey question); and secondly 'what is needed for the ECO industry'. Although the question was interpreted differently by the practitioners both categories are valid for the study and will be reflected on as separate themes in this section and in section 3.2.3 respectively.

The results of the category: 'what the ECO industry is needed for' indicates that 13 (26%) of the practitioners regarded compliance monitoring of EMP and EA conditions as a core need for the industry, while 8 (16%) respondents regarded ensuring legal compliance and 5 (10%) enforcing conditions on a site as a core need for the ECO industry. Thus, more than 50% of the responding practitioners were of the opinion that the ECO function directly corresponds to the need for legal compliance monitoring and enforcement on a site. This correlates strongly with the results of Question 4 as presented in Table 1. Apart from ensuring and enforcing legal compliance 7 (14%) respondents also regarded protection and conservation of the environment as core needs for ECOs (also see rating 9 in Table 1). Furthermore, 6 (12%) of the practitioners deemed communication and reporting as central to the ECO function, (see ratings 5 & 6), while 6 (12%) were of the opinion that advising (other words used were; guidance, facilitate, make aware and coaching) developers on environmental issues is a core need for the industry (the advisory function was rated 3<sup>rd</sup> in Table 1). In essence the results of Questions 4 and 5 correlate closely and reiterate the importance of these roles and the industry in general.

Some of the statements made by the respondents on these topics are listed in Boxes (2 and 3), which are followed by a brief interpretation of what they may mean.

**Box 2: Perspectives on the need for the ECO industry**

- 'ECOs need in essence to monitor and report on the implementation of EA and EMP requirements to facilitate the carrying forward of the intentions or requirements set out in the EMP and EA by creating a consequence to ignoring these requirements.'
- 'Aim at protecting the environment and monitor the project activities in terms of compliance with project management plan and other legislation.'
- 'To ensure project compliance to National legislation, project EAs, EIA etc.'
- 'Ensuring compliance conditions of ROD and monitoring non-compliance.'
- 'Enforcement and ensure sustainable development.'

'To enforce the conditions of the authorisation and EMP that was issued to the applicant and accepted by government.'

'Ensuring environmental compliance through an independent party,..'

'Independent post-decision monitoring and enforcement.'

'An ECO is not a policeman'

The monitoring and reporting function according to the practitioners is a form of warning system to inform the developers of the consequences of not complying with conditions. The industry also focuses (or aims) on protecting the environment by monitoring activities of projects of not only the project specific EA or EMP requirements but also other relevant environmental legislation. Enforcement, ensuring compliance and sustainable development is also raised numerous times by the participants.

The last perspective of an ECO should not be a 'policeman' is interesting because a policing function may be negatively perceived by developers and contractors on a site, whereas more effective outcomes might be achieved if an ECO is seen to be working in collaboration with these workers. A more appropriate analogy may be that of a referee reflected on later in the paper. In order to fulfil these roles effectively and efficiently however, the respondents raised certain needs of the industry.

It is interesting to compare the abovementioned perspectives as well as the roles identified and rated in Table 1 to the principle environmental aims enshrined in s 24 of the Constitution of the Republic of South Africa Act, 1996 (the Constitution) and section 4 of NEMA before concluding this section of the paper. The Constitution, states that: 'everyone has the right- (a) to an environment that is not harmful to his or her health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that- (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.' In essence, effective monitoring (see rating 1), implementation and enforcement (refer to rating 2) as well as ensuring legal compliance (rating 4) should give effect to the constitutional principles of preventing pollution, ecological degradation and securing ecological development during the construction phase of a project (also see rating 9 that deals with environmental protection and sustainable development).

If the NEMA is considered, section 4(a)(viii) of NEMA states that: 'that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied'. Anticipation and prevention of impacts can only be done through proper environmental assessments such as EIAs during pre-construction and, thereafter, during construction and operation on a continuous basis through on-site risk assessments and identification of impacts (refer to rating 9). The identification of impacts and associated non-compliances during construction and operation can only be achieved through effective and efficient continuous monitoring programmes implemented by people (such as an ECO) that frequently visit a site (see 1). In terms of rating 3, 6 and 7 (advising, liaison and raising awareness) section 4(f) of NEMA states that 'The participation of all interested and affected parties in environmental governance must be promoted,...' and section 4(h) requires that 'Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means. All of these legal requirements relevant to the roles of an ECO are given a mandate by section 4(e) which requires that 'Responsibility for the environmental health and safety consequences of a project, or activity exists throughout its life cycle' which includes the construction phase.

Finally and as stated previously, EAs and related conditions issued under section 24 of the NEMA (see also regulation 37(1) of GN R543 as discussed above) are the principle mechanism for compliance and enforcement and hence the implementation of Chapter 5 of NEMA. Legal compliance monitoring (rating 1) and ensuring legal compliance (rating 4) by implementation and enforcement (rating 2) as primary roles of an ECO should thus, in practice, be giving effect to Chapter 5 of the NEMA.

In summary, the perspectives of the practitioners do reflect the intended implementation of the legal provisions contained in the Constitution and the NEMA through the ECO industry. The current legal framework would also appear to be useful in relation to providing legal support for the ECO industry and thus not in need of amendment. However, the EIA regulations specifically may need amendment to adopt specific ECO roles and thus reflect best practice such as the Emissions and Waste Control Officer duties and competency requirements in the applicable SEMAs. Lastly, it is essential that the legal intentions and the method of implementation thereof through an external enforcement or control function such as an ECO should be consistently reflected in EA

conditions (being the principle mechanism for compliance and enforcement during construction phase) to avoid confusion on the issue of independence and roles.

**4.4.2.3 Needs of the ECO industry**

In the context of how to fulfil their roles efficiently and effectively the practitioners identified needs of the industry. With regards to this category 15 (30%) of the 50 practitioners had concerns with the competency (experience and training) of the industry and some of the noteworthy perspectives are reflected in Box 3 below:

**Box 3: Perspectives on competency**

‘A very good understanding of natural systems and ecology is key together with a very practical hands-on approach.’

‘Passionate, educated people who put the environment first and are guided by sustainable development.’

‘ECO that is knowledgeable not only in the environmental aspects of a particular activity, but to be informed and experienced with the engineering, and construction requirements for the said activities.’

‘Knowledge is required so that ECOs are able to assist with compliance and identify non-compliance.’

‘ECOs became the competent environmental assurance practitioners who need to be well versed in a multitude of disciplines relating to environmental management.’

The clear picture that emerges from the comments in Box 3 is that respondents support an educated industry that is versed in environmental matters relating to sustainable development, ecology, legislation and construction and/or engineering requirements with a degree of experience in these subjects.

Closely related to competency were the issue of registration and regulation of the industry by a body (or related criteria and standards) to ensure competent practitioners are performing the ECO function. A total of 5 (10%) of the practitioners had a response on regulating the industry and some of these perspectives are recorded in Box 4 below:

**Box 4: Perspectives on the need for regulation of the industry**

'A system of registration to control the quality and learning of the ECO industry, with particular focus on the specific skill set required by ECOs.'

'Registration of ECOs and regulation of the ECO function: i.e. most companies are doing ECO function and some of the ECOs don't have any experience about what an ECO must do on a site.'

'Screening of potential ECOs based on their skills, qualifications and core competencies. A set standard is required to maintain and/or create effective environmental monitoring & enforcement in South Africa.'

'At this point in time there is a need for the industry to be formally regulated, with clearly defined roles and responsibilities to effectively monitor compliance on behalf of the competent authority, and criteria prescribing professional experience requirements.'

'A board which ensures the independence and relative competency of an ECO would have a great advantage to the ECO industry.'

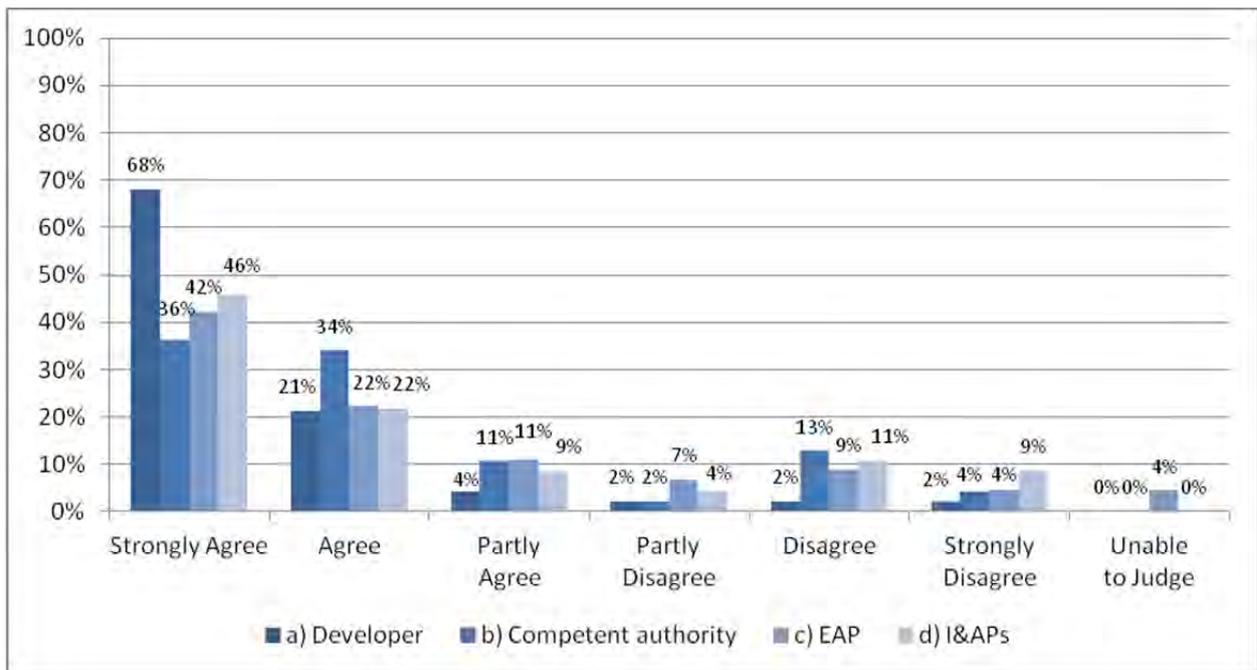
'I think the core need for the ECO industry is to have an accredited body to ensure that they are recognised and adhere to high level of ethics and integrity and professionalism.'

A strong support for the regulation and registration of the industry is seen in the comments reproduced in Box 4. This could be interpreted as people or organisations that invested in the quality and skills of their ECO product and that may want to protect their market share of the industry. On the other hand they may also be altruistic comments made by concerned practitioners based on their experience in the field. Interesting notions to also highlight is the call for a system for screening with related criteria and/or standards that clarifies roles and responsibilities.

Apart from the core needs of competency, regulation, and independence of the industry (discussed in the next section 3.3), practitioners also identified ethics, integrity, honesty and professionalism, support from developers and government as well as clearly defined roles and responsibilities as being core needs of the industry.

**4.4.3 Independence of environmental control officers**

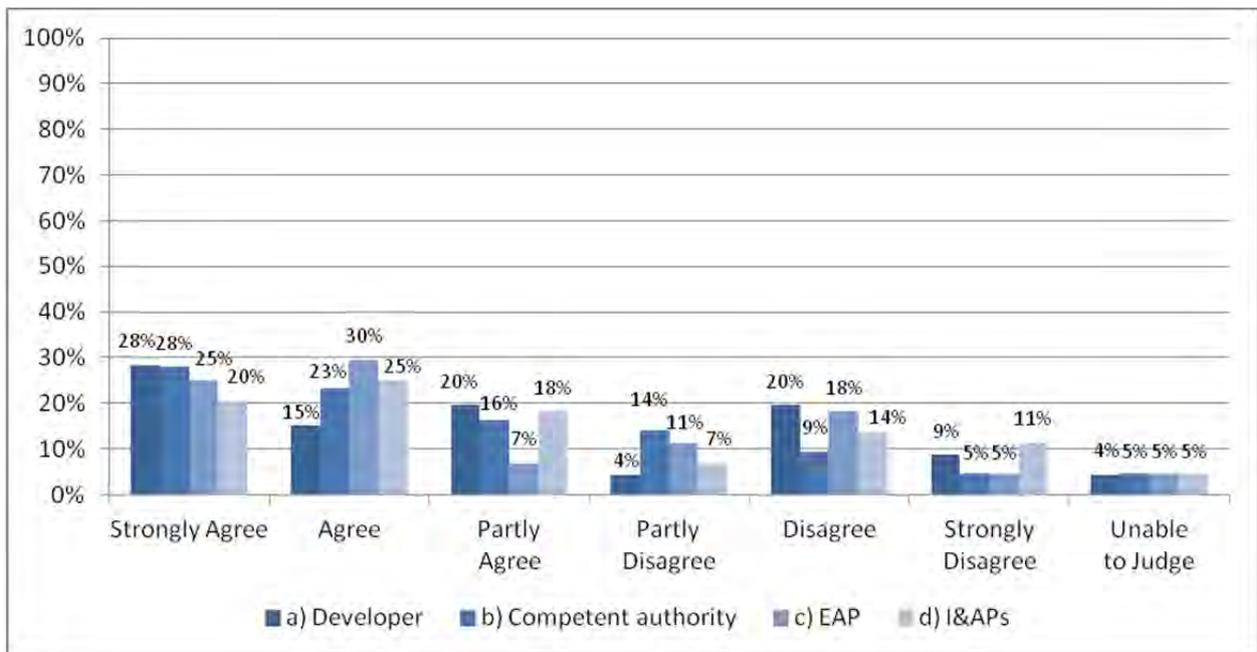
The first part of this section outlines the profile derived from the perspectives of the practitioners on the two defined or closed-choice statements of the survey pertaining to the issue of independence of the ECO industry (see Questions 7–8 in Box 1) followed by a written interpretation of the open question (Question 6) pertaining to the importance of independence of an ECO. In relation to the question of whom an ECO should be independent of (see Question 7), the practitioners generally held independence of ECOs to all role players in high regard as the response to the initial question attest (see Figure 4-1).



**Figure 4-1: In your opinion an ECO should be independent of?**

Of the responding practitioners 44 (93%) were in agreement that ECOs should be independent of developers (68% where in strong agreement), whereas only 3 (6%) disagreed. Furthermore (see Questions 7b-d), 38 (81%) of the respondents were in agreement that an ECO should be independent of the competent authority; 34 (75%) with relation to independence to EAPs; and lastly, 35 (77%) responded that ECOs should be independent of I&APs. These results reflect the international positions (e.g. Hong Kong and Canada) outlined previously.

In contrast, practitioners had a stark view regarding to whom an ECO should be independent of and what the situation is with regards to independence in their own experience. If the rich and strong content on the issue of the importance of independence (see Question 6 and written responses reproduced in Box 5) as well as the rating of independence as a key role (see rating 10 in Table 1) are considered, then it is obvious that independence of the ECO function is a serious concern that needs urgent attention and clarification from government and developers. Independence should, as far as possible in practice, be addressed in EA and EMP requirements as well as service agreements and project governance structures for absolute clarification.



**Figure 4-2: In your experience an ECO is independent of?**

Only 13 (28%) of the respondents in Figure 1-2 strongly agreed and 29 (63%) respondents in total were in agreement that ECOs are indeed independent of developers (see Question 8a). Furthermore: 29 (67%) were of the opinion that ECOs are independent of the competent authorities; 27 (62%) of EAPs; and 28 (63%) of I&APs.

In terms of the written interpretation of the open question in component 2 of the survey 8 (16%) of the practitioners identified independence as a core need (refer to Questions 5 of Box 1), which underscores the strong support for independence to all role-players (see Figure 1-1). Very rich content was received from the practitioners but due to availability of space only some of the more noteworthy perspectives on independence that simply could not be ignored are reproduced in Box 5.

**Box 5: Perspectives on the importance of independence**

‘An independent person/body monitoring the project while still being able to have clear communication with the legislator/Government departments as well as the developer to eliminate any potential grey areas/loop holes.’

‘Independence gives the ECO more authority. Independence does not have to adhere to budget constraints and independence ensures that all shortfalls and non-compliances are reported.’

‘As an ECO, I have been asked by the developer to omit certain comments from my reports. After coaching the developer as to what the role of the ECO actually is, they agreed that the reports should not be biased.’

'Without independence, the inherent and fundamental principles, aims, functions and purposes of section 24 of the Constitution and all subsidiary legislation, notices, lists, best practice guidelines etc. Become compromised.

'The environmental industry as a whole is often brought to question by various I&APs with respect of the independence of EAPs in general. In order to improve the perception of the general public and to ensure the integrity of the industry, independence must be maintained.'

'Complete independence; in other words not to be influenced by the client who pays your salary and maybe a system where the government pay or have a fund where the client pay into the fund.'

'In my experience, if there are no requirements for independence, developers may appoint their own internal ECOs. However, independence of the developer and competent authority is critical to ensure objective and fair representation of conditions on a site.'

'As an independent compliance monitoring agent it is essential that the ECO serve the environment and not any particular party – it is my opinion that they should be independent of all project participants and role players so that they can give a totally unbiased record of fact. BUT the obsession of environmental consultants with independence makes them less than effective in the control of environmental risks and impacts'.

'The benefits of an EAP performing ECO work include intimate familiarity and improved continuity of EA and EMP requirements. In this case, independence can be managed by delegating ECO work to a senior consultant that did not participate in the Basic Assessment or EIA.'

'Preventing corruption, intimidation and/or bias of the ECO. The risk though, is that the ECO then needs to be pretty damn competent to act as such for the interest of their role and not wield their 'power' incompetently with no one being able to hold them accountable for their actions.'

'I think that sports analogy works best for describing the role of an ECO as a referee of a game, and in the world of compliance monitoring, you can't be the player and the referee. Without that independence, we get into potential bias that always throws doubt into any outcome. Keep the following in mind: the authorities should be seen as the governing body (such as FIFA or SARU) who set the framework, guidelines and laws, the EAP who defined the playing field and how that playing field looks for proponents (where the goals are), the developer and I&APs as opposing teams (each fighting for an outcome in their favour) and the ECO as the referee who ensures everyone adheres to the rules to ensure that the outcome is fair, accurate and achieves the goals set by the EAP.'

Interesting to note from the comments reproduced in Box 5 is that the ECO function is not viewed as an independent person only, but may also be an independent body. These bodies referred to may be manifested in the form of independent MCs<sup>49</sup>

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<sup>49</sup> WA Ross 'The Independent Environmental Watchdog: A Canadian Experiment in EIA Follow-up' in Morrison-Saunders and Arts (n1) at 178-190 describes the role of the Independent Environmental Monitoring Agency at Ekati Mine in Canada. Ross mentions that an Environmental Agreement, among other things established the Agency as a watchdog for environmental management for both the mine operator (also the proponent: BHP Billiton Diamonds Inc. (BHPB)) and the regulators (consisting of various agencies of the Government of Canada and the Government of the Northwest Territories). The tasks of the Agency included: reviewing and commenting on monitoring and management plans and the results of these activities; monitoring and encouraging the integration of traditional knowledge into management plans; participating in the regulatory process; bringing concerns of the aboriginal peoples

consisting of a board of members of different categories of people<sup>50</sup> with the principal functions of monitoring and regulatory control after the necessary authorisations have been issued.<sup>51</sup> The role of MCs are in many aspects similar to those identified by the practitioners for ECOs, however, the role of an appointed ECO in his/her personal capacity in these MCs is a further point of debate that currently needs clarification as both literature and the practitioners surveyed are silent on this particular topic. It must be noted that MCs may have a very important function to fulfil in particularly supporting the ECO function and clarifying the issue of payment and corruption raised by many practitioners; if for example, payment of a MC is made by multiple investors (government, developers and NGOs) such as in the Canadian Ekati Mine case study. It may also serve as a monitoring body to monitor the activities of a range of ECOs on different projects in a region or a multi-project development situation such as in the Hong Kong scenario.<sup>52</sup> It should be noted that MCs may also have inherent flaws as well.<sup>53</sup> Apart from individual ECOs and MCs, it is also possible to have a team of ECOs

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and public to mine operators and to government; keeping aboriginal peoples and the public informed; and writing an annual report that require response from BHP and governments.

<sup>50</sup> According to Ross (n47) at 189, the Agency Board members and the members consisted of: a retired senior politician; a retired fisheries consultant with; university professor specialising in different areas; environmental consultants with impact assessment experience; and the vice president of the North Slave Metis alliance. It is interesting to note that these members were sponsored by the various role players. In relation to South Africa, R Midgley 'Environmental Monitoring Committees' (2005) 12 *The South African Journal of Environmental Law and Policy* 37 at 46-47, identifies two broad categories of members: firstly, compulsory members which consist of permit holders (developers or site operators) and relevant government departments (regulators); and secondly, voluntary members which consist of members appointed or elected to represent the local. Interesting to note is that neither Ross nor Midgley mentions an ECO or Independent Checker as being part of the monitoring committee.

<sup>51</sup> Midgley (n48) at 41.

<sup>52</sup> It is interesting to consider the Hong Kong model where multiple projects in a single locality are being followed-up; in the example given by Au and Hui (2004) (n16) the Civil Engineering Department (i.e. a government agency) established an Environmental Project Office to oversee the activities of the Independent Environmental Checker for each project in a multi-project development situation in order to better account for the management of cumulative impacts.

<sup>53</sup> In terms of flaws the DEA (n2) at 20 mentions that although MCs (or EMC) were established on several of the projects reviewed, in one of the projects the MC was limited to include only local, provincial and national authority representation as previous experiences with MC that included both general public and authorities resulted in frequent 'in-fighting'. Other problems raised by the DEA include: poor and irregular attendance; unclear mandates on the part of the authorities; failure to review documentation; failure to take definitive action in response to transgressions of the conditions of the EA and EMP.

fulfilling the compliance monitoring and enforcement function.<sup>54</sup> An advantage of a MC and a team of ECOs over individual ECOs working alone is that they are more likely to generate a relatively balanced and considered view on compliance. Another advantage may be that the diversification may contribute to independence.

Another important issue that needs highlighting is the perspective on the ECO not serving any party or role-player other than the environment itself (thus independence from all). This independent focus helps with: strengthening public perception and integrity of the environmental industry in general; gives more authority to ECOs; ensure that non-compliances are reported truthfully; disconnects ECOs of budget constraints and also possible corruption and intimidation realities. On the other hand, although in support of independence, some practitioners were also of the opinion that there are benefits such as; continuity and familiarity if an EAP fulfils the role of the ECO for a particular project. However, care should be applied for this practice in order to ensure independence in some way. For example, if the same organisation that acted as an EAP in the EIA application is awarded the ECO function for the same development project, a different individual should be fulfilling the ECO function than the one that acted as the EAP. Finally, the interesting participant analogy of an ECO being a “referee” in the environmental compliance game may be a more appropriate description of the independent enforcement role than that of “policemen” as described earlier in the paper.

#### **4.5 Conclusion**

This research set out to understand the perspectives of ECO professionals about their own industry with particular regard to the matters of role and independence. The participating practitioners identified: compliance monitoring; implementation and enforcement; ensuring legal compliance; advising and/or consulting; communicating; reporting; and raisings awareness as the key roles of an ECO. This correlates strongly with and gives effect to the intent of the legal provisions and principles contained in s 24 of the Constitution, s 4 of the NEMA and the EIA regulations that principally aims to prevent pollution, ecological degradation and secure sustainable development through

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<sup>54</sup> A team of ECOs (consisting of a Lead ECO, two ECOs and a Waste Control Officer) for example, where at the time of writing this article, fulfilling the compliance monitoring and enforcement role at the Medupi Power Station project (near Lephalale, South Africa).

the management, monitoring and reporting of environmental impacts. The current legal framework also supports the need of an industry that fulfils the abovementioned tasks during the life cycle of a project. However, the current EIA regulations may need amendment to reflect core roles and competencies of ECOs for the construction phase of projects as done for Emissions and Waste Control Officers in the NEMWA and NEMAQA for the operational phase of related projects. Furthermore, the role of, competency and independence of an ECO should be consistently reflected in EA and EMP requirements to avoid confusion on these issues in practice.

To be effective in fulfilling the abovementioned roles the practitioners identified competency and the regulation of the ECO industry as core needs of the industry. Furthermore, the issue of support from the developer, government, I&APs and possible MCs to an ECO surfaced several times and practitioners viewed this as being vital in ensuring the success of compliance monitoring and enforcement. It is thus clear that without competence and the regulation thereof, as well as proper support, ECOs will not be able to fulfil their roles efficiently and effectively. The practitioners also held independence of the ECO to all role-players in high regard and viewed independence as a critical ingredient in the success of the ECO function and ultimately the successful implementation of environmental legal requirements on a construction site. However, caution should be practiced by practitioners not to obsess with independence to such an extent that this compromises the ability of an ECO to fulfil their roles.

Drawing together the material presented in this paper an initial proposed definition for the role of an independent ECO might be: 'An Environmental Control<sup>55</sup> Officer is an independent, competent person or body that act as a quality controller with a position of authority and power to influence people's behaviour during the construction phase of a project; with selected environmental monitoring instruments; in order to ensure, regulate, record and communicate compliance to applicable environmental conditions and performance specifications'.

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<sup>55</sup> According to C Soanes, FG Fowler and HW Fowler *Pocket Oxford English Dictionary* (9<sup>th</sup> ed 2002) at 178, Control is defined as '(1) the power to influence people's behavior or the course of events. (2) the restriction of something: *crime control*. (3) a means of limiting or regulating something: *exchange controls*. (4) a person or a thing used as a standard of comparison for checking the results of a survey or experiment. Origin: Old French *contreroller* 'keep a copy of a roll of accounts'. Officer is defined as '(1) a person holding a position of authority in the armed services. (2) a person holding a position of authority in an organisation or government'. See Soanes, Fowler and Fowler (n54) at 583.

## **CHAPTER 5: ARTICLE 2**

### **FACTORS THAT INFLUENCE THE INDEPENDENCE OF EIA FOLLOW-UP VERIFIERS: A DEVELOPING COUNTRY PERSPECTIVE**

Objective 2: To identify what factors might influence the independence of verifiers.

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# FACTORS THAT INFLUENCE THE INDEPENDENCE OF EIA FOLLOW-UP VERIFIERS: A DEVELOPING COUNTRY PERSPECTIVE

Jan-Albert Wessels\*

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## Abstract

Independent verification is an important aspect of practice for ensuring the credibility of an Environmental Impact Assessment (EIA). However, the independence of verifiers such as checkers; auditors; and Environmental Control Officers (ECO), may be influenced by various factors that may lead to a conflict of interest between role-players in EIA and EIA follow-up. Identifying these factors is, therefore, important. A total of 18 factors were identified by analysing literature from established verification professions and data derived within the South African context by means of interviews and workshops dedicated to clarifying independence of verifiers. The factors were divided into five categories: financial; commercial; professional; personal; and other. By shedding light on factors that influence the independence of EIA follow-up verifiers, this research aids in anticipating and avoiding potential conflict of interest.

**Keywords:** Factors; independence; EIA follow-up; verifiers; conflict of interest

## 5.1 Introduction

Independence is central to current-day ethical discussions (Everett *et al.* 2005, p. 416) and is viewed as a cornerstone of the ethical foundations of verification fields such as chartered and public accounting, arbitration and auditing (Hong-Lin & Shore 2003, p. 935; Everett *et al.* 2005, p. 416; ISO 2006, p. 2). The International Association of Impact Assessment (IAIA) identify independent verification as an important component of the basic principle of a 'credible EIA' and state that 'a credible EIA process should be carried out with professionalism, rigor, fairness, objectivity, impartiality and balance, and be subject to independent checks and verification' (IAIA 1999, p. 3). Independent checks and verification also form an integral part of EIA follow-up and the related activities of monitoring, auditing, evaluation, management and communication (Arts 1998, p. 26; Lee & George 2000, p. 6; Wood 2003, p. 7; Morrison-Saunders & Arts 2004, p. 2). Moreover, follow-up is widely recognized as the weakest area of EIA

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systems and is of particular concern in developing countries (e.g. ECA 2005, pp. 46–47; Wood 2003, p. 255; DEA 2011a, pp. 7–10).

The purpose of this paper is to identify what factors might influence the independence of verifiers from a developing country perspective with a view to better anticipate and avoid conflict of interest. Examples and experience from South Africa along with perspectives drawn from the international literature provide the basis of my analysis. It is my hope that the research findings will be of relevance and interest to a broad range of EIA practitioners, notwithstanding the particular emphasis on the follow-up stages of the process.

With reference to South Africa as a typical developing country, Craigie *et al.* (2009, pp. 44–45) state that ‘The historical application of unjust and discriminatory laws, which has been compounded by a regime of inadequate legal enforcement, has unquestionably undermined the development of a culture of legal compliance and clouded the application of the rule of law in South Africa and negatively affected the environmental sector.’ As a result South Africa’s environmental authorities were compelled to rely heavily on self-monitoring by industry (Craigie *et al.* 2009, p. 50) and, owing to trust issues; great emphasis has been placed on the independence of EIA practitioners (DEA 2011a, p. 16 and 25). The recent review of the South African Environmental Impact Assessment and Management Strategy (EIMS) of South Africa also referred to the importance of an independent party with no vested interest in the outcome of a particular activity as being the best way of implementing an effective compliance and enforcement regime (Wessels & Morrison-Saunders 2011, p. 30). Furthermore, a study conducted in 2011 on the independence of EIA follow-up verifiers in South Africa (termed environmental control officers, ECOs) highlighted that independence of the ECOs (from developers, government and other parties) is a concern that needs urgent attention and clarification from government and developers (Wessels & Morrison-Saunders 2011, pp. 43–44). Moreover, the South African Department of Environmental Affairs (DEA) mentions that ‘there are strongly opposing views on the issue of “independence” that are unlikely to be resolved in the short-term’ (DEA 2011b, p. 12).

Contradictory views on independence of verifiers involved in EIA and EIA follow-up create the potential for a conflict of interests between parties involved. Interestingly, the Code of Conduct of the IAIA requires members ‘to disclose to employers and clients and in all written reports, any personal or financial interest that could reasonably raise

concerns as to a possible conflict of interest' (IAIA 2013). This may, therefore, also include factors that may influence mandatory independence of verifiers.

The next section describes the research methodology after which existing frameworks and international perspectives on follow-up frameworks and verification are provided. This is followed by a description of the factors that influence independence ending with conclusions and recommendations.

## **5.2 Study methodology**

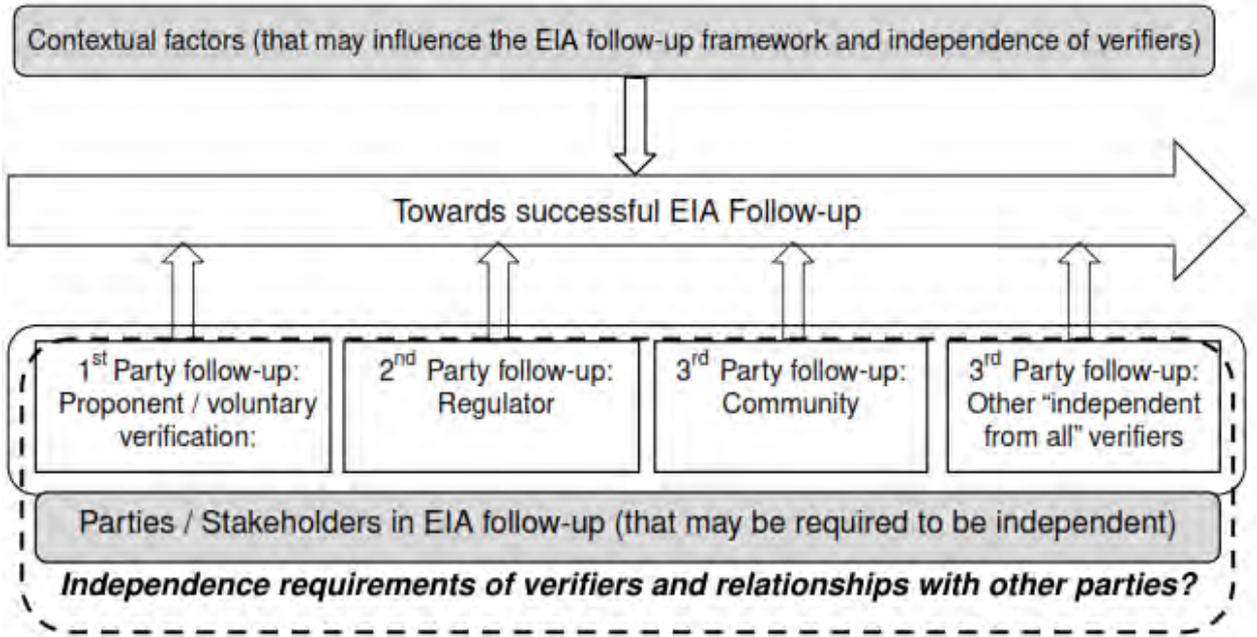
The research methodology is based on a mixed method approach whereby both quantitative and qualitative data collection was performed sequentially following the example of Creswell (2003, p. 21). This approach was first supported by a literature review of theoretical perspectives of other verification professions and fields as well as some international EIA follow-up case examples, consistent with the research methods advice of Creswell (2003, p. 27), Leedy and Ormrod (2010, p. 66) and David and Sutton (2011, p. 55). Professions dealing with independence and which were included for this research include the legal profession, business and financial profession, systems audit profession, EIA and EIA follow-up.

Qualitative data, used to identify the factors that may influence the independence of verifiers, was obtained through semi-structured interviews with key individuals (as per Leedy & Ormrod 2010, p. 182; David & Sutton 2011, p. 294) during 2012 as well as the outcome of a workshop on independence arranged by the South African Chapter of IAIA in 2012 (IAIA KZN Branch 2012a, pp. 1–8).

## **5.3 EIA follow-up frameworks that may influence independence requirements of verifiers**

From the outset I accept that independent verification in EIA follow-up may not be valued to the same extent in every follow-up framework and system. However, contextual factors and related pressures may to some extent influence the follow-up controlling framework and the requirements of independent verification for assuring successful implementation of mitigating or impact management. Marshall (2004: 124) for example notes that “the pressures for EIA follow-up will be greatest where inherent uncertainty in impact assessment requires supplementation or where stakeholders

require a controlling framework for the implementation of mitigation or impact management”. Marshall (2004, p. 124) also mentions that “the regulator’s motivation to impose EIA follow-up will be bound up with the desire to control compliance, to reduce uncertainty, to verify earlier predictions and ultimately to improve the decision management of future EIA processes.” The type of controlling and verification framework mentioned by Marshall (2004, p. 124) may, however, vary from project to project and may be influenced by the complexity and uncertainty of a particular project. These contextual factors (e.g. Morrison-Saunders *et al.*, 2003, p. 45) may influence the independence requirements of verifiers and also the relationship between independent verifiers and other parties involved in follow-up. This relationship is displayed in Figure 5-1.



**Figure 5-1: Contextual factors, parties involved and independence required for successful EIA follow-up and verification (adapted from Morrison-Saunders *et al.* , 2003: 45)**

Morrison-Saunders *et al.* (2003, p. 44) distinguishes between three different types of EIA follow-up in relation to who does follow-up (outlined in Figure 1) and they consider internal or voluntary verification (also known as self-regulation instruments; Marshall, 2004, p. 118) by proponents themselves as a 1<sup>st</sup> party follow-up type. Lehmann (2009, pp. 269-273) notes that in South Africa (as in many developing countries) both government and industry are reverting to alternative or voluntary compliance measures such as environmental management systems (EMS) and other self-monitoring measures to compensate for lack of historical legal enforcement resulted by

environmental authorities' resource constraints. It should be noted, however, that the merit of, and trust in, the ISO 14001 certification scheme and the 'independent' bodies that carry out the certification was dealt a severe blow in 2007 by revelations of serious environmental legal non-compliances at high-profile certified facilities (Craigie *et al.* 2009, p. 60). In the form of additional self-monitoring and verification measures Nel and Wessels (2010, p. 51) note that 'not entirely independent verifiers may be appointed by the regulated industry themselves' and that these verifiers are 'viewed as on-site enforcement surrogates'. These enforcement surrogates are popularly known as ECOs within the South African context.

Compliance with command and control-based instruments such as EIA needs to be verified, in principle by compliance monitoring and enforcement agents of authorities, which are independent from the developer (Nel & Wessels, 2010, p. 50). This type of verification is considered by Morrison-Saunders *et al.* (2003, p. 44) as 2<sup>nd</sup> party follow-up, with the emphasis being typically on ensuring that proponents comply with EIA approval conditions. Recent expansion of the South African inspections by the South African Environmental Management Inspectorate (EMI) has enabled more frequent on-site industry inspections by government. As mentioned previously these inspections are revealing how inadequate self-monitoring has been in South Africa and how frequently industry has failed to comply with self-monitoring and reporting requirements (Craigie *et al.* 2009, pp. 50-51).

The third type of follow-up, according to Morrison-Saunders *et al.*, 2003: 44, involves the community and other independent persons. Morrison-Saunders *et al.* (2003, p. 44) state that 'this body or persons may range from local community immediately affected by a particular proposal through to international pressure groups responding to major infrastructure or resource development projects'. Nel and Wessels (2010, p. 50) also note that 'these verifiers may be independent (from the developer) and may include: public watchdogs; community based or non-governmental based organisations; or statutorily appointed civil-based bodies such as environmental liaison bodies'.

The 'other independent persons' mentioned above may also include additional independent role-players that are independent from not only the developer and their 'not entirely independent verifiers' but also independent of: environmental assessment practitioners (EAPs), the regulators and the community. This 'independent from all' verification function may be appointed by the regulatory authority, the proponent or

other role players individually or jointly and may have an additional verification function over and above first-, second- and third-party follow-up frameworks.

#### **5.4 Independent 3<sup>rd</sup> Party EIA follow-up verification – some international examples**

With the latter description of follow-up frameworks in mind, it is useful to reflect on international case examples where the independence of 3<sup>rd</sup> Party follow-up verifiers was used to achieve certain project objectives. Ross (2004, pp. 178-196) reported that in a Canadian experiment in monitoring and management for a major diamond mining project, an independent environmental monitoring agency (IEMA) was established to serve as an independent watchdog for environmental management at the mine. The IEMA was responsible to seven organisations including: the proponent (BHP Billiton Diamonds Inc.); the Government of Canada; the Government of the Northwest Territories; and the four aboriginal groups in the region. These organisations were all involved in the process of selecting and appointing IEMA members. In this Canadian case study independence is also required from government, thereby ensuring that both the proponent and the performance of government (Government of Canada and the Government of the Northwest Territories) alike are evaluated and that they are held accountable for their actions. The IEMA has also the mandated authority to recommend action to both the proponent and government, which must be responded to publicly (Ross, 2004, p. 188). This is an example of third party EIA follow-up. Interestingly the IEMA contracted an independent consulting firm: the Macleod Institute, to evaluate the IEMA's performance, thus follow-up on follow-up (Ross, 2004, p. 192).

In the UK, the Project Appraisal for Development Control (PADC) at the University of Aberdeen's EIA and Planning Unit (undated), describe a similar (independent) body, the 'Shetland Oil Terminal Environmental Advisory Group' to determine effects of the Sullom Voe oil terminal on the Shetland Islands in Scotland (Arts *et al.* 2001, p. 182). This group comprised representatives from: industry; government; the Shetland Islands Council; other Shetland organisations; and academic experts. According to Ross (2004) the great strengths of this approach to EIA follow-up are the independence of the IEMA and its direct two-way communication with all stakeholders in the project (see Arts *et al.* 2001).

In Hong Kong, a need to assure and inform the public about what was happening in major projects after the EIA reports were approved, led to the initiation of EIA follow-up in the early 1990's. As the EIA follow-up system developed further, quality assurance and impartiality became a prime concern, which prompted the introduction of an Independent Environmental Checker (IEC) system (Au and Hui, 2004, pp. 197-223). The independent IEC system requires the proponent (through permit conditions under the EIA Ordinance) to appoint an IEC (being independent from the developer and the ET) and an Environmental Team (ET). The ET implement the Environmental Monitoring and Audit program required under the EIA Ordinance and the IEC audits the overall program. Both the ET Leader and the IEC must be environmental professionals and have at least seven years of relevant experience. Au and Hui (2004, p. 220) categorise this follow-up approach as a Hong Kong Structure 3 management approach. In the EIA follow-up management Structure 4 of Hong Kong, an Independent Environmental Project Office (ENPO) is set up by the Civil Engineering Department and acts as an IEC for a region of with multiple developments (Au and Hui, 2004, p. 2010). One of the key learning points of EIA follow-up according to Au and Hui (2004, p. 221) in Hong Kong is that 'independent surveillance and vetting of monitoring results help to instil confidence and facilitate informed discussion among stakeholders.'

As mentioned in the introductory and previous section, the lack of environmental legal enforcement is a concern in developing countries such as South Africa and voluntary compliance measures are, therefore, heavily relied upon. One such a measure is the appointment of on-site enforcement surrogates such as ECOs during the construction phase of a project (Lehmann, 2009, p. 273; Nel & Wessels, 2010, p. 51). The ECO may through permit conditions be required to be independent from the developer and may fulfil various roles during EIA follow-up such: as compliance monitoring; ensuring and enforcing legal compliance; advising and/or consulting; communicating; reporting; and raising awareness (Wessels & Morrison-Saunders, 2011, p. 2). There are many case examples of ECOs fulfilling an independent verification function on construction sites in South Africa such as the 125 Billion Rand Medupi coal fired power station project of Eskom (South Africa's largest electricity provider) situated near Lephalale in the Limpopo Province of South Africa. In terms of the environmental authorisation of Medupi 'the Environmental Monitoring Committee (EMC) (with an independent chairperson), in conjunction with the developer must appoint a suitably qualified ECO who must on behalf of the EMC, on a daily basis monitor the project compliance with

conditions of the record of decision, environmental legislation and recommendations of the EMP'.

From the above I deduce that various contextual factors may influence the type of EIA follow-up framework required, which in-turn influence the independent verification requirements of verifiers. In the next section, I describe the factors influencing the independence of verifiers based on the analysis of the interviews and workshop.

## **5.5 Factors that influence the independence of EIA follow-up verifiers**

It is possible to identify the factors that may influence independence, as independence is an external manifestation of certain characteristics, usually in the form of relationships with another (Hong-Lin & Shore, 2003, p. 936). Based on the literature review across different professions, interviews and workshops, I have identified five categories with a total of 18 factors influencing the independence of verifiers were identified as summarized in Table 1. The factors are discussed in the following sections under their respective category heading.

**Table 5-1: Factors that may influence the independence of EIA follow-up verifiers**

CATEGORIES OF FACTORS	FACTORS THAT INFLUENCE THE INDEPENDENCE OF EIA FOLLOW-UP VERIFIERS	LEGAL PROFESSION			BUSINESS & FINANCIAL PROFESSIONS				SYSTEMS AUDIT PROFESSION			SOUTH AFRICAN IMPACT ASSESSMENT			EIA FOLLOW-UP PROFESSION		
		Independence of Judiciary: United Nations	Independence in arbitration: CCMA	Independence in arbitration: Hong-Lin & Shore, 2003	Independence of directors: Blakistan & Crabb, 2007	Independence in accounting: Everett <i>et al</i> , 2005.	Independence in financial auditing: Bakar, A <i>et al</i> , 2005	Independence in financial auditing: PwC	Independence of systems: ISO 17021	Independence in systems: ISO 17024	Independence in systems: ISO 19011	DEAT Guideline (1998) & Legal Memorandum (2006)	NEMA / GNR 543 (2010)	EIAMS Sub-theme: Independence of EAPs	Case examples in literature	IA/Asa Kwazulu Natal event	Case study interviews & questionnaire survey
1. FINANCIAL	1.1 Direct financial interest.				●		●	●	●			●	●				
	1.2 Material indirect financial interest.				●												
2. COMMERCIAL	2.1 Employment relationship.							●			●			●		●	
	2.2 Prior relationship.								●		●				●		
	2.3 Other existing business relationships.			●				●				●					
	2.4 Guaranteeing (safeguarding) independence.	●							●				●			●	
	2.5 Managerial advisory service.	●					●		●		●					●	
3. PROFESSIONAL	3.1 Competency (skill).	●	●			●			●	●	●			●		●	
	3.2 Appearance.					●			●							●	
	3.3 Accountability (self-policing).		●			●	●						●	●		●	
4. PERSONAL	4.1 Family relationships.			●	●			●	●		●	●					
	4.2 Close personal relationships.							●	●			●					
5. OTHER	5.1 Government or political influence.		●											●		●	
	5.2 Transparency of reporting.		●											●	●	●	
	5.3 Diversity of team.		●											●		●	
	5.4 Intimidation threats.	●							●							●	
	5.5 Size of verification firm.						●										
	5.6 Duration of on-site service (tenure).						●									●	

### 5.5.1 Financial factors

The term 'financial interest' has been defined by the judiciary through case law (Stellenbosch Farmers's Windery Ltd v Distillers Corporation (SA) Ltd and Another 1962 (1) SA 458 (A)), to represent a wider concept than propriety (ownership) interest in a business. In terms of financial interest a person or firm may have *direct financial interest* or *indirect financial material interests* in a client.

#### *Direct material interest*

*Direct material interest* is substantial, such as owning stock in the client company or receiving revenue from the company client. On the latter, Bakar *et al.*, (2005, p. 808) raises the issue of size of fees and mentions that: 'the size of fees received by a firm (in relation to total percentage of revenue) is a threat that may influence independence and when talking about the relationship between size of audit fees and annual income, large size of audit fees is associated with a higher risk of losing the auditor's independence.'

In South Africa, following the promulgation of GN R 1183 (South Africa, 1997), the Department of Environmental Affairs and Tourism (DEAT) produced a Guideline Document in an attempt to provide guidance on the statutory provision of the regulations and defines an independent consultant as: 'a consultant not in the permanent service of the Applicant'. In addition, a consultant ceases to be independent if: 'involved in any design or work of the same project; earns more than 50% of his or her work from the same company; and payments depend on the successful authorisation of the application', the latter being an environmental impact assessment application (South Africa, 1998; Cameron Cross Inc. 2006). This guideline is no longer in use as new regulations have been published that do not have restrictions on earnings, but the principle of payment may still be applicable.

#### *Indirect financial material interests*

Having *material indirect financial interests* in any client, such as having a financial interest with any entity associated with the client, may interfere with the independent exercise of the verifier's judgement (Blakistan & Crabb, 2007: 1). The DEAT (South Africa, 1997) also mentions that an EAP may not have any other interest in the activity, application or appeal in respect of which that EAP or person is appointed in terms of

Regulation 543 other than fair remuneration for work performed in connection with that activity, application or appeal (SA 2010).

It is thus evident that the independence of EIA follow-up verifiers may be influenced by direct financial or material indirect financial interests and should be considered in the appointment of or the engagement of a verification function.

## **5.5.2 Commercial factors**

### *Employment relationship*

In terms of Employment relationship, Blakistan and Crabb (2007, p. 1) describe an independent director as 'a non-executive director who is free of any business or other relationship that could materially interfere with the independent exercise of their judgment.' However, being completely free of any business relationship is not possible in EIA follow-up scenarios where verifiers are compensated for their service. In consideration of the latter, it should be accepted that verifiers will always be influenced to an extent by the employer (if the verifier is sub-contracted), the client, a regulatory authority; and the public, or by any combination of these role players.

To guard the independent verification role of the ECO at the Medupi case study, the commercial contract between the ECO service provider (being Nature Conservation Corporation, NCC) and the client is endorsed and promoted by an independent monitoring committee (Marrel, 2012a). Thus, a joint employment relationship exists between the verification service provider, the client and the independent monitoring committee. The joint employment principle is also evident in the Ekati case study in Canada where seven organisations were involved in the process of selecting and appointing the independent watchdog (IEMA) members (Ross, 2004, p. 188). Employment relationship is also mentioned by PricewaterhouseCoopers (undated, p. 2) (PwC) which state that 'if an employee is approached by a client with an offer of employment, the employee should discuss the matter with the audit engagement partner and the employee should be removed from any work for the client until the employment offer is rejected.' Incidentally, the Lead ECO (with the role of independent monitoring, verification and reporting of compliance of authorisation conditions) at the Medupi coal-fired power station case study was approached by the proponent (Eskom as the client) with an offer of employment in the position of Environmental Manager

(EM, with the role of implementing environmental conditions and management systems). After initial rejection of the offer by both the ECO and the service provider (NCC) who sub-contracts the ECO position, the EM position was eventually filled by the ECO; who were at the time of the appointment still sub-contracted by NCC. The DEA, however, expressed the opinion in a letter that a potential for a conflict of interest exists regarding this arrangement and that Eskom needs to consider different arrangements. The DEA opinion may have stemmed from the South African EIA Regulations (37(2)(b)) of the National Environmental Management Act (107 of 1998) (the NEMA) which allows for the conditions of an environmental authorisation to: ‘...require the holder of the authorisation to furnish the competent authority with reports prepared by the holder of the authorisation or a person who is independent, at specified times or intervals- (i) indicating the extent to which the conditions of the authorisation are or are not being complied with; ...’ (SA 2010, p. 10).

Moreover, the EIA Regulations require ‘that there are no circumstances that may compromise the objectivity of that person in performing such work’. The perceived conflict of interest, potential compromise of independence and the different opinions between the parties involved (Eskom- proponent; NCC- environmental verification and implementation service provider; and the DEA- regulatory authority) resulted in the EM resigning from NCC and being employed by Eskom directly. This resolved the conflict of interest concerns expressed by the DEA (Marrel, 2012b). If the independence of the verifiers in this EIA follow-up case was identified as an issue in the early phases of the EIA process, the parties involved could have made adequate provisions to ensure that independence were maintained and that a conflict of interest was avoided.

#### *Prior relationship*

With relation to Prior relationship, ISO (SANS/ISO17024, 2005, p. 5) requires a person (auditor) employed or contracted by a certification body to sign a document to commit themselves to independence from amongst others ‘any prior and/or present link with persons to be examined that would compromise impartiality’. Prior relations are also alluded to by the then DEAT (1998) Guideline Document which states that ‘a consultant ceases to be independent if: involved in any design or work of the same project’. The IAIAasa KZN Branch (2012b) identified in their regional event that ‘an Environmental Assessment Practitioner (EAP) can act as an ECO but that such appointment cannot take place before the environmental authorisation is issued. Otherwise this may

compromise his/her independence in motivating a benefit for a positive outcome of an EA'.

#### *Other existing business relations*

Other existing business relations, apart from the business or work performed in connection with the activity of verification, may also influence independence of a verifier and is mentioned by Hong-Lin and Shore (2003). PwC also state that a partner/employee or immediate family members may only enter into a business relationships with an audit client (or a director, officer or major shareholder of such an audit client) if; the amount of the investment is immaterial; the relationship is insignificant both to the partner/employee and the other party; and the arrangements does not give any of these parties (individually or in combination) the ability to control the venture or entity. The EIA regulations under the NEMA, unpacks independence in relation to an EAP or a person compiling a specialist report or undertaking a specialist process (which may include compliance monitoring) as 'a person or an EAP that has no business (financial, personal or other interest) in the activity, application or appeal in respect of which that EAP or person is appointed in terms of these Regulations other than fair remuneration for work performed in connection with that activity, application or appeal' (SA 2010, p. 10).

The United Nations' (UN) Rule of Law formulated basic principles in 1985 (including principles on independence of the Judiciary) for Governments to consider in their national legislation and practice that was adopted by the Seventh United Nations Congress on the Prevention of Crimes and the Treatment of Offenders held at Milan. UN (1985, p. 1) states in its first principle on independence of the Judiciary that: 'independence shall be guaranteed' (see 2.4-Guaranteeing or safeguarding independence). Guaranteeing independence of verifiers may be done in different ways, such as a contractual agreement or by mandating independence in permit conditions. ISO (SANS/ISO17024, 2005, p. 5) for example requires that independent certification auditors sign a document that guarantees (or to commit themselves to) independence. In South Africa, EAPs are required in terms of GNR 543 (South Africa, 2010) EIA application process to sign a declaration of independence and represent this declaration in writing to the competent authority (South Africa, 2011, p. 12). This latter is, however, not the situation for verification functions such as ECOs in South Africa.

### *Managerial advisory service and/or responsibility*

In relation to Managerial advisory service and/or responsibility, Bakar *et al.* (2005, p. 817) identifies and ranks six general factors influencing independence of auditors and the provision of managerial advisory services is ranked as number five. In empirical studies conducted by Golman and Balry (1974), McKinley *et al.* (1985), Shockley (1981), Pany and Reckers (1983, 1984) and Knapp (1985) (as quoted by Bakar *et al.* 2005, p. 809) all found that the provision of managerial advisory services negatively affected independence. To ensure independence of individual judges the UN Basic Principles on the Independence of the Judiciary requires that that the delegation of authority to supervise the court system must be balanced (UN 2006, p. 9).

Marrel (2012a) states that: 'independence [in relation to independent ECOs at the Medupi case study] means a completely independent function of the project'. Marrel also mentions that: 'The project is the entity responsible for the implementation of the Environmental Management Plan (EMP) [by the Environmental Management team], whereas the independent ECO is responsible for proper quality assurance in terms of environmental legal compliance. The ECO should thus have no contractual authority only an assurance function' (Marrel, 2012a). This distinction between the implementation function of the Environmental Monitoring and Audit program by the environmental team and the verification function by the IEC who audits the overall program is also evident in the Hong Kong case example alluded to earlier in the paper (Au and Hui, 2004, p. 205).

### **5.5.3 Professional factors**

#### *Competency (or skill)*

*Competency (or skill)* is viewed as essential in almost all verification fields. ISO (ISO17021, 2006: 3) for example state that competence is the 'demonstrated ability to apply knowledge and skills' and UNRAL (1985) requires that the Judiciary have appropriate training or qualification. On competence of the accounting field in Canada Abbott (1983) and Gaa (1994) (as quoted by Everett *et al.* 2005, p. 417) wrote 'through the mimicry of other high status professions and accountancy associations in other jurisdictions and through an emphasis on both norms of competence, i.e. education requirements, and norms of conduct, i.e. ethical requirements, accountancy

associations attempt to convince relevant publics that professional privilege is deserved’.

Why is competence then necessary for ensuring independence? A possible answer to the question is contained in element 7.2 i) of ISO (ISO19011, 2002, p. 22) which states that a personal attribute of an auditor is being ‘self-reliant, i.e. acts and functions independently while interacting effectively with others’. When considering the latter, I would argue that a competent professional is less susceptible to influence than an individual that is not competent. Both Marrel (2012a) and Lee (2012) are of the opinion that an independent environmental verifier in the construction field (or ECO) should have ‘a broad range of skills, knowledge and experience’. Marrell (2012a) identified the following knowledge requirements of independent verifiers in construction (ECOs): environmental law and authorisations; Environmental Management Plans (EMPs); successfully providing assurance to government; financial management; contractual understanding; best practice knowledge; understanding of specific project in the local, regional and global economy; and knowledge of life.

With respect to skills, the Medupi case study ECO team: Marrel, Coop and Koekemoer (2012) identified the following skills necessary to be an independent verifier during the construction phase of a project: leadership; advisory; change management; influence; planting seeds of change or ideas; negotiation; ability to understand and negotiate trade-offs; conflict management; project management; organisational (documentation and records); administrative; clear communication; cultural awareness; investigatory; gaining trust. In Hong Kong, the independent verifier (IEC) must be an environmental professional and have at least seven years of relevant experience (Au and Hui, 2004, p. 205). However, there are no mandatory competency requirements for independent verifiers in South Africa, except in situations where competency of ECOs is explicitly asked for in permit conditions.

### *Appearance*

In relation to *Appearance* Paterson (1970: 238) writes (as quoted by Everett *et al.*, 2005, p. 429) ‘The independence of the auditor is both in fact and in appearance vital in order to maintain public confidence in his judgement and integrity’ *Similarly* the Canadian Chartered Accountant stated in 1968 that ‘Without appearing independent the auditor cannot expect the full confidence of the investing public and the financial

community'. Neu and Wright (1992) (as quoted by Everett *et al.* 2005, p. 427) note that 'this emphasis signals the emergence of a preoccupation within the profession with appearance, image, and their management'. ISO (ISO17021, 2006' p. 3) also states that 'Being impartial, and being *perceived* to be impartial, is necessary for a certification body to deliver certification that provides confidence. Interestingly a contractor's environmental manager (Paul, 2012) at the Medupi case study; whose environmental performance is verified by an independent verifier, raised the following concern: 'visually, one of my biggest problems has always been that the ECO on this site need to look as independent as they can. They should not be driving around in a client vehicle and they should not be wearing client logos or uniform.'

### *Accountability*

*Accountability* or evidence that shows accountability through self-policing or internal quality management systems is viewed as important to ensure confidence of verification fields. For example the CCMA (2012) commits itself to accountability by constantly measure themselves against commitments. Paterson (1970, p. 238) also mentions that the most effective means of maintaining the confidence of the public is by continual self-policing and efforts to achieve the highest standards of independence. Bakar *et al.* (2005, p. 809) notes that there is much support to suggest a positive relationship between audit committees (which essentially do self-policing of the financial auditing profession and may hold auditors accountable) and auditor independence, which means that the existence of an audit committee will enhance auditor's independence. In Hong Kong the replacement of the IEC may be demanded by Environmental Protection Department (EPD) if their performance is found to be less than acceptable. In Canada the IEMA of the Ekati mine ensured self-policing by contracting an independent consulting firm to evaluate the IEMA's performance. In South Africa, the Environmental Assessment Practitioners Association of South Africa (EAPSA) was launched in 2011 and will aim to hold environmental practitioners accountable. At the time of writing the paper, it was not clear if independent verifiers (ECOs) of EIA follow-up will need to, or will be able to register at EAPSA and as such the ECO industry is not policed or held accountable by any national organisation or committee. 'Self-policing and accountability is done through the service providers themselves' (Marrel, 2012a) or by mandated environmental monitoring committees (EMCs) such as the Medupi EMC.

#### **5.5.4 Personal factors**

##### *Family relations*

The issue of *Family relations* being a threat for influencing independence surface in most of the professions considered in this study. Hong-Lin and Shore (2003: 935-936) for example state that ‘an independent arbitrator is one who has no close relationship- financial, professional, or personal- with a party or its counsel’. Blakistan and Crabb (2007) indicate in Nyota Minerals’s Policy on Assessing the Independence of Directors that ‘family ties may be relevant in considering interests and relationships which may affect independence, and should be disclosed by the Board’. PwC also indicate that if an engagement team member or a person in the chain of command that a close family member has financial interest in an audit client, a threat to independence may be created. PwC also mentions that you may not provide professional services to an audit client if a close family member is a director, officer or employee in a position to exert direct or significant influence (over financial statements).

##### *Close personal relationships*

A person who an auditor has *Close personal relationships* with may pose familiarity factors. ISO (SANS/ISO17021, 2006, p. 3) refer to familiarity factors which are ‘factors that arise from a person or body being too familiar with or trusting of another person instead of seeking audit evidence. The DEA (South Africa, 1998, p. 10) specifically states that ‘an EAP is a person who has, amongst other, no personal interest in the activity, application or appeal in respect of which that EAP or person is appointed’. I could find no clear evidence of family or close personal restriction requirements being discussed in the literature or case study examples for EIA follow-up.

#### **5.5.5 Other factors**

##### *Government or political influence*

In terms of *Government or political influence* the Commission for Conciliation, Mediation and Arbitration (CCMA) is a South African dispute resolution body established in terms of the Labour Relations Act, 66 of 1995 (LRA). The CCMA states that ‘it is an independent body, does not belong to and is not controlled by any political party, trade union or business’ (CCMA 2012). Jajbhay (1999, p. 54) mentions that ‘although

commissioners are servants of the public, they are not public servants'. Interestingly independence from government in the EIA follow-up field is also required in the Canadian Ekati case example (Ross 2004, pp. 178-196). In South Africa 81% of 50 respondents of the survey conducted by Wessels and Morrison-Saunders (2011) were of the opinion that an ECO should be independent from the competent authority.

### *Transparency of reporting*

In terms of *Transparency of reporting* Nair (2012) is of the opinion that 'independence in this project [construction of Medupi coal fired power station in South Africa] means, 'this guy (ECO function) is allowed to do their work freely without interference and to report it without fear'. Reporting lines of the independent ECO at Medupi is internally to the Assurance Manager (who reports to the project manager directly) (Nair, 2012) and simultaneously to external parties such as the independent monitoring committee and government via a formalised process (Marrel, 2012a). The IAIA KZN Branch (2012a, p. 5) states that 'objectivity can be assured by the ECO in instances where aspects overlooked during the Basic Assessment or EIA process or the EMP are highlighted and reported directly to the authority and client.' The CCMA (2012) also have a commitment on transparency in order to ensure independence and state that the CCMA 'work in a manner that is open and transparent, guided by our statutory obligations and commitment'. Ross also highlights the direct two-way communication with all stakeholders as a great strength of the Shetland Oil Terminal Environmental Advisory group.

### *Diversity of team*

*Diversity of team* is also a factor that may influence independence. On diversity, the CCMA (2012) make the following commitment: 'A team of highly qualified individuals that is representative of all levels of our country's diversity.' The team principle is also evident in the Canadian Ekati, the Sullom Voe oil terminal in Scotland and the Hong Kong ENPO case examples (Ross, 2004, pp. 178-196; Arts *et al.*, 2001, p. 182; Morrison-Saunders *et al.*, 2004, pp. 157-158; and Au & Hui, 2004, p. 2010). In the South African Medupi case study the verification team consists of a Lead ECO, an ECO and two Assistant ECOs (NCC, 2010: 1).

### *Intimidation factors*

As noted above Nair (2012) states that 'independence in this project means: to report it without fear'. The fear mentioned by Nair (2012) relates to *Intimidation factors*. ISO (ISO17021, 2006, p. 3) also identifies intimidation factors as 'factors that arise from a person or body having a perception of being coerced openly or secretly, such as threat to be replaced or reported to a supervisor'. The UN (2006, p. 5) also refers to factors and states that in Principle 1-7 that 'as a basic premise, the independence of the judiciary must be guaranteed by the State and enshrined in the Constitution or in the law of the country'. The UN continues by stating that 'the judiciary must decide matters impartially on the basis of facts and the application of law, without any restrictions, improper influences, inducements, pressures, factors or interferences'.

### *Size of the verification firm*

*Size of the verification firm* is mentioned in the empirical study conducted by Bakar *et al.* (2005, p. 807) and is also rated as the highest ranked threat that may influence auditor independence. Bakar *et al.* (2005, p. 807) mention that 'most empirical studies reviewed found a positive relationship between audit firm size and auditor independence and that these studies prove that large firms are more resistant to client pressures'.

### *Duration of on-site service (tenure)*

Bakar *et al.* (2005, p. 807) also identifies length of time that an audit firm has been filling the audit needs of a given time as a threat that may influence independence and mentions that most writers, who discuss the relationship between tenure and independence, support this view. In the Medupi case study, Pillay (2012) made the following remark 'one does tend to become softer on contractors as one comes to understand their situation and challenges'. A weakness of the independent function identified by Ross and by the Macleod Institute at the Ekati case example is the poor working relationships with BHPB and the IEMA, which were unduly sacrificed by performing the watchdog role (Ross, 2004, p. 193). However, this situation according to Ross (2004, p. 192) improved over time.

## **5.6 Conclusions and recommendations**

In this research I have demonstrated that independence is broadly viewed as a cornerstone of various verification professions. Independent verification is also recognised as an important component of a credible EIA and forms an integral part of EIA follow-up. However, there are many contextual factors and related pressure that may influence the EIA follow-up controlling framework and subsequently the independent verification requirements of verifiers such as checkers, monitoring agencies and ECOs.

I have provided some international examples where independent verification by monitoring agencies, checkers and ECOs were required to fulfil certain project needs including: evaluating performance and compliance; ensuring direct communication between parties; vetting of monitoring results; facilitating decisions; and reporting independently.

In developing countries such as South Africa a history of poor application and enforcement of environmental law, weak EIA follow-up frameworks, and the lack of trust in self-monitoring measures resulted in great emphasis being placed on the independence of EIA practitioners (including EIA follow-up verifiers). The importance of independence is valued to such an extent that the review of the South African Environmental Impact Assessment and Management Strategy makes special mention of a party with no vested interest in the outcome of a particular activity as being the best way of implementing an effective compliance and enforcement regime. However, strong opposing views exist on the independence of verifiers which lead to a conflict of interest between parties involved in the EIA follow-up. In these scenarios the IAIA (IAIA, 2013) requires members “to disclose to employers and clients and in all written reports, any personal or financial interest that could reasonably raise concerns as to a possible conflict of interest”. It is therefore important to identify these factors and to be aware of these factors. It is also recommended by IAIA (IAIA, 2013) to disclose these factors in situations where the issue of independence of verifiers may lead to a conflict of interest between parties involved in EIA follow-up.

The success of EIA depends in large upon successful implantation along with appropriate accounting for follow-up activities after the approval decision is granted. Importantly the independence of those persons responsible for the verification of follow-

up activities is a cornerstone for ensuring integrity and best practice. But as I have demonstrated in this research, what constitutes independence in EIA follow-up is open to interpretation and varies according to context and related factors that influence independence. I hope that this paper may aid in avoiding a potential independence conflict of interest by shedding some light on the factors that influence the independence of EIA follow-up verifiers.

## **5.7 Acknowledgements**

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## **Notes**

ISO (SANS 17021: 2006: 1) defines impartiality as actual and perceived presence of objectivity, and note that other terms that are useful in conveying the element of impartiality are: objectivity; independence; freedom from conflict of interest; freedom from bias; lack of prejudice; neutrality, fairness; open-mindedness; even-handedness; detachment; balance.

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## **CHAPTER 6: ARTICLE 3**

### **APPRAISING THE VALUE OF INDEPENDENT EIA FOLLOW-UP VERIFIERS**

Objective 3: To appraise how and to what extent independent EIA follow-up verifiers add value in major construction projects in the developing country context of South Africa.

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## APPRAISING THE VALUE OF INDEPENDENT EIA FOLLOW-UP VERIFIERS

Jan-Albert Wessels\*, Francois Retief\*\* and Angus Morrison-Saunders\*\*\*

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### Abstract

Independent Environmental Impact Assessment (EIA) follow-up verifiers such as monitoring agencies, checkers, supervisors and control officers are active on various construction sites across the world. There are, however, differing views on the value that these verifiers add and very limited learning in EIA has been drawn from independent verifiers. This paper aims to appraise how and to what extent independent EIA follow-up verifiers add value in major construction projects in the developing country context of South Africa. A framework for appraising the role of independent verifiers was established and four South African case studies were examined through a mixture of site visits, project document analysis, and interviews. Appraisal results were documented in the performance areas of: Planning, Doing, Checking, Acting, Public Participating and Integration with other programs. The results indicate that independent verifiers add most value to major construction projects when involved with screening EIA requirements of new projects, allocation of financial and human resources, checking legal compliance, influencing implementation, reporting conformance results, community and stakeholder engagement, integration with self-responsibility programmes such as environmental management systems (EMS), and controlling records. It was apparent that verifiers could be more creatively utilized in pre-construction preparation, providing feedback of knowledge into assessment of new projects, giving input to the planning and design phase of projects, and performance evaluation. The study confirms the benefits of proponent and regulator follow-up, specifically in having independent verifiers that disclose information, facilitate discussion among stakeholders, are adaptable and proactive, aid in the integration of EIA with other programs, and instil trust in EIA enforcement by conformance evaluation. Overall, the study provides insight on how to harness the learning opportunities arising from EIA follow-up through the appointment of independent verifiers.

**Keywords:** EIA follow-up; independent verifier; checker, supervisor, Environmental Control Officer; construction; value.

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## 6.1 Introduction

Independent environmental verification is often done by individuals and/or groups of independent verifiers such as: Independent Environmental Monitoring Agencies in Canada (Ross, 2004); Environmental Checkers in Hong Kong (Au and Hui, 2004); and environmental supervision individuals and/or teams in China, Latin America and the World Bank (Wang, 2013; Acerbi *et al.* 2014; World Bank, 2012 & 2014). The term “Environmental Control Officers” is used to describe independent verifiers in Singapore and South Africa (Singapore National Environment Agency, 2001 & 2002; and Wessels & Morrison-Saunders, 2011). While this literature covers the function of independent verifiers in the broader context of EIA follow-up, our interest for this paper revolves around the added value of this role.

This paper provides insight into the methodology used and results of an appraisal of the value of independent EIA follow-up verifiers during the construction phase of major development projects within a developing country context. The appraisal was done by: identifying and designing relevant performance standards, followed by measuring the performance of independent verifiers against the standards at four construction case studies. South Africa was identified as an ideal developing country to explore the value of verifiers because of its current focus on major infrastructure development as well as having an established environmental assessment and management system (Presidential Infrastructure Coordinating Commission of South Africa, 2014; Wood, 2003).

The aim of the paper is to appraise how and to what extent independent EIA follow-up verifiers add value in major construction projects in the developing country context of South Africa. Although Marshall *et al.* (2005) notes that “EIA follow-up should be sustained over the entire life of the activity” [construction, operation, rehabilitation and closure] the focus of this study is on the construction phase as South African ECOs are currently only active during this phase of projects. The following sections of the paper give a brief theoretical background on sustainable development and construction, EIA follow-up and EMS, and the South African context for independent EIA follow-up verification. These sections are followed by a description of the research methodology, the analysis of appraisal results; and the conclusion.

### **6.1.1 Sustainability in construction and the EIA- EMS continuum**

The International Council for Building (CIB), the United Nations Environmental Programme (UNEP), and UNEP's International Environmental Technology Centre (UNEP-IETC) recognizes that the construction industry is central to how humans shape their future and to sustainability (UNEP, 1992; CIB, 1999; UNEP-ITC, 2002; and Du Plessis, 2002). However, Arts and Faith-Ell (2012) indicate "many infrastructure project have problems to deliver sustainability commitments made earlier in the planning process". Of particular concern in developing countries is the reluctance of the private sector, especially the construction industry, to commit itself to sustainability in a changing business context that supports environmental and socio-economic development (Craigie *et al.*, 2009; Du Plessis, 2002; Nel & Wessels, 2010). It has, therefore, become necessary for the private sector to take certain management actions in order to deal with technical issues such as materials and technologies; and non-technical or "soft issues" such as legal compliance and performance evaluation through environmental assessment and management strategies (CIB, 1999; Du Plessis, 2002; Nel & Wessels, 2010).

A range of strategies and tools such as well documented and "classic" EIA follow-up, permitting, contracting and auditing (Arts, 1998; Sadler, 1996; Marshall & Morrison-Saunders, 2003; Morrison-Saunders & Arts, 2004; Kotzé and Paterson, 2009), and more "recent" developed approaches as described by Arts and Faith-Ell (2012) exist to "aid in achieving more environmental sustainable outcomes of projects". The new strategies developed include: "Life cycle integration (e.g. life cycle management); Earlier involvement of market parties (Design & Contract etc.); Self-responsibility (e.g. environmental management systems (EMS) such as ISO 14001); Broader scope (e.g. rating or labelling instruments such as green procurement, CEEQUAL, LEED, BREEAM); and Involvement of third parties (e.g. license to operate)" (Arts & Faith-Ell, 2012; and Uttam, 2014). The important, yet "obvious continuum" between the classic EIA strategy (before implementation) and the Self-responsibility (e.g. EMS) strategy (after project implementation) referred to by Arts and Faith-Ell (2012) has gained support and clarification for a number of years (Holling, 1978; Marshall, 2003 & 2004). However, Perdicoúlis *et al.* (2012) notes that this vital connection "happens rarely well in practice". The Key Performance Areas (KPA) for this paper were developed by

connecting and combining the ISO 14001 management system's elements with EIA and EIA follow-up frameworks.

Independent verification may, in turn, aid EIA follow-up processes in various ways such as ensuring that the EIA process remains credible and ensuring that both the proponent and government is held accountable for not meeting performance targets (International Association of Impact Assessment (IAIA), 1999; Ross, 2004; Wessels, 2013). Further benefits include facilitating informed discussion among stakeholders, instilling confidence and trust in enforcement, and strengthening EIA follow-up measures in developing countries (where follow-up is often considered the weakest area of EIA) (Au and Hui, 2004; Economic Commission for Africa, 2005; South Africa, 2011; Wood, 2003).

### **6.1.2 Environmental Control Officers as South Africa's response to independent verification**

Environmental Control Officers are employed both mandatorily and voluntarily at various construction projects across South Africa, and according to the South African Department of Water Affairs and Forestry (DWAF) "act primarily as quality controllers regarding environmental concerns in construction" (DWAF, 2005). The main difference between South African and Singapore ECOs is that in Singapore ECOs tend to focus on human health issues whereas in South Africa they focus more on biophysical components of sustainability as suggested by DWAF (2005). In this respect, DWAF (2005) requires that an ECO should conduct continuous monitoring by various means and suggests that the ECO should be involved in the management and implementation of construction Performance Specifications. Implementation and management are, however, predominantly the tasks of Environmental Officers and Environmental Managers (EM's) (Campbell, 2012; Marrel, 2012; Nair, 2012; Radford, 2012; Rhode, 2012; Stoop, 2012; Swanepoel, 2013). For clarification purposes, Wessels and Morrison-Saunders (2011) defined Environmental Control Officer as "an independent, competent person or body in a position to influence people's behaviour during the construction phase of a project; with selected environmental monitoring instruments; in order to assure and at times to ensure, record and communicate compliance to applicable environmental conditions and performance specifications".

### **6.1.3 Context specific performance standards related to South Africa**

The sustainability principles of Section 2 in the National Environmental Management Act 107 of 1998 (NEMA) guides sustainable development in South Africa and places a duty of care and remediation of environmental damage on every person who causes, has caused or may cause significant pollution or degradation of the environment. The principles also require that these persons take reasonable measures to prevent such pollution (South Africa, 1998; Eskom 2012). While the NEMA definition of the environment includes both social and cultural components, ECOs tend to focus more on the biophysical components of sustainability. However, they are also involved with social-cultural effects on localized communities and aid other professionals such as Social Impact Assessment Practitioners and Heritage Practitioners (Department of Environmental Affairs - South Africa, 2014; De Villiers, 2012, De Jager, 2012; Paul, 2012; Rhode, 2012; Stoop, 2012).

Section 28(3)(a-f) of Chapter 4 of NEMA outlines the Integrated Environmental Management (IEM) objectives and reasonable corrective measures to give effect to these principles. The objectives include: investigate, assess and evaluate impacts; inform and educate employees; cease, modify or control pollution causing activities; contain or prevent movement of pollution; eliminate any source of the pollution or degradation; remedy the effects of the pollution or degradation. To aid with the implementation of the NEMA principles, objectives and measures, the Department of Water Affairs and Forestry (DWAF, 2005) pioneered the “Environmental Best Practice Specifications for construction sites, infrastructure upgrades and maintenance works”. These specifications are the only formal South African construction guidelines with the express purpose of ensuring that all water related infrastructural development projects are implemented within the ambit of sound environmental principles, standards and norms as contained in the Section 2 (principles) and Chapter 4 (objectives) of the NEMA. Importantly also, the DWAF guideline contains a description of the roles and responsibilities of ECOs. The NEMA principles were used to construct the objectives used in the analyses of data, whereas the roles and responsibilities as stipulated by DWAF were used (amongst other information) to determine the questions: Key Performance Indicators (KPI’s) (see Table 1). The following section describes the research methodology in more detail.

## **6.2 Research methodology**

It has been noted “... evaluation is a well-established field of study...” and is viewed as “the process of making a judgment about the value or worth of an object under review” (Owen and Rogers, 1999). As such, evaluation should essentially include: 1) establishing criteria of worth; 2) constructing standards; 3) measuring performance and comparing with standards; and 4) synthesizing and integrating evidence into a judgment of value (Owen and Rogers, 1999). Table 1 was developed from international sources to provide for the first three ingredients of evaluation followed by a judgment of value of the South African case studies in Table 4. In support of evaluation being an established field, case study research is considered a particularly suitable research strategy for performance evaluation and for building theory (David & Sutton, 2011; Huberman & Miles, 2002; Leedy & Ormrod, 2010; Robson, 2002). Following the advice of Yin (2003) we followed a multiple case study research approach, used a variety of data sources (site visits, project document analysis, and interviews) and drafted a case study protocol to strengthen reliability and credibility of the research (Yin, 2003) (refer to the selection of case studies selection in 2.2).

### **6.2.1 Key performance areas and indicators**

Literature review was central in the compilation of Table 1 and to indicate the linkages between the principles of Sustainable Development (UNEP, 1992), EIA (IAIA, 1999) and EIA follow-up (Marshall *et al.* 2005), and the principles enacted in NEMA (South Africa, 1998). Moreover, Table 1 aims to provide the linkages between various objectives sourced from international and South African sources. These include objectives of Sustainable Construction and EIA follow-up; objectives of the ECO code of practice; NEMA’s Integrated Environmental Management (IEM) objectives, and the objectives contained in the Best Practice Specifications for construction sites of the South African Department of Water Affairs and Forestry.

The objectives were used to develop performance standards in the form of KPIs that were categorized into Key Performance Areas (KPIAs) as suggested by Retief (2007a). The KPIAs for this paper were developed by connecting and combining environmental management system elements of planning, doing, checking, acting (ISO, 2004) with EIA and EIA follow-up frameworks (Baker, 2004; Arts *et al.*, 2001). The related components

of EIA follow-up (monitoring, auditing, evaluation, management, and communication) were also considered in the drafting of the KPAs.

The categorization of the KPA topics related to the principles we done by combining the ISO 14001: 2004 elements of Planning, Doing, Checking and Acting with the EIA and EIA follow-up frameworks. It was foreseen that that independent verifiers may add value to both the pre-decision (actions prior to implementation) and post-decision (actions for post proposal implementation) stages of a project. The value components of verifiers were, therefore, divided into two categories: Prior to implementation (Planning & Design phase); and Post proposal implementation (Pre-construction & Construction phase).

**Table 6-1: Linkages between principles, objectives, KPAs and KPIs**

Output component	<p><b>Relevant Sustainability, IEM, EIA &amp; EIA follow-up principles</b></p> <p>"The basic building blocks of Sustainability, IEM, EIA and EIA follow-up context specific perspectives in South Africa" (UNEP 1992; IAIA 1999; Marshall et al, 2005; and South Africa, 1998)</p>	<p><b>KPAs</b></p> <p>"Topic related to principles" (Derived from ISO, 2004; Arts, 1998, Arts et al, 2001; DEA, 2011; and Hullet and Diab, 2002)</p>	<p><b>Objectives</b></p> <p>"Indication of what needs to be achieved to" (UNEP-ITC, 2002: 59-67; South Africa, 1998: 5; Du Plessis, 2002; Morrison-Saunders &amp; Arts, 2004)</p>	<p><b>Key Performance Indicators (KPIs)</b></p> <p>"Questions that provide an indication to what extent the objectives were achieved by subject participation" (derived from South Africa, 1998; Morrison-Saunders &amp; Arts, 2004, Singapore Environmental Agency, undated, and DWAF, 2005 as proposed by Retief, 2007a: 91)</p> <p>Note that all questions start with: "To what extent..."</p>
<p>Prior to implementation [Planning &amp; Design]</p>	<p>UNEP principle 17: Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment.</p> <p>NEMA s(4)(i): The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.</p> <p>Follow-up principles 13 &amp; 16: WHAT? EIA follow-up should be objective-led and goal-oriented; and HOW? EIA follow-up should be sustained over the entire life of the activity.</p>	<p>1. [Plan] Generate data, knowledge and a sustainable vision or outcome.</p>	<p>1. Participate in the early components of EIA prior to proposal implementation.</p>	<p>1.1: ... was the verifier involved in establishing whether an EIA was required for the project and other project related projects (Screening)?</p> <p>1.2: ... was the verifier involved in identifying key issues and impacts to be addressed in the project and other project related projects (Scoping)?</p> <p>1.3: ... was the verifier involved with compiling and reporting the: Environmental Impact Report (EIR)/Statement (EIS); and the sustainability vision?</p> <p>1.4: ... was the verifier involved with the preparation and submission of the environmental management plan of the project and other project related projects?</p>
<p>Post proposal implementation [Pre-construction &amp; Construction phase].</p>	<p>UNEP principle 16: National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost...</p> <p>NEMA s. 2(n): Global and international responsibilities relating to the environment must be discharged in the national interest.</p> <p>Follow-up principles 12 &amp; 17: HOW? EIA follow-up should have a clear division of roles, tasks and responsibilities; and HOW? Adequate resources should be provided.</p> <p>UNEP Principle 16: National authorities should endeavour to promote the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution...</p>	<p>2A. [Do] Pre-construction preparation for implementation of specifications.</p> <p>2B. [Do] Implement, inform decision</p>	<p>2A. Participate in the pre-construction preparation and commissioning of the environmental Performance Specifications.</p> <p>2B. Participate in the implementation of the environmental</p>	<p>2A.1: ... was the verifier involved with the handover of environmental Performance Specifications from the planning phase to the implementation phase?</p> <p>2A.2: ... was the verifier involved in identifying, defining and allocating roles and responsibilities for the implementation, control, monitoring, evaluation, auditing and reporting of environmental specifications?</p> <p>2A.3: ... was the verifier involved in identifying, defining and allocating, financial and human resources for the implementation, control, monitoring, evaluation, auditing and reporting of environmental specifications?</p> <p>2B.1: ... did the verifier perform the defined and discharged roles and responsibilities until the completion of the ECO service?</p> <p>2B.2: ... did the verifier participate in and/or stimulate the use</p>

Output component	<p><b>Relevant Sustainability, IEM, EIA &amp; EIA follow-up principles</b></p> <p>"The basic building blocks of Sustainability, IEM, EIA and EIA follow-up context specific perspectives in South Africa" (UNEP 1992; IAIA 1999; Marshall et al, 2005; and South Africa, 1998)</p>	<p><b>KPAs</b></p> <p>"Topic related to principles" (Derived from ISO, 2004; Arts, 1998, Arts et al, 2001; DEA, 2011; and Hullet and Diab, 2002)</p>	<p><b>Objectives</b></p> <p>"Indication of what needs to be achieved to" (UNEP-ITC, 2002: 59-67; South Africa, 1998: 5; Du Plessis, 2002; Morrison-Saunders &amp; Arts, 2004)</p>	<p><b>Key Performance Indicators (KPIs)</b></p> <p>"Questions that provide an indication to what extent the objectives were achieved by subject participation" (derived from South Africa, 1998; Morrison-Saunders &amp; Arts, 2004, Singapore Environmental Agency, undated, and DWAF, 2005 as proposed by Retief, 2007a: 91)</p> <p>Note that all questions start with: "To what extent..."</p>
	<p><u>NEMA s.2 (4)(a)(i)(ii)(iii)(iv)</u>: The disturbance of ecosystems and loss of biological diversity, pollution and degradation of the environment, disturbance of landscapes and sites that constitute the nation's cultural heritage, and waste; are avoided, or, where they cannot be altogether avoided, are minimized and remedied;</p> <p><u>NEMA s.4 (b)</u>: Environmental management must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.</p> <p><u>NEMA s. 2 (4) (h)</u>: Community wellbeing and empowerment must be promoted through environmental education, awareness, sharing of knowledge and experience...</p> <p><u>Follow-up principles 1 &amp; 10</u>: WHY? Is essential to determine EIA outcomes; and WHAT? Should be timely, adaptive and action-oriented.</p>	<p><i>making in construction and parallel process.</i></p>	<p>Performance Specifications.</p>	<p><i>of sustainable technologies and processes?</i></p> <p>2B.3: ... was the verifier involved with reducing environmental impacts through responding to actual and potential environmental emergency situations?</p> <p>2B.4: ... did the verifier influence decisions related to mitigation and remediation of aspects deemed to be a variation, or not allowed for in the environmental Performance Specifications?</p> <p>2B.5: ... was the verifier involved with documenting, reviewing and/approving of policies, plans, programmes, operational procedures, registers and emergency procedures?</p> <p>2B.6: ... was the verifier involved with internal capacity building and awareness to inform &amp; educate employees about environmental risks of their work and the manner in which their tasks must be performed?</p>
	<p><u>UNEP Principle 10</u>: Environmental issues are best handled with participation of all concerned citizens, at the relevant level.</p> <p>Nations shall facilitate and encourage public awareness and participation by making environmental information widely available.</p> <p><u>NEMA s.4 (f)</u>: The participation of all interested and affected parties in environmental governance must be promoted,...</p> <p><u>Follow-up principles 2 &amp; 11</u>: WHY? Transparency and openness in EIA follow-up is important - all stakeholders have a right to feedback on the EIA process; and WHAT?</p>	<p>2C. [Do] Reporting and Communication.</p>	<p>2C. Participate in reporting and communicating by informing the stakeholders as well as the public about the results of EIA follow-up.</p>	<p>2C.1: ... did the verifier report or gave feedback to the site proponent on actual and/or potential harmful environmental conditions and/or situations?</p> <p>2C.2: ... did the verifier report or gave feedback to the Regulator on actual and/or potential harmful environmental conditions and/or situations?</p> <p>2C.3: ... did the verifier report or gave feedback to the Community on actual and/or potential harmful environmental conditions and/or situations?</p> <p>2C.4: ... was the verifier involved with formal periodic feedback, communication of EIA predictions into the planning stage to be implemented moving forward?</p>

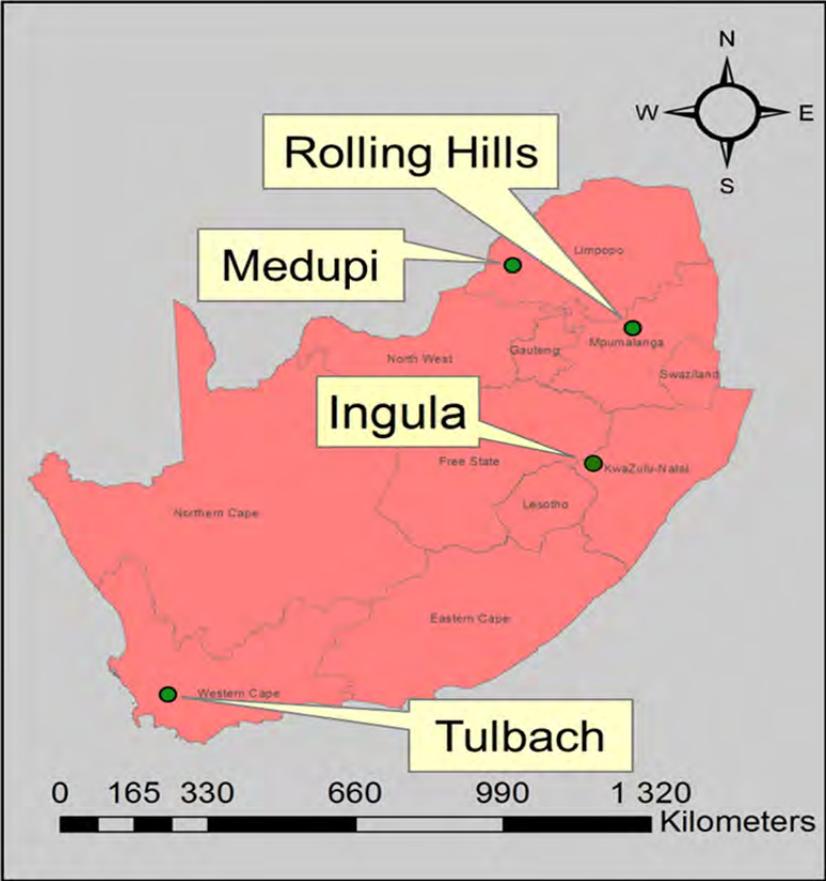
Output component	<b>Relevant Sustainability, IEM, EIA &amp; EIA follow-up principles</b> "The basic building blocks of Sustainability, IEM, EIA and EIA follow-up context specific perspectives in South Africa" <i>(UNEP 1992; IAIA 1999; Marshall et al, 2005; and South Africa, 1998)</i>	<b>KPAs</b> "Topic related to principles" <i>(Derived from ISO, 2004; Arts, 1998, Arts et al, 2001; DEA, 2011; and Hullet and Diab, 2002)</i>	<b>Objectives</b> "Indication of what needs to be achieved to" <i>(UNEP-ITC, 2002: 59-67; South Africa, 1998: 5; Du Plessis, 2002; Morrison-Saunders &amp; Arts, 2004)</i>	<b>Key Performance Indicators (KPIs)</b> "Questions that provide an indication to what extent the objectives were achieved by subject participation" <i>(derived from South Africa, 1998; Morrison-Saunders &amp; Arts, 2004, Singapore Environmental Agency, undated, and DWAF, 2005 as proposed by Retief, 2007a: 91)</i>  <i>Note that all questions start with: "To what extent..."</i>
	EIA follow-up should promote continuous learning from experience to improve future practice - it should not be static and should always strive to maximize learning from experience through active feedback.			2C.5: ... was the verifier involved in active feedback/communication/training for ensuring improved EIA predictions, methods and techniques?  2C.6: ... did the verifier ensure openness, access to information for transparent communication with all stakeholders involved?
	<u>UNEP Principle 15:</u> In order to protect the environment, the precautionary approach shall be widely applied... <u>NEMA s.4(a):</u> Sustainable development requires that a risk-averse and cautious approach is applied and socio-economic and environmental impacts including disadvantages and benefits, be assessed and evaluated,...  <u>Follow-up principle 10:</u> WHAT? Monitoring data collection and evaluation activities should be sufficiently frequent for the information generated to be useful to stakeholders, ...	3A. [Check] Monitoring and measurement of effects.	3A. Participate in the monitoring and measurement of environmental effects.	3A.1: ... was there sufficient evidence to confirm that the verifier collected data on environmental effects?  3A.2: ... was the verifier involved with risk assessment and evaluation of environmental aspects and the risks, consequences and alternative options for mitigation of activities?
	<u>UNEP Principle 11:</u> States (organizations) shall enact effective environmental legislation. <u>EIA principle:</u> To ensure that the terms and condition of approval are met; and where required, to undertake environmental audit and process evaluation to optimize environmental management. <u>NEMA s. (4)(a):</u> Sustainable development requires the consideration of all relevant factors including the following: (vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardized;...	3B. [Check] Monitoring and evaluation of legal compliance (conformance)	3B. Participate in internal and external compliance (conformance) evaluation.	3B.1: ... did the verifier collect data on environmental legal compliance?  3B.2: ... did the verifier use a formal (systematic and objective) assessment approach (internal auditing) to compare environmental effects and compliance data with norms, prediction and expectations?  3B.3: ... was the verifier involved with formal (systematic and objective) external conformance assessments (external audits)?  3B.4: ... was the verifier involved with the ad hoc verification and evaluation of policies, plans, programmes, operational procedures, reports and the subsequent implementation of mitigation measures?

Output component	<b>Relevant Sustainability, IEM, EIA &amp; EIA follow-up principles</b> "The basic building blocks of Sustainability, IEM, EIA and EIA follow-up context specific perspectives in South Africa" <i>(UNEP 1992; IAIA 1999; Marshall et al, 2005; and South Africa, 1998)</i>	<b>KPAs</b> "Topic related to principles" <i>(Derived from ISO, 2004; Arts, 1998, Arts et al, 2001; DEA, 2011; and Hullet and Diab, 2002)</i>	<b>Objectives</b> "Indication of what needs to be achieved to" <i>(UNEP-ITC, 2002: 59-67; South Africa, 1998: 5; Du Plessis, 2002; Morrison-Saunders &amp; Arts, 2004)</i>	<b>Key Performance Indicators (KPIs)</b> "Questions that provide an indication to what extent the objectives were achieved by subject participation" <i>(derived from South Africa, 1998; Morrison-Saunders &amp; Arts, 2004, Singapore Environmental Agency, undated, and DWAF, 2005 as proposed by Retief, 2007a: 91)</i>  <i>Note that all questions start with: "To what extent..."</i>
	<u>UNEP Principle 10:</u> Make environmental information widely available. <u>NEMA s. 2 (4)(h):</u> Community wellbeing and empowerment must be promoted through the sharing of knowledge and experiences... 2. WHY? All stakeholders have a right to feedback on the EIA process.	3C. <i>[Check]</i> Controlling records.	3C. Participate in the control of records.	3C: ... was there sufficient evidence available to indicate that the verifier controlled records to ensure information remains accessible?
	<u>UNEP Principle 10:</u> Environmental issues are best handled with participation of all concerned citizens, at the relevant level. <u>NEMA s.4(a) &amp; (r):</u> Sustainable development requires 4(a)(v) that the use of exploitation of non-renewable natural resources is responsible... Sensitive, vulnerable, highly dynamic or stressed ecosystems, requires specific attention in management and planning procedures... <u>Follow-up principles 1, 10, 14 &amp; 16:</u> WHY? Follow-up is essential to determine EIA (or SEA) outcomes - follow-up has the same goal as EIA, namely to minimize the negative consequences of development and maximize the positive. The emphasis is on action taken to achieve this goal. WHAT? EIA follow-up should be timely, adaptive and action-oriented, and 'fit-for-purpose' - adaptability and being proactive are central to maximizing the benefits of EIA follow-up. HOW? ...EIA follow-up must also be responsive to long-term and short-term environmental changes.	4. <i>[Act]</i> Management and enforcement.	4. Participate in management and enforcement.	4.1: ... did the verifier have the authority to: cease, modify or control any act, activity or process causing [or that may cause] the pollution or degradation; containing, preventing the movement of pollutants or the causing of degradation; eliminate the source of the pollution or degradation; and or remedy the effects of the pollution or degradation? 4.2: ... did the verifier have authority to police or enforce follow-up activities and may hold the Proponent, Implementing Agent and Contractors responsible, accountable, liable and answerable to non-compliances? 4.3: ... was the verifier involved with making and/or approving decisions on matters that are deemed to be a variation, or not allowed for in the environmental Performance Specifications? 4.4: ... did the verifier encourage, specify or employ the use of alternative methods, or equipment if determined to be unsuitable for the task at hand, or unnecessarily detrimental to the environment? 4.5: ... was the verifier involved with dispute and complaint resolution?
	<u>UNEP Principle 22:</u> Indigenous people and their communities and other local communities have a vital role in environmental management...	5. <i>Community involvement, public</i>	5. Participate in community involvement, public	5.1: ... was there sufficient evidence available to indicate that the verifier ensured/encouraged active engagement of stakeholders in decision making processes?

Output component	<b>Relevant Sustainability, IEM, EIA &amp; EIA follow-up principles</b> "The basic building blocks of Sustainability, IEM, EIA and EIA follow-up context specific perspectives in South Africa" <i>(UNEP 1992; IAIA 1999; Marshall et al, 2005; and South Africa, 1998)</i>	<b>KPAs</b> "Topic related to principles" <i>(Derived from ISO, 2004; Arts, 1998, Arts et al, 2001; DEA, 2011; and Hullet and Diab, 2002)</i>	<b>Objectives</b> "Indication of what needs to be achieved to" <i>(UNEP-ITC, 2002: 59-67; South Africa, 1998: 5; Du Plessis, 2002; Morrison-Saunders &amp; Arts, 2004)</i>	<b>Key Performance Indicators (KPIs)</b> "Questions that provide an indication to what extent the objectives were achieved by subject participation" <i>(derived from South Africa, 1998; Morrison-Saunders &amp; Arts, 2004, Singapore Environmental Agency, undated, and DWAF, 2005 as proposed by Retief, 2007a: 91)</i>  <i>Note that all questions start with: "To what extent..."</i>
	<p><u>NEMA s. 2 (4)(f)(g)</u>:... all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation.... Decisions must take into account the interests, needs and values of all interested and affected parties...</p> <p><u>Follow-up principles 2 &amp; 6</u>: WHY? Beyond the informing role, active engagement of stakeholders in follow-up processes with genuine opportunities for involvement is preferable. WHO? The community should be involved...</p>	<p><i>participation, capacity building, and awareness.</i></p>	<p>participation, capacity building and awareness.</p>	<p><i>5.2: ... was there sufficient evidence available to indicate that the verifier participated in awareness and capacity building campaigns, training courses and other activities to develop and sustain the interest of the community?</i></p>
	<p>UNEP Principle 10: Environmental issues are best handled with participation of all concerned citizens, at the relevant level.</p> <p>NEMA s. 2 (4)(b): Environmental management must be integrated, ... and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.</p>	<p><i>6. Integration with other programmes and/or information.</i></p>	<p>6. Participate in the integration of EIA follow-up with other programs and/or information.</p>	<p><i>6.1: ... did the organization have an EMS and to what extent did the verifier participate in the monitoring and evaluation of the EMS?</i></p> <p><i>6.2: ... was evidence available to indicate that the verifier was involved with area-wide programmes?</i></p>

**6.2.2 Case study selection**

Considering the advice of Silverman (2006), Yin (2003) and Retief (2007), we purposively chose four case studies. The specific construction cases were chosen due to each of the four case studies legally required an EIA, the different scales and types of the projects, experienced ECOs being active at the sites, appropriate advancement of construction, and accessibility for research. The case studies are: 1) Medupi- construction of a coal-fired power station situated in Limpopo Province; 2) Ingula- construction of a pumped storage power scheme; 3) Rolling Hills- construction of a luxury golf estate development situated in Mpumalanga Province; and 4) Tulbagh- reconstruction and upgrade of a Trunk Road situated in the Western Cape Provincial Province. The main author visited the case studies during 2012 and 2013 and case study reports for each case were drafted to maintain a chain of evidence as suggested by Creswell (2003) and Yin (2003). Table 2 provides a summary account of the case studies.



**Figure 6-1: Map indicating location of case studies in South Africa**

**Table 6-2: Summary profile of ECO construction case studies**

Cases	Project description and background	Location and scale	Type	Interviewees
Medupi	<p>The construction of the 125 Billion Rand (approximately 12 Billion US Dollars) Medupi coal fired power station is a project by Eskom; Africa's largest energy supplier. The Medupi Power Station will be a super-critical, pulverised fuel power station, utilizing direct dry-cooled technology and is proposed to ultimately have a maximum installed capacity of up to 4800 MW (6 x 800 MW units). According to the Environmental Monitoring Committee (EMC) (2011) "The ECO is an independent body [team of four ECOs], appointed under Section 3.2.4.1 of the Medupi Record of Decision (RoD) (DEAT, 2006) by the EMC in conjunction with the Client to ensure compliance with the environmental management plan and environmental legislation. The site was at the time of the research in the process of preparing for certification of their ISO 14001 EMS. The final handover of the project is envisaged to be in 2018 (Marrel, 2012).</p>	<p>Lephalale in the Limpopo Province of South Africa and is approximately 1200 Ha in size.</p>	<p>Coal-fired power station.</p>	<ul style="list-style-type: none"> <li>• Asset manager</li> <li>• Environmental Manager</li> <li>• Lead ECO</li> <li>• ECO</li> <li>• Waste Control Officer</li> <li>• Assistant ECO</li> </ul>
Ingula	<p>The planning of the R27 billion project (approximately 2.7 Billion US Dollars) of Eskom's Ingula Pumped Storage Scheme for electricity generations started in the 1980's and is scheduled to come into operation in 2014 (or 2015). The project consists of an upper and lower dam (4.6 kilometers apart) that are connected by underground water ways which passes through an underground powerhouse that contains four pump turbines, each with a capacity to produce 333MW (SSI Environmental, 2012). The EIA for the project commenced in early 1998 and authorization was granted in December 2002. One full-time ECO was involved on the project (contracted by NCC Environmental Services as the ECO service provider) and is per contractual agreement required to be on-site on a permanent basis. The ECO is viewed as part of the team of professional environmentalists that monitor all activities and ensures that the project operates within the terms of the government authorization (Stoop, 2012; Rhode, 2012; Eskom, 2010: 2). Ingula had, at the research, been maintaining a certified and matured ISO14001:2004 system for a number of years.</p>	<p>The Ingula site is situated 55 kilometers from Ladysmith and spans the provincial boundary between the Free State and Kwazulu-Natal provinces.</p>	<p>Pumped storage power scheme.</p>	<ul style="list-style-type: none"> <li>• Project Manager</li> <li>• Environmental Manager</li> <li>• ECO</li> </ul>

Cases	Project description and background	Location and scale	Type	Interviewees
Rolling Hills	<p>According to EKOTECHNIK (2005: 4) the objective of the remote project situated in a pristine environment is to develop an upmarket golf estate with a rural residential component and will consist of: six hundred and fifty share block stands; five Directors houses; one golf course; an airstrip; two hotels; a conference facility; a shopping Centre; a restaurant on the residential area; an Equestrian Centre; Chapel; a Distillery; a fishing shop; and existing Trout dams (DALA, 2004). Costs for the project were not available but is significantly less than cases above. Three ECOs were involved on the project: Ecoleges provided the permanent on-site ECO service and the independent ECO service. A third ECO service is provided by Basil Read themselves (as the Developer), who visits the site once a month in support of the Basil Read ISO14001:2004 EMS. The construction of the project is estimated to be completed in 2015.</p>	<p>The 1500 Ha property is located next to N4 toll road between Belfast and Machadodorp, Mpumalanga Province.</p>	<p>Luxury golf estate development.</p>	<ul style="list-style-type: none"> <li>• Contractor Director</li> <li>• Group Environmental Manager</li> <li>• ECO</li> <li>• On-site ECO</li> </ul>
Tulbagh	<p>The Western Cape Provincial Department of Transport and Public Works proposed the upgrade of a Trunk Road (TR). The project costs were not available but are estimated to be the lowest of the four cases. The EIA process commenced in February 2006 and the ROD was issued on 11 September 2009. An EMP was compiled for the proposed borrow area and submitted for approval in 2009. Approval for the latter was received in August 2010 (Anon, undated). According to Swanepoel (2011), the construction related activities commenced on the 14th of February 2011 and the ECO was appointed on 15 June 2011. At the time of the appointment of the ECO a Construction and Operational phase environmental management as required by the Record of Decision was not submitted to the Directorate for approval.</p>	<p>The site is situated between Gouda and Wolseley in the Tulbagh area of the Western Cape province of South Africa.</p>	<p>Upgrade of a Trunk Road.</p>	<ul style="list-style-type: none"> <li>• Project Director / Construction Manager</li> <li>• Engineering Representative</li> <li>• ECO</li> </ul>

**6.3 Results and Analysis**

In this section, the research results and analysis are described in relation to the appraisal of the value of verifiers. The overall appraisal results of verifier for each case study are displayed in Table 4. We opted for an analyses method that provided qualitative results (interpretive results of case study observations, quotations of participants, and analysis of project documents) to make sense of the disordered world of the ECO industry as suggested by Creswell (2003), Johnson *et al.* (2007) and Robson (2003). An evaluation matrix was developed that assisted in categorizing the actions of verifiers and to determine the extent of value added by verifiers.

The Assessment Keys indicated below were used to provide an indication of the extent to which objectives were achieved:

**Table 6-3: Description of Assessment Keys**

Key	Description
NA	Not applicable to case study.
?	Status could not be established.
x	Very limited or no evidence of participation to support achievement of objective(s).
½	Some evidence to support partial participation to support achievement objective(s).
✓	Sufficient evidence of participation to support achievement of objective(s).
—	Indicator with particular reference to case.

For the ordinal scale evaluation and ranking of data we assigned: x for very limited to no evidence available; ½ as the median (halfway point) for some evidence; and ✓ as sufficient evidence available to indicate that a KPI was achieved, partially achieved or not achieved. An underlined evaluation (e.g. x, ½, ✓) indicates a particular interesting or unique reference to a case study.

**Table 6-4: Value component matrix**

Output component	Objectives "Indication of what needs to be achieved to give effect to principles" and KPIs "Questions that provide an indication if the objectives were achieved by subject participation" <i>Note that all questions start with: "To what extent ..."</i>	Appraisal results			
		Medupi	Ingula	Rolling Hills	Tulbagh
Prior to proposal implementation	<b>1. Participate in the early components of EIA prior to proposal implementation.</b>				
	1.1: ... was the verifier involved in establishing whether an EIA was required for the project and other project related projects (Screening)?	✓	✓	✓	✓
	1.2: ... was the verifier involved in identifying key issues and impacts to be addressed in the project and other project related projects (Scoping)?	x	?	✓	x
	1.3: ... was the verifier involved with compiling and reporting the: Environmental Impact Report /Statement; the sustainability vision; and/or the environmental management plan of the project and other project related projects?	x	x	?	x
	1.4: ... was the verifier involved with the preparation and submission of the environmental management plan of the project other project related projects?	x	x	½	x
Post proposal implementation	<b>2A. Participate in the pre-construction preparation and commissioning of the environmental Performance Specifications.</b>				
	2A.1: ... was the verifier involved with the handover of environmental Performance Specifications from the planning phase to the implementation phase?	x	x	½	x
	2A.2: ... what extent was the verifier involved in identifying, defining and allocating roles and responsibilities for the implementation, control, monitoring, evaluation, auditing and reporting of environmental specifications?	x	x	✓	x
	2A.3: ... was the verifier involved in identifying, defining and allocating, financial and human resources for the implementation, control, monitoring, evaluation, auditing and reporting of environmental specifications?	✓	x	½	✓
	<b>2B. Participate in the implementation of the environmental Performance Specifications.</b>				
	2B.1: ... did the verifier perform the defined and discharged roles and responsibilities until the completion of the ECO service?	½	✓	½	½
	2B.2: ... did the verifier participate in and/or stimulate the use of sustainable technologies and processes?	✓	✓	✓	✓
	2B.3: ... was the verifier involved with reducing environmental impacts through responding to actual and potential environmental emergency situations?	✓	✓	✓	✓
	2B.4: ... did the verifier influence decisions related to mitigation and remediation of aspects deemed to be a variation, or not allowed for in the environmental Performance Specifications?	✓	✓	✓	½
	2B.5: ... was the verifier involved with documenting, reviewing and/approving of policies, plans, programmes, operational procedures, registers and emergency procedures?	✓	✓	✓	✓
	2B.6: ... was the verifier is involved with internal capacity building and awareness to inform & educate employees about environmental risks of their work and the manner in which their tasks must be performed?	✓	✓	✓	✓
<b>2C. Participate in reporting and communicating by informing all the stakeholders about the results of EIA follow-up.</b>					
2C.1: ...did the verifier report or gave feedback to the site proponent on actual and/or potential harmful environmental conditions and/or situations?	✓	✓	✓	✓	

Output component	Objectives "Indication of what needs to be achieved to give effect to principles" and KPIs "Questions that provide an indication if the objectives were achieved by subject participation" <i>Note that all questions start with: "To what extent ..."</i>	Appraisal results			
		Medupi	Ingula	Rolling Hills	Tulbagh
	2C.2: ... did the verifier report or gave feedback to the Regulator on actual and/or potential harmful environmental conditions and/or situations?	✓	✓	✓	✓
	2C.3: ... did the verifier report or gave feedback to the Community on actual and/or potential harmful environmental conditions and/or situations?	✓	✓	✓	x
	2C.4: ... was the verifier involved with formal periodic feedback, communication of EIA predictions into the planning stage to be implemented moving forward?	x	x	x	✓
	2C.5: ... was the verifier involved in active feedback/communication/training for ensuring improved EIA predictions, methods and techniques?	✓	✓	1/2	✓
	2C.6: ... did the verifier ensure openness, access to information for transparent communication with all stakeholders involved?	✓	✓	✓	✓
<b>3A. Participate in the monitoring and measurement of environmental effects.</b>					
	3A.1: ... was there sufficient evidence to confirm that the verifier collected data on environmental effects?	x	x	x	x
	3A.2: ... was the verifier involved with risk assessment and evaluation of environmental aspects and the risks, consequences and alternative options for mitigation of activities?	1/2	1/2	1/2	x
<b>3B. Participate in internal and external compliance (conformance) evaluation.</b>					
	3B.1: ... did the verifier collect data on environmental legal compliance?	✓	✓	✓	✓
	3B.2: ... did the verifier use a formal (systematic and objective) assessment approach (internal auditing) to compare environmental effects and compliance data with norms, prediction and expectations?	✓	✓	✓	✓
	3B.3: ... was the verifier involved with formal (systematic and objective) external conformance assessments (external audits)?	1/2	1/2	1/2	1/2
	3B.4: ... was the verifier involved with the ad hoc verification and evaluation of policies, plans, programmes, operational procedures, reports and the subsequent implementation of mitigation measures?	✓	✓	✓	✓
<b>3C. Participate in the control of records.</b>					
	3C: ... was there sufficient evidence available to indicate that the verifier controlled records to ensure information remains accessible?	✓	✓	✓	✓
<b>4. Participate in management and enforcement.</b>					
	4.1: ...did the verifier have the authority to: cease, modify or control any act, activity or process causing [or that may cause] the pollution or degradation; containing, preventing the movement of pollutants or the causing of degradation; eliminate the source of the pollution or degradation; and or remedy the effects of the pollution or degradation?	x	1/2	x	1/2
	4.2: ... did the verifier have authority to police or enforce follow-up activities and may hold the Proponent, Implementing Agent and Contractors responsible, accountable, liable and answerable to non-compliances?	x	x	x	x
	4.3: ... was the verifier involved with making and/or approving decisions on matters that are deemed to be a variation, or not allowed for in the environmental Performance Specifications?	x	1/2	x	x

Output component	Objectives "Indication of what needs to be achieved to give effect to principles" and KPIs "Questions that provide an indication if the objectives were achieved by subject participation" <i>Note that all questions start with: "To what extent ..."</i>	Appraisal results			
		Medupi	Ingula	Rolling Hills	Tulbagh
	4.4: ... did the verifier encourage, specify or employ the use of alternative methods, or equipment if determined to be unsuitable for the task at hand, or unnecessarily detrimental to the environment?	1/2	✓	✓	✓
	4.5: ... was the verifier involved with dispute and complaint resolution?	✓	1/2	✓	<u>x</u>
	<b>5. Participate in community involvement, public participation, capacity building and awareness.</b>				
	5.1: ... was there sufficient evidence available to indicate that the verifier ensured/encouraged active engagement of stakeholders in decision-making processes?	✓	✓	✓	<u>x</u>
	5.2: ... was there sufficient evidence available to indicate that the verifier participated in awareness and capacity building campaigns, training courses and other activities to develop and sustain the interest of the community?	✓	✓	✓	<u>x</u>
	<b>6. Participate in the integration of EIA follow-up with other programs and/or information.</b>				
	6.1: ... did the organization have an EMS and to what extent did the verifier participate in the monitoring and evaluation of the EMS?	✓	✓	1/2	NA
	6.2: ... was evidence available to indicate that the verifier was involved with area-wide programmes?	✓	✓	0	?

Please note that not achieving an objective or a KPI does not necessarily indicate a negative outcome. A non-achievement indicates that the verifier was not involved in this particular activity, which may imply that another resource is fulfilling this task. It may also be that no one is fulfilling this task, which then indicates an area of concern. For both these non-achievement scenarios, an opportunity for utilizing a verifier more creatively may exist. We now discuss the results with respect to “output components” of construction activities.

### **6.3.1 Value output component: Prior to proposal implementation [Project Planning & Design phase].**

#### *1. Participate in the early components of EIA prior to proposal implementation.*

The overall appraisal results in Table 6-4 demonstrate many similarities between cases and indicate that the verifiers did not achieve KPI's 1.2, 1.3 and 1.4. The objective was thus largely not achieved and indicates the verifiers are not participating in early components of EIA. This is understandable as different environmental specialists are responsible for conducting EIA's and is known in South Africa as environmental assessment practitioners (EAPs). The non-achievement of the KPIs indicate an opportunity for verifiers to more effectively feedback follow-up data and knowledge gained through “learning from doing” into the assessment of new projects as suggested by see Sadler (1996) and Sánchez & André (2013). The Rolling Hills case study; however, is an anomaly as evidence was found that the verification function at Rolling Hills was actively involved with the early components of at least two project related EIAs. There is, however, is a risk concerning losing verification independence due to prior relationships at this case as indicated by Wessels (2013).

Interestingly the evidence show that the verifiers were involved with establishing whether an EIA was required for the project and related future projects (Screening) at all four case studies KPI 1.1. This observation is supported by examples given by Radford (2012), Marrel (2012) and Campbell (2012) for the identification of a number of obligatory environmental, heritage and water related impact assessments that were not identified in the original EIA application process. Swanepoel (2013) for example states that, “All the projects that I've been involved with missed identifying listed activities”. The accurate Screening for mandatory impact assessment processes “in the advanced and

complex South African environmental regime” mentioned by Kotzé and Paterson (2009) is attributed to the vast construction related knowledge and experience of the verifiers evaluated at the construction cases.

### **6.3.2 Value output component: Post proposal implementation [Construction phase]**

#### *2A. Participate in the pre-construction preparation and commissioning of the environmental Performance Specifications.*

The appraisal results indicate that verifiers at most case studies did not meet the overall objective of participating in the pre-construction and commissioning phase. The Rolling Hills case is a variance again as the verifiers participated to an extent in the handover of environmental Performance Specifications<sup>KPI 2.A.1</sup>, and participated in identifying, defining and allocating roles and responsibilities<sup>KPI 2.A.2</sup> with an expedient audit programme. Moreover, evidence was also found that the Rolling Hills verifiers were involved with the identification and allocation of financial resources for EIA follow-up activities<sup>KPI 2.A.3</sup> for effective support of the ECO function. Apart from Rolling Hills, evidence was also found at the Medupi and Tulbagh cases that verifiers were involved with the identification, allocation of financial and human resources for EIA follow-up activities<sup>KPI 2.A.3</sup>. At Medupi, Marrel (2012) notes, “as construction activities increased an Assistant ECO and two more ECO positions were created and filled”. At the Tulbagh case study Swanepoel (2013) mentions, “the initial time budget and allocated for the project was to have the ECO on-site once a month, which in my opinion was not enough. I was then told to come as and when required”. It is thus evident that the verifiers aided in enhancing what Sánchez (2012) refer to as “other management tools in EMPs”. These include “capacity management” such as “(i) securing a budget, (ii) defining an implementation schedule, and (iii) providing adequate human capacity (Goodland and Mercier, 1999 as cited by Sánchez, 2012).

#### *2B. Participate in the implementation of the environmental Performance Specifications.*

The results in Table 6-4 show the achievement of the objective for participating in the implementation of Performance Specification across all four case studies. The KPIs that were achieved are, stimulating the use of sustainable technologies and processes<sup>KPI 2B.2</sup>; responding to actual and potential environmental emergency situations<sup>KPI 2B.3</sup>;

documenting, reviewing and/approving of policies, plans, programmes, and operational procedures, registers<sup>KPI 2B.5</sup>; and internal capacity building and awareness<sup>KPI 2B.6</sup>. The achievement show that independent verifiers are “forums” (Durning, 2012) that drives implementation practice forward in-line with what Marshall (2005) suggested, “Practitioners should be the ones to take forward improvement in the practice of impact monitoring and management”.

There were, however, evidence that indicated deviation from performing the defined and discharged roles and responsibilities as stipulated in authorization and environmental management plan conditions<sup>KPI 2B.1</sup> at the Medupi, Rolling Hills and Tulbagh cases. At Medupi deviation from the implementation requirements of the Record of Decision (or EA) were found as the verifier function were aimed at focusing on fulfilling monitoring and reporting duties (Marrel, 2012) whereas the EMP requires “Environmental Control Officer will have the responsibility of implementing the approved EMP”. Evidence was also found at Tulbagh of deviation from the “Stock Standard” environmental management plan and that Els (2013) were of the opinion that influencing decisions may have been a weak area of the project, as the ECO was not always informed of the decisions and work on site<sup>KPI 2B.4</sup>.

In relation to stimulating the use of sustainable technologies and processes<sup>KPI 2B.2</sup> at Medupi the “ECO function asks contractors to explain technical and product specific risks before use” (Coop, 2002). At Ingula Campbell (2012) notes, “the ECO is advising the occupier of the construction site on what needs to be done on remedial measures to be taken to prevent recurrence is intrinsic to the ECO position but not the ECO’s formal role. It should be”. At the Tulbagh case Swanepoel (2013) indicate, “The ECO initiated the idea of hay bales for siltation management”. Lastly, at the Rolling Hills case study the footprint area of the development were decreased due to the ECO identifying and being involved with a legal process to accommodate a sensitive wetland area. On this Radford (2012) notes, “We were inspecting conditions and became aware that they were constructing in the wetland area. So as the ECO as an independent party we suggested that they need to stop and amend their layout plan. We also realized that this development plan was eating into these rock-barren outcrops and that the original hotel site was allocated on these rocky outcrops. We actually contracted an ecologist to re-survey these areas and we recommended that the Record of Decision [impact

statement] be amended to make provisions for these sites”. The ECO “also initiated the Ecological Offset to compensate for the loss of the sensitive areas” (Radford, 2012).

Overwhelming results show that the verifiers play an integral part in internal capacity building and awareness<sup>KPI 2B.6</sup>. At Medupi Pillay (2012) notes, “The ECOs do inform and educate. A method of continuous awareness making of key employees is that the ECO have constant interaction with the Foremen of Contractor whilst conducting an inspection or site walkabout”. Marrel (2012), however, mention, “Although required by the Record of Decision, the ECO do not conduct induction training”. Similar to Medupi, the ECO at the Ingula case study are tasked to ensure contractors and workers are familiar with environmental authorization conditions but do not personally do them. Campbell (2012) notes, “The ECO joins training sessions at times to verify adequacy of training” and according the EMS system document (EMS Generation-Ingula, 2011) “The ECO as part of the ENCORD team does: Training needs Analysis (TNA); identify training requirements recorded and sourced as appropriate and Eskom Induction is developed and revised by ENCORD”. Different to Medupi and Ingula is the Rolling Hills and Tulbagh cases, where the verifiers are tasked and actually do induction training and continuous awareness talks with project employees. The difference may be attributed to the practicability of giving induction due to the size of the employee forces at Medupi and Ingula. At Tulbagh for example Els (2013) notes, “One of the values that the ECO add is an educational value. Due to the involvement of the ECO the Client, Contractors and Project Advisors are definitely more sensitive to the environment.

*2C. Participate in reporting and communicating by informing the stakeholders as well as the public about the results of EIA follow-up.*

Sufficient evidence was available to indicate that verifiers across all cases achieved the objective for participating in reporting and communication (in terms of: giving feedback to the proponent, regulator, and community; and ensuring openness and access to information for transparent communication with stakeholders). However, the results indicate that an area where the verification function did not add value is formal periodic feedback and communication of EIA predictions into senior management’s planning and review meetings<sup>KPI 2C.4</sup>, except for case 4 where the verifier was involved with communication with management due to a relative flat reporting structure of the project. Communication with the community was at case 4 not part of the ECO’s scope of work. Interestingly, the verifiers from Medupi and Ingula participated in formal feedback for

external EIA process improvement by formal lectures at the North-West University, Potchefstroom campus (Marrel, 2012; Campbell, 2012). Another interesting observation is that at all the cases; the verifiers fulfill the responsibility of giving feedback to the community<sup>KPI 2C.3</sup> (also refer to results of KPA 5 “Community involvement”). Campbell (2012) states, “..., it has become obvious that the independence not only is important from an assurance [client’s] perspective, but also from a lot of different stakeholders involved – governmental and non-governmental organizations”. This observation and comment is in-line with the findings of Wessels (2013) that shows that independence in verification instil confidence and trust into processes such as EIA and EIA follow-up.

### *3A. Participate in the monitoring and measurement of environmental effects.*

Monitoring is viewed as “the collection of activity and environmental data both before and after (compliance and impact monitoring) (Arts *et al.* 2001). The appraisal results in Table 6-4 strongly indicate that the verification function did not add value to the monitoring, measurement and/or the evaluation of environmental effects [or impact monitoring] in terms of participating in: collecting data, measuring data of environmental effects<sup>KPI 3A.2</sup>; and risk assessment/evaluation of environmental aspects, risks and alternatives<sup>KPI 3A.2</sup>. The task of monitoring and measurement of environmental effects in South Africa are done by other environmental specialists such as environmental monitors and water [or other] quality specialists. The results, however, show that the verification functions at the Medupi and Rolling Hills participate in risk assessments (in a review capacity) to an extent. Nair (2012) as the Assurance Manager at Medupi note, “When we do risk assessments we need to involve our ECO. We got an Environmental Team and then we have the ECO team. They both have a specific focus. We’ve seen that if we get these guys together then we’ll have a very comprehensive product at the end of the day.” This indicates that these verifiers participate and add value in the identification and prioritization of environmental issues, which Raissiyani and Pope (2012) view as “The core of both EIA and EMS practice”.

### *3B. Participate in internal and external compliance (conformance) evaluation.*

It is evident in the appraisal results of Table 6-4 that verifiers do achieve the objective of participating in internal and external compliance evaluation (legal conformance / compliance monitoring) referred to by Arts *et al.* (2001) and Arts and Faith-Ell (2012). This is indicative that compliance monitoring is one of the primary roles of independent

verifiers and corresponds with the results of Wessels and Morrison-Saunders (2011). Moreover, the results show that the verifiers: collect data on environmental legal compliance<sup>KPI 3B.1</sup>; do formal internal assessments<sup>KPI 3B.2</sup>; are involved with ad hoc verification and evaluation of policies, plans, programmes, operational procedures, reports and the subsequent implementation of mitigation measures<sup>KPI 3B.4</sup>. At Medupi Marrel (2012) note, “the ECO will “Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMP.” The results of KPI 3B.3 indicate that verifiers participate only partially in external environmental assessments in an information providing capacity.

### *3C. Participate in the control of records.*

The results indicate that there is sufficient evidence available to indicate that verifiers participated largely in the control of environmental related records to ensure information remains accessible to stakeholders. This supports 3B above in that verifiers collect and manage historical documents and records for proof of compliance monitoring. This is a very important function as the verifiers are generating and keeping records that may aid in the transfer of information and later learning from EIA follow-up experience (refer to Arts and Faith-Ell, 2012). This record-keeping role may also be beneficial in ensuring more efficient feedback of information and knowledge into the assessment of new projects as indicated by Sánchez and André (2013).

### *4. Participate in management and enforcement.*

The appraisal results in Table 6-4 indicate that there is a lack of evidence to support the achievement of the objective. The results indicate that the verification function do not have the authority to: cease, modify or control any act, activity or process causing the pollution or degradation<sup>KPI 4.1</sup>; or to police and enforce follow-up activities; and may not hold the proponent, implementing agent and contractors responsible, accountable, liable and answerable to non-compliances<sup>KPI 4.2</sup>. According to Radford (2012) (ECO at Rolling Hills) “The ECO cannot physically do it. You may note the problems and warn them of non-compliance which are around the corner”. At Medupi Marrel (2012) states, “The ECO assure, not ensure avoidance, minimization but only by for example reviewing remedial plans”. At the Ingula case Rhode (2012) notes, “The ECO has no powers, only advisory role and thus no authority for stopping work. In extreme cases, however, work may be stopped but only with very clear communication with the project

manager”. An interesting example at Medupi is the ECOs influencing management to cease and contain sources of pollution by arranging a two hour ‘stand down’ where construction was stopped and all contractors and employees were required to clean their areas of responsibility. However, the results show that the verifiers did encourage and specify the use of alternative methods or equipment<sup>KPI 4.4</sup>. The results also show that they were to a partial extent involved with dispute and complaint resolution<sup>KPI 4.5</sup>, especially at Medupi and Rolling Hills, and partially at the Ingula case study, where the verifier only monitored the outcomes. The results also indicate that the verifier at the Tulbagh case study did not participate in dispute resolution which coincides with the results of KPIs 2C.3 (feedback to community); and KPIs 5.1 & 5.2 that showed that the verifier was not involved in community participation. The Tulbagh independent verifier therefore, did not function as a facilitator and focused more on verification.

*5. Participate in community involvement, public participation, capacity building and awareness.*

Sufficient evidence is available to indicate the achievement of the objective in that: the verifiers ensured and encouraged active engagement of stakeholders in decision-making processes<sup>KPI 5.1</sup>; and that the verifiers participated in awareness and capacity building campaigns, training courses and other activities to develop and sustain the interest of the community<sup>KPI 5.2</sup>. At the Rolling Hills case study de Villiers (2012) states, “Yes, with this I agree; they did actually do this [promoting public participation]. Phillip [Radford as the ECO] visited me last week and he also visited all the neighbouring people in the area”. At Ingula Stoop (2012) makes the following observation, “It is important for our stakeholders and the community as all of them knows Alastair [Campbell as the ECO] on his name and those that don’t talk about the guy with the tooth around his neck and also, they know what his role is on site”. At the Medupi case, Paul (2012) answers a question on community involvement, “I don’t know how far their influence is supposed to be. In terms of a very localized community, most definitely yes”. The results coincide with KPIs 2C.3 & 2C.4, which reiterates the importance of community participation in EIA follow-up that was also mentioned in the Canadian, Ekati EIA follow-up example by Ross (2004). The Tulbagh case is the anomaly again in that the results indicate no participation of the verifier in these activities.

#### 6. Participate in the integration of EIA follow-up with other programs and/or information.

The results in Table 6-4 show that the objective was achieved. The verification function at the Medupi and Ingula case studies was actively participating in the organizations' ISO14001:2004 EMSs<sup>KPI 6.1</sup> and actively participated in the understanding of area-wide effects and issues<sup>KPI 6.2</sup>. Evidence was also found at the Rolling Hills case study that the verification function contributed to the developer's EMS without knowledge of it. The results therefore indicate that verifiers were participation in advancing the continuum agenda between assessment and management referred to by Perdicoúlis *et al.* (2012). However, although the relevant government department and the public required it, no concrete evidence was found that the verification function participated in the understanding of area-wide effects and issues<sup>KPI 6.2</sup> at Rolling Hills. The status of KPI<sup>6.2</sup> for the Tulbagh could not be established.

### 6.4 Conclusions and Recommendations

The research aimed to appraise how and to what extent do independent EIA follow-up verifiers add value during the construction phase of major development projects within a developing country context. The study method drew from international expectations for EIA follow-up. It also provides insight into the appraisal results of four case studies in South Africa. It is hoped that this study aided in providing some insight on how to gain knowledge from learning opportunities arising from EIA follow-up.

Overall, the appraisal results indicate that verifier's added value in South Africa by being involved with key construction and related EIA, EIA follow-up and EMS areas such as: screening EIA requirements for current and future projects; monitoring and evaluation of legal compliance (conformance) specifications; and controlling environmental records for information retrieval purposes. The results build on the findings and definition of Wessels and Morrison-Saunders (2011). Evidence was also found of verifiers being involved with the identification and allocation of financial and human resources for EIA follow-up activities. Results also show that verifiers added value in the areas of: doing implementation of specifications by informing decision making in construction and parallel process and doing reporting on and communication of EIA follow-up results. The results also indicate that the verifiers participate in and add value to the identification and prioritization of environmental issues that is viewed as the core of both EIA and EMS practice. The importance of community participation in EIA follow-up was

reiterated and suggests that verifiers should be involved with community participation in their role as verifiers that instil trust into EIA follow-up.

It was found, however, that verifiers added limited value to the planning and design phases of projects such as; the generation of data and knowledge necessary for effective planning and design for significant adverse impacts. Although other environmental specialists such as Environmental Assessment Practitioners (EAPs) are involved with planning and design, the results are convergent with literature that shows “learning from doing” (or organizational learning) should be more effectively fed back into the assessment of new projects (Sadler, 1996; Sánchez and André, 2013).

Non-achievement of objectives was also noted for doing pre-construction preparation for implementation of specifications. This is particularly alarming as the results suggest that no competent person is fulfilling this responsibility during the vulnerable stage of the project. The results also indicate that limited value was added by verifiers in the checking, monitoring and measurement of environmental effects (or performance evaluation). The lack of involvement with these activities indicates a limited focus on legal compliance (or conformance) evaluation by South African verifiers. This is an opportunity to be explored for further improvement of evaluation of performance in practice. Limited value was also added in acting on management and enforcement measures due to verifier not having authority on construction sites. However, sufficient evidence was found to indicate that the independent verifiers influenced management actions by various means. Deviation from performing the defined roles and responsibilities as stipulated in authorization and environmental management plan conditions were noted at most of the case studies and in one case both the senior managers interviewed were of the opinion that the verifiers did not focus on the correct issues and did not add sufficient value to the project.

It is recommended that performance standards be formulated within project specific and country contexts to approach learning opportunities from doing arising from real EIA follow-up cases. This may open the door to information that is not always readily available to the academic community and may lead to the generation of new knowledge within the EIA follow-up field. It is also suggested that related research in the future focus on the potential indirect value outputs of verifiers. It is also recommended that developers utilize independent verifiers more creatively in pre-construction preparation, effective feedback of knowledge into the assessment of new projects, and performance

evaluation. The latter may be achieved by devising appropriate mechanisms to harness learning obtained through follow-up activities as recommended by Sánchez & André (2013). Lastly, although it is evident that ECOs are currently involved in the construction phases of projects, there may be cases where ECOs may provide benefits to the operational phases of projects similarly to the benefits they have to construction. It is recommended that this scenario be explored in the future.

In conclusion, the study confirms the benefits of proponent and regulator follow-up in major construction projects, specifically in having independent verifiers that: disclose information; facilitate discussion among stakeholders; are adaptable and proactive; aid in the integration of EIA follow-up with other programs; instil trust in EIA enforcement by conformance evaluation.

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## **CHAPTER 7: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

### **7.1 Introduction**

The research aim of this PhD thesis is “*to advance understanding of independent Environmental Control Officers in major South African construction projects*”. The rationale of the aim is that little learning about environmental governance approaches has been drawn from and shared by ECOs. These approaches include “classic” approaches including EIA and EIA follow-up, and “new” approaches such as self-regulatory (ISO 14001-based EMSs) and involvement of third parties. To achieve the aim, I followed three lines of inquiry, presented as objectives in the first chapter:

- 1 to define what the role is, or ideally should be, of an ECO in the South African compliance monitoring and enforcement effort during the construction phase of a project;
- 2 to identify what factors might influence the independence of verifiers; and
- 3 to appraise how and to what extent independent EIA follow-up verifiers add value in major construction projects in the developing country context of South Africa.

The peer-reviewed and published articles 1, 2 and 3 (presented as Chapters 4, 5, and 6, respectively) show the results and achievement of the objectives of the thesis. This concluding part is intended to provide an integrated summary and discussion of the conclusions made in the articles. In the conclusion, the results of the objectives, are linked with what was found in the literature review of Chapter 3. Moreover, methodological learning about conducting the study is briefly reflected upon, the potential implications for practice and the industry is discussed, and suggestions are made for future research. The thesis finally concludes with a summative understanding of independent ECOs in major South African construction projects.

### **7.2 Concluding remarks on research objectives**

Due to different views on the role and independence of ECOs, the first objective (Objective 1 – Chapter 4: Article 1) of the study was to define what the ECO role is, or ideally should be. The assumption was that an ECO industry is active on various construction sites across South Africa and is in some way involved with, or contributing

to, the South African compliance monitoring and enforcement effort. I therefore set out to, by means of a survey, capture and analyse South African environmental practitioners' perspectives about the ECO industry, with particular regard to their role and independence. As expected, the participating practitioners identified various roles that ECOs perform during the construction phase of projects, including the monitoring of compliance; implementation and enforcement; ensuring legal compliance; advising and/or consulting; communicating; reporting; and raising awareness. Interestingly, practitioners held ECOs' independence of all role-players in high regard and viewed independence as a critical ingredient in the success of the ECO function, and ultimately, the successful implementation of environmental legal requirements on a construction site. Being independent is, however, in conflict with the implementation roles that practitioners identified. Key learning points gained from the survey are firstly that, without clear rules of engagement, the role of an independent ECO can be reduced to a perfunctory role and secondly, that environmental practitioners should not be obsessed about independence to such an extent that it compromises the ability of ECOs to fulfil their roles. Consolidating the material presented, a definition for the role of an independent ECO was proposed: *'An Environmental Control Officer is an independent, competent person or body in a position to influence people's behaviour during the construction phase of a project; with selected environmental monitoring instruments; in order to assure and at times to ensure, record and communicate compliance to applicable environmental conditions and performance specifications'*.

Conflicting results gained from the survey study indicated that the issue of independence influenced what an ECO might do on a construction site, which, in turn, might lead to a conflict of interest in projects. This discovery encouraged me to investigate the independence of ECOs in more detail, especially the factors that might influence their independence (refer to Objective 2 – Chapter 5: Article 2). It became clear that there are various verification professions with similar independence challenges and that independence is considered a cornerstone of the ethical foundation of these professions. It also became evident that independent verification is an important aspect of practice in ensuring the credibility of an EIA. In addition, it became evident that the independence of verifiers such as checkers; auditors; and ECOs, may be influenced by various factors that may lead to a conflict of interest between role-players in EIA and EIA follow-up. A total of 18 factors, divided into five categories (financial, commercial, professional, personal and other) that might influence independence were identified. This was achieved through a

literature analysis, interviews and the evaluation of a workshop on the independence of ECOs. Also highlighted was the importance of identifying these factors and disclosing them in situations where the issue of independence of verifiers might lead to a conflict of interest between parties involved in EIA follow-up. The results also show that, by and large, the success of EIA depends upon successful implantation, along with appropriate accounting for follow-up activities. Moreover, the research showed that accounting for follow-up activities are done by 1<sup>st</sup> party (self-regulating), 2<sup>nd</sup> party (authorities), 3<sup>rd</sup> party (communities) role-players and that ECOs as an “independent from all” 3<sup>rd</sup> party, have additional verification functions over and above the aforementioned. The results confirmed that the independence of persons responsible for the verification of EIA follow-up activities is a cornerstone in ensuring EIA integrity and best practice.

As indicated in section 1.2, the results of the studies above (Objective 1 and 2) left the with the sense of gaining an understanding of perceptions and theory related to the role and independence of ECOs as EIA follow-up verifiers. However, the confidence lacked of truly understanding their essential value in the real world. This realisation was an encouragement to formulate and achieve Objective 3. As a result, I established a framework to appraise the role of ECOs as South African independent EIA follow-up verifiers. Four South African cases where then studied and data collected to appraise how and to what extent independent EIA follow-up verifiers, such as ECOs, add value in major construction projects in the developing country context of South Africa. The central learning gained from the research is that EIA follow-up verifiers add value in South Africa, by being involved in key construction and related EIA, EIA follow-up and EMS areas. The results also indicated that independent verifiers add the most value to major construction projects when involved in screening EIA requirements of new projects, allocating financial and human resources, checking legal compliance, influencing implementation, reporting on conformance results, engaging with communities and stakeholders, integrating with self-responsibility programmes such as EMSs, and controlling records. Importantly, the results built on the results and definition of Objective 1. The results also indicated that verifiers could be employed more creatively in pre-construction preparation; by providing feedback of knowledge on the assessment of new projects; giving input to the planning and design phase of projects; and by implementing performance evaluation. Of international importance was the confirmation of the benefits of proponent and regulator follow-up, specifically insofar as it concerns adaptable, proactive and independent verifiers who fulfil various EIA follow-up roles. It should, however, be noted that EIA

models internationally may differ from the command and control situation in South Africa where EIA forms the basis of the consent to build and operate. Different EIA models, therefore, have a key implication for EIA follow-up verifiers internationally in that their expected roles may not be universally the same.

### **7.3 Concluding remarks on the literature review**

The NWU's rules and guidelines for the submission of a PhD thesis in article model require a focused literature analysis with an integrated discussion of the relevant conclusions (NWU, 2012: 2). This section of the concluding chapter, therefore, provides the linkages between what have been found in the achievement of the objectives to previous knowledge reviewed in Chapter 3.

Various available primary and secondary sources of literature are directly and indirectly relevant to the topic "independent Environmental Control Officers on major South African construction projects". The most relevant literature covers areas such as sustainability in construction, environmental governance, EIA and EIA follow-up, ISO 14001-based EMSs, and systems auditing. There are also areas of literature that contains information indirectly related to ECOs, such as philosophy on truth, independent verification, the built environment, and the Anthropocene period.

The review firstly shows that independent verifiers, who focus on the authentication of sustainability statements and commitments, are indeed active across the globe. They include ECOs (South Africa and Singapore), Environmental Checkers (Hong Kong), Environmental Supervisors (China and Latin America), and EMS auditors. It is evident, however, that there are differing views on the value that these verifiers add and that their roles may differ according to the contextual factors of projects. The review highlighted that ill-defined roles and responsibilities of environmental management are viewed as one of the most significant weaknesses of the South African environmental governance effort. A specific problem identified was the confusion about monitoring and enforcement by environmental specialists, who are not directly involved in implementing a project, and their relationship with those who are. The review also shows that the role of the ECO in South Africa changed from implementing to verification of commitments due to the need for an "independent from all" 3<sup>rd</sup> party.

The review indicates that one characteristic of independent verifiers is that they are, or should be, free from outside control or influence and “aim to identify the truth of statements such as: ‘we conform to standards’ and/or ‘we are legally compliant’ with its verifiability”. The review also shows that independence has various benefits such as instilling confidence and trust in enforcement, and strengthening follow-up measures in developing countries. Furthermore, it shows that independence may be influenced by various contextual factors and that it is possible to identify the factors that might influence the independence of verifiers. The review aided in identifying such factors, which in turn influence the role that a verifier may have, or ideally should have, on a construction project.

The review emphasised that sustainability, sustainable construction, and effective environmental governance are dependent on each other; and that there are many challenges to these concepts. Challenges include poor environmental governance, inadequate collaboration between role players, ill-defined roles and responsibilities, and insufficient use of governance approaches in exercising responsibilities. It is evident that “classic”, stand-alone governance approaches such as EIA and EIA follow-up (and activities of monitoring, auditing, management, reporting and communication), are not effective to deliver on sustainability commitments – they should be combined with “new” approaches to aid in collaborative relationship between various parties. Literature also suggests that the relatively unexplored approach of continuous on-site “independent from all” 3<sup>rd</sup> party verification may enhance the combined or co-regulation approach to environmental governance, through the many benefits of independent verification. The review further shows that little learning was gained from independent EIA follow-up verifiers such as ECOs, and that these independent verifiers may have gained unique knowledge from doing EIA and EIA follow-up. This underexplored source of information may pose significant learning potential in EIA and the follow-up activities after project approval.

#### **7.4 Concluding remarks on research design and methodological learning**

Gaining a better understanding of independent ECOs proved to be a challenge in the disordered “real world” of the South African construction industry and as stated before, limitations were experienced in conducting the research. However, it was clear that having a proper research design or “blueprint” is of utmost importance in a complex and

relatively poorly controlled real world research study. Moreover, it was also evident that claiming knowledge from pragmatism enables a researcher to use whatever methodology or method that works best for a particular research problem to collect and analyse data from practice. This is of great value in the ill-defined world of the ECO industry. Another experience was that pragmatism leads to a mixed methods methodology, in which the use of both quantitative and qualitative approaches is supported. This flexible methodology is particularly useful in real-life research. Another interesting characteristic of this methodology is that it allowed me to use different methods of data collection, analyses and writing. This is particularly useful in case study research and the writing of an article model PhD thesis. The mixed methods methodology also aided significantly in the triangulation and collaboration of the research findings. Another learning experience was that sharing methodological knowledge with other researchers is highly valued. Consequently, more insight was provided on how to gain knowledge from learning opportunities as initially intended (see Chapter 6: Article 3). I hope that the learning gained from the particular research design and methodology applied in this thesis aids future researchers.

## **7.5 Recommendations for policy, practice and future research**

The following recommendations, based on the results of the study, are made to aid in resolving problems experienced in the ECO profession and for related future research purposes.

### **7.5.1 Recommendations for policy and practice**

Due to the key South African challenge of ill-defined roles and responsibilities for environmental management, it is highly recommended that the environmental profession in South Africa standardise definitions and roles of all environmental professionals in policy and/or law. While this may not be finalised in the near future, it is suggested that parties involved in major construction projects, agree on and define the roles and responsibilities of all environmental professionals involved in the project. Clarity should especially be reached with reference to environmental specialists, such as ECOs who are not directly involved in the implementing of a project, and their relationship with those who are. All environmental practitioners are encouraged to disclose all factors that might influence the independence of independent verifiers such

as ECOs, as soon as it is recognised and in situations where the issue of independence may lead to a conflict of interest. It is further suggested that proponents and developers utilise the service of EIA follow-up verifiers like ECOs, more creatively in EIA, EMS and EIA follow-up processes. This will add more value, especially in the pre-construction preparation of the implementation of specifications, whereby integration with planning arrangements, performance evaluation and the effective feedback of knowledge into the assessment of new projects is ensured. It is advised however, that ECOs restrain from adding to the perceived drawback of impact assessment as a major time and resource constraint by, for example, driving their own agendas and objectives without considering contractual and sustainability objectives.

### **7.5.2 Recommendations for future research**

A recommendation for future research is firstly to investigate the standardisation of the definitions of professionals' roles and responsibilities. It is also recommended that future research on independent verifiers focus on the practical implications of the concept of 'no vested interest'. Further research is also needed on government's perspectives on the value and role of ECOs in South Africa. A wider survey of more experienced professionals within the EIA community will also aid in building on the thesis's findings. The role of an ECO in his/her personal capacity in monitoring committees may be another future research topic as this matter lacks clarity.

On competence, DWAF (2005) recommend that "the role of an ECO be fulfilled by any person (department or professional service provider), well versed in environmental studies and construction processes." However, there is currently no indication on what this "well versed" or competent person is. It is therefore recommended that the competency and the regulation of the competency of ECOs be investigated in further detail. At the time of finalising the thesis, it was still not clear if ECOs will be able to register at the Certification Board for Environmental Assessment Practitioners of South Africa.

Research that is more detailed is also required to clarify the possible indirect output value of the South African ECO function. Another interesting topic to research in South Africa would be the possibility of having a regional verification office to better account for the understanding and management of cumulative impacts in areas where multi-project developments are earmarked. Due to the scope of the research being limited to

the construction phase of projects, follow-up research on the role and value of ECOs during the operational and closure phases of projects may be invaluable. I also suggest that this follow-up research examine how new forms of construction contracts, the greening of framework supply chains, design and build schemes such as the green building initiative of The Green Council of South Africa, and the revised ISO 14001 (scheduled for publication in 2015) influence the ECO role and its objectives. Lastly an international comparative study of similar environmental verification functions can be carried out done to draw further valuable information from learning through doing verification, in order to enhance EIA, EMS and EIA follow-up.

## **7.6 Concluding summary on understanding Environmental Control Officers**

The fundamental conclusion related to the aim of the thesis is that independent ECOs constantly authenticate statements about, and the implementation of, sustainability commitments made during the planning phase of major construction projects in South Africa. By doing so, they add value to key areas of EIA, EIA follow-up, EMSs, involvement of third parties and ultimately, they aid in the South African environmental governance effort. This is significant, as insufficient, stand-alone governance approaches such as EIA, together with poor collaboration between parties involved, are crucial weaknesses in the delivery of sustainability and environmental commitments on major construction projects internationally and in South Africa. On-site verifiers like ECOs may aid in restraining these challenges by bridging ineffective governance approaches such as classic EIA, with new governance approaches for instance self-responsibility and involvement of third parties. It is, therefore, imperative that the governance approach of independent on-site verification be combined with the approaches proposed by Arts & Faith-Ell (2012: 3240) to ultimately enhance environmental governance in South Africa and internationally.

As previously mentioned, this study shows that ECOs, as EIA follow-up verifiers, add the most value when involved in screening EIA requirements of new projects, checking compliance, influencing decisions and implementation, engaging with communities and stakeholders, and controlling records. Linked to the value they add is the role they may perform, and pivotal to this link is verifier independence. Remaining free from control or influence and avoiding a conflict of interest, whilst fulfilling both an implementation and

verification role, is a challenge to verification professions worldwide and very difficult, if not impossible. Nevertheless, independence is a cornerstone of the validity and integrity of an ECO's role. Independence is therefore considered the ethical foundation of verification professions worldwide, and understanding factors that may influence independence is crucial, as indicated in Objective 2 (see Chapter 5: Article 2). Balancing the roles listed (see Chapter 4: Article 1) on the axle of independence for Objective 1 and output value components of ECOs presented in Objective 3 (see Chapter 6: Article 3) is possible if there is a coherent understanding of independent EIA follow-up verifiers, such as ECOs in major construction projects.

It is hoped that this research adds, albeit a little, to building and sharing experience about EIA, EMS and EIA follow-up on major construction sites, through the knowledge drawn from the independent South African EIA follow-up verifiers known as Environmental Control Officers (ECOs). Personally, the most valuable lesson learned about independent EIA follow-up verifiers and South African ECOs is that they should not be excessively restrained or boxed-in. They are, or should be, adaptive, proactive, experienced, ethical, and independent mentors who monitor, verify, at times implement and above all, provide truthful feedback on the achievement of sustainable and environmental compliance and conformance commitments on major construction sites.

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**ANNEXURE A: SURVEY QUESTIONNAIRE - ROLE OF ECOS**

## **QUESTIONNAIRE: The Role of Environmental Control Officers (ECOs)**

I am a PhD candidate at the Department of Geography and Environmental Management, North-West University under the supervision of Prof. Francois Retief and Prof. Angus Morrison-Saunders and gained an interest in the ECO topic while working as an ECO for 5 years.

The document presented to you is a survey designed to determine what South African environmental practitioners perceive the role of the ECO industry to be in environmental post-decision monitoring and enforcement and to compare this with positions in international literature.

In terms of the National Environmental Management Act (107 of 1998) (NEMA) a developer has to apply for an Environmental Authorisation (EA) for listed activities. As part of this authorisation the competent authority may require the developer to appoint an ECO with specific environmental roles in order to influence the behaviour of people to help achieve the core environmental aim of the Constitution: “everyone has the right to an *environment that is not harmful* to his or her *health or well-being*,” and of NEMA: “ensuring *sustainable development* which requires the integration of social, economic and environmental factors in the planning, *implementation* and evaluation of decisions to ensure that development serves present and future generations.” NEMA also states that everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative *and other measures* that- prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

As an environmental practitioner involved with the ECO industry, your input is extremely valuable to this research and I thank you for the time that you spent on this questionnaire.

Sincerely

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PhD candidate

North-West University

**PART 1: GENERAL:**

1. What do you consider to be the critical ingredients for effective post-decision monitoring and enforcement in South Africa? \_\_\_\_\_

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**PART 2: THE NEED FOR ENVIRONMENTAL CONTROL OFFICERS**

2. In one sentence explain what you consider to be the core need for the ECO industry?

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**PART 3: THE ROLE OF ENVIRONMENTAL CONTROL OFFICERS**

3.1 List up to five **key** roles of an ECO? (Please list in order of priority with 1 as the highest priority)

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_
- 3) \_\_\_\_\_
- 4) \_\_\_\_\_
- 5) \_\_\_\_\_

3.2 For what activities should the services of the ECO industry be utilised? \_\_\_\_\_

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*Please explain your answer:*

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3.3 When should the ECO role start and finish for the activities in 3.2?

Start: \_\_\_\_\_ Finish: \_\_\_\_\_

Please explain your answer: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**PART 4: INDEPENDENCE OF ENVIRONMENTAL CONTROL OFFICERS**

Please rate each of the statements below according to the supplied response scale (tick one box only for each line). Respond on the basis of 4.1) YOUR OWN OPINION and 4.2) YOUR OWN EXPERIENCE of the ECO industry.

<i>Strongly</i>		<i>Partly</i>	<i>Partly</i>		<i>Strongly</i>	<i>Unable</i>
<i>Agree</i>	<i>Agree</i>	<i>Agree</i>	<i>Disagree</i>	<i>Disagree</i>	<i>Disagree</i>	<i>to Judge</i>

4.1 In my opinion an ECO **should** be independent of:

- |  |                          |                          |                          |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| a) Developer                             | <input type="checkbox"/> |
| b) Competent authority                   | <input type="checkbox"/> |
| c) Environmental Assessment Practitioner | <input type="checkbox"/> |
| d) Interested and Affected parties       | <input type="checkbox"/> |

4.2 In my **experience** of ECO practice ECOs are independent of:

- |  |                          |                          |                          |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| a) Developer                             | <input type="checkbox"/> |
| b) Competent authority                   | <input type="checkbox"/> |
| c) Environmental Assessment Practitioner | <input type="checkbox"/> |
| d) Interested and Affected parties       | <input type="checkbox"/> |

4.3 Explain the importance of independence of an ECO.

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**PART 5: THE ROLE OF ECOs IN INFLUENCING THE BEHAVIOR OF PEOPLE IN ORDER TO ACHIEVE THE ENVIRONMENTAL AIMS OF THE CONSTITUTION AND OF NEMA**

5.1 Explain how ECOs can influence or change behaviour of people in a project.

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5.2 Please provide an example of an ECO influencing behaviour from your experience.

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Please rate each of the statements below according to the supplied response scale (tick one box only for each line). Respond on the basis of 5.3) YOUR OWN OPINION and 5.4) YOUR OWN EXPERIENCE of the ECO industry.

<i>Strongly</i>		<i>Partly</i>	<i>Partly</i>		<i>Strongly</i>	<i>Unable</i>
<i>Agree</i>	<i>Agree</i>	<i>Agree</i>	<i>Disagree</i>	<i>Disagree</i>	<i>Disagree</i>	<i>to Judge</i>

5.3 In my opinion an ECO **should** influence the behaviour of:

a) Developer	<input type="checkbox"/>						
b) Competent authority	<input type="checkbox"/>						
c) Environmental Assessment Practitioner	<input type="checkbox"/>						
d) Interested and Affected parties	<input type="checkbox"/>						

5.4 In my **experience** an ECO influences the behaviour of:

- |  |                          |                          |                          |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| a) Developer                             | <input type="checkbox"/> |
| b) Competent authority                   | <input type="checkbox"/> |
| c) Environmental Assessment Practitioner | <input type="checkbox"/> |
| d) Interested and Affected parties       | <input type="checkbox"/> |

**PART 6: FUTURE DIRECTIONS OF THE ECO INDUSTRY**

6.1 How would you like to see the ECO industry develop/evolve in the future?

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6.2 What would you suggest as the best way forward for the South African environmental post-decision enforcement and monitoring effort in:

a) the immediate future?

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b) the longer term future?

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**PART 7: DEMOGRAPHIC DATA**

7.1 Approximately how much of your working time do you spend directly on ECO-related activities

- |                         |                    |                     |
|-------------------------|--------------------|---------------------|
| None of my working time | Between 25 and 50% | Between 75 and 100% |
| Up to 25%               | Between 50 and 75% | 100%                |

7.2 How many years have you worked in the ECO industry (choose 1 only)

- |               |                    |                         |
|---------------|--------------------|-------------------------|
| Up to 5 years | 10 to 15 years     | None of my working time |
| 5 to 10 years | More than 15 years |                         |

7.3 What best describes your role in the ECO industry (choose 1 only)

- |                     |                       |                |
|---------------------|-----------------------|----------------|
| Academic research   | Consultant / EAP      | NGO            |
| Competent authority | Developer / Proponent | Practising ECO |

**PART 8: ANY FURTHER COMMENTS**

8. Do you have any other comments related to the role of ECOs in the South African post-decision environmental monitoring and enforcement effort?

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## **ANNEXURE B: SURVEY RESULTS - CORE NEED FOR ECOS**

## Survey data analyses of qualitative data

### **PART 2: Core need for ECOs - Question 2: In one sentence, explain what you consider the core need for the ECO industry?**

Theme	Summary of results: Key terms used	#-Colour key:
Theme 1: What is needed for the ECO industry?	Registration; regulation (criteria); accredited body (quality); recognition and exposure (in law and media); defined roles & responsibilities; professional experience (in ecology, environment, engineering & construction), competence (specific skills); well versed in multiple disciplines (learning); to independence; ethics, integrity & honesty; privatised EMI's; appointed by government; passion; support (from government and industry); integrated into pre-planning;	XXXX
Theme 2: What the ECO industry is needed for?	Ensuring honesty; self-regulation; ensuring compliance; protection and conservation of the environment; reducing impacts & incidents; monitoring; ensure enforcement; guidance (coaching implementers) & advisor; provide for awareness; ensure sustainable development; integration of environmental principles into decisions; competent environmental assurance practitioners; mediation link between legislation and government enforcement (clear communication); reporting; mitigation of negative impacts.	XXXX
Respondent	Response	#
1	An ECO <b>registration/accreditation/certification body</b> .	1
2	At this point in time there is a need for the industry to be <b>formally regulated</b> , with clearly <b>defined roles and responsibilities</b> to effectively <b>monitor compliance</b> on behalf of the competent authority, and <b>criteria prescribing professional experience</b> requirements.	1
3	ECOs need in essence to <b>monitor</b> and <b>report</b> on the implementation of EA and EMP requirements to <b>facilitate</b> the carrying forward of the intentions or requirements set out in the EMP and Ease by creating a consequence to ignoring these requirements.	1
4	Plays a role in <b>ensuring honesty</b> and helps the industries not being bias in terms of their activities and information.	1
5	An <b>environmental wise</b> person.	1
6	To <b>protect, manage</b> and <b>prevent pollution</b> incidents.	1
7	<b>Registration of ECOs</b> and <b>regulation of the ECO function</b> i.e. most companies are doing ECO function and some of them don't have any <b>experience</b> about what an ECO must do on a site.	1
8	To ensure project <b>compliance</b> to National legislation, project EAs, EIA etc.	1
9	<b>Help reduce impacts</b> on the environment and make sure developers take <b>environment into consideration</b> in their activities.	1
10	To ensure the environment is <b>protected</b> and <b>monitored</b> to ensure <b>compliance</b> .	1

Theme	Summary of results: Key terms used	#-Colour key:
11	To provide <b>awareness, enforcement</b> on contraventions to legislation, <b>guide</b> and protect the environment.	1
12	To <b>protect and conserve</b> the environment for sustainable use for future and present generations.	1
13	To be an <b>independent body</b> that oversees all activities.	1
14	<b>Enforcement</b> and ensure <b>sustainable development</b>	1
15	To ensure environmental <b>compliance</b> , environmental <b>auditing</b> , <b>practical experience</b> & <b>environmental planning</b> .	
16	To oversee and <b>monitor</b> activities in terms of EMP, EA and relevant legislation	1
17	All sectors involved in the environment in SA should have ECO's designated for each areas in the environment that have good knowledge and understanding of the environment to <b>monitor</b> and <b>guide</b> .	1
18	The core need for ECO industry is to ensure that the environmental <b>principles are integrated</b> when decision are to be taken regarding the developments, especially in sensitive areas.	1
19	<b>Protection</b> of the environment.	1
20	<b>Legal compliance</b> to our resource protection (commitments) on the environment.	1
21	I think the core need for the ECO industry is to have an <b>accredited body</b> to ensure that they are <b>recognised</b> and adhere to high level of <b>ethics</b> and <b>integrity</b> and <b>professionalism</b> .	1
22	For <b>monitoring the compliance</b> of the development to environmental authorisation and EMP.	1
23	Aim at <b>protecting</b> the environment and <b>monitor</b> the project activities in terms of <b>compliance</b> with project management plan and other legislation.	1
24	To <b>ensure the sustainability</b> of the environment which assists in maintaining our resources & <b>conserving</b> them and keeping our ecosystems complete?	1
25	Ensuring <b>compliance</b> conditions of ROD and <b>monitoring</b> non-compliance.	1
26	To ensure <b>monitoring and compliance</b> to the SA environmental legislation	1
27	To <b>enforce</b> the conditions of the authorisation and EMP that was issued to the applicant and accepted by government.	1
28	His/her presence during construction - updated	1
29	Mandates of all different acts, standards and legal legislation.	1
30	Environmental impacts by developments need to be closely <b>monitored</b> for sustainability.	1

Theme	Summary of results: Key terms used	#-Colour key:
31	There is a lack of <b>self-regulation</b> . If one compares SA to Australia, the concept of an ECO would not work as well in Australia as in general, people are more self-regulating. In SA no one wants to spend money on HSEQ, they all want to build, make money and run off to the next buck. The industry needs <b>privatised EMI's</b> . ECO's are essentially privatised EMI's which means that business can drive the quality and competence of the ECO's rather than leaving it up to Government. ECO's also become the <b>competent environmental assurance practitioners</b> who need to be <b>well versed in a multitude of disciplines</b> relating to environmental management and become the <b>link between Legislation and Gvt 'enforcement'</b> and <b>coaching the implementers</b> (Projects: Clients & Contractors) to conduct their activities within both the guidelines of the law and environmental best practice.	1
32	An <b>independent person/body monitoring</b> the project while still being able to have <b>clear communication</b> with the legislator/Government departments as well as the developer to eliminate any potential grey areas/loop holes. This way all the stakeholders understand exactly what is needed and expected.	1
33	A system of <b>registration</b> to control the quality and learning of the ECO industry, with particular focus on the <b>specific skill</b> set required by ECOs.	1
34	A very good <b>understanding</b> of natural systems and ecology is key together with a very <b>practical</b> hands on approach.	1
35	<b>Passionate educated</b> people who put the environment first and are guided by sustainable development	1
36	ECO that is <b>knowledgeable</b> not only in the environmental aspects of a particular activity, but to be <b>informed and experienced</b> with the <b>engineering, and construction requirements</b> for the said activities. And understanding how the different processes impact on one another. If an ECO has this knowledge base, their role can be <b>integrated into the pre- planning</b> of a development as well, which is where flags can be raised and costs can be saved.	3
37	There must be no "cover ups' ( <b>honesty</b> ) and the ECO must be a clear <b>mediator</b> between the developer and the authority.	1
38	Unfortunately, due to shortfalls in the effectiveness and efficiency of Government and the Industry, there is a need for independent ECO's to ensure that the <b>law is upheld</b> and that development is <b>sustainable</b> .	1
39	Ensuring environmental <b>compliance</b> through an <b>independent party</b> , allowing development to continue by <b>implementing best practice</b> solutions <b>to protect</b> the environment and <b>mitigate</b> negative impacts.	1
40	A <b>board</b> which ensures the <b>independence</b> and relative <b>competency</b> of an ECO would have a great advantage to the ECO industry.	1
41	<b>Screening</b> of potential ECOs based on their <b>skills, qualifications</b> and <b>core competencies</b> . A set <b>standard</b> is required to maintain and/or create effective environmental monitoring & enforcement in South Africa.	2

Theme	Summary of results: Key terms used	#-Colour key:
42	<b>Independent</b> post-decision <b>monitoring</b> and <b>enforcement</b>	1
43	<b>Monitor and report</b> on the implementation of the Authorisation conditions. The ECO is also in some respects an <b>advisor</b> to the authorization holder in so far as making recommendations regarding compliance solutions. An ECO is a form of environmental <b>quality control</b> with regards to permit conditions, legislation and standards. An <b>ECO is not a policeman!</b>	4
44	<b>Knowledge</b> and <b>independence</b> . Knowledge is required so that ECOs are able to <b>comply</b> with compliance and identify non-compliance. Independence so that the ECO can give unbiased <b>reports</b> on what is happening so that government is aware of what is actually happening and act accordingly.	3
45	The ECO industry needs <b>more exposure</b> in legislation and the media to make the public and contractors aware of our existence and our function and we need <b>support</b> from various government sectors and other sectors in the industry.	1
46	Complete <b>independence</b> ; in other words not to be influenced by the client who pays your salary and maybe a system where the government pay or have a fund where the client pay into the fund. The ECO is then directly <b>appointed by the relevant</b> provincial department.	2
47	The role will be to <b>help enforce legislation, monitor and assess</b> all aspects for better sustainable environmental management.	1
48	<b>Support</b> from the department and industries where you are based so you do not find yourselves between a rock and a hard place.	1
49	Total <b>independence</b> of ECO`S	1
50	ECO that is <b>knowledgeable</b> not only in the environmental aspects of a particular activity, but to be informed and experienced with the engineering, and construction requirements for the said activities. An <b>understanding</b> how the different processes impact on one another. If an ECO has this knowledge base, their role can be <b>integrated into the pre- planning</b> of a development as well, which is where flags can be raised and costs can be saved.	3
	<b>TOTAL</b>	<b>60</b>

**ANNEXURE C: SURVEY RESULTS - ROLE OF ECOS**

**Survey data analyses of qualitative data**

**PART 3 of the survey questionnaire - Question 3.1: List up to five key roles of an ECO? (Please list in order of priority with 1 as the highest priority)**

Respondent	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Priority 1	Independence	Monitor (report/audit)	Monitor Legal c	Legal C	Awareness	Manage / Protect env	Implement EMP	Monitor Legal c	Assess before construction	Enforce EMP	Awareness	Protect env	Monitoring	Implement - EMP & Monitor	Manage / implement	Act on behalf of gov	Study key areas	Implement / Legal c	Protect env	Legal c
Priority 2	Monitoring - Legal c	Advise / recommend	Report	Monitor	Protect env	Enforce	Audit	Advise	Negotiate access to private land	Monitor	Manage / implement	Awareness	Legal C	Enforce - method statements	Audit	Monitor	Monitoring	Legal c - env auth	Legal c	Protect Env
Priority 3	Advise / guide	Implement	Comm / liaise	Audit	Prevent unlawful activities	EIA regs - Legal c	Comm / liaise - landowners	Comm	Monitor implementation	Advise	Monitor / enforce Legal C	Comm / liaise - public	Advise	Comm / liaise - authority	Enforce	Advise	Legal c	Awareness	Legal c - EMP	Independent
Priority 4	Ensure continual improvement	Awareness	Audit	Inspect / monitor	Monitor	Legal c	Apply for permits	Audit	Monitor impacts	Monitor Legal c		Monitor	Comm - land owners	Monitoring / Auditing	Awareness training	Report	Enforce	Advise	Legal c - contractors	Env driven
Priority 5	Comm / interface / mediate		Facilitate proper interpretation of EMP / supporting amendment to EMP	Awareness	Enforce	Amendments to EA	Monitor	Independent perspective	Approval of agreements				Report	Assisting	Monitor	Audit	Advise	Enforce		
Respondent	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Priority 1	ID impacts	Monitoring - legal c	Protect Env	Develop EMPs	Audit	Monitor	Advise	Monitor	Advise	Implement / mitigate	Monitoring	Independent	Monitor	Legal c - EMP	Monitor	Monitor	Comm	Legal c	Legal c	Independent
Priority 2	Doc control - register of auths	Report	Monitor - legal c	ID sensitive areas	Monitor	Legal c / enforcement	Monitoring / enforce	Legal c - EMP	Monitor	Monitor	Report	Comm / liaise	Advise	Legal c - EA	Report	Report	Monitor	Env protect	Legal c (EMP)	Assist
Priority 3	Review EA	Comm - gov	Monitor Act	Monitor	Mitigate / impacts	Awareness - Promote / Sustainable development	Mitigate / emergency incidents	Report	Audit	Awareness / educate	Audit	Mitigate / imlement	Awareness	Legal c - legisl	Advise	Awareness	ID shortfalls of EMP	Ensuring Sustainable development	Report	Monitor
Priority 4	Monitor	Comm - landowners	Advise	Regulate / Enforce	Prevention of impacts		Monitor / inspections	Approval / method statement	Implement	Legal c	Ris Assessment	Comm		Mitigation (implement)	Comm	Conflict manage	Report	Legal c	Mitigate/ implement	Monitor
Priority 5	Report	Audit	Conflict manage	Mitigate / rehab	Legal c		Awareness	Monitor / inspect	Protect / manage	RA / Mitigate	Comm	Legal c		Report	Awareness	Doc control	Advise/Consult	Legal c	Advise	Team player
Respondent	41	42	43	44	45	46	47	48	49	50										
Priority 1	Report	Monitor	Monitor	Monitor	Advise	Monitor	Legal c	Monitor	Monitor	Monitoring - Legal C & performance										
Priority 2	Comm		Report	Report	Audit	Report	Monitor	Audit	Audit	Report / comm										
Priority 3	Behavior change		Audit	Audit	Report	Advise	Manage	Advise	Report	Advise										
Priority 4	Comm		Advise	Advise	Monitor		Report	Legal c		Assurance										
Priority 5			Comm	Assist				Report		Awareness / educate										

## Survey data analyses results of quantitative data

**PART 3 of the survey questionnaire: Key roles of ECOs.** Question 3.1: List up to five key roles of an ECO? (Please list in order of priority with 1 as the highest priority)

Rating	Summary of Results: Category and related key terms used	# Listed Colour key:
1	<b>Compliance monitoring:</b> activities to ensure compliance, independent monitoring and enforcement, inspections, investigations,	48
2	<b>Implementation and Enforcement:</b> Manage, develop & approve, apply for ( EA/EMP/Method statements), prevent & mitigate (rehabilitate) (impacts & emergency incidents) & close-out (non-compliances), continual improvement, act	34
3	<b>Advising and/or consulting:</b> Facilitate, aid, help, recommending, provide support, assisting (EOs), reviewing, consulting: - contractors and client to minimise impacts, guidance on legislation and authorisation, best practice, & negotiate access, review.	27
4	<b>Ensuring legal compliance:</b> implementation of law, legislation, permits, prevent non-compliances, law enforcement	26
5	<b>Reporting:</b> legal compliance, incidents and non-compliances,	21
6	<b>Communicating and/ liaising:</b> Mediator between government & developer, liaising with government, providing impartial feedback on level of environmental awareness & commitment from developer, facilitating better relationships by clear communication, key figure where to a person may go that knows something about everything,	17
7	<b>Awareness/Educate:</b> Education, training, promoting, understanding, self-governance, & compliance, of contractors, promote sustainability.	13
8	<b>Auditing:</b> auditing and audit activities	12
9	<b>Environmental protection &amp; sustainable development.</b>	7
9	<b>Risk assessment (RA) and identification:</b> Pro-active thinking, impacts, sensitive areas. document shortfalls,	7
10	<b>Independence.</b>	5
11	<b>Document control.</b>	2
11	<b>Conflict management: avoiding and mitigating conflict</b>	2
12	<b>Influencing behaviour</b>	1
12	<b>Acting as a team player</b>	1
12	<b>Providing assurance</b>	1
12	<b>Driver for continual improvement</b>	1
12	<b>Acting on behalf of government</b>	1

**ANNEXURE D: SURVEY RESULTS - INDEPENDENCE OF ECOS**

**Survey data analyses of quantitative data**

***PART 4 of Survey Questionnaire: Independence of ECOs***

Please rate each of the statements below according to the supplied response scale (tick one box only for each line). Respond on the basis of 4.1) YOUR OWN OPINION.

4.1 In my opinion an ECO **should** be independent of:

*Did not answer any of the below = 0*

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Partly Agree</i>	<i>Partly Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Unable to Judge</i>	
a) Developer	32	10	2	1	1	1		3 Not answered
%	68%	21%	4%	2%	2%	2%	0%	
b) Competent authority	17	16	5	1	6	2		3 Not answered
%	36%	34%	11%	2%	13%	4%	0%	
c) EAP	19	10	5	3	4	2	2	4 Not answered
%	42%	22%	11%	7%	9%	4%	4%	
d) I&APs	21	10	4	2	5	4		4 Not answered
%	46%	22%	9%	4%	11%	9%	0%	

**Survey data analyses of quantitative data**

***PART 4 of Survey Questionnaire: Independence of ECOs***

Please rate each of the statements below according to the supplied response scale (tick one box only for each line). Respond on the basis of 4.2) YOUR OWN EXPERIENCE of the ECO industry.

4.2 In my **experience** of ECO practice ECOs are independent of:

*Did not answer any of the below = 2*

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Partly Agree</i>	<i>Partly Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Unable to Judge</i>	
a) Developer	13	7	9	2	9	4	2	2 Not answered
%	28%	15%	20%	4%	20%	9%	4%	
b) Competent authority	12	10	7	6	4	2	2	5 Not answered
%	28%	23%	16%	14%	9%	5%	5%	
c) EAP	11	13	3	5	8	2	2	4 Not answered
%	25%	30%	7%	11%	18%	5%	5%	
d) I&APs	9	11	8	3	6	5	2	4 Not answered
%	20%	25%	18%	7%	14%	11%	5%	

**ANNEXURE E: ANALYSIS OF INDEPENDENCE FACTORS**

**Analysis of independence factors on an Excel electronic spreadsheet**

TEXT REVIEW QUESTIONS	TEXT 1-17																
	LEGAL PROFESSION				FINANCIAL & AUDITING				SYSTEMS AUDITING			ENVIRONMENT - IMPACT ASSESSMENT			EIA FOLLOW-UP		
	UNROL: Basic principles on the independence of the Judiciary (UN Crime Congress, 1985)	Fundamentals of independence in arbitration. The CCMA "Vision and Mission"	CCMA Arbitration: GNR 34573 - Guidelines on Minsconduct Arbitrations	Arbitration profession: (Hong-Lin, Y and Shore, R. 2003).	Policy assessing the independence of directors (Blakiston & Crabb, 2007)	Independence, objectivity and the Canadian CA profession (Everett et al, 2003)	Factors influencing auditor independence: Malaysian loan officers' perceptions (Bakar et al, 2005)	Independence in financial auditing: PwC relevant independence policies	Independence of system auditors: ISO 17021	Independence certification of system auditors: ISO 17024	Independence certification of system auditors: ISO 19011	Cameron Cross – Legal Requirements: Memorandum: Independent Consultant	NEMA; GNR 543 & SA Guidelines of 1998	EIAMS Sub-theme	Case examples in EIA follow-up literature	IAlAsa Kwazulu Natal Branch - Event on 25 May 2012	Case studies & interviews
<p>What are they key elements included?</p> <p>Refined to include elements relevant to the PhD of JA Wessels.</p> <p>These are the factors that may influence the independence of ECO's.</p>	<p><b>Independence of the Judiciary:</b></p> <p>1. <b>Independence shall be guaranteed.</b> Duty of state/institutions to respect the independence.</p> <p>2. Decide matters impartially (basis of facts and accordance of law)</p> <p>3. Authority to decide whether issue submitted is within its competence as defined by law.</p> <p>4. <b>No inappropriate or unwarranted interference.</b></p> <p>5.</p> <p>6. Principle of independence requires the judiciary to ensure proceedings are <b>conducted fairly</b> and respect rights of all parties.</p> <p>7. <b>Duty to provide resources</b> to properly perform functions.</p> <p>Freedom of</p>	<p>1. <b>Integrity:</b> Honest and ethical in everything we do; we deliver on commitments; we are accountable and responsible for performance.</p> <p>2. <b>Diversity (of team):</b> A team of highly qualified individuals that is representative at all levels of our country's diversity.</p> <p>3. <b>Transparency:</b> Work in a manner that is open and transparent, guided by our statutory obligations and commitment.</p> <p>4. <b>Excellence:</b> Committed to excellence; continuously strive to deliver quality work. We always seek to improve our processes, products and services to better serve citizens.</p> <p>5. <b>Accountability:</b></p>	<p>i) Who is an <b>employee</b>?</p> <p>The Labour Relations Act, 1995 (RSA, 1995b) (Section 213), the Basic Conditions of Employment Act, 75 of 1997 (RSA, 1997) (Section 1), and the Employment Equity Act, 55 of 1998 (RSA, 1998a) (Section 1) all define an employee as any person, <b>excluding an independent contractor</b>, who works for another person or for the State and who receives, or is entitled to receive, remuneration; and any other person who in any manner assists in carrying on or conducting the business of an employer.</p>	<p><b>An independent arbitrator is:</b></p> <p>1. <b>No close relationships with a party or its council-</b></p> <p>1.1 <b>Financial</b></p> <p>1.2 <b>Professional</b></p> <p>1.3 <b>Personal</b></p> <p>A <b>Justifiable doubts</b> standard</p> <p>B <b>Real danger of Bias</b> Standard</p> <p>C <b>Reasonable person</b> would have to conclude partiality standard</p> <p>D <b>Immunity</b> standard (absolute immunity except for bad faith standard)s</p> <p>E <b>Status:</b> Contractual or Concessional</p> <p>Should <b>disclose (intellectual honesty)</b> any facts or circumstances which might be of such nature as to call into question the</p>	<p>The policy define an independent director as a "non-executive director who is <b>not a member of management</b> and who is <b>free of any business or other relationship</b> that could materially interfere with - or could reasonably be perceived to materially interfere with the <b>independent exercise of their judgement.</b></p>	<p>"The independence of the auditor is both in fact and in <b>appearance</b> vital in order to maintain public confidence in his judgement and integrity..." Paterson also mentions that the most effective means of maintaining the confidence of the public is by <b>continual self-policing</b> and efforts to achieve the highest standards of independence (1970, p. 238).</p>	<p>Factors influencing auditor independence: There are at least six factors that have been examined by previous studies on perceptions of auditor independence. The six factors are</p> <p>1. <b>size of audit firm;</b></p> <p>2. <b>level of competition in the audit services market;</b></p> <p>3. <b>tenure of audit firms serving the needs of a given client;</b></p> <p>4. <b>size of audit fees received by audit firms;</b></p> <p>5. <b>provision of managerial advisory services by audit firms to the audit clients;</b></p> <p>6. <b>and the existence of audit committee.</b></p>	<p>The following factors are identified:</p> <p>1) <b>Family relationships</b></p> <p>2) <b>Financial interest:</b> direct material (equity, stock, shares, investments, annuities) or indirect financial (scheme, estate, trust holding etc.)</p> <p>3) <b>Business relationships:</b> may only enter into a business relationship if; immaterial; insignificant investment; arrangements do not give party ability to control venture or entity.</p> <p>4) <b>Employment:</b> if approached for an offer to work for client then practice staff member should be removed from any work for the client.</p> <p>5) <b>Other:</b></p> <p>5.1) Bank deposits,</p>	<p>Principles for inspiring confidence:</p> <p>1) <b>impartiality;</b></p> <p>2) <b>competence;</b></p> <p>3) <b>responsibility;</b></p> <p>4) <b>openness;</b></p> <p>5) <b>confidentiality; and</b></p> <p>6) <b>responsiveness to complaints.</b></p> <p>Factors or threats for impartiality:</p> <p>1) Being and being perceived to be impartial (<b>appearance</b>);</p> <p>2) Source of revenue (financial);</p> <p>3) Objective evidence</p> <p>Threats for impartiality:</p> <p>1) <b>Self interest:</b> threats that arise from a person or body acting in their own interest. A concern related to certification, is <b>financial self-interest;</b></p> <p>2) <b>Self review:</b> threats that arise from a person</p>	<p>Factors for certification body and persons impartiality (independence):</p> <p>1) Documented structure safeguarding <b>impartiality &amp; assuring impartiality (gaurantee)</b></p> <p>2) Sub-contractor may not be involved, either directly or through their employer, <b>with training or the maintenance</b> of the certification of persons.</p> <p>3) Sub-contractors must sign a document to commit themselves to independence from:</p> <p>3.1) <b>Commercial;</b></p> <p>3.2) <b>other interests;</b> and from</p> <p>3.3) <b>any prior and/or present link</b> with persons to be examined that would compromise</p>	<p>Independence factors for auditors:</p> <p>1) Auditors must be independent of the activity being audited. Independence can be demonstrated by the <b>freedom from responsibility for the activity</b> being audited.</p> <p>2) Free from bias;</p> <p>3) Free from conflict of interest</p> <p>4) Auditors maintain an objective state of mind.</p> <p>Auditors must be <b>self-reliant</b> i.e. acts and functions independently while interacting effectively with others.</p> <p>Auditors must be competent.</p>	<p>Sept 1997-Jan 2005: ECA GNR 1183 s.3(1)(c) states that an applicant (proponent) has the legal duty to ensure that "...the consultant has no <b>financial or other interest</b> in the undertaking of the proposed activity, except with regard to the compliance with these regulations" (Our emphasis).</p> <p>DEAT Guideline Document" "Environmental Impact Management, Implementation of sections 21, 22 and 26 of the Environment Conservation Act" dated April 1998. "A <b>consultant not in the permanent service of the Applicant.</b> In addition, a consultant ceases to be independent if:</p>	<p>2010-.....to date The EIA regulation (GN R 543) unpacks "independent", in relation to an EAP or a person compiling a specialist report or undertaking a specialised process (which may include compliance monitoring) or appointed as a member of an appeal panel, means— (a) that such EAP or person has no <b>business, financial, personal or other interest</b> in the activity, application or appeal in respect of which that EAP or person is appointed in terms of these Regulations other than fair remuneration for work performed in connection with that activity, application or appeal; or (b) that there are no</p>	<p>Independence and objectivity in practice, currently specified in the EIA Regulations, requires specific attention as this has been identified as a major issue by stakeholders impacting the <b>quality of professional work</b> and thus the efficiency and effectiveness of environmental assessment.</p> <p>Quality assurance and independence are inextricably linked. There are many views on the nature of independence and whether the above requirements and even <b>signing a declaration of independence</b> can achieve good quality and ethical practice. Many would argue</p>	<p>Independence factors:</p> <p>1) Independence is also required from government; (Ekati, UK-Shetland oil &amp; Australia-EPA)</p> <p>2) <b>Diversity of independent team</b> (Ekati watchdog; UK-Shetland Oil; Australia-EPA).</p> <p>3) <b>Direct two-way communication.</b></p> <p>4) Independence mandated/legally required (<b>guaranteed</b>) (South Africa-ECO 5) <b>Competency requirements</b> (Hong Kong 7 yrs; SA-ECO permit conditions)</p>	<p>An Environmental Assessment Practitioner (EAP), responsible for planning management and coordination of the impact assessment, can act as an ECO, but that such <b>appointment cannot take place before the Environmental Authorisation (EA) is granted</b> as this may compromise his/her independence in motivating a benefit for a positive outcome of an EA.</p> <p>Objectivity can be assured by the ECO in instances where aspects overlooked during the BAR/EIA process or the EMP are highlighted and <b>reported directly to the authority</b> and client.</p>	<p>1) Independence for me means completely <b>independent function of the project tenure.</b> The project [project process] is the entity responsible for the implementation of the Environmental Management Plan (EMP). The ECO should thus have no contractual authority (Marrell, 2012).</p> <p>2) ECO have a contract with the client which is <b>endorsed and promoted (guaranteed)</b> by an independent monitoring committee (Marrell, 2012).</p> <p>3) Independence in this project means, this guy (function) is allowed to do their work freely without interference and to report it without fear (Mair, 2012)</p>

**ANNEXURE F: FACTORS THAT INFLUENCE INDEPENDENCE**

**Analysis of factors that influence independence - table from the published article**

Table 1. Factors that may influence the independence of EIA follow-up verifiers

Categories of factors	Factors that influence the independence of EIA follow-up verifiers	Legal profession		Business and financial professions				Systems audit profession			South African impact assessment		EIA follow-up profession			
		Independence of Judiciary: United Nations	Independence in arbitration: CCMA	Independence in arbitration: Hong-Lin & Shore, 2003	Independence of directors: Bhkistan & Crabb, 2007	Independence in accounting: Everett et al. 2006	Independence in financial auditing: Bakar et al. 2005	Independence in financial auditing: PwC	Independence of systems: ISO 17021	Independence in systems: ISO 17024	Independence in systems: ISO 19011	DEAT Guideline (1998) & Legal Memorandum (2006)	NEMA/GNR 543 (2010)	EIAMS Sub-theme: Independence of EAPs	Case examples in literature	IAlAsa Kwazulu Natal event
1 Financial	1.1 Direct financial interest				*		*	*				*	*			
	1.2 Material indirect financial interest				*											
2 Commercial	2.1 Employment relationship							*				*		*		*
	2.2 Prior relationship								*			*			*	
	2.3 Other existing business relationships			*				*				*				
	2.4 Guaranteeing (safeguarding) independence	*							*				*			*
	2.5 Managerial advisory service	*					*		*		*					*
3 Professional	3.1 Competency (skill)	*	*					*	*	*				*		*
	3.2 Appearance					*		*	*	*				*		*
	3.3 Accountability (self-policing)		*			*	*						*	*	*	*
4 Personal	4.1 Family relationships			*	*			*	*	*		*	*			*
	4.2 Close personal relationships						*	*	*	*		*	*			*
5 Other	5.1 Government or political influence		*											*		*
	5.2 Transparency of reporting		*											*	*	*
	5.3 Diversity of team		*											*	*	*
	5.4 Intimidation threats	*							*					*		*
	5.5 Size of verification firm						*									*
	5.6 Duration of on-site service (tenure)						*									*

**ANNEXURE G: CASE STUDY PROTOCOL**

## CASE STUDY PROTOCOL FOR PHD RESEARCH:

### The Value of Environmental Control Officers (ECOs) in the South African Environmental Impact Assessment and Management Effort

#### 1 AN OVERVIEW OF THE RESEARCH PROJECT

##### 1.1 Background information about the research project

I am a PhD candidate at the Department of Geography and Environmental Management, North-West University under the supervision of Prof. Francois Retief and Prof. Angus Morrison-Saunders and gained an interest in the environmental management practices during the construction phase of large-scale developments, in particular the role and independence of Environmental Control Officer (ECO) function. The ECO industry is currently entirely unregulated but may add value to the South African Environmental Impact Assessment and Management Effort. To date the role and value of the industry has not been researched.

The project you are involved with is a key strategic large-scale project and is host to an ECO that play a certain role in the project and which may or may not add value to the project. The project has, therefore, been identified as a case study that can aid in exploring some of the research questions.

The document presented to you is a case study protocol that forms part of my PhD research strategy with the objective of obtaining insight in the following research question:

#### ***What value does ECOs add to the South African EIAM effort?***

As a manager; engineer or environmental practitioner involved with the construction and ECO industry, your input is extremely valuable to this research and I thank you for the time that you spent as part of this case study analysis.

Sincerely

Jan-Albert Wessels

[janalbert.wessels@nwu.ac.za](mailto:janalbert.wessels@nwu.ac.za)

0795244847

PhD candidate and Lecturer

North-West University

## **1.2 The substantive issues being investigated (project rationale & issues)**

The case study is part of a multiple case study research strategy and built on a survey research that was conducted in September 2011. The latter investigated the role and independence of ECOs as perceived by 50 environmental practitioners. The survey revealed many interesting issues that needs further investigation and hence the reason for the case studies. The case study research strategy was designed to investigate and/or determine:

- 1 the actual on-site role of ECOs is versus legislated and/or policy expectations of environmental practitioners and relevant South African government departments;
- 2 the instruments used by ECOs to perform their roles/duties;
- 3 how independence of ECOs are ensured on a construction site;
- 4 the value that ECOs may add to a construction project and Environmental Impact Assessment and Management (EIAM);
- 5 financial proportions and commitment to the ECO function; and
- 6 the ideal/critical ingredients for ECO success.

## **1.3 Literature review (relevant readings): policy & theoretical relevance of the study**

In terms of the National Environmental Management Act (107 of 1998) (NEMA) a developer has to apply for an Environmental Authorisation (EA) for listed activities. As part of this authorisation the competent authority may require the developer to appoint an ECO with specific environmental roles in order to influence the behaviour of people to help achieve the core environmental aim of the Constitution: “everyone has the right to an *environment that is not harmful* to his or her *health or well-being;*” and of NEMA: “ensuring *sustainable development* which requires the integration of social, economic and environmental factors in the planning, *implementation* and evaluation of decisions to ensure that development serves present and future generations.” NEMA also states that everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative *and other measures* that- prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

## 2. FIELD PROCEDURES

### 2.1 Access to organisation and the site

Safety, security and access protocol is held in high regard on any construction site and it is thus essential for me to be made aware of and follow on-site safety regulations and rules. I will provide my own basic PPE (hard hat, safety shoes and ear plugs). Please inform me of any additional access and or safety/security measures that I must be aware of (e.g. induction training, Visitor Permit) before I visit the organisation and site.

Please also indicate to what information I will have access to (related to Environmental Control Officer function), what information I may not be able to access and what information I will need special clearance approval for (see part 4 – Documents required).

### 2.2 Resources needed and allowed on site

In order for me to collect and to capture the relevant data for analysis I need to use a writing pad, personal computer (Laptop), voice recording instrument, and a camera. I will also need for short periods of time a quiet place (such as an abandoned or open office) to write notes privately.

### 2.3 Procedure and schedule for calling for assistance and guidance

In order for me to get relevant and reliable information and point of views of the role and value of ECOs it is essential for me to have short interviews with the site Environmental Manager (EM); the site Environmental Control Officer; and the Project Manager (or similar person of authority that deals/communicate with the site ECO). The following table was drafted to clarify the roles and persons involved in the case study visit:

**Table 1:** Persons and their role in the case study

#	Person	Role in Project	Organisation	Role in case study
1	Jan-Albert Wessels	Researcher (PhD candidate)	North-West University	Investigate the role, value, instruments and independence of the ECO function on site.
2	?????????	Environmental Control Officer	?????	Provide assistance Obtain relevant documents; Participate in an interview; Participate in a site visit.
3	?????????	Environmental manager	?????	Help identify and obtain documents; Participate in an interview; Participate in a site visit.

#	Person	Role in Project	Organisation	Role in case study
4	?????????	Project manager	?????	Participate in a 1 hour interview.

In order not to interfere too significantly with daily tasks of the persons involved, I aim to follow a strict time frame that will enable me to obtain the necessary information to successfully and meaningfully conduct the case study investigation. I have drafted a draft schedule for your consideration that needs to be reviewed and finalised before the visit commence. See Table 2 on the next page.

## 2.4 Schedule of the data collection activities

### Day 1: ?????

Time	01:00	01:00	01:00	01:00	01:00	01:30	01:00	01:00	00:00
Time	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00	01:00 - 14:30	14:30 - 15:30	15:30 - 16:30	16:30
Persons	Jan-Albert & ECO	Jan-Albert & ECO	Jan-Albert & ECO	Jan-Albert & ECO	Lunch	Jan-Albert & ECO	Jan-Albert & ECO	Jan-Albert	Jan-Albert
Action	Site orientation	Site induction	Site visit	Site visit		Accompany inspection	Document verification	Data analysis	Leave site
Place	????	Office	?????	?????	???	????	?????	?????	?????

### Day 2: ?????

Time	01:00	01:00	01:00	01:00	01:00	01:30	01:00	01:00	00:00
Time	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00	01:00 - 14:30	14:30 - 15:30	15:30 - 16:30	16:30
Persons	Jan-Albert & ECO	Jan-Albert & EM	Jan-Albert & EM	Jan-Albert & EM	Lunch	Jan-Albert & ECO	Jan-Albert & ECO	Jan-Albert	Jan-Albert
Action	Recap previous day	Interview	Site visit	Site visit		Accompany inspection	Document verification	Data analysis	Leave site
Place	????	Office	?????	?????	???	????	?????	?????	?????

### Day 2: ?????

Time	01:00	01:00	01:00	01:00	01:00
Time	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00
Persons	Jan-Albert & ECO	Jan-Albert & Manager	Jan-Albert & ECO	Jan-Albert & ECO	Farewell
Action	Recap previous day	Interview	Data analysis	Obtain outstanding	Leave
Place	????	Office	?????	?????	???

**3. CASE STUDY QUESTIONS**

In order to obtain relevant information a semi-structured interview will be followed that will address (amongst others) the following questions (open-ended and closed). Please note that this is a draft only and will be finalised before visiting the site.

**Name:** \_\_\_\_\_

**Position:** \_\_\_\_\_

**Qualification:** \_\_\_\_\_

**Experience (in construction):** (years and role) \_\_\_\_\_

**Experience with or as an ECO:** (years and role) \_\_\_\_\_

**PART A: GENERAL DISCUSSION (FREEDOM OF SPEECH)**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**PART B: EXTRAORDINARY EXAMPLES OF BEST PRACTICE (INLUENCE BY ECO's)**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**PART 1: ROLE VS EXPECTATIONS**

1.1 What in your opinion is the most important role of the ECO on this site? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

*Please explain your answer:*

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1.2 In your opinion is the ECO responsible for monitoring (compliance) or implementation of mandatory/performance conditions? \_\_\_\_\_

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*Please explain your answer:*

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1.3 What are the permit/authorisation expectations/requirements of the ECO role?

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*List the expectations:*

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## **PART 2: INSTRUMENTS**

2.1 What instruments are used by an ECO to fulfil their expected role (with a short explanation why for each)?

A) Environmental instruments (show the toolbox to participant):

\_\_\_\_\_ (inspections)

\_\_\_\_\_ (investigations)

\_\_\_\_\_ (meetings)

\_\_\_\_\_ (Risk assessments)  
\_\_\_\_\_ (any other....)

B) Software:

\_\_\_\_\_ (computer)  
\_\_\_\_\_ (excel)  
\_\_\_\_\_ (GIS skills)  
\_\_\_\_\_ (any other....)

C) Hardware:

\_\_\_\_\_ (PPE)  
\_\_\_\_\_ (Vehicle)  
\_\_\_\_\_ (Writing pad)  
\_\_\_\_\_ (On-site office / offsite office)  
\_\_\_\_\_ (any other...)

In your opinion what knowledge does an ECO require to successfully fulfill his/her role?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

In your opinion what skills do an ECO require to successfully fulfill his/her role?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### **PART3: INDEPENDENCE**

3.1 In my opinion independence mean? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3.2 In my experience independence of ECOs on this site is ensured by the following (activities; products; services; facilities): \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3.3 What service provider (providers) were/are appointed in the following roles for the project:

Environmental Assessment Practitioner (EAP): \_\_\_\_\_

\_\_\_\_\_

Environmental Manager (EM): \_\_\_\_\_

\_\_\_\_\_

Environmental Control Officer (ECO): \_\_\_\_\_

\_\_\_\_\_

Environmental Officer (EO or EEO): \_\_\_\_\_

\_\_\_\_\_

Environmental Auditor (EA): \_\_\_\_\_

\_\_\_\_\_

Land Liaison Officer (LLA/ LLO): \_\_\_\_\_

\_\_\_\_\_

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Partly Agree</i>	<i>Partly Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Unable to Judge</i>
3.4 <i>In my opinion a single service provider may perform all of the above roles:</i>	<input type="checkbox"/>						

*Please explain your answer:* \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**PART 4: VALUE - ECONOMIC, SOCIAL AND ENVIRONMENT**

3. In your opinion an ECO add value to the following aspects of the construction project...

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Partly Agree</i>	<i>Partly Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Unable to Judge</i>
<i>4.1 In my opinion an ECO add value to:</i>							
a) Ensuring the project is completed as per project schedule	<input type="checkbox"/>						
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	<input type="checkbox"/>						
c) Ensuring that the community surrounding the project is protected/helped/informed.	<input type="checkbox"/>						
d) Ensuring that the environment is protected	<input type="checkbox"/>						
e) No value	<input type="checkbox"/>						

**PART 5: FINANCIAL COMMITMENT/EMPOWERMENT:**

5.1 What % of the yearly project cost is dedicated to the ECO function of the project?

*Project budget:* R\_\_\_\_\_

*ECO budget:* R\_\_\_\_\_

*Percentage:* \_\_\_\_\_%

5.2 Please rate each of the statements below according to the supplied response scale (tick one box only for each line).

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Partly Agree</i>	<i>Partly Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Unable to Judge</i>
<i>5.1.1 In my opinion the ECO budget is enough to support the tasks of the ECO function:</i>	<input type="checkbox"/>						

*Please explain your answer:* \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**PART 6: CRITICAL INGREDIENTS FOR A RECIPE OF ECO SUCCESS (as a follow-up function)**

6.1 *What do you consider to be the critical ingredients for a recipe of success for an ECO (to fulfil their role, add value but to remain independent)?* \_\_\_\_\_

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**PART 7: ADDITIONAL DISCUSSION / UNFORESEEN CIRCUMSTANCES**

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#### 4. DOCUMENTS REQUIRED/NEEDED FOR INVESTIGATION

In order to focus the document scope relevant to the case study, I have identified the following documents that may aid my research. These are the following (but not limited to the following):

#	Name / document number	Available / Obtained		Special permission
		Yes	No	Yes
1	GIS or hard copy <b>map</b> indicating the geographical extent of the project (footprint) in order to determine the geographical scope of the ECO power/work.			
2	<b>Procedure</b> for identification of project roles and responsibilities with related <b>organogram</b> in order to determine ECO role and correspondence/ communication lines.			
3	<b>Project progress meeting minutes</b> (weekly and/or monthly) indicating role of an ECO in the project.			
4	The latest <b>environmental authorisations</b> : <ul style="list-style-type: none"> <li>• Environmental Impact Assessment (EIA) Record of Decision/s (ROD) or Environmental Authorisations (EA);</li> <li>• Water Use Licences;</li> <li>• Heritage authorisation;</li> <li>• Air quality permit;</li> <li>• Waste licence;</li> <li>• Biodiversity related (trees etc.)</li> <li>• any other...</li> </ul> in order to determine statutory mandate of ECOs.			
5	The <b>Environmental Management Plan (EMP)</b> relevant to the project.			
6	The <b>ECO (and/or assistant ECO) Brief/Scope of Work</b> and or appointment letter or <b>contract</b> in order to establish Terms of Reference and roles.			
7	The Environmental Manager (EM) <b>Brief/Scope of Work</b>			
8	ECO Curriculum Vitae ( <b>CV</b> ).			
9	Minutes and agenda of <b>meetings</b> (project meetings, Environmental Monitoring Committee meetings; meetings with communities, etc.) where the ECO was involved or chaired.			
10	Environmental Monitoring Committee ( <b>EMC</b> ) <b>Constitution or Terms of Reference</b> (if available)			
11	An example of letters, <b>notices of concern</b> from the Environmental Monitoring Committee (EMC) which may indicate the role of the ECO.			

#	Name / document number	Available / Obtained		Special permission
		Yes	No	Yes
12	The <b>ECO year planner</b> indicating scheduled inspections, audits, EMC meetings, other meetings or any similar events.			
13	Procedure for environmental compliance monitoring (if available)			
14	<b>Environmental Reports</b> for project (monthly / weekly)			
15	<b>ECO environmental inspection reports</b> (monthly / weekly / start-up / closure).			
16	Method statements indicating role of ECO.			
17	Environmental <b>complaints register</b>			
18	The latest <b>environmental audit report</b> for the site in order to establish the role of the ECO in this audit/s.			
19	Any ECO handover document to another incoming ECO?			
20	Any project specific <b>training documents</b> for ECOs or training material that ECOs are involved with (e.g. induction training, environmental awareness training)			
21	Environmental <b>non-compliance letters</b> drafted by the ECO or any other party.			
22	<b>Timesheet/s</b> (monthly) completed by the ECO indicating duties performed.			
	Any other.....			

## **5. DRAFT CASE STUDY ANALYSES REPORT**

### Executive summary

1. AN OVERVIEW OF THE ECO CASE STUDY
  - 1.1 Project type
  - 1.2 Project description and environmental authorisation background
  - 1.3 Site location and scale
  - 1.4 Key role players in environmental management and governance
  - 1.5 Environmental authorisations and ECO related requirements
2. CASE STUDY QUESTIONS AND RESULTS
  - 2.1 The ECO's own views on the role and value of ECOs
  - 2.2 Extraordinary examples of adding value
  - 2.3 Role / Expectations of the ECO
  - 2.4 Need and value of the ECO
  - 2.5 Appraising the Value of ECOs
  - 2.6 Critical ingredients for ECO success
  - 2.7 Additional discussions

### BIBLIOGRAPHY

### ANNEXURES

**ANNEXURE H: CASE STUDY INTERVIEW QUESTIONNAIRE**

**Interview questions: Project Management**

**Name:** \_\_\_\_\_

**Position:** \_\_\_\_\_

**Qualification:** \_\_\_\_\_

**Relation to/with ECO:** \_\_\_\_\_

**Date of interview:** \_\_\_\_\_

1. Is this the first project that you've been involved with where an ECO was required or part of the project team?
2. Is there in your opinion any need for an ECO?
3. In your experience what is the role of the ECO (in the project)?
4. What do you think is the value of an ECO? (for this project):

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Partly Agree</i>	<i>Partly Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Unable to Judge</i>
<i>4.1 In my opinion an ECO add value to:</i>							
a) Ensuring the project is completed as per project schedule	<input type="checkbox"/>						
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	<input type="checkbox"/>						
c) Ensuring that the community surrounding the project is protected/helped/informed.	<input type="checkbox"/>						
d) Ensuring that the environment is protected	<input type="checkbox"/>						
e) No value	<input type="checkbox"/>						

5. What do you think should an ECO be qualified/trained or experienced in?

6. What do you think should be the personal attributes of an ECO?
7. In your opinion was the ECO able to make meaningful and workable recommendations as required?
8. Would you recommend that an ECO should be part of a professional team in a project?
9. What authority does the ECO have?
10. Do you report to the ECO?
11. What information does you disclose/report/give to the ECO?
12. In your opinion, how independent is the ECO?

**ANNEXURE I: MEDUPI CASE STUDY ANALYSIS REPORT**

# ECO CASE STUDY RESEARCH ANALYSIS 1: ESKOM – Medupi Coal Fired Power Plant Construction

**Final Revision 24**

*16 August 2013 to 4 March 2014*



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## EXECUTIVE SUMMARY

The focus of the project is different in that Eskom is a parastatal and profit margin is not the main driver of the project. Eskom has a responsibility to the country with its focus on putting electricity into the grid and ensuring economic growth while driving sustainability. Eskom needs to be very sensitive about the incredible impact it has on the community. The environment is part of the community and Eskom has to protect what it has (Nair, 2012: interview #05).

The Medupi Power Plant Project is a very large development with many procedures, documents and internal measures that is relevant to the ECO function. Moreover, the project has many applicable environmental authorisations with EIA follow-up and ECO requirements. An issue that is evident in these authorisations is the fact that the ECO roles and responsibilities differ from authorisation to authorisation, as well as from Eskom's internal procedures (Eskom, 2012). For example, the NEMA S.24 Environmental Authorisation Reference # 12/12/20/1079 requires that (Section 1.11) "[t]he applicant must appoint a suitably qualified and responsible person who will act as an Environmental Control Officer (ECO) who will have the responsibility of implementing the approved EMP". However, implementation of the EMP conditions is not part of the ECO scope (refer to Procedure: Integrated SHE Organisation, Roles and Responsibilities and Statutory Appointments, EPC 32-296).

An interesting characteristic of the project is the appointment of a Waste Management Control Officer (WMCO), a first in South Africa for a construction site (not being part of a municipality). The WMCO must be appointed in terms of the National Environmental Management: Waste Act (No. 59 of 2008) to monitor and ensure compliance and correct implementation of all mitigation measures and provisions, as stipulated in the license and approved EMP. The WMCO must, amongst others, report any non-compliance with license conditions, or requirements, or provisions of the National Environmental Management: Waste Act (No. 59 of 2008) to the licensing authority through reasonable means. Duties and responsibilities of the WMCO must be included in the mandate of the ECO appointed in terms of the Medupi Power Station RoD condition 3.2.4.1, unless Eskom prefers to appoint an additional person, in which case the appointment must be done in accordance with condition 3.2.4.1 of the Medupi

Power Station RoD. The ECO is an independent party and Eskom takes independence extremely seriously (Nair, 2012: interview #05).

The following conclusions may be drawn from the evidence sourced on the worth of the object, based on the six KPAs:

I) OUTPUT COMPONENT: PRIOR TO PROPOSAL IMPLEMENTATION [PROJECT PLANNING AND DESIGN PHASE].

- **In terms of [Planning]** generating data, knowledge and a sustainable outcome for a project, evidence was found that the ECO function at Medupi pre-empted risks. The ECO was involved in the screening phase of projects related to the main project. However, no evidence was found that the ECO team was involved in scoping, detailed assessments and the compilation of EMPs for new projects. Evidence was found, however, of the ECOs being involved with the review of the project's EMP.

II) OUTPUT COMPONENT: POST PROPOSAL IMPLEMENTATION [PRE-CONSTRUCTION AND CONSTRUCTION PHASE].

- **With regard to [Doing] implementation** (refer to sections A: Pre-construction preparation for implementation; B: Implementing and informing decision making; and C) Reporting and Communication and related subsections of the evaluation matrix below):

2A) No evidence was found of the ECO being involved in the handover from the planning to the implementation phase, or the identification, defining and allocation of roles and responsibilities for EIA follow-up. However, the ECO function at Medupi was involved in identifying, defining and allocating financial and human resources during the project in support of the ECO function;

2B) Evidence was found of a slight deviation from the implementation requirements of the Environmental Authorisation (Reference # 12/12/20/1079). It was found, however, that the ECO did fulfil all the monitoring and reporting duties as per EAs. Moreover, evidence was found of the ECOs promoting the use of sustainable processes and technologies. Evidence was also found that the ECO function, in particular the WMCO, did indeed respond to environmental emergency situations. Overwhelming evidence was found of the ECO function influencing decisions and maintaining decision-making flexibility by giving advice, making recommendations, and reviewing and accepting environmental method

statements. It was also found that the ECO played an important role in the review, update and drafting of various of Medupi's environmental plans and programmes. Sufficient evidence was found of the ECO function being involved in informing and educating employees about environmental risks, although not in the induction training.

- 2C) Numerous sources of evidence indicated that the ECO function at Medupi was, to a large extent, involved in providing continuous feedback from EIA follow-up programmes to the proponent; regulator and the community. However, not sufficient evidence was found that the ECO contributed to formal periodic feedback for internal EIA process improvement. The ECO did, however, contribute in providing formal periodic feedback for external EIA process improvement, by means of formal lectures at the North-West University, Potchefstroom campus. Moreover, sufficient evidence was found that the ECO contributed to openness and access to information for transparent communication.
- **In terms of [Checking]** (see evaluation matrix sections A: Monitoring and measurement of and B: Evaluation of legal compliance (performance) and related subsections below):
    - 3A) No evidence was found of the ECO conducting any monitoring of environmental parameters or effects. To an extent the ECO contributed to the evaluation of environmental risks and effects by reviewing risk assessments, but were not formally part of the risk assessment process;
    - 3B) Sufficient evidence was found to confirm that the ECO function participated in: monitoring compliance; conducting internal compliance (performance) assessments; providing information in support of external compliance (performance) assessment (i.e auditing; and, on an ad hoc basis, verifying and evaluating policies, plans, programmes, operational procedures and implementation of mitigation measures.
    - 3C) Sufficient evidence was found that the ECO function at Medupi controlled relevant environmental records.
  - **In relation to [Acting] Management and Enforcement**, the evidence obtained from the Medupi case study suggests that the ECO did not have a management and enforcement function. Although the EMP required the ECO to take appropriate action if the specifications contained in the EMP were not followed, it was found that the ECO function rather had a supporting role in management and enforcement, and only recommended and advised on actions for ceasing, containing and eliminating sources of pollution. An example was given where the ECO motivated a 2-hour

“stand down” where all contractors were required to clean their areas of responsibility. It was found that some contractors might be answerable to the ECO through method statements. Interviewees (Nair and Marrel, 2012) also confirmed that the ECO had no authority (no one was answerable to the ECO) on site and did not manage directly but indirectly, through influence. Furthermore, no evidence was found that the ECO made or approved any decisions (although approval of method statements was evident). It was further found that the ECO function at Medupi participated in adaptive management by reviewing remedial actions/plans; by updating and reviewing the EM; and by sending sign-off letters for acceptance. Evidence was, however, found that the ECO participated in conflict management and the resolving of environmentally related disputes.

- No evidence was found that the ECOs were actively involved in public participation, capacity building or public awareness.
- Sufficient evidence was found that the ECO participated in the ISO 14001: 2004 EMS of the project and the understanding of area-wide effects and issues.

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The following colour codes were used in section 1 of the report to assist in the analysis of the interviews and documents consulted:

Colour code	Information sourced that indicates: <b>Value added</b> / <b>Partial value added</b> / <b>No value added.</b>
	Information sourced with particular reference to case.

## **1. AN OVERVIEW OF THE ECO CASE STUDY**

### **1.1 Project type**

Construction of a coal-fired power station.

### **1.2 Project description and environmental authorisation background**

The 125 Billion Rand Medupi coal fired power station project of Eskom situated near Lephalale in the Limpopo Province of South Africa. The Power Station is proposed to ultimately have a maximum installed capacity of up to 4800 MW (6 x 800 MW units), but the first phase to be constructed and operated will be approximately half that installed capacity (i.e. 3 x 800 MW units). The exact output will depend on the specification of the equipment installed and the ambient operating conditions. The footprint of the proposed new power station is still to be determined through final engineering and design, but has been indicated by Eskom that the new facility will be similar in size (ground footprint) to the existing Matimba Power Station (Bohlweki Environmental, 2006).

Medupi Power Station will be a super-critical, pulverised fuel power station, utilising direct dry-cooled technology. The power station will utilise electrostatic bagfilters as its primary pollution abatement technology (for particulate emissions, anticipated to be less than 50mg/Sm<sup>3</sup>), and will have low NO<sub>x</sub> burners inherently built into the boiler for efficient combustion and thus lower NO<sub>x</sub> emissions. In terms of sulphur oxide emissions, the power station will be constructed to be FGD (flue gas desulphurisation) ready, i.e. physical space will be allowed for the FGD plant and the smokestacks lined with FGD compatible materials, should the power station be retrofitted with it at a later stage. When fully operational, the power station would strive towards a zero liquid effluent discharge philosophy (Eskom, 2012b: 9)

The environmental authorisation was granted in 2006 and the construction commenced in 2007 (site clearance). The ECO (at that time Phillip Ducas from NCC) was appointed in 2007; where after Emile Marrel (NCC) took over the ECO task in 2008. The final handover of the project (to operations) is envisaged to be in 2018 (Marrel, 2012).

In terms of Eskom's Safety, Health and Environment policy (ESHEP), Eskom will approach Occupational Safety, Health, and Environmental issues as a responsible corporate citizen, taking into account international commitments, legislative

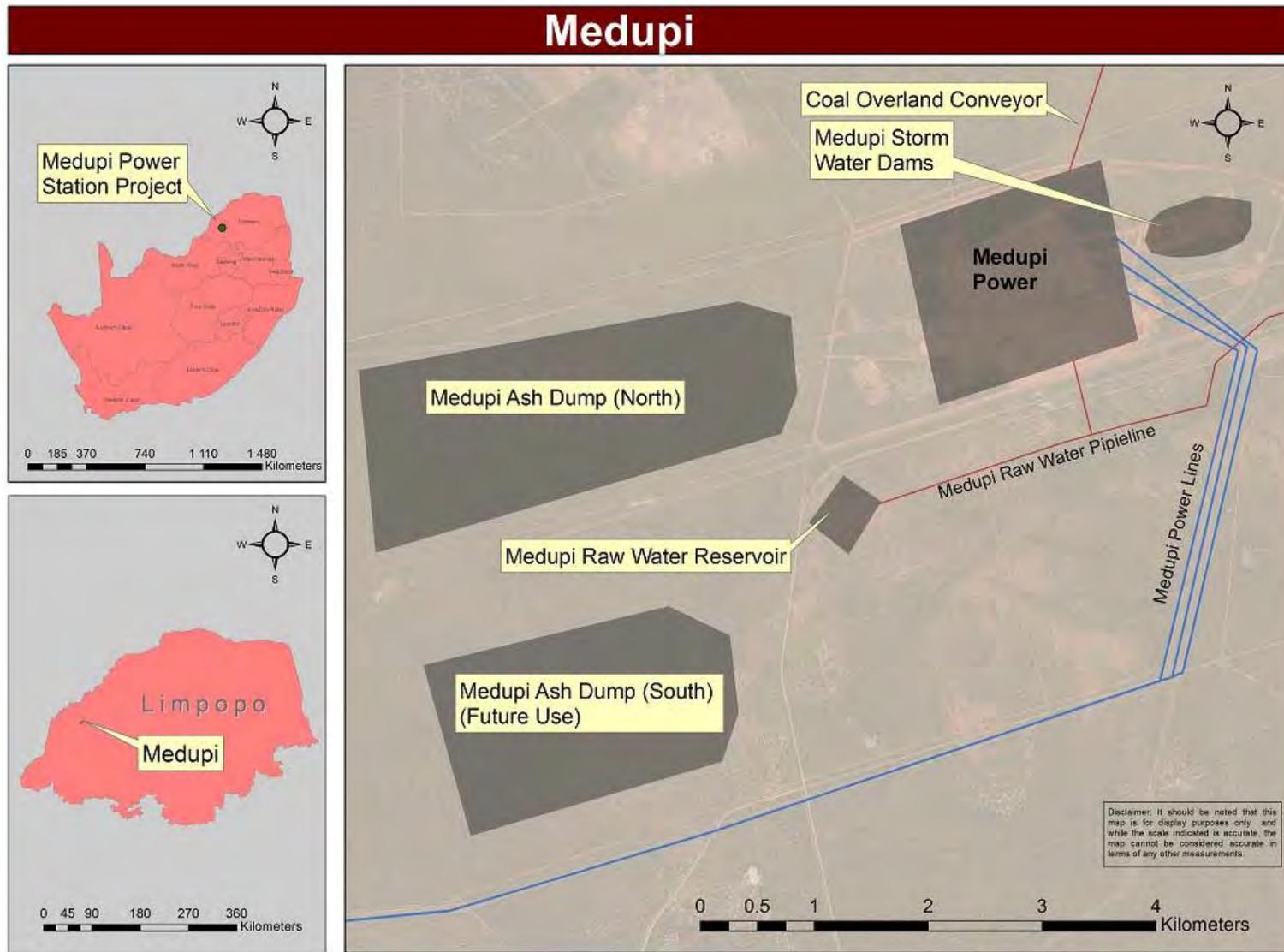
requirements, and the views of stakeholders, communities and staff. It will strive to eliminate negative impacts and to ensure safe work practices (Eskom, 2012: 3). According to Eskom (2012: 8) the intention of “Procedure: Integrated SHE Organisation, Roles and Responsibilities and Statutory Appointments” is to ensure a common understanding of the requirements amongst the various stakeholders and to clarify these appointments in terms of applicable Acts and Regulations. According to this procedure “Complying with the requirements of conditions of environmental authorisations obtained through the undertaking of an Environmental Impact Assessment, a general requirement is that of appointing an independent Environmental Control Officer (ECO) (Eskom 2012: 8). The ECO forms part of the Environmental Liaison Committee at Medupi and had thus a supporting role of finding solutions at Medupi (refer to Annexure B). According to the EMC (2011) “The Environmental Control Officer (ECO) is an independent body, appointed under Section 3.2.4.1 of the Medupi Record of Decision (RoD, Ref 12/12/2-/695) by the Environmental Monitoring Committee (EMC) in conjunction with the Client to ensure compliance with the Medupi RoD, Environmental Management Plan (EMP) and South African Environmental legislation. The ECO reports to the Department of Environmental Affairs (DEA), the Limpopo Department of Economic Affairs, Environment and Tourism (LEDET) and the Medupi EMC.

In terms of the Environmental Impact Assessment (EIA) Regulations published in terms of the Environment Conservation Act (No 73 of 1989), Eskom Holdings Limited requires authorisation from the National Department of Environmental Affairs and Tourism (DEAT) in consultation with the Limpopo Department of Economic Development, Environment and Tourism (LDEDET) for the undertaking of the proposed project. In order to obtain authorisation for this project, comprehensive, independent environmental studies have been undertaken in accordance with the EIA Regulations. Eskom appointed Bohlweki Environmental (as independent consultants) to undertake environmental studies together with a team of specialists to identify and assess all potential environmental impacts associated with the proposed project. The environmental studies followed a two-phased approach in accordance with the EIA Regulations published in terms of the Environment Conservation Act (No 73 of 1989) i.e.: Phase 1: Environmental Scoping Study; and Phase 2: Environmental Impact Assessment (EIA) (Bohlweki Environmental, 2006).

### **1.3 Site location and scale**

The total Medupi site is situated near Lephalale in the Limpopo Province of South Africa and is approximately 1200 Ha in size and is estimated to be the largest coal fired power station in the world (Marrel, 2012). The power plant and associated plant (terrace area) would require an area of approximately 700 ha, and an additional estimated 500 - 1000 ha would be required for ancillary services, including ashing (Bohlweki Environmental, 2006).

Figure 1: Map: Case study location and infrastructure



## 1.4 Key role players in environmental management and governance

- **Regulator/competent authority:**
  - Department of Environmental Affairs (DEA)
  - Limpopo Department of Economic Affairs, Environment and Tourism (LEDET).
- **The Applicant/proponent/client/permit holder:**
  - PB Power
- **Environmental consultant / Environmental Assessment Practitioner (EAP)**
  - Bolweki did the initial EIA;
  - Savannah Environmental did other EIA and BA applications during construction (e.g. Ash dump).
- **The Implementing Agent & Environmental Manager:**
  - PB Power (PB is the appointed site engineer and a joint venture)
- **The Environmental Control Officer services:**
  - NCC fulfills the role of the Lead ECO: Emile Marrel (outgoing) and Ilse Coop (incoming)
  - NCC fulfills the role of the Assistant ECO: Ilse Coop and Thesen Pillay.
  - NCC fulfills the roles and Waste Control Officer: Lizl Koekemoer.
- **The Environmental Officer services:**
  - Eskom and PB Power
- **The Contractor:**
  - Various contractors including: Hitachi and Murray & Roberts.
- **Independent Environmental Auditor (EA):**
  - EIMS appointed by Eskom, scope of audit is Legal ROD & EMP
- **Internal auditor(s):**
  - Project environmental team (PB Power) and NCC

## **1.5 Environmental authorisations and ECO related requirements**

### **1.5.1 Relevant Environmental Authorisations**

The site has several authorizations to comply with. For example:

- The Medupi Power Station RoD (Ref: 12/12/20/695). Record of Decision issued on 21 September 2006 by the National Department of Environmental in terms of the Affairs and Tourism (See Appendix B).
- The Medupi Power Station RoD Amendment (Coal conveyor re-alignment) - Section 3.2.2.
- The Medupi Power Station Amendment (removal of the requirement for carbon monoxide monitoring) – Section 3.2.2.
- The Medupi Raw Water Reservoir and Associated Pipelines RoD (Ref: 12/12/20/1139) – Section 1.9.
- The Medupi Raw Water Reservoir and Associated Pipelines RoD Amendment (increase in storage capacity). NEMA section 24 Environmental Authorisation issued on 27 October 2008 for the proposed construction of a raw water reservoir and associated pipelines for Medupi Power Station Department of Environmental Affairs, 2008).
- The Medupi Power Station Ash storage, -treatment and-disposal licence (Ref: 12/9/11/L50/6).
- The Telecommunications mast for Medupi RoD (Ref: 12/12/20/1228).
- The NEMA section 24 re-alignment of a Portion of the Afguns Road RoD (Ref: 12/12/20/1179). Application for Environmental Authorisation R. 386 and R.387: Proposed re-alignment and construction of a portion of the Afguns Road in the vicinity of the Medupi Power Station near Lephalale. (R. 386: 15and 7 and R. 387: 5) (Department of Environmental Affairs and Tourism, 2008).
- The Medupi Power Station Environmental Management Plan (EMP) (Ref:12/12/20/695) as amended.
- The Grootegeluk EMPR amended for the Coal silo, Coal conveyor and Associated infrastructure between the Grootegeluk Coal mine and Medupi Power Station (Ref: 5/3/2/50)

- NEMWA Waste Licence Reference # 12/9/11/L50/6 in terms of Section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) “Storage, treatment and Disposal of Ash from the Medupi Coal Fired Power Station” (Department of Environmental Affairs, 2009).
- NEMA, Regulation 43 of the EIA Regulations, 2006 Reference # 12/12/20/1139. Amendment to the Environmental Authorisation for allowing the deviation of a section of the approved raw water pipeline alignment from the approved alignment 350 metres (m) north of the initial alignment (Department of Environmental Affairs, 2010)
- Provincial authorisations from LEDET and the local government authorisations.

### **1.5.2 Authorisation requirements for EIA follow-up**

- NEMWA Waste Licence # 12/9/11/L50/6 in terms of Section 20(b) of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) “Storage, treatment and Disposal of Ash from the Medupi Coal Fired Power Station” (Department of Environmental Affairs, 2009).
  - Section 8.1 (8.1.1): “Internal audits must be conducted monthly by the licence holder and on each audit occasion an official report must be compiled by the relevant auditor to report the findings of the audits, which must be made available to the external auditor specified in in condition 8.2.1.
  - Section 8.2 (8.2.1): “The licence holder must appoint an independent external auditor to audit the site annually and this auditor must compile an audit report documenting the findings of the audit which must be submitted by the licence holder according to condition 10.9 below (10.9: reports to be submitted to the Director within 30 days from the date of which the external auditor finalized the audit).”
  - Section 10.1: “The Licence holder must within 24 hours notify the Director and Director: RPW of the occurrence or detection of any incident on site, or incidental to the operation of the site, which has the potential to cause, or has caused pollution of the environment, health risks or nuisance conditions or water pollution.”

- Section 10.4: “The licence holder must keep an incident report and complaints register, which must be made available to external auditor, Departmental and DWA auditors for the purpose of the audit.”
- Section 11 (11.1): “The licence holder must establish, maintain and ensure the continued functioning of the Monitoring Committee for as long as the ashing facility is operational. The committee may be included in the mandate of the EMC established in terms of the Medupi power station RoD dated 21 September 2006, condition 3.2.2.1.
- Section 16.7: “Compliance/non-compliance records must be kept and shall be made available on request from the authorities within five days of receipt of the request.”
- Section 16.16: “Any complaint from the public during construction must be attended to as soon as possible to the satisfaction of the parties concerned. A complaints register must be kept up to date and shall be produced upon request.”

### **1.5.3 Contractual, Environmental Authorisation, EMP and/or Procedural roles and responsibilities requirements for the ECO**

- Eskom (2012: 10) “Procedure: Integrated SHE Organisation, Roles and Responsibilities and Statutory Appointments”
  - “Although there is no direct statutory requirement for the appointment of environmental practitioners, the National Environmental Management Act (NEMA) places a duty of care and remediation of environmental damage on every person who causes, has caused or may cause significant pollution or degradation of the environment. There is a responsibility for these persons to take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment. In order to ensure duty of care is maintained, environmental management appointments are required. Furthermore, in terms of Conditions of Environmental Authorisations obtained through the undertaking of an Environmental Impact Assessment, a general requirement is that of **appointing an independent Environmental Control Officer (ECO)**. In general, it is required **that a suitable qualified ECO is appointed to monitor project compliance with the conditions of the Environmental Authorisation, environmental legislation and the environmental management plan**. The ECO **may be required to ensure that periodic**

environmental performance audits are undertaken on the project implementation and compile environmental compliance reports.

- The ECO forms part of the Environmental Liaison Committee at Medupi [sub-committee] and had thus a support role of finding solutions at Medupi (refer to Annexure B). Sub-committees are responsible for, developing and proposing solutions; guiding and supporting their implementation and, for ensuring continuous improvement of SHE programmes, standards, rules and procedures.
- The Medupi Power Station Project’s Environmental Monitoring Committee (EMC) (EMC, undated).
  - An independent chairperson who has the appropriate people and project management skills;
  - An Ecologist that participated in the EIA process or any other suitably qualified and experienced ecologist approved for this purpose by the department;
  - Two representatives of the public, one community member from Marapong and one from Lephalale;
  - **The Environmental Control Officer (ECO);**
  - The Waste Management Control Officer (WMCO);
  - Project Stakeholder Representative;
  - The Site manager from the Project.

**Table 1: EMC Members**

<b>Category</b>	<b>Organisation</b>
Chairperson	TOKISO
ECO	NCC Environmental Services
WMCO	NCC Environmental Services
Ecologist	Bathusi Environmental
Medupi Management Representative	Eskom
Medupi Environmental Representative	Eskom
Eskom Stakeholder Representative	Eskom
Medupi Assurance and HSE	Eskom
I&AP	Community Representative - Marapong
I&AP	Community representative - Lephalale

- The following are considered to be the roles and responsibilities of the EMC and the ECO within the EMC) (EMC, undated):
  - The role of the EMC is to facilitate communication and co-operation amongst the Local Constituencies that the EMC members represent, Local Authorities and Eskom. The public should not be dealing directly with construction staff.
  - The EMC will be responsible for monitoring and auditing project compliance to the condition of the RoD's, Environmental Legislation and specific mitigation requirements as stipulated in the EMP and Environmental Impact Report (EIR).
  - The committee is to be representative of statutory as well as community interests but does not have an executive role.
  - The Independent Environmental Control Officer (ECO) will be appointed by the EMC as per condition 3.2.4 of the RoD.
  - The ECO's reports on the implementation of the EMP will be monitored and reported on by the EMC. In the event of non-compliance, the EMC shall make recommendations to Eskom in order to rectify and/or improve environmental management performance.
  - The EMC will be responsible for making recommendations to the Director-General (DG) of the Department of Environmental Affairs (DEA) on issues related to the monitoring and auditing of the project.
  - The EMC may provide feedback to the local community and other stakeholders.
  - The EMC shall report to the DG on a quarterly basis. The report shall deal with matters as specified in the terms of reference of the EMC.
  - Monitoring of the construction phase will be done by means of reviewing the reports produced by the ECO, as well as receiving project progress reports from Eskom. EMC members may, at appropriate intervals, conduct site inspections to monitor actual on site environmental management performance and be provided with the necessary documentation such as method statements, procedures, non-conformance records and incident reports.
  - All records to the EMC shall be made available on request.

*The following ECO related Roles and Responsibilities are specified in the authorisations:*

*NEMA S.24 Environmental Authorisation Reference # 12/12/20/1079.*

Application for Environmental Authorisation R. 386 and R.387: Proposed re-alignment and construction of a portion of the Afguns Road in the vicinity of the Medupi Power Station near Lephalale. (R. 386: 15and 7 and R. 387: 5) (Department of Environmental Affairs and Tourism, 2008). This authorization requires that:

- Section 1.11: “The applicant must appoint a suitably qualified and responsible person that will act as an Environmental Control Officer (ECO) that will have the responsibility of implementing the approved EMP.
  - The ECO must be appointed before the commencement of the activity and the authorities must be notified of such an appointment for communication purposes.
  - The ECO must inform all contractor staff via induction training of the conditions of this authorization and the requirements of the approved EMP.
  - The ECO must continuously monitor compliance with the conditions of this authorization and the requirements of the approved EMP and keep record of such monitoring.
  - The ECO must submit a quarterly environmental compliance report, in writing, to the Director: Environmental Impact Evaluation and copy the Applicant with such report. This report shall include a description of all activities on site, problems identified, transgressions noted and remedial action implemented.
  - The ECO shall maintain the following on site: Copies of all reports submitted to the Department and a complaints register of all public complaints and the remedies applied to such complaints.
  - The ECO must remain employed until all construction activities and rehabilitation measures as well as site clean-up are completed and the site is handed over to Eskom by the contractor for operation.

*NEMWA (licence #: 12/9/11/L50/6) waste permit (section 2.2):*

- A Waste Management Control Officer (WMCO) must be appointed to monitor and ensure compliance and correct implementation of all mitigation measures and provisions as stipulated in the License and approved EMP.

- The WMCO must, amongst others: report any non-compliance with license conditions or requirements or provisions of the National Environmental Management: Waste Act (No. 59 of 2008) to the licensing authority through the means reasonable.
- Duties and responsibilities of the WMCO are not exempting the license holder from complying with legal obligations of this license and in terms of NEMWA.
- Duties and responsibilities of the WMCO must be included in the mandate of the ECO appointed in terms of the Medupi power station RoD condition 3.2.4.1 unless Eskom prefers to appoint an additional person in which case they must appoint in accordance with condition 3.2.4.1 of the Medupi power station RoD.

*The following ECO related Roles and Responsibilities are specified in the EMP (Eskom, 2012b: 16-17):*

- **The Environmental Control Officer: Medupi Power Station:**
  - The EMC, in conjunction with Eskom, must appoint a suitably qualified Environmental Control Officer (ECO) who would on behalf of the EMC, on a daily basis monitor the project compliance with conditions of the Record of Decision, environmental legislation and recommendations of the EMP.
  - The costs of the ECO shall be borne by Eskom.
  - The ECO must be appointed one month before the start of construction, and the authorities must be notified of such an appointment for communication purposes.
- **The Environmental Control Officer will:**
  - Be fully conversant with the Environmental Impact Assessment Report (EIR).
  - Be fully conversant with the conditions of the Record of Decision (RoD).
  - Be fully conversant with the Environmental Management Plan.
  - Be fully conversant with all relevant environmental legislation and Eskom environmental policies and procedures, and ensure compliance with them.
  - Ensure that periodic environmental performance audits are undertaken on the project implementation.
  - Submit an environmental compliance report on a two monthly basis, in writing, to the Director General of the DEA, copied to the Limpopo Department of Economic Development, Environment and Tourism.

- Maintain the following on site: A daily site register; A non-compliance register; A public complaint register; A register of audits.
  - Remain employed until the completion of the construction phase.
  - Report to project manager and be accountable to the EMC.
- **In addition, the Environmental Control Officer will:**
    - Convey the contents of this document to the site staff and discuss the contents in detail with the Project Director and Contractor.
    - Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMP.
    - Take appropriate action if the specifications contained in the EMP are not followed.
    - Monitor and verify that environmental impacts are kept to a minimum, as far as possible.
    - Ensure that activities on site comply with all relevant environmental legislation.
    - Compile progress reports on a regular basis, with input from the Site Director, for submission to the Project Director, including a final post-construction audit carried out by an independent auditor/consultant.

**Table 2: Persons and their role in the case study**

#	Person	Role in Project	Organisation	Role in case study
1	Jan-Albert Wessels	Researcher (Phd candidate)	North-West University	Investigated the role, value, instruments and independence of the ECO function on site.
2	Emile Marrel	Lead Environmental Control Officer (outgoing)	NCC and Eskom	Provided assistance to the researcher for general needs and clarification of communication channels. Helped researcher obtain relevant documents. Participated in interviews. Participated in a site visit.
3	Ilse Coop	Environmental Control Officer	NCC	Helped to identify and obtain documents. Participated in an interview. Participated in a site visit.

#	Person	Role in Project	Organisation	Role in case study
4	Lizl Koekemoer	Waste Control Officer	NCC	Helped to identify and obtain documents. Participated in an interview.
5	Thesen Pillay	Assistant Environmental Control Officer	NCC	Helped to identify and obtain documents. Participated in an interview. Participated in a site visit.
6	Kubentheron Nair	Project manager (or similar person of authority)	Eskom: Asset Manager	Participated in a 1 hour interview.
7	Bruce Paul	Contractors Environmental Manager	MPJSJV: Murray and Roberts	Participated in a 1 hour interview.

In order not to interfere too significantly with daily tasks of the persons involved, I had to follow a strict time frame that enabled me to obtain the necessary information to successfully and meaningfully conduct the case study investigation (refer to the schedule below – Medupi Annexure G).

## 2. CASE STUDY QUESTIONS AND RESULTS

**Date:** 8 March 2012

**Name:** Emile Marrel

**Position:** Current lead ECO and Future Environmental Manager

**Qualification:** B.Tech (Nature Conservation); various certificates

**Experience (in construction):** 5 years

**Experience with or as an ECO:** 4 years

### 2.1 The ECO's own views on the role and value of ECOs before the structured interview

- Marrel (interview: #001): "There are three goals at Medupi in Environmental Management from a compliance perspective: 1) Environmental Awareness (from the Project Manager to the general worker); 2) Compliance (once a person knows what they should do they will comply); 3) Best practice (beyond compliance).
- Marrel (interview: #001): "Very important; the project management may determine the value of the ECO".
- Marrel (interview: #001): "The question is 'where does the ECO pitch?' in environmental awareness and compliance".
- Marrel (interview: #001): "In best practice in Environmental Management the ECO does have a role to play and to employ an ECO does make business sense".

### 2.2 Extraordinary examples of adding value

**Show me/tell me where you had a major influence in the course of events.**

#### Story 1:

At the time of the visit the observation was made of the ECO team being informed of protected Arachnid species by an Eskom employee next to roadwork's being done by adjacent mine: Grootegeluk Mine on 07/03/2012. The ECO team reported the discovery to the relevant mine employees. An investigation was launched the same day

and it was confirmed that a Meta-population of Golden Baboon Spiders are residing in the road reserve that was in the process of being upgraded by the mine. A joint search and rescue operation were launched by the ECO team, Eskom employees and Grootegeluk Mine employees the following day (08/02/2012) where more than 50 individuals were found and relocated.

#### Story 2:

The crushing and milling and re-use of cement instead of discarding it as waste to Johannesburg thus having a large financial saving to the company.

#### Story 3:

The initiative of collecting rainwater at the coal stock yard pollution control dam was the idea of the ECO.

#### Story 4:

ECO advised to test water (effluents) and discharge into storm water system saving R20000.00

#### Story 5:

Observation was made during the research site visit that the ECO forced a contractor to handle waste as a potential contaminated hazardous waste until proven otherwise before disposal of the waste in general waste area.

## **2.3 Role / expectations of the ECO**

### **2.3.1 What in your opinion is the most important role of the ECO in this project?**

#### ***ECO opinion:***

- Marrel (interview: 001:-0:35s) “**Compliance monitoring only**” (verified by Pillay and Coop): “The field requires **ECOs to monitor compliance of the conditions of the ROD & EMP. But if one looking at the larger scale of things, various projects requires and different contracts have different ways in monitoring compliance in generally and they’ll bring these requirements into various kinds of lists, most of the time they will be in line with ISO14001.** But some of the larger guys have their own internal docs developed for their specific scope and activities.

- Marrel: The ECO role is more a shepherd role (guide with a stick) rather than policemen.
- *Wessels: Please explain your answer:*
- Marrel (2012: interview #001): "We are trying to move away from the policemen concept. The concept is to influence and change behavior and even culture. Implementation is done by Project (Eskom) Environmental Manager. The ECO have influence in implementation matters through systems."
- Marrel (001-07: 28] "The ECO is literally a quality assurance type of role. The ECO does not implement anything in the EMP all they do is to assure that the requirements in the EMP are complied with and implemented through the project."

***Middle Management's (Environmental Manager) opinion:***

- Paul (2012: interview #12): "They have an advisory role".
- Paul (2012: interview #12): "I sometimes wonder if an ECO is not to a large extent a bit of a policeman, but there is more to them. To give you an example; we have a problem with ongoing perceptions. At Medupi we've had a lot of European and United Kingdom Environmental Officers and we had a young lady from England, she had a huge issue with how people work, waste and all of that. But if you look at the way of the behaviour was conditioned, it did not start here - it comes from the engineering company or at home etc. But if you look at the way of the behaviour was conditioned, it did not start here - it comes from the engineering company or at home etc. To rectify the problem we explained to her that we need to go to their homes and need to understand the conditions under which they live in, show them that they are part of it [the construction site) and need to instil a new type of behaviour on site. She could not get that."

***Senior manager's opinion (Medupi Assurance Manager – Kubentheron Nair)***

- Nair (2012: interview #05): "In my view what is very important of an ECO role is the independence assurance function on a site. They tell me what happens on a site whereas an Environmental Manager will not necessarily tell me that. The independent ECO provides me that assurance that these things are happening; somebody who is checking the checkers basically in the paradigm of saying what you do, do what you say and then proof it. That's what an ECO does for me."

## 2.4 Need and value of the ECO

### 2.4.1 In the ECO's opinion an ECO add value to the following aspects of the construction project:

	Strongly Agree	Agree	Partly Agree	Partly Disagree	Disagree	Strongly Disagree	Unable to Judge
<i>In my opinion an ECO add value to:</i>							
a) Ensuring the project is completed as per project schedule	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Ensuring that the community surrounding the project is protected/helped/informed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Ensuring that the environment is protected	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) No value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

#### 6.4.1.1 Any comments on the abovementioned?

- On d): the ECO; partly disagreed due to his opinion that the ECO do not ensure that the environment is protected (as the environment has already been affected) but assure sustainability by assuring mitigation as per ROD takes place. Thus the ECO assure sustainable utilisation of the environment, but not to the detriment of the ecosystem functioning.

#### 2.4.1.2 In your experience and/or opinion do you think there is a need for an ECO and what value does the ECO add to the project (apart from the above areas)?

- On all of the above mentioned the ECO, stated that the word ensure should be replaced by the word assure as the ECO do not ensure on the site. The ECO do not do the work and do not have any authority.

**2.4.2 Middle Management: In the Contractor’s (Murray & Roberts) Environmental Manager’s (Bruce Paul, 2012: interview #012) opinion an ECO add value to the following aspects of the construction project:**

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Partly Agree</i>	<i>Partly Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Unable to Judge</i>
<i>In my opinion an ECO add value to:</i>							
a) Ensuring the project is completed as per project schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Ensuring that the community surrounding the project is protected/helped/informed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Ensuring that the environment is protected	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) No value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**2.4.2.1 Any comments on the abovementioned?**

- On a): “I don’t think it is their main focus”
- On c): “I don’t know how far their influence is supposed to be. **In terms of a very localize community, most definitely yes.**”
- On d): “We make a joke here: ‘In a coal mine who cares about oil spills?’ This thing [the Medupi project] is bigger than some countries’ carbon footprint. In the grand scheme of things; if there is a God, then we will all go to hell. How do we [as environmental practitioners] even partake in this? So, in my opinion, it is the industry [construction industry] that is the problem and not the site. This site must show people that there is a better way of doing things. **So in terms of the ECOs teaching people how to do things properly and this is the way we continue to do stuff on other sites, YES**” (Paul, 2012: interview #012).
- On e): **“I would hate to see this site without an ECO. It adds tremendous value”**

2.4.2.2 In your experience and/or opinion do you think there is a need for an ECO and what value does the ECO add to the project (apart from the above areas)?

- Paul (2012: interview #12): “Yes, in terms of work instructions – if we were just left to certain packages in Eskom, the project is so big that it is broken down into certain components and some package managers have a very, very weird perception on their environmental risks and what they expect from us. For example this site is a “0 waste site”... I just love that concept “0 waste”, we can strive to get there. One of the role of the ECOs is to explain this to them.”
- Wessels: relationship with ECO? BP (2012: interview #12): “Antagonistic relationship (laughing). We have a contractual relationship with Eskom or the Project Engineer in Medupi. **We have no relationship with the ECO.** The ECO should as far as we are concern, address environmental issues with the management [environmental] team of Medupi. It has happened that the ECO engage with contractors directly and demand that it be rectified immediately. This may damage the long term relationship between the contractor and the client.
- Paul (2012: interview #12): “People on a site do not see the difference between the ECO and the Client. **One of my biggest problems has always been that the ECO on this site need to look as independent as they can.** They should not be driving around in a client vehicle and they should not be wearing client logos or uniform. They should be apart.”
- Paul (2012: interview #12): “In the past it has happened that it is Eskom and the ECO versus the Contractor. However, we are a division of Eskom contractually. **So it should actually be the Medupi Team Environmental Manager, us a division now and the ECO.** It is not how it comes across, it comes across as: the Contractor is evil and the contractor does not adhere. So it is always the contractors fault. I’m not saying we are innocent, but it is not always the Contractor.”
- Paul (2012: interview #12): **“I sometimes wonder if an ECO is not to a large extent a bit of a policeman, but there is more to them.** To give you an example; we have a problem with ongoing perceptions. At Medupi we’ve had a lot of European and UK Environmental Officers and we had a young lady from England, she had a huge issue with how people work, waste and all of that. But if you look at the way of the behaviour was conditioned, it did not start here - it comes from the engineering

company or at home etc. To rectify the problem we explained to her that we need to go to their homes and need to understand the conditions under which they live in, show them that they are part of it [the construction site) and need to instil a new type of behaviour on site. She could not get that.”

**2.4.3 In the senior manager’s (Medupi Assurance Manager – Kubentheron Nair) opinion an ECO add value to the following aspects of the construction project:**

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Partly Agree</i>	<i>Partly Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Unable to Judge</i>
<i>In my opinion an ECO add value to:</i>							
a) Ensuring the project is completed as per project schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
c) Ensuring that the community surrounding the project is protected/helped/informed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
d) Ensuring that the environment is protected	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
e) No value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

2.4.3.1 Any comments on the abovementioned?

- On a): “The ECO is not tied to the project schedule the ECO is tied to maintenance of the project performance. The ECO cannot influence how Hitachi works. The ECO’s value is that it prevents the project from being shut down.”
- On c): “We’ve changed that attitude 2-3 years ago [in relation to ECOs ensuring that the environment is protected]. I think it is much more than just ensuring that the environment is protected. It is ensuring that the environmental performance is improved and sustainability is assured”.
- On e): “The ECO has got a lot of value”.

2.4.3.2 In your experience and/or opinion do you think there is a need for an ECO and what value does the ECO add to the project (apart from the above areas)?

- Nair (2012: interview #05): “There are a number of things that they do. They go out and check specifications and what they then do is they report into a certain structure. They will report into the project and if there are deviations they will say that is what we think you should do. **Now, they don't do the work, they monitor the work.** The project will then make certain commitments in terms of what needs to be done etc. They will then go check if the mitigation measures are done. **Thus, they identify the gaps, provide some sort of solution and then check if the solution has been implemented and if it is sustainable.** They are also involved in risk. An issue is what has already happened and risk is what may happen. When we do risk assessments we need to involve our ECO. We got an Environmental Team and then we have the ECO team. They both have a specific focus. **We've seen that if we get these guys together then we'll have a very comprehensive product [Risk assessment] at the end of the day. These thus get involve throughout the value chain.**”
- Nair (2012: interview #05) in terms of **value** “**The biggest thing is that they keep us out of trouble.** There is a whole series of environmental legislation that we need to adhere to, a series of authorization conditions we need to adhere to and these guys are constantly scanning the environment to make sure that we are clean. That for me is one of the biggest benefits.”
- Nair (2012: interview #05): “The environmental performance of the project is of paramount importance and when it gets to **environmental performance we need to make sure that all the ticks have been checked.**”
- Nair (2012: interview #05): “**The next thing that is important for me is the project performance.** If we get to a situation where we are **shut-down because of a non-compliance the financial implications will be far reaching in terms for penalties and the loss of time will be phenomenal.** So these guys play a very, very important role in these aspects.
- Nair (2012: interview #05): “**Thus these guys make sure that the environmental performance improve,** and it does actually improve, and also to keep us out of trouble”.
- Nair (2012: interview #05): “Experience is very important as none of the guys that joined this project were there yet and a very steep learning curve was needed for all of them. We've realised the importance of these people and that's why give them the support they need and that is why they are never alone.”

- Nair (2012: interview #05): “Creativity is very important. People need to do what people need to do; there are certain legal boundaries and parameters in which one is allowed to do it. Don’t just come there and say this is not what you are supposed to do. People need solutions and do not just want to be told what not to do. If the law says this is the parameters then ethical solutions is needed to remain legal.
- Nair (2012: interview #05): “One thing about the ECOs is: what do you want out of them? As the client you need to understand what you want. We know what we want, we know what we expect. But is that all that you want? No, an ECO can provide more functions [than maybe initially intended] and one thing that we are hoping to harness in the ECO domain “what about beyond the project; what about the community involvement?...”
- Nair (2012: interview #05): “The ECO from a project management point of view is not part of the project team. They sit outside the team so that they are not contaminated and have an independent view on the project. They report to the team”.

## 2.5 Appraising the value of ECOs

This section of the report aims to capture, combine the evidence sourced and make a value judgment of the subject participation in the achievement of objectives. The keys below were used to give an indication that objectives were achieved by subject participation. According to Owen (2007) “judgment on worth is the process of synthesizing and integrating evidence into a judgment of merit of worth”.

**Table 3: Description of Assessment Keys**

Key	Description
NA	Not applicable to case study.
?	Status could not be established.
x	Very limited or no evidence of participation to support achievement of objective(s).
½	Some evidence to support partial participation to support achievement objective(s).
✓	Sufficient evidence of participation to support achievement of objective(s).
–	Indicator with particular reference to case.

For the ordinal scale evaluation and ranking of data I assigned: x for very limited to no evidence available; ½ as the median (halfway point) for some evidence; and ✓ as sufficient evidence available to indicate that a Key Performance Indicator (KPI) was achieved, partially achieved or not achieved. An underlined evaluation (e.g. x, ½, ✓) indicates a particular interesting or unique reference to a case study.

**Table 4: Data evaluation matrix – Medupi**

<p><b>Key performance areas (KPA's)</b>  <i>"Topic related to principles"</i>                      (Derived from ISO, 2004; Arts, 1998, Arts et al, 2001; DEA, 2011; and Hullet and Diab, 2002)</p>	<p><b>Objectives</b>  <i>"Indication of what needs to be achieved to"</i>                      (UNEP-ITC, 2002: 59-67; South Africa, 1998: 5; Du Plessis, 2002; Morrison-Saunders &amp; Arts, 2004)</p>	<p><b>Key performance indicators (KPI's)</b>  <i>"Questions that provide an indication to what extent the objectives were achieved by subject participation"</i>                      (derived from South Africa, 1998; Morrison-Saunders &amp; Arts, 2004, Singapore Environmental Agency, undated, and DWAF, 2005 as proposed by Retief, 2007a: 91)                      Note that all questions start with: "To what extent..."</p>	<p><b>Evidence provided that objective were achieved, partially achieved or not achieved.</b></p>	<p><b>Appraisal</b></p>
<p><b>I) OUTPUT COMPONENT: PRIOR TO PROPOSAL IMPLEMENTATION [PROJECT PLANNING &amp; DESIGN PHASE].</b></p>				
<p><b>1. [Plan]: Generate data, knowledge and a sustainable vision or outcome.</b></p>	<p><b>Objective 1: Participate in the early components of EIA prior to proposal implementation.</b>                      (Ex-ante evaluation: Preliminary assessment: Screening/Scoping; Detailed assessment: Impact analysis/mitigation measures/Reporting/EIS review/Decision-making; and EIA follow-up plans: EMP, CEMP etc.)  <b>Judgement on worth:</b>                      In terms of generating data, knowledge and a sustainable outcome, evidence was found that the ECO function at Medupi pre-empted risks and was involved in the Screening phase of projects related to the main project. However, no evidence was found that the ECOs were involved in Scoping, Detailed assessments and the compiling of EMPs for new projects. Evidence was found, however, of ECOs being involved with the review of the project's EMP.</p>			
	<p>KPI 1.1: ...was the verifier involved in establishing whether an EIA was required for the project and other project related projects (Screening)?</p>	<ul style="list-style-type: none"> <li>• Yes – the ECO do pre-empt problems. According to Pillay &amp; Coop (2012) "ECO's definitely pre-empt risks. An example is that new developments are screened for legal risks and implications."</li> </ul>		<p>✓</p>
	<p>KPI 1.2: ...was the verifier involved in identifying key issues and impacts to be addressed in the project and other project related projects (Scoping)?</p>	<ul style="list-style-type: none"> <li>• NO EVIDENCE. The ECO was not involved.</li> </ul>		<p>x</p>
	<p>KPI 1.3: ...was the verifier involved with compiling and reporting the: Environmental Impact Report (EIR)/Statement (EIS); the sustainability vision; and/or the Environmental Management Plan (EMP) of the project and other project related projects?</p>	<ul style="list-style-type: none"> <li>• NO EVIDENCE. The ECO was not involved.</li> </ul>		<p>x</p>

	KPI 1.4: ...was the verifier involved with the preparation and submission of the Environmental Management Plan of the project other project related projects?	• NO EVIDENCE.	x
<b>II) OUTPUT COMPONENT: POST PROPOSAL IMPLEMENTATION [PRE-CONSTRUCTION &amp; CONSTRUCTION PHASE].</b>			
<b>2A. [Do]: Pre-construction preparation for implementation of specifications.</b>	<p><b>Objective 2A: Participate in the pre-construction preparation and commissioning of the environmental Performance Specifications.</b> (E.g. identifying: resources required, roles and responsibilities; documenting procedures, processes and checklists).</p> <p><b>Judgement on worth:</b> No evidence was found that the ECO function at Medupi was involved in the handover from planning to the implementation phase or the identifying, defining and allocating roles and responsibilities for the implementation, control, monitoring and evaluation, auditing and reporting of environmental specifications. However the ECO function at Medupi was involved in identifying, defining and allocating financial and human resources during the project for support of the ECO function.</p>		
	KPI 2A.1: ... was the verifier involved with the handover of environmental Performance Specifications from the planning phase to the implementation phase	• NO EVIDENCE WAS FOUND.	x
	KPI 2A.2: ... was the verifier involved in identifying, defining and allocating roles and responsibilities for the implementation, control, monitoring, evaluation, auditing and reporting of environmental specifications?	• Legal binding requirement that ECO remains appointed until construction/ rehabilitation/site clean-up and site handover to ESKOM has been done. According to Eskom's (2012: 10) "Procedure: Integrated SHE Organisation, Roles and Responsibilities and Statutory Appointments" 'Although there is no direct statutory requirement for the appointment of environmental practitioners, the National Environmental Management Act (NEMA) places a duty of care and remediation of environmental damage on every person who causes, has caused or may cause significant pollution or degradation of the environment. There is a responsibility for these persons to take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment. In order to ensure duty of care is maintained, environmental management appointments are required. Furthermore, in terms of Conditions of Environmental Authorisations obtained through the undertaking of an Environmental Impact Assessment, a general requirement is that of appointing an independent Environmental Control Officer (ECO). In general, it is required that a suitable qualified	x

		<p>ECO is appointed to monitor project compliance with the conditions of the Environmental Authorisation, environmental legislation and the environmental management plan. The ECO may be required to ensure that periodic environmental performance audits are undertaken on the project implementation and compile environmental compliance reports.'</p> <ul style="list-style-type: none"> <li>• According to the EMC (Undated) section 3.4 "The Independent Environmental Control Officer (ECO) will be appointed by the EMC as per condition 3.2.4 of the RoD."</li> <li>• The costs of the ECO shall be borne by Eskom (Eskom, 2012b: 16)</li> </ul> <p><b>However, no evidence indicates that the ECO was involved in discharging roles and responsibilities.</b></p>	
	<p>KPI 2A.3: ... was the verifier involved in identifying, defining and allocating, financial and human resources for the implementation, control, monitoring, evaluation, auditing and reporting of environmental specifications?</p>	<ul style="list-style-type: none"> <li>• Initially there was enough resources yes, but as construction extent it's scope of works <b>the ECO had to apply and motivate for additional human and financial resources to successfully conduct the roles of the ECO</b> function. As a result the position of "Assistant ECO" was created and 2x Assistant ECO's were appointed (Marrel, 2012).</li> </ul>	✓
<p><b>2B. [Do]: Implement, inform decision making in construction and parallel process.</b></p>	<p><b>Objective 2B: Participate in the implementation of the environmental Performance Specifications.</b>  (E.g. implementing processes: internal housekeeping, project control &amp; control of impacts; documenting procedures and processes; establishing emergency procedures and responses; education and induction of employees; and communication of EMP).</p> <p><b>Judgement on worth:</b></p> <p>Evidence was found of slight deviation from the implementation requirements of the Environmental Authorisation (Reference # 12/12/20/1079) of ECOs at Medupi. It was found, however, that the ECO do fulfil all the monitoring and reporting duties as per EA's. Moreover, evidence was found of the ECOs promoting the use of sustainable processes &amp; technologies. Evidence was also found that the ECO function (in particular the WMCO) do respond to environmental emergency situations. Overwhelming evidence was found of the ECO function influencing decisions and maintaining decision-making flexibility by: giving advice, making recommendations, reviewing and accepting environmental method statements. It was also found that the ECO plays an important role in the review, update and drafting of various environmental plans and programmes of Medupi. Sufficient evidence was also found of the ECO function being involved with informing and educating employees about environmental risks, although not in the induction training.</p>		
	<p>KPI 2B.1: ... did the verifier perform the defined and discharged roles and responsibilities until the completion of the ECO service?</p>	<ul style="list-style-type: none"> <li>• <u>The Medupi Power Plant Project has many applicable environmental authorisations with EIA follow-up and ECO</u></li> </ul>	1/2

		<p>requirements. An issue that is evident in these authorisations is the fact that the ECO roles and responsibilities differ from authorisation to authorisation and also from the Eskom internal procedures (Eskom, 2012). For example the NEMA S.24 Environmental Authorisation Reference # 12/12/20/1079 requires that (Section 1.11): "The applicant must appoint a suitably qualified and responsible person that will act as an Environmental Control Officer (ECO) that will have the responsibility of implementing the approved EMP. However, implementation of the EMP conditions is not part of the ECO scope (refer to Procedure: Integrated SHE Organisation, Roles and Responsibilities and Statutory Appointments, EPC 32-296).</p>	
	<p>KPI 2B.2: ... did the verifier participate in and/or stimulate the use of sustainable technologies and processes?</p>	<ul style="list-style-type: none"> <li>• ECOs ask contractors to explain technical / product specific risks before use. The ECO also informs on pollution and advises on how to eliminate the source of pollution and makes mitigation suggestions (Pillay &amp; Coop, 2002).</li> <li>• According to Eskom (2011: 2) section 1.9 "ECO indicated that he has requested response to management of stormwater at the stockpiles. Environmental team to submit a plan to ECO."</li> </ul>	✓
	<p>KPI 2B.3: ... was the verifier involved with reducing environmental impacts through responding to actual and potential environmental emergency situations?</p>	<ul style="list-style-type: none"> <li>• I.t.o sections 28 of NEMA, certain activities may be stopped in emergency situations. On other issues the ECO may only recommend to the project manager and may request to stop the activities. Only the project manager as the contract holder may stop activities (Marrel, 2012).</li> <li>• NEMWA (licence #: 12/9/11/L50/6) waste permit (section 2.2) requires that: "The License Holder must maintain and implement an emergency preparedness and response plan and review it after each emergency and/or major incident and annually when conducting an audit." The WMCO officer has the duty to fulfil these tasks.</li> </ul>	✓
	<p>KPI 2B.4: ... did the verifier influence decisions related to mitigation and remediation of aspects deemed to be a variation, or not allowed for in the environmental Performance Specifications?</p>	<ul style="list-style-type: none"> <li>• According to Nair (2012: interview #05): "The ECO has no authority on the project, they can make recommendations and when they make recommendations we have to take it very, very seriously. Remember, they have multiple</li> </ul>	✓

		<p>reporting into the project and government. If we do not follow the recommendations then stakeholders can turn around and ask why did we not follow the recommendations?”.</p> <ul style="list-style-type: none"> <li>• The ECO forms part of the Environmental Liaison Committee at Medupi and had thus a support role of finding solutions at Medupi (refer to Annexure B).</li> <li>• The ECO has power to influence behaviour through accepting and implementing method statements (Marrel, 2012).</li> <li>• ECOs review and comment on method statements. ECOs also ask contractors to explain technical / product specific risks before use. The ECO also informs on pollution and advises on how to eliminate the source of pollution and makes mitigation suggestions (Thesen &amp; Coop, 2002).</li> <li>• The ECO is available to advise on incidental issues that arise (Marrel, 2012).</li> <li>• According to the EMP (Eskom, 2012b: 16-17) the ECO will “Take appropriate action if the specifications contained in the EMP are not followed.”</li> <li>• The ECO may make formal recommendation on non-compliances and system non-conformities (Marrel, 2012).</li> <li>• The ECO forms part of the Environmental Liaison Committee at Medupi [sub-committee] and had thus a support role of finding solutions at Medupi (refer to Annexure B). Sub-committees are responsible for, developing and proposing solutions; guiding and supporting their implementation and, for ensuring continuous improvement of SHE programmes, standards, rules and procedures. (Eskom, 2012: 8-10).</li> <li>• According to Esmo. (2010: 8) the ECO will “Advise the Environmental Manager, SHE Manager and Engineer on matters relevant to environmental compliance.”</li> </ul>	
	<p>KPI 2B.5: ... was the verifier involved with documenting, reviewing and/approving of policies, plans, programmes, operational procedures, registers and emergency procedures?</p>	<ul style="list-style-type: none"> <li>• The ECO was involved in the review and update of the EMP (Marrel, 2012 and Nair, 2012: interview #05).</li> <li>• The ECO forms part of the Environmental Liaison</li> </ul>	<p>✓</p>

		<p>Committee at Medupi [sub-committee] and had thus a support role of finding solutions at Medupi (refer to Annexure B). Sub-committees are responsible for, developing and proposing solutions; guiding and supporting their implementation and, for ensuring continuous improvement of SHE programmes, standards, rules and procedures.</p> <ul style="list-style-type: none"> <li>• According to the EMP (Eskom, 2012b: 16-17) the ECO will “Maintain the following on site: A daily site register; A non-compliance register; A public complaint register; A register of audits.”</li> <li>• Evidence was found that Marrel as the ECO compiled the following document (Eskom. 2010) “Procedure: Environmental Compliance Monitoring. Procedure Date: February 2010”.</li> <li>• According to Eskom (2010: 9) “Additionally further checklists will be developed by the MET Environmental Department in conjunction with the ECO for specific focus areas.”</li> </ul>	
	<p>KPI 2B.6: ... was the verifier involved with internal capacity building and awareness to inform &amp; educate employees about environmental risks of their work and the manner in which their tasks must be performed?</p>	<ul style="list-style-type: none"> <li>• The ECO do inform &amp; educate. A method of continuous awareness making of key employees is that the ECO have constant interaction with the Foremen of Contractor whilst conducting an inspection/site walkabout (Pillay, 2012: site visit).</li> <li>• Moreover, according to the EMP (Eskom, 2012b: 16-17) the ECO “In addition, the Environmental Control Officer will: Convey the contents of this document to the site staff and discuss the contents in detail with the Project Director and Contractor.</li> <li>• However, the ECO do not conduct induction training (although required by the RoD) (Marrel, 2012). The first ECO (Phillip Ducas) was to an extent involved with induction training (2007-2008) by providing input into training packages. However, the contractors designed training packages based on the contract’s Environmental Performance Specifications.</li> </ul>	✓
<p>2C. [Do]: Reporting</p>	<p>Objective 2C: Participate in reporting and communicating by informing the stakeholders as well as the general public about the results of</p>		

<p><b>and Communication</b></p>	<p><b>EIA follow-up.</b></p> <p><i>Communication is "Informing the stakeholders as well as the general public about the results of EIA follow-up (in order to provide feedback on project/plan implementation as well as feedback on EIA processes)". According to DEA (2013:97) communication of: plans and participation across all levels of the organisation, especially senior staff and politicians, relevant sectors, academia, professional bodies, civil society and NGOs, etc.</i></p> <p><b>Judgement on worth:</b></p> <p>Numerous sources of evidence indicated that the ECO function at Medupi was, to a large extent, involved with providing continuous feedback from EIA follow-up programmes to the: proponent; regulator; and the community. However, not enough sufficient evidence was found that the ECO contribute to formal periodic feedback for internal EIA process improvement. The ECO (Emile Marrel) did, however, contribute in providing formal periodic feedback for external EIA process improvement by formal lectures at the North-West University, Potchefstroom campus. Moreover, sufficient evidence was found that the ECO contribute to openness and access to information for transparent communication.</p>	
	<p>KPI 2C.1: ... did the verifier report or gave feedback to the site proponent on actual and/or potential harmful environmental conditions and/or situations?</p>	<ul style="list-style-type: none"> <li>• According to Nair (2012: interview #05): "... Remember, they [the ECOs] have multiple reporting into the project and government. If we do not follow the recommendations then stakeholders can turn around and ask why did we not follow the recommendations?"</li> <li>• According to the EMP (Eskom, 2012b: 16-17) the ECO will "Report to project manager and be accountable to the EMC." The ECO gives feedback directly to the Project Manager (and Assurance Manager) (Marrel, 2012).</li> <li>• According to the EMP (Eskom, 2012b: 16-17) the ECO will "Compile progress reports on a regular basis, with input from the Site Director, for submission to the Project Director, including a final post-construction audit carried out by an independent auditor/consultant."</li> <li>• The ECO review remedial actions/plans and sent a sign-off letter for acceptance (Marrel, 2012).</li> <li>• ECO attend relevant meetings that involves environment and the ECO attends overall project progress meetings as required for pertinent compliance of environmental issues &amp; contractor progress meetings (Marrel, 2012).</li> <li>• The ECO forms part of the Environmental Liaison Committee at Medupi [sub-committee] and had thus a support role of finding solutions at Medupi (refer to Annexure B). Sub-committees are responsible for, developing and proposing solutions; guiding and supporting their implementation and, for ensuring continuous</li> </ul>

		<p>improvement of SHE programmes, standards, rules and procedures (Eskom, 2012: 8-10).</p> <ul style="list-style-type: none"> <li>• Evidence was found that the ECO attended the Stockpile Management Meeting of 13 October 2011 (Eskom, 2011).</li> <li>• According to the EMC (2012) “The ECO’s reports on the implementation of the EMP will be monitored and reported on by the EMC.”</li> <li>• Monitoring of the construction phase will be done by means of reviewing the reports produced by the ECO.</li> <li>• According to EMC (2011) relating to concerns raised on stockpile and waste management noted: <ul style="list-style-type: none"> <li>○ “Numerous weekly and monthly reports submitted to the Project and EMC by the ECO as per requirement 3.2.4.7 of the Medupi RoD – The ECO shall Report and be accountable to the EMC.”</li> <li>○ “Various e-mail discussions between the ECO, Team Medupi Representatives, Generation Environmental Management and Eskom Legal Department”</li> <li>○ “ECO letter regarding Roschon’s contamination of temporary stockpile, Ref no: 257-28101, dated 08/02/2010.”</li> </ul> </li> </ul>	
	<p>KPI 2C.2: ... did the verifier report or gave feedback to the Regulator on actual and/or potential harmful environmental conditions and/or situations?</p>	<ul style="list-style-type: none"> <li>• “Very important is that the ECO keeps government informed on what they are doing (Nair, 2012: interview #05).</li> <li>• According to Nair (2012: interview #05): “... Remember, they [the ECOs] have multiple reporting into the project and government. If we do not follow the recommendations then stakeholders can turn around and ask why did we not follow the recommendations?”</li> <li>• NEMWA’s (licence #: 12/9/11/L50/6) waste permit (section 2.2) requires that: “The WMCO must, amongst others: report any non-compliance with license conditions or requirements or provisions of the National Environmental Management: Waste Act (No. 59 of 2008) to the licensing authority through the means reasonable.”</li> </ul>	✓

		<ul style="list-style-type: none"> <li>• According to the EMC (2011) “The Environmental Control Officer (ECO) is an independent body, appointed under Section 3.2.4.1 of the Medupi Record of Decision (RoD, Ref 12/12/2-/695) by the Environmental Monitoring Committee (EMC) in conjunction with the Client. The ECO reports to the Department of Environmental Affairs (DEA), the Limpopo Department of Economic Affairs, Environment and Tourism (LEDET) and the Medupi EMC.</li> <li>• According to the EMC (2012) “The ECO’s reports on the implementation of the EMP will be monitored and reported on by the EMC” and the “ECO to present efficacy of actions to EMC”</li> <li>• According to the EMP (Eskom, 2012b: 16-17) the ECO will “Submit an environmental compliance report on a two monthly basis, in writing, to the Director General of the DEA, copied to the Limpopo Department of Economic Development, Environment and Tourism.</li> </ul>	
	<p>KPI 2C.3: ... did the verifier report or gave feedback to the Community on actual and/or potential harmful environmental conditions and/or situations?</p>	<ul style="list-style-type: none"> <li>• Project Manager does not need to give feedback to the implementation agent as ECO gives feedback to I&amp;APs (Marrel, 2012).</li> <li>• According to the EMC (2011) “The Environmental Control Officer (ECO) is an independent body, appointed under Section 3.2.4.1 of the Medupi Record of Decision (RoD, Ref 12/12/2-/695) by the Environmental Monitoring Committee (EMC) in conjunction with the Client to ensure compliance with the Medupi RoD, Environmental Management Plan (EMP)) and South African Environmental legislation. The ECO reports to the Department of Environmental Affairs (DEA), the Limpopo Department of Economic Affairs, Environment and Tourism (LEDET) and the Medupi EMC.</li> <li>• According to the EMC (2012) “The ECO’s reports on the implementation of the EMP will be monitored and reported on by the EMC” and the “ECO to present efficacy of actions to EMC”</li> </ul>	✓
	<p>KPI 2C.4: ... was the verifier involved with formal periodic feedback, communication of EIA predictions into the planning stage to be</p>	<ul style="list-style-type: none"> <li>• ECO attend only relevant meetings that involves environment (Marrel, 2012).</li> </ul>	x

	implemented moving forward?		
	KPI 2C.5: ... was the verifier involved in active feedback/communication/training for ensuring improved EIA	<ul style="list-style-type: none"> <li>• The ECO has been involved with the design and presentation of formal short-course training at the North-West University since 2010 (CEM, 2011/2012/2013). The course is termed “Post-decision Environmental Monitoring and Enforcement: Roles and Responsibilities” and aims to educate the general public, government and environmental practitioners (consultants) on improving post-decision monitoring and enforcement of projects. Specific training topics were: <ul style="list-style-type: none"> <li>➤ Environmental Control Tools, Processes and Reporting: Case Study Experience from Mega Infrastructure Projects.</li> <li>➤ Screening and Potential Additional Authorisations Required for Activities.</li> <li>➤ Inspections and Reporting &amp; Incident and Non-Conformance Reports.</li> <li>➤ The PDFU Roles in Designing, Implementing and Reporting on a Monitoring Programme</li> <li>➤ Method Statements (MS): Writing MS and Linking MS to Environmental Performance Objectives and Targets</li> <li>➤ Implementing Environmental Management Plans (EMPs): The influence of the Structural determinants on roles, responsibilities and authorities.</li> </ul> </li> </ul>	✓
	KPI 2C.6: ... did the verifier ensure openness, access to information for transparent communication with all stakeholders involved?	<ul style="list-style-type: none"> <li>• The Project Team's and the Contractor's Environmental Officers join the ECO inspections in order to act immediately on deviations from Performance Specifications.</li> <li>• Project Manager does not need to give feedback to the implementation agent as ECO gives feedback to I&amp;As (Marrel, 2012).</li> <li>• According to Eskom (2010: 10) “The ECO shall track the performance of the Project in achieving the targets of the action plans and report on the progress and status of close</li> </ul>	✓

		<p>out in the ECO Monthly Environmental Report."</p> <ul style="list-style-type: none"> <li>• Photograph below indicates access of ECOs to all controlled project areas.</li> </ul> 	
<p><b>3A. Monitoring and measurement of effects</b> [Check]: and of</p>	<p><b>Objective 3A: Participate in the monitoring and measurement of environmental effects.</b>          (Ex-post evaluation: measuring, comparing, assessing &amp; auditing – environmental effects &amp; parameters)  <u>Judgement on worth:</u>          No evidence was found that the ECO at Medupi conducted monitoring of environmental parameters or effects. The ECO do to an extent contribute to the evaluation of environmental risks and effects by reviewing risk assessments but are not formally part of the risk assessment process.</p>		
	<p>KPI 3A.1: ... was there sufficient evidence to confirm that the verifier collected data on environmental effects?</p>	<ul style="list-style-type: none"> <li>• According to the EMP (Eskom, 2012b: 16-17) the ECO "Monitor and verify that environmental impacts are kept to a minimum, as far as possible."</li> <li>• However, no parameter monitoring by the ECO. The monitoring of environmental parameters is part of job of EO/EM (Marrel, 2012).</li> </ul>	<p>X</p>
	<p>KPI 3A.2: ... was the verifier involved with risk assessment and evaluation of environmental aspects and the risks, consequences and alternative options for mitigation of activities?</p>	<ul style="list-style-type: none"> <li>• The ECO do not assess, but evaluate assessments (Risk assessments) – thus a reviewing function only (Marrel, 2012).</li> <li>• The ECO do pre-empt problems. According to Thesen &amp;</li> </ul>	<p>1/2</p>

		<p>Ilse Coop (2012) <b>ECOs definitely pre-empt risks.</b> ECOs also review and <b>comment on risk assessments as well as method statements.</b> ECOs also ask contractors to explain technical / product specific risks before use. The ECO also informs on pollution and advises on how to eliminate the source of pollution and makes mitigation suggestions (Thesen and Coop, 2002).</p> <ul style="list-style-type: none"> <li>• According to Nair (2012: interview #05) “They [ECOs] are also involved in risk. An issue is what has already happened and risk is what may happen. <b>When we do risk assessments we need to involve our ECO.</b> We got an Environmental Team and then we have the ECO team. They both have a specific focus. <b>We’ve seen that if we get these guys together then we’ll have a very comprehensive product at the end of the day.</b>”</li> </ul>	
<p><b>3B. [Check]: Monitoring and evaluation of legal compliance (performance)</b></p>	<p><b>Objective 3B: Participate in internal and external compliance (performance) evaluation.</b>          (Ex-post evaluation: measuring, comparing, assessing &amp; auditing - legal compliance/performance to Environmental Specifications)</p> <p><b>Judgement on worth:</b>          Sufficient evidence was found to confirm that the ECO function at Medupi participated in: monitoring compliance; conducting internal compliance (performance) assessments; providing information in support of external compliance (performance) assessment [auditing]; and the ad hoc verification and evaluation of policies, plans, programmes, operational procedures and implementation of mitigation measures.</p>		
	<p>KPI 3B.1: ... did the verifier collect data on environmental legal compliance?</p>	<ul style="list-style-type: none"> <li>• According to the EMP (Eskom, 2012b: 16-17) the <b>ECO will “Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMP.”</b> The ECO will also “Monitor and verify that environmental impacts are kept to a minimum, as far as possible.”</li> <li>• <b>“The ECO monitor compliance to EMP and ROD specifications/ requirements continuously through inspections and audits”</b> (Marrel, 2012).</li> <li>• <b>The ECO conducts daily site inspections as the EMP requires regular inspections.</b> The assurance manager expects that ECOs know the environmental issues on site.</li> </ul>	<p>✓</p>



Figure: Eco performing routing inspections

- Evidence was found of the ECO participating in a “Joint Site Inspection at stockpile areas”. The team to conduct joint site inspection Thursday 20th October 2011 at 12:30 (Eskom, 2011).
- NEMWA (licence #: 12/9/11/L50/6) waste permit (section 2.2): requires that: “A Waste Management Control Officer (WMCO) must be appointed to monitor and ensure compliance and correct implementation of all mitigation measures and provisions as stipulated in the License and approved EMP.”
- According to DEAT *Environmental Authorisation* (Reference # 12/12/20/1079 of DEAT) “The ECO must continuously monitor compliance with the conditions of this authorization and the requirements of the approved EMP and keep record of such monitoring.
- According to Eskom (2010: 10) “The ECO shall track the performance of the Project in achieving the targets of the action plans and report on the progress and status of close-out in the ECO Monthly Environmental Report.”

			
	<p>KPI 3B.2: ... did the verifier use a formal (systematic and objective) assessment approach (internal auditing) to compare environmental effects and compliance data with norms, prediction and expectations?</p>	<p>Figure: Eco performing routing inspections</p> <ul style="list-style-type: none"> <li>• The ECO at times conduct aspect audits (e.g. stockpiling) and audit [verify] the clearance of findings. This is done approximately twice a year (Marrel, 2012).</li> <li>• According to DEAT <i>Environmental Authorisation (Reference # 12/12/20/1079 of DEAT)</i> “The ECO must submit a quarterly environmental compliance report, in writing, to the Director: Environmental Impact Evaluation and copy the Applicant with such report. This report shall include a description of all activities on site, problems identified, transgressions noted and remedial action implemented.”</li> <li>• According to the EMP (Eskom, 2012b: 16) “The ECO will ensure that periodic environmental performance audits are undertaken on the project implementation.”</li> <li>• According to Eskom (2010: 8-9) the ECO will “Assist the Environmental Manager in undertaking regular environmental performance audits.” Moreover, An Environmental Audit Team shall undertake bi-annual compliance audits on Package Areas. This team shall consist of a certified lead auditor, the Senior Package Manager, the Medupi Environmental manager, the dedicated Environmental Officer and the ECO.”</li> </ul>	<p>✓</p>

	<p>KPI 3B.3: ... was the verifier involved with formal (systematic and objective) external conformance assessments (external audits)?</p>	<ul style="list-style-type: none"> <li>• There are external legal compliance audits and 3<sup>rd</sup> party external EMS performance audits done. These are in fulfilment of the ISO 14001: 2004 requirements (Marrel, 2012).</li> <li>• Compliance audits are required bi-annually as per ROD &amp; EMP. The audit is done by 3rd party auditors: EIMS. The ECO role is only to provide information on compliance as request and do not arrange the audit (Marrel, 2012).</li> <li>• According to the EMP (Eskom, 2012b: 16-17) the ECO will “Compile progress reports on a regular basis, with input from the Site Director, for submission to the Project Director, including a final post-construction audit carried out by an independent auditor/consultant.”</li> </ul>	<p>1/2</p>
	<p>KPI 3B.4: ... was the verifier involved with the ad hoc verification and evaluation of policies, plans, programmes, operational procedures, reports and the subsequent implementation of mitigation measures?</p>	<ul style="list-style-type: none"> <li>• The ECO is involved with the update and review of the EMP (Marrel, 2012).</li> <li>• The ECO verify the monitoring reports submitted by EO (Marrel, 2012). According to Eskom (2010: 9) “The Environmental Officer shall track the performance of the Contractors in achieving the targets of their action plans. Deviation from the action plans shall be raised during the Environmental Officer meetings for clarification and rectification. These shall also be reported to the Environmental Manager and the ECO who shall in turn inform the Package Manager and Senior Package Manager of these deviations.”</li> <li>• The ECO review remedial actions/plans and sent a sign-off letter for acceptance (Marrel, 2012).</li> <li>• ECOs also review and comment on risk assessments as well as method statements (Pillay and Coop, 2002).</li> <li>• According to the EMC (2012) “The ECO’s reports on the implementation of the EMP will be monitored and reported on by the EMC” and the “ECO to present efficacy of actions to EMC”</li> <li>• In terms of the Medupi Coal-Fired Power Station in the Lephalale Area, Limpopo Province: Construction Phase EMP Method Statement means (Eskom, 2012b): “A written</li> </ul>	<p>✓</p>

		<p>submission by the Contractor to the Site Director / Engineer and ECO in response to Environmental Specifications or a request by the Client, setting out the construction equipment, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Site Director when requesting the Environmental Method Statement, in such detail that the Site Director / ECO is enabled to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications."</p> <ul style="list-style-type: none"> <li>• According to Eskom (2010: 10) "Should the relevant Principal Contractor still fail to correct any non-compliance, it will be elevated through the ECO to the EMC (See consequences of non-compliance for further details).</li> </ul>	
<p>3C. [Check]: Controlling records.</p>	<p><b>Objective 3C: Participate in the control of records.</b> <b>Judgement on worth:</b> Sufficient evidence was found that the ECO function at Medupi controlled relevant environmental records.</p>		
	<p>KPI 3C: ... was there sufficient evidence available to indicate that the verifier controlled records to ensure information remains accessible?</p>	<ul style="list-style-type: none"> <li>• According to DEAT Environmental Authorisation (Reference # 12/12/20/1079 of DEAT) "The ECO must continuously monitor compliance with the conditions of this authorization and the requirements of the approved EMP and keep record of such monitoring."</li> <li>• The ECO shall maintain the following on site: Copies of all reports submitted to the Department and a complaints register of all public complaints and the remedies applied to such complaints (DEAT Environmental Authorisation (Reference # 12/12/20/1079 of DEAT).</li> </ul>	✓
<p>4. [Act]: Management and enforcement</p>	<p><b>Objective 4: Participate in management and enforcement.</b> <i>(E.g. ensuring accountability; making decisions; maintaining decision-making flexibility; employing the modes of environmental management best suited ; promoting adaptive management; and resolving disputes through conflict management)</i></p> <p><b>Judgement on worth:</b> The evidence obtained from the Medupi case study suggests that the ECO did not have a management and enforcement function. Although the EMP requires the ECO to take appropriate action if the specifications contained in the EMP are not followed, it was found that the ECO function had a supporting role in management and enforcement and only recommended and advised on actions for ceasing, containing and eliminating sources</p>		

	<p>of pollution. One example was given where the ECO motivated for a 2 hour “stand down” where all contractors were required to clean their areas of responsibility. It was also found that some contractors may be answerable to the ECO through method statements. Interviewees (Nair and Marrel, 2012) also confirmed that the ECO had no authority (no one was answerable to ECO.) on site and did not manage directly but indirectly through influence. Furthermore, no evidence was found that the ECO made or approved any decisions (although approval of method statements is evident). It was also found that the ECO function at Medupi participated in adaptive management by: reviewing remedial actions/plans; by updating and reviewing of the EM; and by sending sign-off letter for acceptance. Evidence was, however, found that the ECO participate in conflict management and resolving of environmentally related disputes.</p>		
	<p>KPI 4.1: ... did the verifier have the authority to: cease, modify or control any act, activity or process causing [or that may cause] the pollution or degradation; containing, preventing the movement of pollutants or the causing of degradation; eliminate the source of the pollution or degradation; and or remedy the effects of the pollution or degradation?</p>	<ul style="list-style-type: none"> <li>• According to the EMP (Eskom, 2012b: 16-17) the ECO will “Take appropriate action if the specifications contained in the EMP are not followed.”</li> <li>• “We’ve [as Murray and Roberts] had certain operations being shut down [see illegal dumping discussion below]. We’ve had some issues with waste management where we were in serious trouble (Paul, 2012: interview #012).</li> <li>• The ECO forms part of the Environmental Liaison Committee at Medupi [sub-committee] and had thus a support role of finding solutions at Medupi (refer to Annexure B). Sub-committees are responsible for, developing and proposing solutions; guiding and supporting their implementation and, for ensuring continuous improvement of SHE programmes, standards, rules and procedures (Eskom, 2012: 8-10).</li> <li>• The ECO assure (not ensure) avoidance, minimisation but only by for example reviewing remedial plans (Marrel, 2012).</li> <li>• I.t.o sections 28 of NEMA, certain activities may be stopped in emergency situations. On other issues the ECO may only recommend to the project manager and may request to stop the activities. Only the project manager as the contract holder may stop activities. Moreover, the ECO only informs on pollution, but not physical activity related to pollution and only advises on how to eliminate the source of pollution. Also, the ECO does not remedy effects of pollution as it is the contractor’s responsibility (Marrel, 2012).</li> <li>• The Project Team’s and the Contractor’s Environmental Officers join the ECO inspections in order to act immediately on deviations from Performance</li> </ul>	<p style="text-align: center;">x</p>

		<p><b>Specifications.</b></p> <ul style="list-style-type: none"> <li>• All other principles of NEMA are applicable, but the ECO s needs to understand principles of NEMA (Marrel, 2012).</li> <li>• An interesting example of the ECOs having influence in ceasing, containing and eliminating sources of pollution was the arrangement of a 2 hour “stand down” where construction was stopped and all contractors and employees were required to clean their areas of responsibility.</li> </ul>	
	<p>KPI 4.2: ... did the verifier have authority to police or enforce follow-up activities and may hold the Proponent, Implementing Agent and Contractors responsible, accountable, liable and answerable to non-compliances?</p>	<ul style="list-style-type: none"> <li>• According to Marrel (2012: interview #10): “The idea is to get people to police themselves. There are various mechanisms to use to ensure control of the environment on a site like this. You go to resort to all these alternative measure before using the punitive measures] as they will be clamping up and prevent them [Contractors &amp; employees] from providing the information as they worry about getting in trouble. Now the ECO’s work is not getting people in trouble, it is to improve their performance.” In all my experience, I’ve seen that punitive measures do not work that well, particularly on a site like this. Small fines such as R500.00 or a R1000.00 will not deter a Contractor with a contract of Four Billion Rand and they are not stupid, they’ve probably built this into their budget. Thus we are not achieving anything on performance by using punitive systems. I know a couple of ECOs that LOOVE writing fines, I do not know if it is an ego thing. I’ve put a lot of thought in on this in the past and you have to ask yourself are we really achieving anything by giving a Contractor a fine? I think there should be a monetary fining system but then the Contractors should feel it and what we’ve seen at Medupi is that by stopping works, they really feel it. But that is really the last measure that should be taken.”</li> <li>• According to Nair (2012: interview #05): “The ECO has no authority on the project, they can make recommendations and when they make recommendations we have to take it very, very seriously. Remember, they have multiple reporting into the project and government. If we do not follow the recommendations then stakeholders can turn around and ask why did we not follow the</li> </ul>	<p>x</p>

		<p>recommendations? The authority sits with the project manager. It keeps both the ECO and the project clean in that the ECO can't make ridiculous recommendations and the project can't do ridiculous things."</p> <ul style="list-style-type: none"> <li>• The ECO do not manage directly but indirectly through influence and no one is answerable to ECO. The ECO has power to influence behaviour through accepting and implementing method statements (Marrel, 2012). The ECO forms part of the Environmental Liaison Committee at Medupi and had thus a support role of finding solutions at Medupi (refer to Annexure B).</li> <li>• According to Eskom (2010: 12) "Should non-compliance issues raised through any of the above mentioned audits and /or additional site inspections by MET or the ECO, the following steps will be pursued: <ul style="list-style-type: none"> <li>• <b>Escalation:</b> <ul style="list-style-type: none"> <li>• Initial notification to the Principal Contractor by the Package Manager requesting an action plan to rectify non-compliances or should the agreed/accepted target dates to rectify non-compliances not be met. This communication will be copied to the Senior Package Project Manager and the ECO.</li> <li>• Should there be no resolution within the specified time frame or agreed action plan or should the agreed/accepted target dates to rectify non-compliances not be met within seven (7) days of initial notification, a notification shall be issued to the Principal Contractor by the Senior Project Package Manager (the Package Area Manager mentioned above). This communication shall be copied to the Site Director and Delivery Manager and the ECO.</li> <li>• Should there be no resolution within the specified time frame or agreed action plan or should the agreed/accepted target dates to rectify non-compliances not be met within fourteen (14) days of initial notification, the Site Director will be notified to effect a resolution. This could be accompanied by any of the consequences stipulated in Section 5.2 of this procedure. This communication shall be copied</li> </ul> </li> </ul> </li> </ul>
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		<p style="background-color: #00FF00; display: inline-block; padding: 2px;">to the Project Manager, Project Director and ECO.</p> <ul style="list-style-type: none"> <li>• Should there be no resolution within the specified time frame or agreed action plan or should the agreed/accepted target dates to rectify non-compliances not be met within twenty one (21) days of initial notification, the Project Director/Project Manager will instruct the relevant Principal Contractor to address the non-compliance.</li> <li>• Should there be no resolution within the specified time frame or agreed action plan or should the agreed/accepted target dates to rectify non-compliances not be met within twenty eight (28) days of initial notification, the Project or EMC (should it convene before this time period lapses) will suspend all activities associated with the non-compliance. This suspension will only be lifted upon the recommendation of the EMC following presentations made to the EMC by the relevant Principal Contractor.</li> <li>• Note 5: Activities resulting in Legal Contraventions will be suspended immediately by the Package Manager upon the recommendation of the Environment Team or the ECO and elevated directly to the Medupi Project Manager and EMC. The relevant Principal Contractor will also be required to make a presentation to the EMC.</li> <li>• According to Minutes of Meeting (Eskom, 2011) "Illegal dumping: For any illegal dumping of stockpile material onsite, all contractors will be penalised for that dumping when discovered. Letters to be sent out to contractor's w.r.t above statement. Penalties must be applied to contractor not complying. There is provision for a fining system in the EMP, this is however, for small fines and is not really achieving anything in terms of Environmental Performance. We rather motivate to stop work (Marrel, 2012). According to Eskom (2010: 13):</li> </ul> <ul style="list-style-type: none"> <li>• <b>Consequences [of non-compliance]:</b></li> </ul>	
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		<ul style="list-style-type: none"> <li>• The possible consequences of non-compliance will depend on the severity of the non-compliance and the management action undertaken to rectify the non-compliance. These may include the following, either independently or in conjunction with any or all of the others:</li> <li>• Issuing of a fine in accordance with the EMP and the Medupi Power Station Project Rewards and Discipline Procedure.</li> <li>• Withholding of payment for failure to meet obligations in accordance with the terms of the contract</li> <li>• Presentation of non-compliance and rectification measures to the Project Manager and the EMC.</li> <li>• Breach of contract due to legal non-compliance resulting in termination of contract and recovery of costs related to non-compliance.</li> <li>• Exclusion from tendering for future contracts.</li> <li>• Governmental withdrawal of the environmental authorisation</li> <li>• Formal legal proceedings instituted by Government against the contractor for offences which could result in fines, custodial sentences or both.</li> <li>• The <b>EO must compile &amp; submit a report to Waste Control Officer on a monthly basis.</b> Moreover, principle contractors – should accept method statements and Environmental Officer is to an extent answerable through method statements. Thus; the ECO have power to influence behaviour (through abovementioned measures) (Marrel, 2012).</li> </ul>	
	KPI 4.3: ... was the verifier involved with making and/or approving decisions on matters that are deemed to be a variation, or not allowed for in the environmental Performance Specifications?	<ul style="list-style-type: none"> <li>• <b>ECO do NOT approve.</b> The ECO manage indirectly through influence (Marrel, 2012).</li> </ul>	x
	KPI 4.4: ... did the verifier encourage, specify or employ the use of alternative methods, or equipment if determined to be unsuitable for the task at hand, or unnecessarily detrimental to the environment?	<ul style="list-style-type: none"> <li>• ECOs <b>also review and comment on risk assessments as well as method statements.</b> ECOs also ask contractors to explain technical / product specific risks before use. <b>The</b></li> </ul>	1/2

		<p>ECO informs on pollution and advises on how to eliminate the source of pollution and makes mitigation suggestions (Pillay and Coop, 2002).</p> <ul style="list-style-type: none"> <li>The Environmental Manager (EM) report, however, ECO review remedial actions/plans and sent a sign-off letter for acceptance. ECO do NOT approve. ECO have documented responsibility – see EMP conditions (Marrel, 2012).</li> </ul>	
	KPI 4.5: ... was the verifier involved with dispute and complaint resolution?	<ul style="list-style-type: none"> <li>The ECO do keep copies (records) of complaints (Marrel, 2012). Complaints register was not available (evidence of further address?).</li> <li>EML (2012: interview #10): "In theory, when there is conflict, conflict resolution forms an important part of the ECO's role. You get the various parties to talk to each other to come up with mechanisms of managing their environments together"</li> </ul>	✓
<b>5. Community involvement, public participation, capacity building, and awareness</b>	<p><b>Objective 5: Participate in community involvement, public participation, capacity building and awareness.</b></p> <p><u>Judgement on worth:</u></p> <p>No evidence was found that the ECOs at Medupi were actively involved in public participation, capacity building and awareness of the public.</p>		
	KPI 5.1: ... was there sufficient evidence available to indicate that the verifier ensured/encouraged active engagement of stakeholders in decision-making processes?	<ul style="list-style-type: none"> <li>There is sufficient evidence that the ECO was actively involved in promoting public participation: <ul style="list-style-type: none"> <li>INFORMED on: ECO is informed, consulted and should accept HSE plan; Compile communications from/to I&amp;APs; Press/Media.</li> <li>RESPONSIBLE for: Receives complaints from I&amp;APs and provides information thereon; Interface with EMC.</li> <li>ACCOUNTABLE for: Receives complaints from I&amp;APs and provides information thereon; Interface with EMC;</li> <li>Need to be CONSULTED on: Press/media.</li> </ul> </li> </ul>	✓
	KPI 5.2: ... was there sufficient evidence available to indicate that the	<ul style="list-style-type: none"> <li>See above.</li> </ul>	✓

	verifier participated in awareness and capacity building campaigns, training courses and other activities to develop and sustain the interest of the community?		
<b>6. Integration with other programmes and/or information</b>	<p><b>Objective 6: Participate in the integration of EIA follow-up with other programs and/or information.</b></p> <p><b>Judgement on worth:</b></p> <p>Sufficient evidence was found that the ECO function at Medupi participated in the ISO 14001: 2004 EMS of the Project and the understanding of area-wide effects and issues.</p>		
	KPI 6.1: ... did the organization have an EMS and to what extent did the verifier participate in the monitoring and evaluation of the EMS?	<ul style="list-style-type: none"> <li>The construction site was certified at the end of 2011 (November). Not all contractors are part of the Scope of the EMS. Unfortunately the EMS representative resigned (Marrel was at the time of the site visit in the process of taking over this position) (Marrel, 2012).</li> <li>There is sufficient evidence that the ECO was actively involved in the implementation, operation, maintenance, review and improvement of an Environmental Management System. The ECO fulfilled the following role in the EMS system: <ul style="list-style-type: none"> <li>INFORMED on: ECO is informed, consulted and should accept HSE plan; Compile communications from/to I&amp;APs; Press/Media.</li> <li>RESPONSIBLE for: Receives complaints from I&amp;APs and provides information thereon; Interface with EMC.</li> <li>ACCOUNTABLE for: Receives complaints from I&amp;APs and provides information thereon; Interface with EMC;</li> <li>Need to be CONSULTED on: Press/media.</li> </ul> </li> </ul>	✓
	KPI 6.2: ... was evidence available to indicate that the verifier was involved with area-wide programmes?	<ul style="list-style-type: none"> <li>An important function of the ECO at Medupi is that the function extends beyond the scope of the project into the EMC, neighbouring community, as an independent party on environmental matters on a regional scale. Examples of these are: <ul style="list-style-type: none"> <li>The relocation of a colony of Golden Spiders on property of Exxarro Mining Company during the site visit.</li> <li>The contract review of waste service providers for the</li> </ul> </li> </ul>	✓

		<p>Local Municipality.</p> <ul style="list-style-type: none"><li>• Waste site auditing of waste service providers.</li><li>• Informing the project managers of illegal sand mining operations that supply the project of sand.</li></ul>	
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## 2.6 Critical ingredients for ECO success

***What do you consider to be the critical ingredients for a recipe of success for an ECO (to fulfil their role, add value but also to remain independent)?***

- ECO roles/etc. to standardise.
- How to make it better: different RODs requirements should be standardised.
- Not all authorisations need ECOs, but rather an “environmental resource”.
- Transparency is needed - ensures that project runs per project spec.
- Fairness is needed (impartial – Judges Hat).
- Assertive.
- Communication.
- Clarity of roles & responsibility.
- Broad range and skills / experience as project ECO is absolute critical.
- The project will try to limit the scope of an ECO as small as possible, whereas the ECO have to make it as wide as possible.
- “There should be a fund available where the Department of Environmental Affairs appoints the Independent ECO. It should be funded through taxes that is paid by the developer who pays a “development tax” and have no choice and they got to take the ECO”.

## 2.7 Additional discussions

- According to Nair (2012: interview #05): “The ECO is an independent party and we take independence very, very seriously”.
- The appointment of a Waste Control Officer.
- Changing EMP/ROD requirements: ECO extremely important in – should with EM team drive changes and updates.
- Inspections vs. Audits: contractors are audited to death, thus ECO’s should rather have an inspection approach. Currently DQS trained: Lizl Koekemoer; Ilse Coop and Thesen Pillay to train.

- Non-conformance process – a) letter of concern; b) NCR, c) action plans & follow-up inspections; d) letter from EMC (non-conformance) stop order; e) total shut down.
- Definition of ECO: The scope of works explains/determines role.
- Fining system (enforcement): in EMP provision is made; small fines; not achieving anything to environmental performance; rather stop works; must be provision however. This is part of control scales: Negative re-enforcement of 5% (fining/punishment/stopping work) that breaks law vs. 70%, want the 5% to be caught; vs 25% (NCR/monthly reports) always compliant through positive enforcement.
- There are EMP requirements that monitor the Occupational Health and Safety Act (refer to Paul, 2012 interview of linking environmental management with Health and Safety and where environmental management is learning from Health & Safety.)
- On accelerating work: this brings hundreds even thousands of people onto a construction site additional to the planes work force. “I would love to hear what the ECO has to say about that and if any of the environmental management people were consulted on this” (Paul, 2012: interview #012).

**Box 1: The independence conflict of interest at Medupi**

Refer to Wessels (2013: 174) “The Lead ECO [with the role of independent monitoring, verification and reporting of compliance of authorisation conditions] at the Medupi coal-fired power station case study was approached by the proponent (Eskom as the client) with an offer of employment in the position of Environmental Manager (EM) [with the role of implementing environmental conditions and management systems]. After initial rejection of the offer by both the ECO and the service provider (NCC) who sub-contracts the ECO position, the EM position was eventually filled by the ECO; who were at the time of the appointment still sub-contracted by NCC. The DEA, however, expressed the opinion in a letter that a potential for a conflict of interest exists regarding this arrangement and that Eskom needs to consider different arrangements. The DEA opinion may have stemmed from the South African EIA Regulations (37(2)(b)) of the National Environmental Management Act (107 of 1998) (the NEMA) which allows for the conditions of an environmental authorisation to: “...require the holder of the authorisation to furnish the competent authority with reports prepared by the holder of the authorisation or a person who is independent, at specified times or intervals- (i) indicating the extent to which the conditions of the authorisation are or are not being complied with; ...” (SA, 2010: 10). Moreover, the EIA Regulations require “that there are no circumstances that may compromise the objectivity of that person in performing such work”. The perceived conflict of interest, potential compromise of independence and the different opinions between the parties involved (Eskom- proponent; NCC- environmental verification and

implementation service provider; and the DEA- regulatory authority) resulted in the EM resigning from NCC and being employed by Eskom directly. This resolved the conflict of interest concerns expressed by the DEA (Marrel, 2012b). If the independence of the verifiers in this EIA follow-up case was identified as an issue in the early phases of the EIA process, the parties involved could have made adequate provisions to ensure that independence were maintained and that a conflict of interest was avoided.

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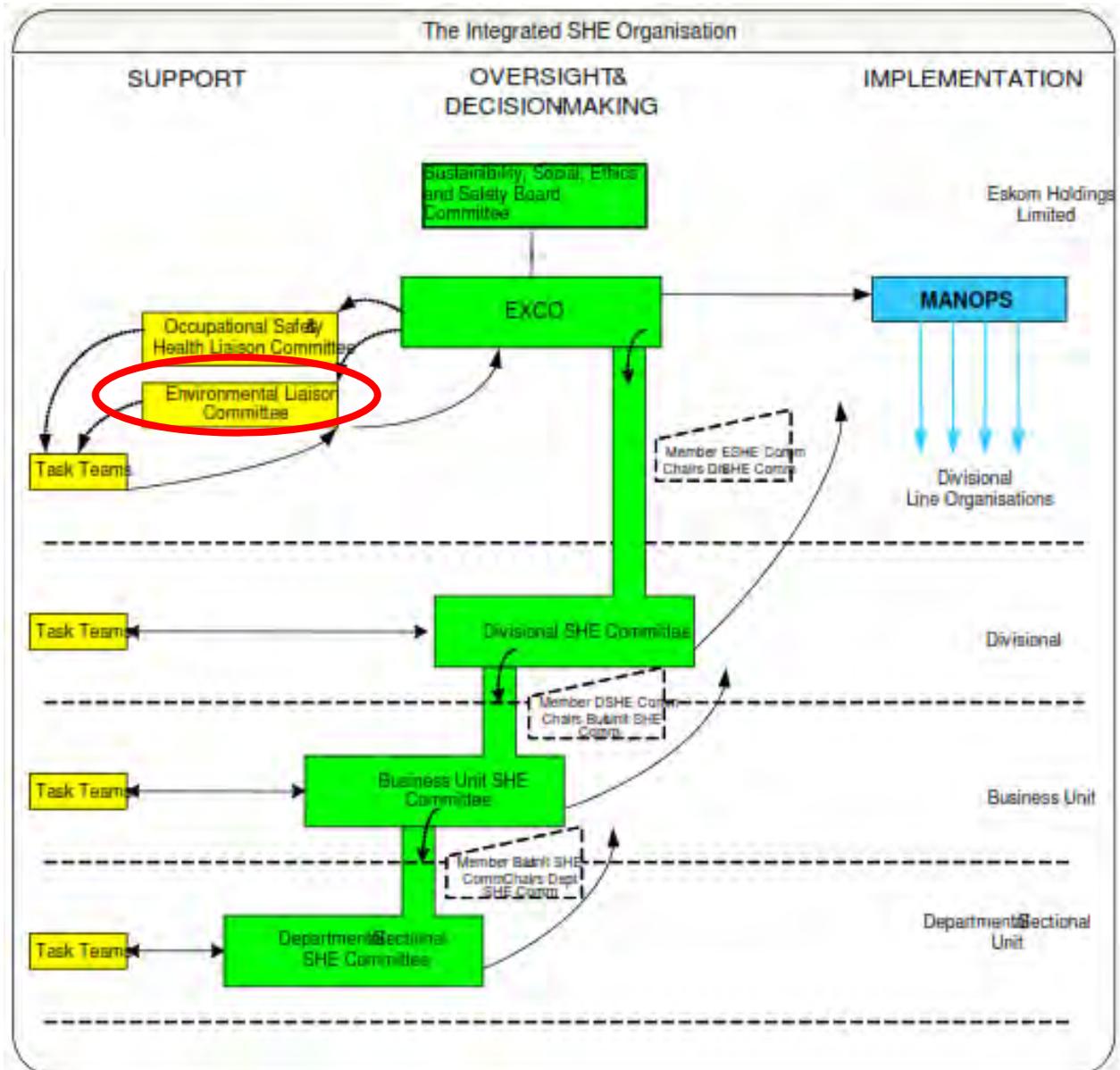
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# Annexure A: Detailed map of Medupi Power Plant indicating detailed extent of infrastructure



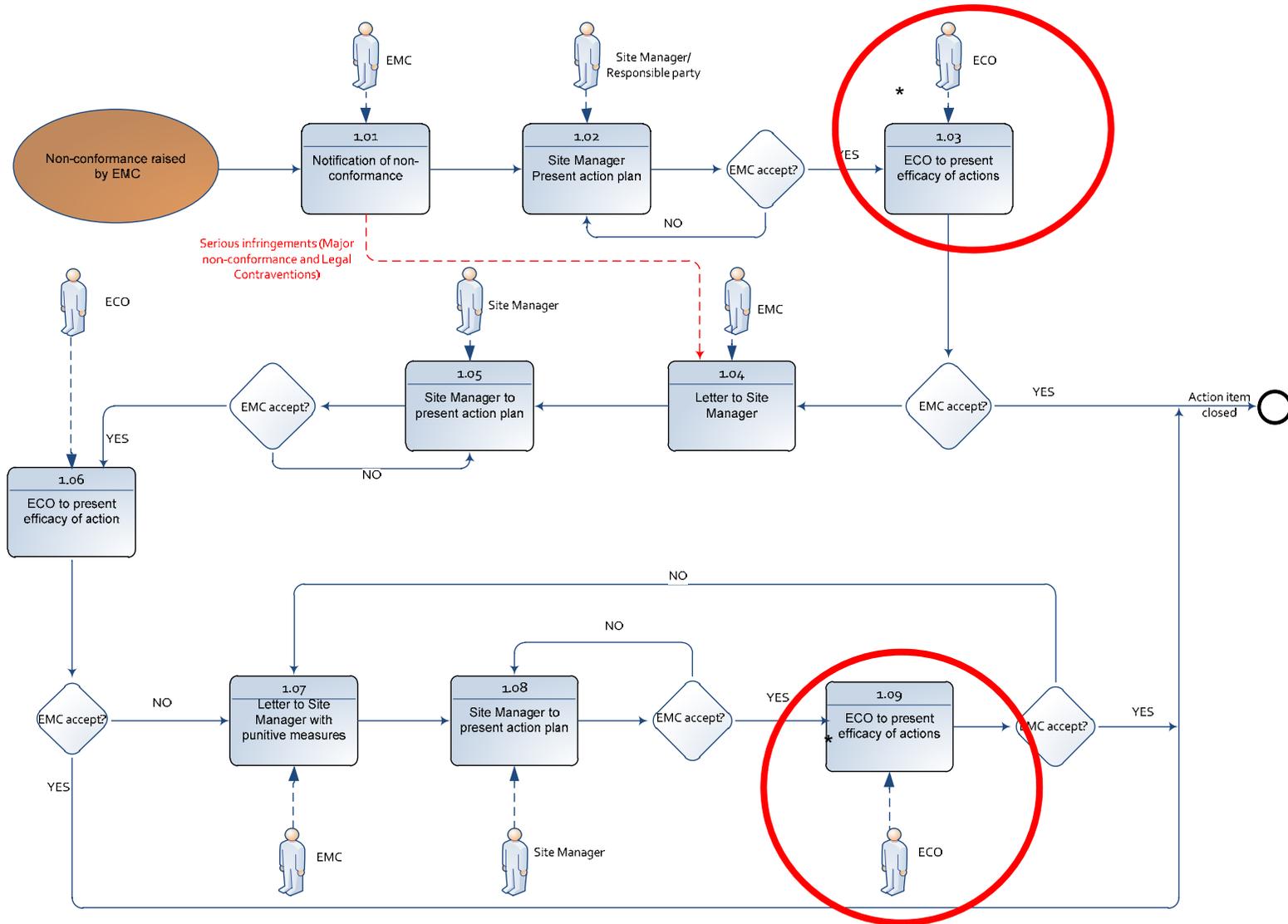
## Annexure B: The Three Principle Activities for ensuring effective Eskom SHE organization



(Source: Eskom. 2012a)

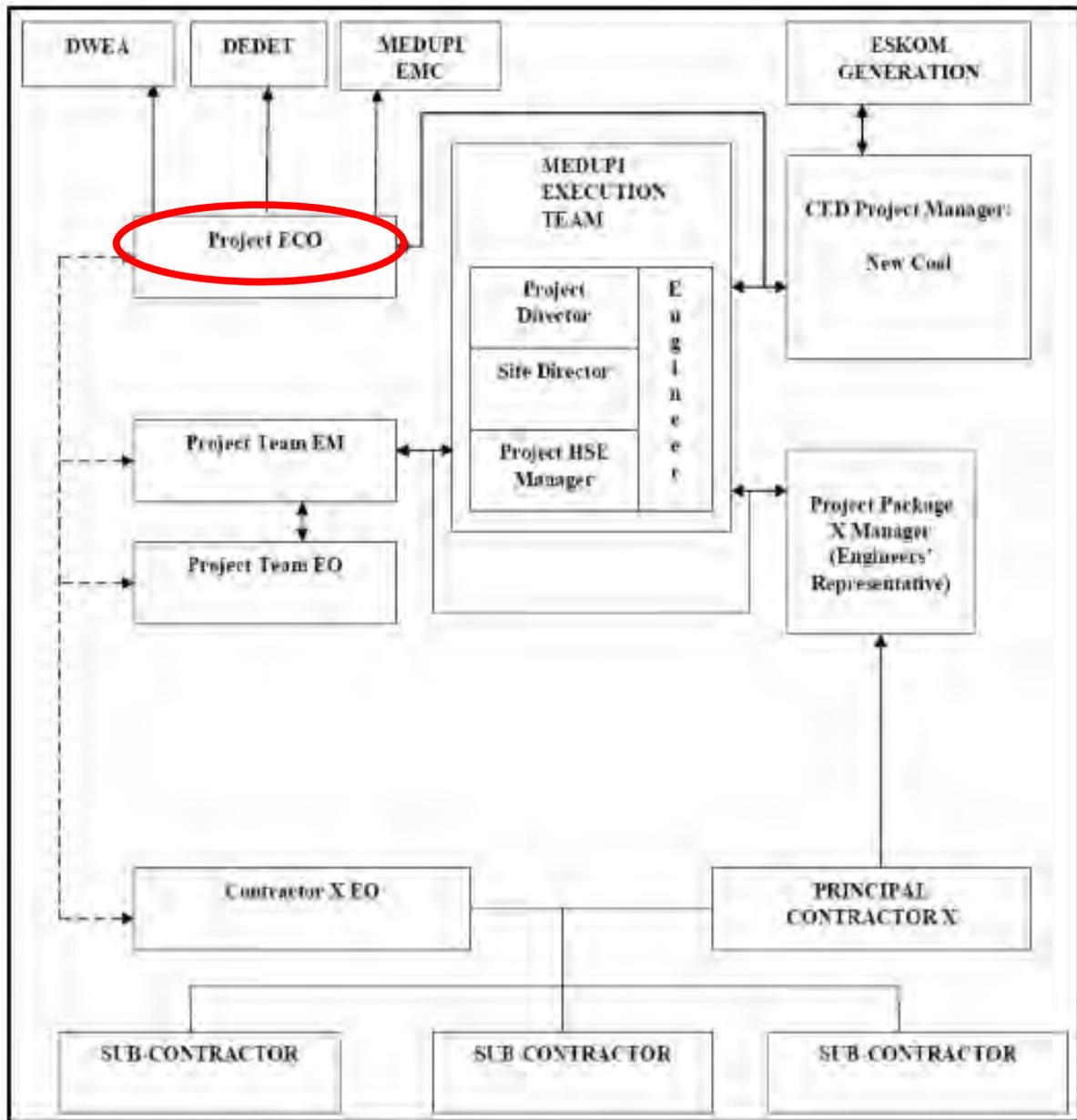
\*The ECO forms part of the Environmental Liaison Committee at Medupi. Thus according to this figure have a support role of finding solutions.

## Annexure C: The Role of the ECO in Non-Conformities raised



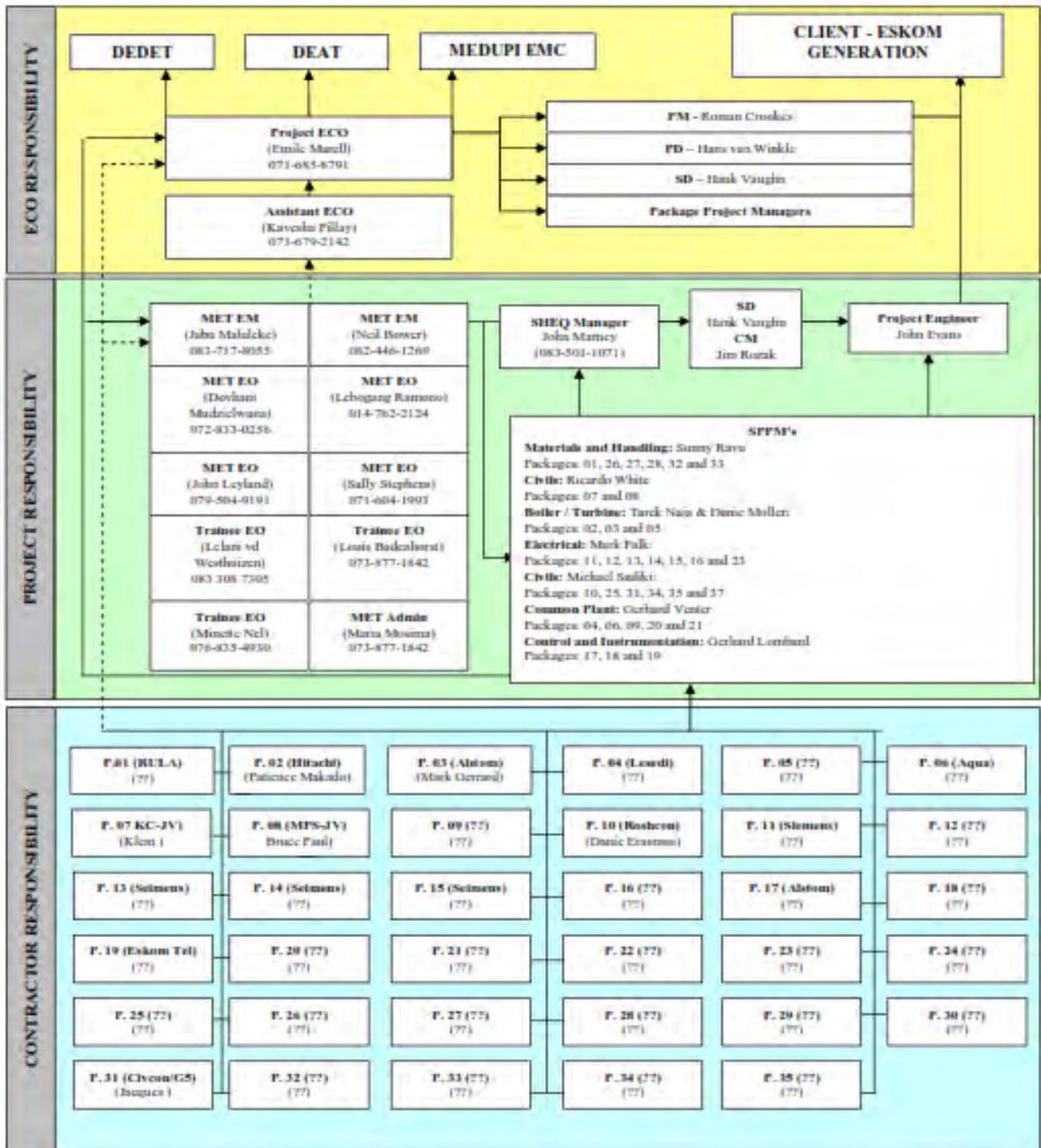
(Source: EMC, Undated)

## Annexure D: Functions and Responsibilities for the Construction Phase



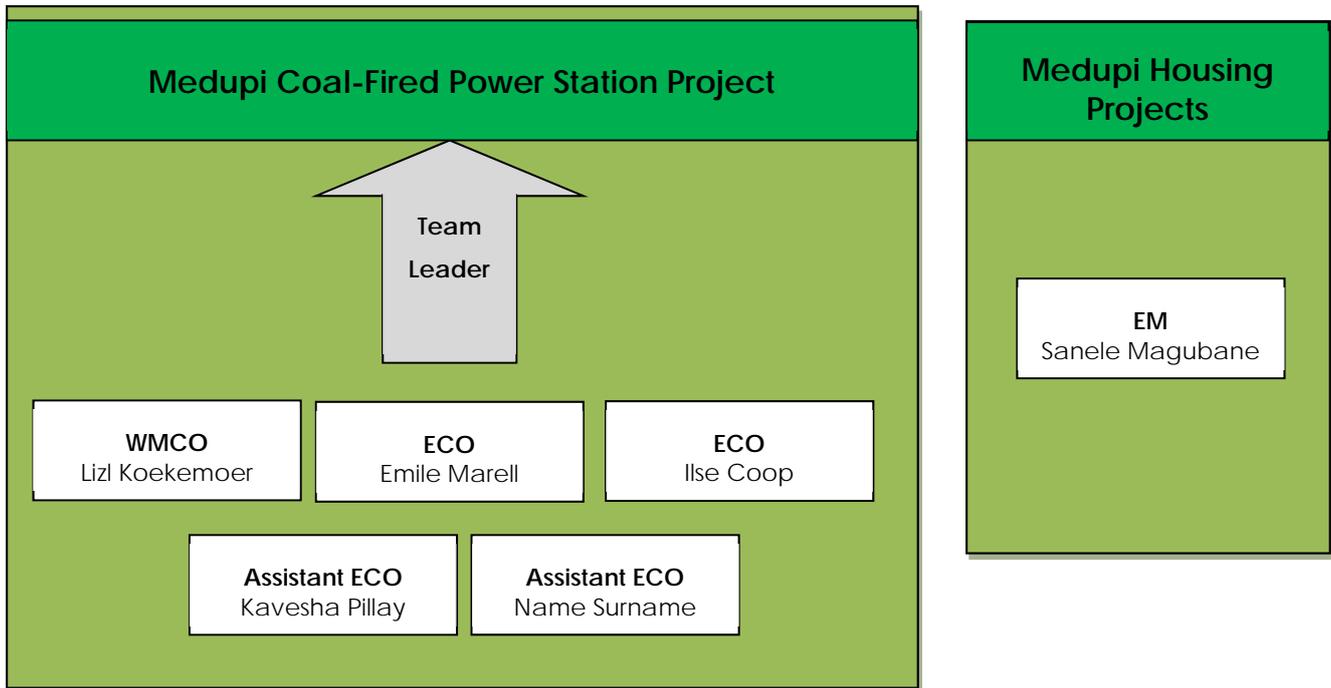
(Source: Eskom. 2012b)

# Annexure E: Environmental Correspondence and line communication management



(Source: Eskom. 2012a)

## Annexure F: NCC Team structure at Medupi



(Source: NCC 2010)

## Annexure G: Schedule of the data collection activities

Day 1: 7 March 2012

Time	01:00	01:00	01:00	01:00	01:00	01:30	01:00	01:00	00:00
Time-frame	8:00 - 9:00	9:00 - 9:30	9:30 - 11:00	11:00 - 12:30	12:00	01:00 - 14:30	14:30 - 15:30	15:30 - 16:30	16:30
Persons	Jan-Albert & Emile Marrel	Jan-Albert & Emile	Jan-Albert & Emile	Jan-Albert & Emile	Lunch	Jan-Albert & Emile or ECO	Jan-Albert & Emile	Jan-Albert	Jan-Albert
Action	Site orientation & planning	Site induction	ECO Interview part 1	ECO Interview part 2		Accompanying inspection	Document verification	Data analysis	Leave site
Place	ECO office	Boardroom	ECO office	ECO office		Construction	ECO office	ECO office	

Day 2: 8 March 2012

Time	01:00	01:00	01:00	01:00	01:00	01:30	01:00	01:00	00:00
Time-frame	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00	01:00 - 14:30	14:30 - 15:30	15:30 - 16:30	16:30
Persons	Jan-Albert & Emile /	Jan-Albert & new ECO / EM	Jan-Albert & new ECO / EM	Jan-Albert & new ECO / EM	Lunch	Jan-Albert & ECO	Jan-Albert & Emile	Jan-Albert	Jan-Albert
Action	Site inspection	Site inspection	Site inspection	Interview WCO (L Koekemoer)		Interview – Grp assurance	Document verification	Data analysis	Leave site
Place	Medupi surrounds	Medupi surrounds	Medupi surrounds	ECO office		ECO office	ECO office	ECO office	

Day 2: 9 March 2012

Time	01:00	01:00	01:00	01:00	01:00
Time-frame	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00
Persons	Jan-Albert & Emile / ECO	Jan-Albert & EM: Grp 5	Jan-Albert & ECO	Jan-Albert & ECO	Farewell
Action	Recap previous day	Interview	Data analysis	Obtain any outstanding	Leave
Place	ECO office	Office	?????	?????	???

**ANNEXURE J: INGULA CASE STUDY ANALYSIS REPORT**

## ECO CASE STUDY RESEARCH ANALYSIS 2: ESKOM – Ingula Pump Power Scheme Construction

**Final Revision 22**

*16 September 2013 to 4 March 2014*



*Prepared by: Jan-Albert Wessels – PhD candidate at the North-West University, Potchefstroom*

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## EXECUTIVE SUMMARY

The Eskom Ingula Pumped Storage Scheme (PSS) for electricity generation's feasibility investigations started in the 1980's and was, at the time of the study, being built at a cost of R27 billion. The PSS is scheduled to come into operation in 2014. The project was one of the earlier projects in South Africa where the ECO function was initiated. The site has many environmental authorisations, including mining-related authorisations. One full-time ECO, appointed by Eskom, is involved in the project. As per contractual agreement, the ECO is required to be on-site on a permanent basis until the completion of the project's construction phase. Although there is no condition that requires the ECO to be independent, independence became an essential internal Eskom arrangement as Eskom, together with the I&APs, requires independence for assurance reasons (Campbell & Rhode, 2012).

The following conclusions may be drawn from the evidence sourced on the worth of the ECO, based on the six KPAs:

- I) OUTPUT COMPONENT: PRIOR TO PROPOSAL IMPLEMENTATION [PROJECT PLANNING AND DESIGN PHASE].
  - **In terms of [Planning]** generating data, knowledge and a sustainable outcome for a project, evidence was found that the ECO at Ingula was involved in the screening phase of projects related to the main project. However, no evidence was found that the ECO was involved in scoping, detailed assessments and the compilation of EMPs for new projects. Evidence was found, however, of ECO being involved in the review of the project's EMP.
- II) OUTPUT COMPONENT: POST-PROPOSAL IMPLEMENTATION [PRE-CONSTRUCTION AND CONSTRUCTION PHASE].
  - **With regard to [Doing] implementation** (refer to sections A: Pre-construction preparation for implementation; B: Implementing and informing decision-making; and C) Reporting and communication and related subsections of the evaluation matrix below):
    - 2A) No evidence was found that the ECO at Ingula was involved in the handover from the planning to the implementation phase or the identification, defining and allocation of roles and responsibilities, and/or resources required for

implementation, control, monitoring and evaluation, auditing, and reporting of environmental specifications;

- 2B) Sufficient evidence was found that the ECO at Ingula was involved in the implementation of performance specifications. It was found that, to a large extent, the ECO did fulfil the defined and discharged roles and responsibilities until the completion of the ECO service. Moreover, evidence was found of the ECO promoting the use of sustainable processes and technologies, by advising the occupier of the construction site on what needs to be done in terms of remedial measures. Evidence was also found that the ECO, in the capacity of a member of ENCORD, did indeed respond to environmental emergency situations. As with the Medupi case, overwhelming evidence was found of the ECO at Ingula influencing decisions and maintaining decision-making flexibility by giving advice, making recommendations, and reviewing and accepting environmental method statements. It was also found that the ECO played an important role in the review, update and drafting of various environmental plans, procedures and programmes of Ingula. Sufficient evidence was also found of the ECO being involved in informing and educating employees about environmental risks, by conducting a Training needs Analysis (TNA); by creating the Induction and Toolbox Talk training packages. The ECO was also involved with creating the educational posters and by joining training sessions at times to verify the adequacy of training (e.g. induction training of Chinese contractors on the proper use of toilets);
- 2C) Numerous sources of evidence indicated that the ECO at Ingula was actively involved in providing continuous feedback from EIA follow-up programmes to the proponent, regulator, and the community. However, as with the Medupi case, no evidence was found that the ECO contributed to formal periodic feedback for internal EIA process improvement. The ECO did however; contribute in providing formal periodic feedback for external EIA process improvement by means of formal lectures at the North-West University, Potchefstroom campus. Moreover, sufficient evidence was found that the ECO contributed to openness and access to information for transparent communication.
- **In terms of [Checking]** (see evaluation matrix sections A: Monitoring and measurement of and B: Evaluation of legal compliance (performance) and related subsections below):
- 3A) No evidence was found of the ECO conducting any monitoring of environmental parameters or effects. Moreover, it was found that no risk assessments were done by the ECO. The ECO viewed this as a specialist

task. However, the ECO did indicate that he did some assessment on the EMP for potential impacts but did not use a quantitative approach.

- 3B) Sufficient evidence was found to confirm that the ECO of Ingula participated in monitoring compliance; conducting internal compliance assessments; providing information in support of external compliance assessment. It was also found that the ECO, on an ad hoc basis, did verify and evaluate the Environmental Officers' monitoring reports. The ECO also reviewed and verified the quarterly audit reports of the external auditors and verified actions for successful remediation. However, evidence suggested that the drafters of the EMP did not understand the difference between inspections and audits.
- 3C) Sufficient evidence was found that the ECO at Ingula controlled relevant environmental records.
- **In relation to [Acting] Management and Enforcement**, the evidence obtained suggests that the ECO did not have a management and enforcement function. It was found that the ECO function rather had a supporting role in management and enforcement, an advisory role with no authority to stop work (except in extreme emergency situations), and/or a responsibility role in terms of ceasing, containing or eliminating sources of pollution. The ECO only had an advisory role on the matters mentioned. The management responsibility was situated with Eskom's Environmental Management Team and Contractor's EOs. However, the ECO had an approval function in relation to certain procedures (refer to Annexure C) but in principle approvals related to environmental decisions were obtained from the Environmental Manager. It was also found that the ECO of Ingula participated in adaptive management, by issuing non-compliance warnings where necessary, by recommending appropriate action to the supervisor; and by updating and reviewing the EMP. Evidence was also found that the ECO played an integral part in tracking conflict management and the resolving of disputes. The actions for clearing these grievances were, however, the client's and contractor's responsibility.
  - Sufficient evidence was found which prove that the ECO of Ingula was actively involved in public participation, capacity building and public awareness.
  - Sufficient evidence was found that the ECO at Ingula participated in the implementation, operation, maintenance, review and improvement of the ISO 14001: 2004 EMS of the project in the capacity of a member of ENCORD, and the understanding of area-wide effects and issues as an active member of the Ingula Advisory Committee, Conservation (IACC).

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The following colour codes were used in section 1 of the report to assist in the analysis of the interviews and documents consulted:

Colour code	Information sourced that indicates: <b>Value added</b> / <b>Partial value added</b> / <b>No value added.</b>
	Information sourced with particular reference to case.

## **1. AN OVERVIEW OF THE ECO CASE STUDY**

### **1.1 Project type**

Construction of a Pumped Storage Scheme (PSS) for electricity generation.

### **1.2 Project description and environmental authorisation background**

Eskom initiated a search for appropriate sites for a Pumped Storage Scheme in the 1980's. More than 90 possible sites were investigated; resulting in a short listing of three sites, where after the Ingula site was selected for the PSS project. The project, when complete, will consist of an upper (Bedford) and lower dam (Braamhoek). The dams which are 4.6 kilometres apart are connected by underground waterways, passing through an underground powerhouse which will contain four pump turbines, each with a capacity to produce 333MW (SSI Environmental. 2012). To generate electricity during times of peak demand, water will be released from the upper dam and pass through the pump/turbines into the lower dam. During times of low energy demand, the pump/turbines will be used to pump the water from the lower dam back to the upper dam (Eskom, 2010: 1).

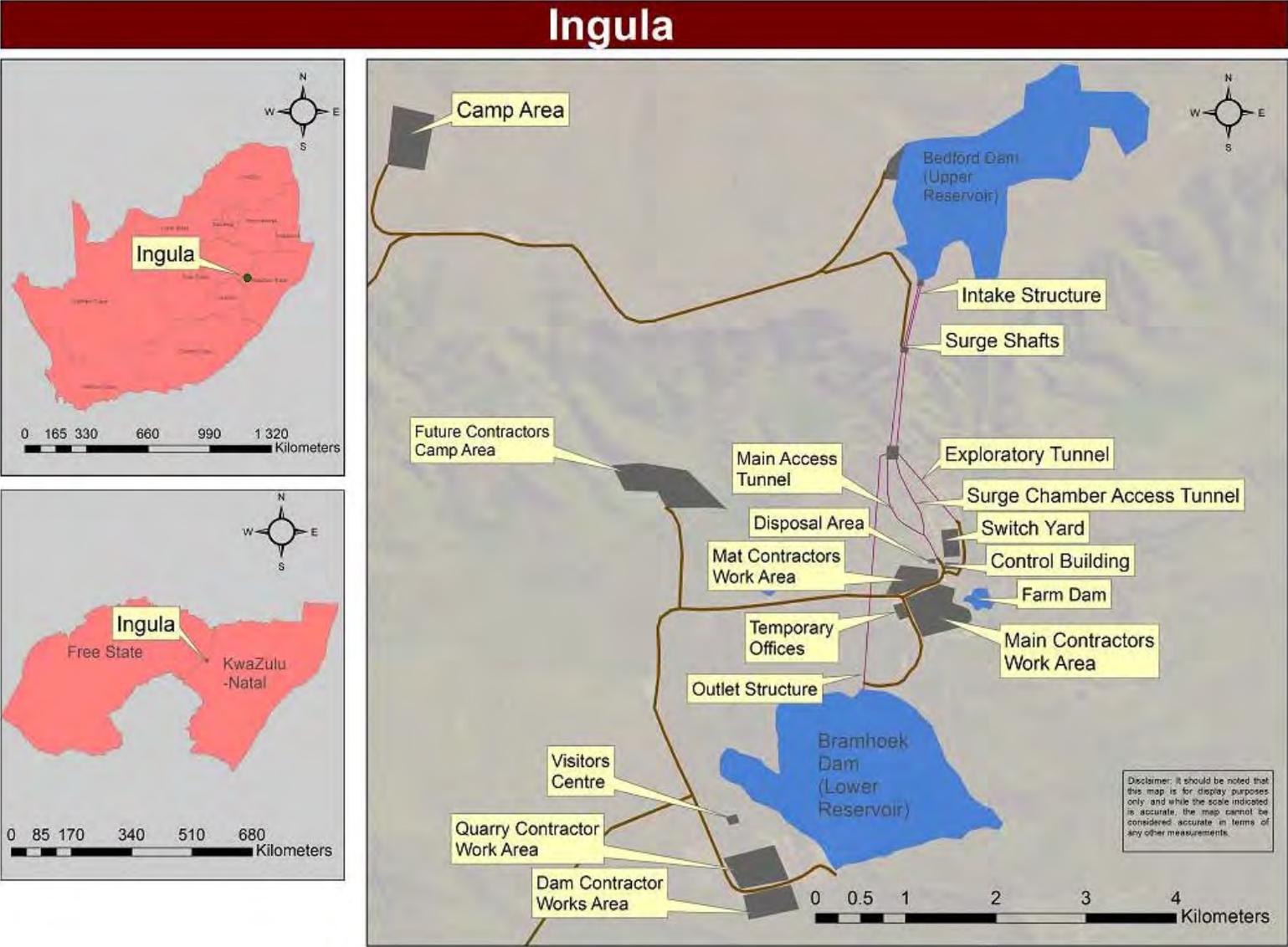
The Environmental Impact Assessment (EIA) for the IPSS commenced in early 1998, resulting in the Minister of Environmental Affairs and Tourism authorising the scheme in December 2002. In terms of the Record of Decision (ROD), condition 6.2.3 required that Eskom “purchase the farms Wilge Rivier 319, Bedford 389 and Chatsworth 388 as per recommendation in the specialist report (revision 6 of October 2002, drafted for Eskom by Dr Mike Mentis, pg 44) for conservation purposes. This area will then be known as the Bedford Wetland Park (BWP). This area shall be managed by Eskom in close cooperation with the relevant provincial departments.” (Eskom Generation – Ingula, 2009). Moreover, Eskom has taken a decision to manage the area surrounding the dams and construction sites as a conservation area. This area, located in both the Free State and KwaZulu-Natal, is of significant value as a source of water for the highveld and serves as a habitat for a variety of plants, birds and animals. A team of full time, professional environmentalists monitor all activities on site, ensuring all legal requirements are met and that the project operates within the terms of the government authorization (Eskom, 2010: 2). The site aims to be an internationally renowned

sustainable conservation area and all activities on site are carried out with this long-term objective in mind (Eskom, 2010: 3).

### **1.3 Site location and scale**

The Ingula site is situated 55 kilometres from Ladysmith and straddling the provincial boundary between the Free State and Kwazulu-Natal provinces. Refer to map below.

Figure 1: Map: Case study location and infrastructure



## **1.4 Key role players in environmental management and governance**

- **Regulator/competent authority:**
  - National Department of Environmental Affairs
- **The Applicant/proponent/client/permit holder:**
  - Eskom Holdings Limited
- **Environmental consultant / Environmental Assessment Practitioner (EAP):**
  - Various EAPs for the different authorisation applications. The main EAP was Poltech.
- **The Implementing Agent & Environmental Manager:**
  - Eskom Generations
- **The Environmental Control Officer services:**
  - NCC
- **Independent Environmental Auditor (EA):**
  - EIMS appointed by Eskom, scope of audit is Legal ROD & EMP
- **Internal auditor(s)**

## **1.5 Environmental authorisations and related ECO requirements**

### **1.5.1 Relevant environmental authorisations**

- Braamhoek Pumped Storage Scheme RoD (A24/16/3/124) -13/12/2002;
- Ingula Telecommunication Mast RoD, KwaZulu-Natal Province - 12/12/20/1089: 24/06/2008
- Ingula Bridge Construction ROD, Braamhoekspruit River Downstream - 12/12/20/1266: 02/01/2009;
- Internal and External Access Roads RoD, Braamhoek Pumped Storage Scheme - 12/12/20/671; and

- Ingula Pumped Storage Scheme Construction Environmental Management Plan (Revision 5) -09/2008.
- Mining Right (EMPr).

### **1.5.2 Authorisation requirements for EIA follow-up**

Condition 6.1.5 and 6.2.9 of the main RoD issued by the Department of Environmental Affairs (DEA), Reference nr A24/16/3/12 states “The applicant (Eskom) must carry out regular environmental audits to establish compliance with the authorisation conditions and submit audit report to the DEA.” It is due to this condition that Eskom Holdings have decided to appoint independent auditors to report on compliance to the various RoDs and CEMPs, on a quarterly (every 3 months) basis (SSI Environmental. 2012). The required auditing and compliance monitoring process is essential in determining the effectiveness of overall on-site environmental management and performance of the project as it relates to the conditions of the RoDs and CEMP.

### **1.5.3 Contractual, Environmental Authorisation and EMP roles and responsibilities requirements for the ECO**

One full-time ECO is involved on the project (NCC as the ECO service provider and appointed by Eskom). The ECO is per contractual agreement required to be on-site on a permanent basis until the completion of the project’s construction.

*The following ECO related Roles and Responsibilities are specified in the CEMP (2012) and ESKOM, 2012 -4.4.1 Resources & Roles: Extract from the Ingula Project Construction Environmental Management Plan, in support of 4.4.1:*

- **Environmental Control Officer:**
  - Conduct daily inspections to determine compliance with RoD and CEMP, using checklists.
  - Submit weekly audit report to Supervisor.
  - Ensure contractors and workers have the RoD and CEMP and are familiar with the requirements.
  - Advise site personnel on all environmental issues.
  - Maintain records of incidents and corrective action.
  - Manage and maintain a complaints register.

- Issue non-compliance warnings where necessary and recommend appropriate action to the supervisor.
- Inform Eskom if any additional licenses/authorizations are required, prior to activity.
- Provide any information required for external auditing.
- Report to Eskom any problems that cannot be solved by the Supervisor.
- **In addition, the ECO role at Ingula Project has been improved to include: -**
  - Assist with review of Method Statements submitted by contractors in support of their construction activities;
  - Provide input into environmental (ISO 14001) procedures, systems and processes;
  - Sign-off on closure of all environmental incidents at Ingula Project, via a short closure report, for submission to GC H/O for record purposes.
  - Initiate programmes aimed at improving environmental awareness or compliance with legal and other requirements;
  - Should the ECO not be in possession of audit accreditation, the “audits” shall be deemed to be internal reviews of compliance with ROD, EMP and/or legal requirements.
- **Eskom Project Manager:**
  - Receive and decide on reports, recommendations and approvals from Site Supervisor and ECO.
- **Site Supervisor:**
  - Collaborate with ECO on all environmental management.
- **Contractors:**
  - Each contractor shall undertake baseline survey 14 days before construction to establish ambient dust and other airborne particulate levels and submit a report to the Eskom ECO.
  - Each contractor shall submit his water abstraction records to the Eskom ECO/EM by 25th day of every month.
  - Contractor’s Site Manager: Collaborate with the ECO and Supervisor regarding environmental management of the construction site, contractor camp and staff

housing sites, including electricity supply, potable water supply, wastewater treatment, and solid and hazardous waste storage and disposal.

- **Other ECO Roles and Responsibilities**

- Where wastewater is removed for disposal at an approved facility off-site, proper control measures shall be implemented to monitor its safe disposal (such as triplicate waybill, tag system, etc.), which shall be monitored by the ECO.

**Table 1: Persons and their role in the case study**

#	Person	Role in Project	Organisation	Role in case study
1	Jan-Albert Wessels	Researcher (Phd candidate)	North-West University	<ul style="list-style-type: none"> <li>• Investigated the role, value, instruments and independence of the ECO function on site.</li> </ul>
2	Alastair Campbell	Environmental Control Officer	NCC	<ul style="list-style-type: none"> <li>• Provided assistance to the researcher for general needs and clarification of communication channels.</li> <li>• Helped researcher obtain relevant documents.</li> <li>• Participated in interviews.</li> <li>• Participated in a site visit.</li> </ul>
3	Anville Rhode	Environmental Manager	Eskom – Group Capital	<ul style="list-style-type: none"> <li>• Helped to identify and obtain documents.</li> <li>• Participated in an interview.</li> <li>• Participated in a site visit.</li> </ul>
4	Carel Stoop	Project Manager	Eskom – Group Capital	<ul style="list-style-type: none"> <li>• Participated in a 1 hour interview.</li> </ul>

In order not to interfere too significantly with daily tasks of the persons involved, I had to follow a strict time frame that enabled me to obtain the necessary information to successfully and meaningfully conduct the case study investigation (refer to the schedule below – Annexure I).

## 2. CASE STUDY QUESTIONS AND RESULTS

### Subject under review's background information:

<b>Name:</b>	Alastair Campbell
<b>Position:</b>	Independent ECO
<b>Qualification:</b>	B.sc Ecology and various CEM short courses
<b>Experience (in construction):</b>	5 years in South Africa and a couple of weeks in UK
<b>Experience with or as ECO:</b>	4 and a half years

### 2.1 The ECO's own views on the role and value of ECOs before the Structured interview

#### Campbell (2012)

- The ECOs role is largely a misunderstood one... largely shrouded in myth.
- Field requires you to (refer to Campbell's recorded interview) be Independent but importantly this is not necessarily required in the permit conditions. It has become more and more obvious that an ECO must be an independent thing. In terms of this project there is requirements for being independent, you have many authorisations – some of them stipulate that you be independent and others [authorisations] don't, that is why the first ECO was from ESKOM [thus representing the client]. But, it has become obvious that the independence not only is important from an assurance perspective, but also from a lot of different stakeholders involved – governmental and non-governmental organisations. They find the independence of the ECO as quite a large assurance and they take quite a lot of security out of that. Especially the Free-State Dept. of Conservation do not trust the developer but gain trust if the communication came from a different perspective. It is a weird dynamic as they [these organisations] do not trust the developer to give them the right stuff [information].
- There needs to be much more collaboration between the Environmental Department and the ECO, in particular the Scorpions [Environmental Management Inspectorate] (Campbell, 2012: #1). What happens currently is that there is a massive rift between the Governmental compliances people and the people on the site that are trying to

ensure that compliance goes ahead. The problem is that they are tackling it from two completely different perspectives and it needs to be a bit more intervened between the two parties. I mean, it almost becomes a witch-hunt [Government's approach]. There needs to be a bit more cohesion between the two to try and achieve the end goal, which ultimately is the benefit to the environment. **And that's where the independence is also vitally important. The ECO needs that level of independence.**

## 2.2 Extraordinary examples of adding value

Show me/tell me where you had a major influence in the course of events.

### Story 1:

The **ECO played an integral part in the fossil finds and the successful collaboration of role players** during the construction of the upper reservoir dam.

### Story 2:

The **ECO played an integral collaboration role in the removal of San art** and the role in the approval of the action by the South African Heritage Resources Agency (SAHRA).

### Story 3:

"Event # 012-23". **The ECO flagged the non-compliance of the overloading of sewage works**, monitored the compliance thereof, and gave advice, cleared work of all [was] is done (Campbell, 2012). Eskom embarked on a Basic Assessment processes at the end of last year to obtain authorisation to upgrade this treatment plant (and Area 1 plant), as they continually exceed discharge requirements, to the detriment of the environment. This Basic Assessment EIA processes was halted by the Green Scorpions during their audit in January, due to the fact that two cement slabs had been cast. Eskom is now required to submit Section 24 applications, further delaying the upgrade of the plants. In the meantime the treatment works continue to discharge water into the environment which does not meet with the requirements, due to the challenges faced with plant capacity, efficiency and design (refer to SSI, 2012: 11).

### Story 4:

The ECO **played a role in the education of Chinese contractors for the proper use of toilets.**

## 2.3 Role / expectations of the ECO

### 2.3.1 What in your opinion is the most important role of the ECO in this project?

#### *ECO opinion:*

Campbell: “Ensuring compliance to EMP/legalities (all environmental issues) including the scope of issues in mining [the tunneling for the shoots through the mountain required a mining right]; and assurance to client but not only to the client [Eskom] but also to the department [Department of Environmental Affairs] [regulator].”

*Wessels: Please explain your answer:*

- Ultimately the client wants to be sure that they are doing the right thing and is operating within their legal mandate and Government wants to know if the Client is operating within the rules as well. The ECO is trying to fit probably between all of that. That is why I'm saying that in future the link between Government and the ECO needs to be so much more interwoven.
- “I have the luxury to be on-site 24hrs a day.”

**Middle Management's (Environmental Manager) opinion:** Group Capital (Anville Rhode, 2012, interview #5, 25 April 2012):

- Rhode: “A challenge was that initially the ECO (being Anville Rhode) was both the referee [monitoring compliance] and player [implementing] role. We then recruited Alastair Campbell into the project so that I [the EM] can do the Environmental Management for Eskom without being the “enforcement value” at the same time...”
- There must be an enforcement leg with an independent perspective to keep the implementing agent like Eskom in check with what is contained within the ROD. As an implementing agent we can do that, but there will also be bit of biased, hence the ECO that plays the “referee” role.

**Senior manager's opinion (Carel Stoop) - Project Manager** [interview # 09 translated from Afrikaans to English]:

- Stoop: “One role is that he links with the community and receives complaints and then he ensures that the actions are taken to resolve these complaints [grievances].”

- Stoop: “Protecting the environment is for me very important, it is his role and is key to what he does on site”
- Stoop: “It may be that if one gets another ECO [not being Alastair] that persons role may be different”.
- Stoop: “I do not see the ECO as being independent [part of the team]. The only time I view him as being independent is when something goes wrong and I’m [implicated/warned/] punished by the ECO by telling what to do correctly. The rest of the time I view him as part of the team.

## 2.4 Need and value of ECO

### 2.4.1 In the ECO's opinion an ECO add value to the following aspects of the construction project:

	Strongly Agree	Agree	Partly Agree	Partly Disagree	Disagree	Strongly Disagree	Unable to Judge
<i>In my opinion an ECO add value to:</i>							
a) Ensuring the project is completed as per project schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Ensuring that the community surrounding the project is protected/helped/informed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Ensuring that the environment is protected	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) No value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

#### 2.4.1.1 Any comments on the abovementioned?

No.

#### 2.4.1.2 Apart from the above in what other areas do an ECO add value?

Capacity building; awareness raising; building environmental ethics in the project; advisory capacity.

**2.4.2 Middle Management: In In the environmental manager’s opinion an ECO add value to the following aspects of the construction project (Anville Rhode (AR), 2012, interview #5, 25 April 2012):**

	Strongly Agree	Agree	Partly Agree	Partly Disagree	Disagree	Strongly Disagree	Unable to Judge
<i>In my opinion an ECO add value to:</i>							
a) Ensuring the project is completed as per project schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Ensuring that the community surrounding the project is protected/helped/informed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Ensuring that the environment is protected	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) No value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

2.4.2.1 Any comments on the abovementioned?

- On a) Rhode: **“I think the ECO may influence the project in a negative way.** For example the sewage works non-compliance that was identified by the ECO. There is currently a contractor that needs to be on site that is sitting and waiting, as he cannot be on site without the additional cost of upgrading the sewage works. **Yes he can influence project schedule negatively.** **However, he can influence a project schedule positively if legal requirements are identified pro-actively.** Thus I can’t really say.”
- On c) Rhode: **“I will agree on that simply because of the ECOs involvement with the community liaison, complaints and Communication Register and in his capacity as the ENCORD as he has the responsibility to verifying the water quality reports.”**

2.4.2.2 In your experience and/or opinion do you think there is a need for an ECO and what value does the ECO add to the project (apart from the above areas)?

- Wessels: why is there a need for a third party like the ECO?

- Rhode: “The ECO has a critical role. Maybe it is the history of the country. There were bad things and the environmental legislation was not entrenched. We had the Environmental Conservation Act and only with NEMA were the sustainability concept entrenched and it slowly gained momentum. **We come from a history of “you need a policeman to be the enforcer”**. That is my personal opinion on the need for an ECO. Specifically for example the Chemical industry and all the things that happened that no-one wants to talk about. So it is the secrecy surrounding environmental management and the infancy of the environmental legislation, thus it will take time to implement the sustainability and Millennium Development Goals.
- Rhode: **“purely from an assurance point of view: government needed an assurance function in development projects so that we can avoid the history** of the past in the present, specifically in major developments and major parastatal developments (Denel, Transnet etc.) because of historical factors. In our instance, it was written [required] to appoint an Environmental Manager (EM) and/or an environmental control officer (ECO). There was never a requirement for independence. I was appointed but as I met the contractors, I identified a gap that I will become the referee and the player, which is not going to work. You needed that independent party. At some point you need a third party to come in, **all the better if that party is on-site and is informed of activities on site, is party to all the [environmental] decisions to be taken on site, he can then play a much better role in providing influence”**.
- Wessels: “will the ECO have less value if not permanently on site”
- Rhode: **“I think the ECO will be less effective as the ECO will not have the full context of the activities. If he does not understand the complex environment, it is difficult to come in and audit something; we see it even with our auditors”**. They for example expect that we have everything under control as there is a contract between Eskom and the contractors and I can’t just say do this or do that without payment.”
- Rhode: **“from a government point of view: government needed an ECO to maintain their interests so that the commitments made by Eskom in the EIA report (EIR) and the management plan [EMP] can actually be assured by an independent person on site.”**

- Wessels: “the ECO is then a surrogate environmental officer on-site, but what about the Environmental Management Inspectorate (EMI)?”
- Rhode: “They only came into being in 2005 and I’ve also been trained as an EMI” On the other side of things, **government simply do not have the manpower and competence to do enforcement on an on-going basis.** South Africa (SA) went through a phase after apartheid where huge foreign investments were made in SA. The number of projects, especially during the world cup [soccer] where there was a continuity of projects, government could not enforce the environmental conditions imposed for that projects on site. **Levels of competency in government,** I come from government, **is sometimes lacking** due to a huge turnaround of staff, as there is no real financial incentive to keep competent staff.
- Wessels: “what is the value and role of the ECO?”
- Rhode: **“Firstly, personally: yes the ECO does add value. The entire call for an ECO was initiated by Eskom; so it was our own call.**
- Rhode: “In terms of competence, the **ECO added value by educating/training another ECO on the EMS and what his role** is in the system as we have an EMS. Thus one ECO adding value by educating another ECO”
- Rhode: “In respect of independence; we **use it [independence] at times to our own advantage from an implementation point of view.** In that regard and the value that the ECO add, we have multiple accountabilities and liabilities [9 different environmental authorisations] in terms of partnerships and commitments with stakeholders. I can’t say that we’ve used him [the ECO] but in terms of reporting; if I had to write a monthly report on what has happened environmentally on the site and he [the ECO] has to write a report, it would basically be the same report. Thus, essentially I’ve reduced my [as the EM] my internal reporting duties and due to the objectivity of the ECO the report is a **“true” reflection of what happens on a site.** The unfortunate part of this is [the independence/objectivity] is that there is not a commitment/requirement in the ROD [to be independent] but we do submit the independent quarterly report to government.”

**2.4.3 In the senior manager's opinion (Carel Stoop (CS) - Project Manager: interview # 09) an ECO add value to the following aspects of the construction project:**

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Partly Agree</i>	<i>Partly Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Unable to Judge</i>
<i>In my opinion an ECO add value to:</i>							
a) Ensuring the project is completed as per project schedule	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Ensuring that the community surrounding the project is protected/helped/informed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Ensuring that the environment is protected	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) No value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**2.4.3.1 Any comments on the abovementioned?**

- On a) Stoop: "As a project manager I manage contracts and all contractors have one goal and that is to make as much money as possible by either, quickly in and quickly out or by as long as possible for as much as possible money. For me it is important that **such a person [the ECO] helps with managing the contractors** as if they are not managed correctly then it will cost me time and money. An example is at the dam area where hydro seeding is being done. If the ECO is not there to keep an eye then I may lose time on this action."
- On b) Stoop: "**Absolutely, as an example I was driving behind a truck that was spilling a substance and had the ECO investigate** as I thought this was possibly sewage spill. It turned out to be just water. This is for me critically important as we deal with community people and also what the contractors do."
- On c) Stoop: "**One of the reasons that we use him to manage the complaints is that he has to have that contact with the community**"
- On d): "Definitely. An example is that the ECO joins the farmers to investigate, take photos and discuss methods to rectify erosion and if he is not there to do this the

erosion will continue and even worsen. **It is thus a combination of stakeholder engagement and protecting the environment.** An advantage is, and this may not be true for all ECOs that the ECO is on site most of the time and not just sitting in office and as a team, almost like Laurel and Hardy, the ECO and EM addresses issues together. Another example is that the ECO flagged water erosion under the road leading into Ingula and with his recommendations, we were able to address this problem. So protecting the environment is for me very important, it is his role and is key to what he does on site.

- On e): “No, **my ECO adds a lot of value. I need him on this project and can’t work without him**. ...He is and should be part of the team”.

2.4.3.2 In your experience and/or opinion do you think there is a **need for an ECO** and what **value does the ECO add** to the project (apart from the above areas)?

- Stoop - Project Manager [interview # 09 translated from Afrikaans to English]:
- Stoop: “My opinion on the need to have an ECO as part of the team is that there is in many instances where one is not 100% sure what the right thing is to do. **Because of the ECO having an independent [objective] view help us to make a decision**”.
- Stoop: “The ECO gives a monthly report to me where he indicates what we do right and what we do wrong. **I’m not sure but I think it is a similar report that he sends forward [to Group Capital and Government]. In this reporting being independent is important for me as the Environmental Manager may not point out all the problems** as there always the possibility that the EM may hide things as I have a contract with the EM and may hold him responsible if he does not manage things correctly. I do not have a contract with the ECO and thus I know that what the EM does is 100% in-line with specifications.” [Thus ensuring openness, transparency and instilling trust in reporting].
- Stoop: “To be honest, from me the project is more valuable than the Environment and I may manipulate the EM to achieve certain goals in situations where there is no ECO.” **With the ECO present and integrated into the project I cannot do things in secret as he will find out about it, he will know of it** [environmental conscious].
- Stoop: “At Ingula the ECO the role **[value] that the ECO has is rather successful. There are various reasons. Firstly, the passion of these guys [instilling passion for**

**the environment**. One may appoint an ECO but if the task is becoming just another job then the ECO adds no value. The advantage that we at Ingula have is that not only Alastair [Campbell], but also the people that he works with have an absolute passion for the environment. You cannot work with them without sharing the passion. I've never been a "tree hugger" but felt the environment was in a sense important, but they've infected me with this passion for the environment in a way that I'm now reading various books about the environment. The site is also beautiful [kept clean, maintained] and **one feels proud about the site. The environment is still wild at the site and we would like to keep it this way [protection of the natural/wild environment]**. Alastair plays a vital role in this and I usually introduce Alastair as Ingula's Crocodile Dundee. It balls down **to Alastair living the example** and not just talking about it, and that is what is important. Usually one gets people [ECOs] that is here and do their job but do not live the passion and then that passion is lost.

- Stoop: "Another thing is that the ECO is on site on a **full-time basis, which is important** for Ingula. We've had people that come in periodically that fulfill the independent "policeman role". The advantage is that I know Alastair [the ECO] for a long period now **and it does not feel that he is here as a policeman** when he goes into the veld and site and he does not have a probing attitude. **He tries to be a problem solver** and I feel that many instances guys just want to show the red light [indicate the problem] then they feel that the issue has been solved. However, Alastair [the ECO] will point out a problem and will be part of the solution. None of us see Alastair [the ECO] as independent, **we see him as part of the team**, not that he's not independent. Look, he makes a big fuss when there is something wrong, but what makes it acceptable to us is that when a problem is indicated then it is a problem with a solution. He, therefore, links with the team and is part of the solution. This is important; for example Alastair will put things on the table [identify challenges / deviations] and I will respond "Nê; do you know how much that will cost!" Then **he will discuss alternatives and give advice on solutions and in this manner becomes part of the solution. Then one may arrive at a negotiated best solution.** I look after the money, the project and construction, he looks after the environment.
- Stoop: "An **example of adding value is that one day Anville Rhode (the Environmental Manager) and/or Peter Nelson [the Conservation Officer] were not here and we had to give a presentation to a group of people [important visitors]. Alastair volunteered to give the presentation and conveyed his passion and the**

objectives that we at Ingula want to achieve with the environment as a team member with this group and all of a sudden they shared this passion [educational/awareness role through conveying passion]. I sometimes feel that being independent is not part of his job and if he was standing there in his police uniform it might not have had the same impact.

- Wessels: “what I’ve seen the last two days is that there’s a fine balance between being independent and being part of the team and not losing one’s independent influence”. Stoop: “It is absolutely true. If one leans too much towards being independent then guys start to hide things [problems]. Again, if the ECO is part of the solution then they bring problems to you”. It is important for our stakeholders and the community as all of them knows Alastair on his name, and those that don’t talks about the guy with the tooth around his neck and also, they know what his role is on site [thus almost an iconic].

## 2.5 Appraising the value of ECOs

This section of the report aims to capture, combine the evidence sourced and make a value judgment of the subject participation in the achievement of objectives. The keys below were used to give an indication that objectives were achieved by subject participation. According to Owen (2007) “judgment on worth is the process of synthesizing and integrating evidence into a judgment of merit of worth”.

**Table 2: Description of Assessment Keys**

Key	Description
NA	Not applicable to case study.
?	Status could not be established.
x	Very limited or no evidence of participation to support achievement of objective(s).
½	Some evidence to support partial participation to support achievement objective(s).
✓	Sufficient evidence of participation to support achievement of objective(s).
–	Indicator with particular reference to case.

For the ordinal scale evaluation and ranking of data I assigned: x for very limited to no evidence available; ½ as the median (halfway point) for some evidence; and ✓ as sufficient evidence available to indicate that a Key Performance Indicator (KPI) was achieved, partially achieved or not achieved. An underlined evaluation (e.g. x, ½, ✓) indicates a particular interesting or unique reference to a case study.

**Table 3: Data evaluation matrix - Ingula**

<p><b>Key performance areas (KPA's)</b>  <i>"Topic related to principles"</i>                      (Derived from ISO, 2004; Arts, 1998, Arts et al, 2001; DEA, 2011; and Hullet and Diab, 2002)</p>	<p><b>Objectives</b>  <i>"Indication of what needs to be achieved to"</i>                      (UNEP-ITC, 2002: 59-67; South Africa, 1998: 5; Du Plessis, 2002; Morrison-Saunders &amp; Arts, 2004)</p>	<p><b>Key performance indicators (KPI's)</b>  <i>"Questions that provide an indication to what extent the objectives were achieved by subject participation"</i>                      (derived from South Africa, 1998; Morrison-Saunders &amp; Arts, 2004, Singapore Environmental Agency, undated, and DWAF, 2005 as proposed by Retief, 2007a: 91)                      Note that all questions start with: "To what extent..."</p>	<p><b>Evidence provided that objective were achieved, partially achieved or not achieved.</b></p>	<p><b>Appraisal</b></p>
<p><b>I) OUTPUT COMPONENT: PRIOR TO PROPOSAL IMPLEMENTATION [PROJECT PLANNING &amp; DESIGN PHASE].</b></p>				
<p><b>1. [Plan]: Generate data, knowledge and a sustainable vision or outcome</b></p>	<p><b>Objective 1: Participate in the early components of EIA prior to proposal implementation.</b>                      (Ex-ante evaluation: Preliminary assessment: Screening/Scoping; Detailed assessment: Impact analysis/mitigation measures/Reporting/EIS review/Decision-making; and EIA follow-up plans: EMP, CEMP etc.)  <u><b>Judgement on worth:</b></u>                      In terms of generating data, knowledge and a sustainable outcome, evidence was found that the ECO at Ingula was involved in the Screening phase of projects related to the main project. However, no evidence was found that the ECO were involved in Scoping, Detailed assessments and the compiling of EMPs for new projects. Evidence was found, however, of ECOs being involved with the review of the project's EMP.</p>			
	<p>KPI 1.1: ...was the verifier involved in establishing whether an EIA was required for the project and other project related projects (Screening)?</p>	<ul style="list-style-type: none"> <li>• The ESKOM CEMP requires the ECO to "Inform Eskom if any additional licenses/authorizations are required, prior to activity." (ESKOM, 2012).</li> <li>• An example is the "Event # 012-23". The ECO flagged the non-compliance of the overloading of sewage works, monitored the compliance thereof, and gave advice, (?) cleared work of all [was] is done (Campbell, 2012).</li> </ul>	<p>✓</p>	
	<p>KPI 1.2: ...was the verifier involved in identifying key issues and impacts to be addressed in the project and other project related projects (Scoping)?</p>	<ul style="list-style-type: none"> <li>• STATUS COULD NOT BE ESTABLISHED.</li> </ul>	<p>?</p>	

	KPI 1.3: ...was the verifier involved with compiling and reporting the: Environmental Impact Report (EIR)/Statement (EIS); the sustainability vision; and/or the Environmental Management Plan (EMP) of the project and other project related projects?	<ul style="list-style-type: none"> <li>• NO EVIDENCE WAS FOUND.</li> </ul>	x
	KPI 1.4: ...was the verifier involved with the preparation and submission of the Environmental Management Plan of the project other project related projects?	<ul style="list-style-type: none"> <li>• “ECO do not prepare &amp; submit environmental programme” (Campbell, 2012)</li> <li>• “However, the ECO is involved with the update and review of the EMP” (Campbell, 2012) (see 2B.5 below).</li> </ul>	x
<b>II) OUTPUT COMPONENT: POST PROPOSAL IMPLEMENTATION [PRE-CONSTRUCTION &amp; CONSTRUCTION PHASE].</b>			
<b>2A. [Do]: Pre-construction preparation for implementation of specifications</b>	<p><b>Objective 2A: Participate in the pre-construction preparation and commissioning of the environmental Performance Specifications.</b> (E.g. identifying: resources required, roles and responsibilities; documenting procedures, processes and checklists).</p> <p><b>Judgement on worth:</b> No evidence was found that the ECO at Ingula was involved in the handover from planning to the implementation phase or the identifying, defining and allocating roles and responsibilities and/or resources required for implementation and control for the implementation, control, monitoring and evaluation, auditing and reporting of environmental specifications.</p>		
	KPI 2A.1: ... was the verifier involved with the handover of environmental Performance Specifications from the planning phase to the implementation phase	<ul style="list-style-type: none"> <li>• <u>NO EVIDENCE WAS FOUND THAT INDICATE THAT THE ECO WAS INVOLVED WITH THE HANDOVER OF ENVIRONMENTAL PERFORMANCE SPECIFICATIONS.</u></li> </ul>	x
	KPI 2A.2: ... was the verifier involved in identifying, defining and allocating roles and responsibilities for the implementation, control, monitoring, evaluation, auditing and reporting of environmental specifications?	<ul style="list-style-type: none"> <li>• Yes, the CEMP and the Ingula EMS General Overview Document # 4-4.4 Rev 3 (2011) indicates roles and responsibilities of the ECO as part of the formal EMS of Ingula.</li> <li>• The conditions of the ROD stipulate that “The ECO shall be appointed until the completion of the project’s construction” (Rhode, 2012 interview # 6).</li> <li>• Duties are clearly defined as part of the EMS document for element 4.4.1 of ISO14001 (refer to ESKOM, 2012) “Extract from the Ingula Project Construction Environmental Management Plan, in support of 4.4.1): <ul style="list-style-type: none"> <li>o Environmental Control Officer:</li> <li>o Conduct daily inspections to determine compliance</li> </ul> </li> </ul>	x

		<p>with RoD and CEMP, using checklists.</p> <ul style="list-style-type: none"> <li>○ Submit weekly audit report to Supervisor.</li> <li>○ Ensure contractors and workers have the RoD and CEMP and are familiar with the requirements.</li> <li>○ Advise site personnel on all environmental issues.</li> <li>○ Maintain records of incidents and corrective action.</li> <li>○ Manage and maintain a complaints register.</li> <li>○ Issue non-compliance warnings where necessary and recommend appropriate action to the supervisor.</li> <li>○ Inform Eskom if any additional licenses/authorizations are required, prior to activity.</li> <li>○ Provide any information required for external auditing.</li> <li>○ Report to Eskom any problems that cannot be solved by the Supervisor.</li> </ul> <ul style="list-style-type: none"> <li>● According to the Curriculum Vitae of Alastair Campbell (CV-Alastair Campbell, 2012) the ECO has the following role: <ul style="list-style-type: none"> <li>○ Provide an on-site ECO service to the Client to ensure effective implementation and compliance of their Environmental Authorizations and Environmental Management Plans (EMP).</li> <li>○ He is responsible for reporting compliance and non-compliance to both the Client and National and Provincial Government (DEA), as well as conducting periodic environmental auditing.</li> </ul> </li> </ul> <p><b>HOWEVER, NO EVIDENCE WAS FOUND THAT THE ECO WAS INVOLVED WITH IDENTIFYING, DEFINING AND/OR ALLOCATING ROLES AND RESPONSIBILITIES FOR THE IMPLEMENTATION, CONTROL, MONITORING, EVALUATION, AUDITING AND REPORTING OF ENVIRONMENTAL SPECIFICATIONS.</b></p>	
	<p>KPI 2A.3: ... was the verifier involved in identifying, defining and allocating, financial and human resources for the implementation, control, monitoring,</p>	<ul style="list-style-type: none"> <li>● Refer to Campbell, 2012 – indicating that there were sufficient resources available to fulfil his roles and</li> </ul>	<p><b>x</b></p>

	evaluation, auditing and reporting of environmental specifications?	responsibilities. <b>HOWEVER, NO EVIDENCE WAS FOUND THAT THE ECO WAS INVOLVED WITH IDENTIFYING, DEFINING AND/OR ALLOCATING FINANCIAL AND HUMAN RESOURCES FOR THE IMPLEMENTATION, CONTROL, MONITORING, EVALUATION, AUDITING AND REPORTING OF ENVIRONMENTAL SPECIFICATIONS.</b>	
<b>2B. [Do]: Implement, inform decision making in construction and parallel process.</b>	<p><b>Objective 2B: Participate in the implementation of the environmental Performance Specifications.</b> (E.g. implementing processes: internal housekeeping, project control &amp; control of impacts; documenting procedures and processes; establishing emergency procedures and responses; education and induction of employees; and communication of EMP).</p> <p><b>Judgement on worth:</b> Sufficient evidence was found that the ECO at Ingula was involved in the implementation of Performance Specifications. It was found that the ECO do fulfil to a large extent all the defined and discharged roles and responsibilities until the completion of the ECO service. Moreover, evidence was found of the ECOs promoting the use of sustainable processes &amp; technologies by advising the occupier of the construction site on what needs to be done in terms of remedial measures. Evidence was also found that the ECO function (in the capacity of a member of ENCORD) do respond to environmental emergency situations. As with the Medupi Case, overwhelming evidence was found of the ECO of Ingula influencing decisions and maintaining decision-making flexibility by: giving advice, making recommendations, reviewing and accepting environmental method statements. It was also found that the ECO plays an important role in the review, update and drafting of various environmental plans, procedures and programmes of Ingula. Sufficient evidence was also found that the ECO was involved with informing and educating employees about environmental risks by: conducting Training needs Analysis (TNA); creating the Induction and Toolbox talks training packages as well as educational posters; and by joining training sessions at times to verify adequacy of training (evidence was also found of the ECO being involved with induction training of Chinese contractors on the proper use of toilets).</p>		
	KPI 2B.1: ... did the verifier perform the defined and discharged roles and responsibilities until the completion of the ECO service?	<ul style="list-style-type: none"> <li>• Yes, there is sufficient evidence to suggest that the ECO performed his roles and responsibilities as per Performance Specifications in the form of: quarterly, monthly assessments, reviewing of procedures and reports and training packages/events, managing the complaints register, etc. in the year 2012.</li> <li>• However, the external audit report of SSI (2012) indicates some improvements that could be made by the ECO to improve the ECO role. For example Rhode (2012: interview # 6) commented that the quarterly assessments were not done as per schedule, but that the issue has been identified and is being addressed".</li> </ul>	✓
	KPI 2B.2: ... did the verifier participate in and/or stimulate the use of sustainable technologies and processes?	<ul style="list-style-type: none"> <li>• According to Campbell (2012) "the ECO is advising the occupier of the construction site on what needs to be done</li> </ul>	✓

		<p>on remedial measures to be taken to prevent recurrence is intrinsic to the ECO position but not the ECO's formal role. It should be".</p> <ul style="list-style-type: none"> <li>• The ESKOM CEMP requires, however, that the ECO to "Issue non-compliance warnings where necessary and recommend appropriate action to the Supervisor." (ESKOM, 2012)..</li> </ul>	
	<p>KPI 2B.3: ... was the verifier involved with reducing environmental impacts through responding to actual and potential environmental emergency situations?</p>	<ul style="list-style-type: none"> <li>• Any legal contravention is reported by the ECO to the National Department / regulator [DEA] if appropriate action were not taken by the Client or Contractor after the initial non-compliance warning. The Project Manager signs the non-compliance letter drafted by the ECO. (Campbell, 2012).</li> <li>• Moreover, the ECO stated in the Sewage Effluent Discharge Non-compliance letter of 2010 the following "As the ECO, it is in my mandate to monitor that the RoD and CEMP requirements are met. If an incident of this nature occurs again, my only recourse is to report the legal contravention to the relevant National Authority, and this legal contravention will be assigned to Eskom."</li> <li>• ESKOM CEMP requires that the ECO Sign-off on closure of all environmental incidents at Ingula Project, via a short closure report, for submission to GC H/O for record purposes.</li> <li>• Possible environmental emergencies situations are identified by ENCORD [ECO is part of ENCORD], and reviewed on a regular basis. (See 4.4.7 Emergency Response Records).</li> </ul>	<p>✓</p>
	<p>KPI 2B.4: ... did the verifier influence decisions related to mitigation and remediation of aspects deemed to be a variation, or not allowed for in the environmental Performance Specifications?</p>	<ul style="list-style-type: none"> <li>• Contractor's Site managers collaborate with ECO (Campbell, 2012).</li> <li>• Yes, the ECO does advise the occupier of the construction site and the Environmental Officer (see Campbell, 2013 interview #5).</li> <li>• Approving mitigation measures: The ECO also forms part of the ENCORD (Environmental Management Team) (consisting of the Building contractors environmental</li> </ul>	<p>✓</p>

		<p>managers and practitioners, Environmental Manager, Conservation Manager, and the ECO). In the event of a non-compliance (a significant event) ENCORD can decide after an investigation to close an event (see ESKOM EMS Events Planner), however, the event can only be officially closed if the ECO as an independent body goes and verifies this (the actions for successful remediation) and signs of the hard copy of the evidence (of the Event Manager) (also see the Verification/monitoring section).</p> <ul style="list-style-type: none"> <li>• The ESKOM CEMP requires that the ECO must “Advise site personnel on all environmental issues.”</li> <li>• Approval is obtained from the Environmental Manager (EM) or Client [Eskom Project Manager]. Site managers only collaborate with ECO (Campbell, 2012).</li> <li>• “Then he [the ECO] will discuss alternatives and give advice on solutions and in this manner becomes part of the solution. Then one may arrive at a negotiated best solution. I look after the money, the project and construction, he looks after the environment” (Stoop, 2012: interview #09).</li> </ul>	
	<p>KPI 2B.5: ... was the verifier involved with documenting, reviewing and/approving of policies, plans, programmes, operational procedures, registers and emergency procedures?</p>	<ul style="list-style-type: none"> <li>• The ECO is involved with the update and review of the EMP (Campbell, 2012).</li> <li>• In terms of ESKOM’s CEMP (2012) the ECO has the responsibility to “Assist with review of Method Statements submitted by contractors in support of their construction activities.”</li> <li>• Evidence was available to indicate that the ECO reviewed and approved EMS procedures (see Annexure C).</li> <li>• Evidence was found of the ECO being part of the Development team for the drafting and documenting of the Ingula Environmental Auditing Procedure (see Annexure D).</li> <li>• A permit register is in place and is reviewed by the ECO (SSI Audit Report, 2012).</li> </ul>	<p style="text-align: center;">✓</p>

	<p>KPI 2B.6: ... was the verifier involved with internal capacity building and awareness to inform &amp; educate employees about environmental risks of their work and the manner in which their tasks must be performed?</p>	<ul style="list-style-type: none"> <li>• The CEMP (2012) requires that the ECO "Ensure contractors and workers have the RoD and CEMP and are familiar with the requirements."</li> <li>• The ECO as part of the ENCORD team does: Training needs Analysis (TNA); identify training requirements recorded and sourced as appropriate and Eskom Induction is developed and revised by ENCORD (see the Ingula EMS General Overview Document # 4-4.4 Rev 3 (2011).</li> <li>• The ECO created the Induction and Toolbox talks training packages as well as educational posters. Not a formal requirement in the EMP.</li> <li>• The ECO joins training sessions at times to verify adequacy of training (Campbell, 2012). Refer to Annexure B.</li> </ul>	✓
<p><b>2C. [Do]: Reporting and Communication</b></p>	<p><b>Objective 2C: Participate in reporting and communicating by informing the stakeholders as well as the general public about the results of EIA follow-up.</b></p> <p><i>Communication is "Informing the stakeholders as well as the general public about the results of EIA follow-up (in order to provide feedback on project/plan implementation as well as feedback on EIA processes)". According to DEA (2013:97) communication of: plans and participation across all levels of the organisation, especially senior staff and politicians, relevant sectors, academia, professional bodies, civil society and NGOs, etc.</i></p> <p><b>Judgement on worth:</b></p> <p>Numerous sources of evidence indicated that the ECO at Ingula is actively involved with providing continuous feedback from EIA follow-up programmes to the: proponent; regulator; and the community. However (as with the Medupi Case) no evidence was found that the ECO contribute to formal periodic feedback for internal EIA process improvement. The ECO (Alastair Campbell) did, however, contribute in providing formal periodic feedback for external EIA process improvement by formal lectures at the North-West University, Potchefstroom campus. Moreover, sufficient evidence was found that the ECO contribute to openness and access to information for transparent communication.</p>		
	<p>KPI 2C.1: ... did the verifier report or gave feedback to the site proponent on actual and/or potential harmful environmental conditions and/or situations?</p>	<ul style="list-style-type: none"> <li>• Yes (see Alastair Campbell interview #5). The ECO do identify and point out irregularities, but focuses only on environmental issues [not on health].</li> <li>• According to Stoop (2012: interview #09): "The ECO gives a monthly report to me where he indicates what we do right and what we do wrong."</li> <li>• ESKOM CEMP requires the ECO to "Report to Eskom any problems that cannot be solved by the Supervisor." (ESKOM, 2012).</li> </ul>	✓

		<ul style="list-style-type: none"> <li>• The ECO do report and provide feedback directly to the project manager (Campbell, 2012). [Ensures direct line of communication to management]. The implementation agent for this case is Eskom Group Capital. The Environmental Manager (EM) provides feedback for/ on behalf of Project Manager (see Campbell, 2012 interview #05).</li> <li>• In terms of the CEMP the ECO has to "Submit weekly audit reports to the Site Supervisor" (Eskom, 2012).</li> <li>• The ESKOM CEMP requires the ECO to "Issue non-compliance warnings where necessary..." (ESKOM, 2012). He [the ECO] is responsible for reporting compliance and non-compliance to both the Client and National and Provincial Government (DEA) (CV-Alastair Campbell, 2011).</li> <li>• The ESKOM CEMP requires the ECO to "Ensure contractors and workers have the RoD and CEMP (ESKOM, 2012).</li> <li>• The ECO attend relevant Environmental meetings but not technical or management meetings. (Campbell, 2012).</li> </ul>	
	<p>KPI 2C.2: ... did the verifier report or gave feedback to the Regulator on actual and/or potential harmful environmental conditions and/or situations?</p>	<ul style="list-style-type: none"> <li>• He [the ECO] is responsible for reporting compliance and non-compliance to both the Client and National and Provincial Government (DEA) (CV-Alastair Campbell, 2011).</li> <li>• The Free-State Dept. of Conservation do not trust the developer but gain trust if the communication came from a different [independent ECO] perspective. It is a weird dynamic as they [these organisations] do not trust the developer to give them the right stuff [information].</li> <li>• Any legal contravention is reported to National Government/regulator [DEA] if appropriate action were not taken by the Client/Contractor after the initial non-compliance warning. The Project Manager signs the non-compliance letter drafted by the ECO. (Campbell, 2012). Moreover, the ECO stated in the Sewage Effluent Discharge Non-compliance letter of 2010 the following "As the ECO, it is in my mandate to monitor that the RoD and CEMP requirements are met. If an incident of this nature</li> </ul>	<p>✓</p>

		<p>occurs again, my only recourse is to report the legal contravention to the relevant National Authority, and this legal contravention will be assigned to Eskom.”</p> <ul style="list-style-type: none"> <li>• The ECO also gives feedback to IACC members, including members of government on construction related environmental risks.</li> <li>• Complaints as in the “Communication Register” is reported back to the Regulator (Campbell, 2012 interview #4)</li> </ul>	
	<p>KPI 2C.3: ... did the verifier report or gave feedback to the Community on actual and/or potential harmful environmental conditions and/or situations?</p>	<ul style="list-style-type: none"> <li>• ..., it has become obvious that the independence not only is important from an assurance [client’s] perspective, but also from a lot of different stakeholders involved – governmental and non-governmental organisations (Campbell, 2012: #1).</li> <li>• Yes, there is sufficient evidence in the form of the ESKOM-Ingula Communication Register of 23 March 2012 (refer to Annexure F).</li> <li>• Refer to ANNEXURE G: Evidence of the ECO involved in active community feedback in terms of a “Communication Report” and clearing actions taken.</li> <li>• ECO feedback to the IACC members, including members of public on construction related environmental risks.</li> </ul>	✓
	<p>KPI 2C.4: ... was the verifier involved with formal periodic feedback, communication of EIA predictions into the planning stage to be implemented moving forward?</p>	<ul style="list-style-type: none"> <li>• The ECO attend Environmental meetings but not technical or management meetings. Management meetings are attended by the EM (Campbell, 2012).</li> <li>• The Management review meetings are attended by (see the the Ingula EMS General Overview Document # 4-4.4 Rev 3 (2011) ): <ul style="list-style-type: none"> <li>➤ CED Environmental Manager</li> <li>➤ CED Executive PM</li> <li>➤ CED Ingula Finance</li> <li>➤ CED Ingula HR Manager</li> <li>➤ CED Ingula OHMS Manager</li> <li>➤ CED Ingula Support &amp; Services Manager</li> </ul> </li> </ul>	x

		<ul style="list-style-type: none"> <li>➤ CED EPM</li> <li>➤ GBE Engineering manager</li> <li>➤ Peaking Conservation Manager</li> <li>➤ Peaking Plant Manager</li> </ul>	
	<p>KPI 2C.5: ... was the verifier involved in active feedback/communication/training for ensuring improved EIA</p>	<ul style="list-style-type: none"> <li>• The ECO has been involved with the design and presentation of formal short-course training at the North-West University since 2010 (CEM, 2011/2012/2013). The course is termed “Post-decision Environmental Monitoring and Enforcement: Roles and Responsibilities” and aims to educate the general public, government and environmental practitioners (consultants) on improving post-decision monitoring and enforcement of projects. Specific training topics were: <ul style="list-style-type: none"> <li>➤ Environmental Control Tools, Processes and Reporting: Case Study Experience from Mega Infrastructure Projects.</li> <li>➤ Screening and Potential Additional Authorisations Required for Activities.</li> <li>➤ Inspections and Reporting &amp; Incident and Non-Conformance Reports.</li> <li>➤ The PDFU Roles in Designing, Implementing and Reporting on a Monitoring Programme</li> <li>➤ Method Statements (MS): Writing MS and Linking MS to Environmental Performance Objectives and Targets</li> <li>➤ Implementing Environmental Management Plans (EMPs): The influence of the Structural determinants on roles, responsibilities and authorities.</li> </ul> </li> </ul>	✓
	<p>KPI 2C.6: ... did the verifier ensure openness, access to information for transparent communication with all stakeholders involved?</p>	<ul style="list-style-type: none"> <li>• Evidence ensuring openness and transparency is in the form of the publicly available EMS procedures (refer to Annexures C &amp; D) in terms of the Access to Information Act, 2000 as well as the Ingula Communication register (refer to Annexure F).</li> <li>• Also refer to ANNEXURE G: Evidence of the ECO involved in active community feedback in terms of a</li> </ul>	✓

		<p>“Communication Report” and clearing actions taken as well as feedback to the IACC forum meetings.</p> <ul style="list-style-type: none"> <li>• According to Rhode (2012: interview 6) “we [the EM and the ECO] share information. What I know, he knows. We work as a team in ENCORD”.</li> <li>• The ECO played an integral part in the fossil finds and the successful collaboration of role players during the construction of the upper reservoir dam.</li> <li>• The ECO played an integral collaboration role in the removal of San art and the role in the approval of the action by the South African Heritage Resources Agency (SAHRA).</li> <li>• According to Stoop (2012: interview #09): “The ECO gives a monthly report to me where he indicates what we do right and what we do wrong. I’m not sure but I think it is a similar report that he sends forward [to Group Capital and Government]. In this reporting being independent is important for me as the Environmental Manager may not point out all the problems as there always the possibility that the EM may hide things as I have a contract with the EM and may hold him responsible if he does not manage things correctly. I do not have a contract with the ECO and thus I know that what the EM does is 100% in-line with specifications.” [thus ensuring openness, transparency and instilling trust in reporting].</li> </ul>	
<p><b>3A. [Check]: Monitoring and measurement of effects</b></p>	<p><b>Objective 3A: Participate in the monitoring and measurement of environmental effects.</b> (Ex-post evaluation: measuring, comparing, assessing &amp; auditing – environmental effects &amp; parameters)</p> <p><b>Judgement on worth:</b> No evidence was found that the ECO at Ingula conducted monitoring of environmental parameters or effects. Moreover, it was found that no risk assessments are done by the ECO and that this is viewed (by the ECO) as a specialist task. However, the ECO did indicate that he did some assessment on the EMP for potential impacts but did not use a quantitative approach.</p>		
	<p>KPI 3A.1: ... was there sufficient evidence to confirm that the verifier collected data on environmental effects?</p>	<ul style="list-style-type: none"> <li>• Not part of the ECO scope.</li> <li>• Daily evaluation [monitoring] is done by EOs on site (refer to the Ingula EMS General Overview Document # 4-4.4 Rev 3 (2011). Instruments used for measurement are</li> </ul>	<p>x</p>

		calibrated where necessary, and records maintained by EOs	
	KPI 3A.2: ... was the verifier involved with risk assessment and evaluation of environmental aspects and the risks, consequences and alternative options for mitigation of activities?	<ul style="list-style-type: none"> <li>No risk assessments are done by the ECO. It depends on the incident but this is a specialist task. However, the ECO does some assessment on the EMP for potential impacts but no existing quantitative approach (Campbell, 2012).</li> </ul>	x
<b>3B. [Check]: Monitoring and evaluation of legal compliance (performance)</b>	<p><b>Objective 3B: Participate in internal and external compliance (performance) evaluation.</b> (Ex-post evaluation: measuring, comparing, assessing &amp; auditing - legal compliance/performance to Environmental Specifications)</p> <p><b>Judgement on worth:</b> Sufficient evidence was found to confirm that the ECO at Ingula participated in: monitoring compliance; conducting internal compliance (performance) assessments; providing information in support of external compliance (performance) assessment [auditing]; and the ad hoc verification and evaluation of: monitoring reports of Environmental Officers; reviewing and verifying the quarterly audit reports of the external auditors; and verifying actions for successful remediation. However, evidence suggests that the drafters of the EMP did not understand the difference between inspections and audits.</p>		
	KPI 3B.1: ... did the verifier collect data on environmental legal compliance?	<ul style="list-style-type: none"> <li>ECO does monitor legal compliance through inspections and compliance assessments (not compliance audits). (Campbell, 2012).</li> <li>In terms of the CEMP the ECO has to "Submit weekly audit reports to the Site Supervisor" (Eskom, 2012) (see comments below on assessments vs. auditing).</li> </ul>	✓
	KPI 3B.2: ... did the verifier use a formal (systematic and objective) assessment approach (internal auditing) to compare environmental effects and compliance data with norms, prediction and expectations?	<ul style="list-style-type: none"> <li>"Auditing is a specialist task done by external environmental auditors. However, the ECO does some assessments with no existing quantitative approach (rather assessments than audits) on EMP compliance for potential impacts" (Campbell, 2012). In this regard the CEMP requires that the ECO has to: "Submit weekly audit reports to the Supervisor" (Eskom, 2012). <ul style="list-style-type: none"> <li>[evidence suggests that the drafters of the EMP did not understand the difference between inspections and audits]</li> </ul> </li> <li>The SSI external audit report of March 2012 (SSI, 2012) finding 21.06.11 also allude to this misunderstanding of audits/inspections and state that "As above - these are not formal "audit" reports, but issues and progress with</li> </ul>	✓

		<p>regards to the issues are recorded. 13.09.11: It is recommended that this condition be amended to ensure practicality.” According to Campbell (2012 interview # 2) “we’ve stopped calling them audits and refer to them as assessments”.</p> <ul style="list-style-type: none"> <li>• The ESKOM CEMP requires that the ECO “Issue non-compliance warnings where necessary and recommend appropriate action to the supervisor.” (ESKOM, 2012).</li> <li>• According to the Ingula Environmental Auditing Procedure (ESKOM-Ingula, 2012) “The EO’s, EM, ECO, CEM and ENCORD are responsible for conducting and implementing the internal assessments in this document, within respective roles. The EM will schedule audits as per 3.3.” According to this procedure the “Independent ECO will conduct quarterly assessments and bi-annual assessments for the 400kv” (refer to Annexure D).</li> <li>• The ESKOM Audit Planner was sourced to indicate the scheduled ECO assessments (see Annexure E).</li> </ul>	
	<p>KPI 3B.3: ... was the verifier involved with formal (systematic and objective) external conformance assessments (external audits)?</p>	<ul style="list-style-type: none"> <li>• Auditing is a specialist task done by external environmental auditors (see Quarterly audit report of SSI, 2012).</li> <li>• In terms of the ESKOM CEMP the ECO has to “Provide any information required for external auditing.” (ESKOM, 2012).</li> </ul>	1/2
	<p>KPI 3B.4: ... was the verifier involved with the ad hoc verification and evaluation of policies, plans, programmes, operational procedures, reports and the subsequent implementation of mitigation measures?</p>	<ul style="list-style-type: none"> <li>• According to Campbell (2012) “the ECO forms part of the ENCORD (Environmental Management Team) (consisting of the Building contractors environmental managers and practitioners, Environmental Manager, Conservation Manager, and the ECO). In the event of a non-compliance (a significant event) the ENCORD can decide after an investigation to close an event (see ESKOM EMS Events Planner), however, the event can only be officially closed if the ECO as an independent body goes and verifies this (the actions for successful remediation) and signs of the hard copy of the evidence (Campbell, 2012 #2).</li> <li>• The ECO verifies the monitoring reports of Environmental Officers (Campbell, 2012) (see also</li> </ul>	✓

		<ul style="list-style-type: none"> <li>• Evidence was obtained of the ECO reviewing and verifying the quarterly audit reports of the external auditors (see SSI, 2012: 27).</li> <li>• The ECO verifies the adequacy of training (Campbell, 2012). Refer to Annexure B.</li> </ul>	
<b>3C. [Check]: Controlling records.</b>	<p><b>Objective 3C: Participate in the control of records.</b></p> <p><b>Judgement on worth:</b></p> <p>Sufficient evidence was found that the ECO at Ingula controlled relevant environmental records.</p>		
	KPI 3C: ... was there sufficient evidence available to indicate that the verifier controlled records to ensure information remains accessible	<ul style="list-style-type: none"> <li>• The ESKOM CEMP requires that the ECO "Maintain records of incidents and corrective action". (ESKOM, 2012).</li> <li>• CEMP requires that the ECO "Manage and maintain a complaints register." (ESKOM, 2012).</li> </ul>	✓
<b>4. [Act]: Management and enforcement</b>	<p><b>Objective 4: Participate in management and enforcement.</b></p> <p><i>(E.g. ensuring accountability; making decisions; maintaining decision-making flexibility; employing the modes of environmental management best suited ; promoting adaptive management; and resolving disputes through conflict management)</i></p> <p><b>Judgement on worth:</b></p> <p>The evidence obtained from the Ingula case study suggests that the ECO did not have a management and enforcement function. It was found that the ECO function has a supporting role in management and enforcement and had an advisory role with no authority to stop work (except in extreme emergency situations<sup>0</sup> and/or being responsible for ceasing, containing, or eliminating sources of pollution. The ECO only has an advisory role on the matters mentioned. The responsibility for management was situated with Eskom's Environmental Management Team and Contractor's ECOs. However, the ECO had an approval function in relation to certain procedures (refer to Annexure C) but in principle approvals related to environmental decisions were obtained from the Environmental Manager.</p> <p>It was also found that the ECO at Ingula participated in adaptive management by: issuing non-compliance warnings where necessary and recommend appropriate action to the supervisor; and by updating and reviewing of the EMP. Evidence was also found that the ECO played an integral part in tracking conflict management and the resolve of environmentally related disputes. The actions for clearing these grievances were, however, the Client's and Contractor's responsibilities.</p>		
	KPI 4.1: ... did the verifier have the authority to: cease, modify or control any act, activity or process causing [or that may cause] the pollution or degradation; containing, preventing the movement of pollutants or the causing of degradation; eliminate the source of the pollution or degradation; and or remedy the effects of the pollution or degradation?	<ul style="list-style-type: none"> <li>• The ECO have no powers, only advisory role and thus no authority for stopping work. In extreme cases, however, work may be stopped but only with very clear communication with the project manager. Rhode (2012: interview 6) also states that "even I as the EM do not have the authority to stop work. I can only issue an instruction to</li> </ul>	1/2

		<p>stop work through the Project Manager and the contract”.</p> <ul style="list-style-type: none"> <li>• The ECO is not responsible or accountable for any of these tasks. These responsibility lies with the Environmental Management Team of ESKOM and the Department of Water Affairs (DWA) (Cambell, 2013).</li> <li>• The ECO do not ensure but assure that this environmental principle and the other environmental principles are adhered to (Campbell, 2012). The EOs of contractors is responsible for implementation of the Method Statements.</li> <li>• However, the ECO did play a role in containing, preventing and eliminating the source of degradation in his role and duty in the Fire Committee. [Refer to SPI 2.3.3 above].</li> <li>• According to Rhode (2012: interview 6) the authority of the ECO is his capability to report directly to government and the project manager on non-compliances.</li> </ul>	
	<p>KPI 4.2: ... did the verifier have authority to police or enforce follow-up activities and may hold the Proponent, Implementing Agent and Contractors responsible, accountable, liable and answerable to non-compliances?</p>	<ul style="list-style-type: none"> <li>• “No, the ECO do not manage and no one is answerable to the ECO.” Moreover, “the ECO do not ensure but assure” (Campbell, 2012).</li> <li>• There must be an enforcement leg with an independent perspective to keep the implementing agent like Eskom in check with what is contained within the ROD. As an implementing agent we can do that, but there will also be bit of biased, hence the ECO that plays the “referee” role.</li> </ul>	x
	<p>KPI 4.3: ... was the verifier involved with making and/or approving decisions on matters that are deemed to be a variation, or not allowed for in the environmental Performance Specifications?</p>	<ul style="list-style-type: none"> <li>• The ECO had an approval function of certain procedures (refer to Annexure C), and an internal assessment function (refer to Annexure D).</li> <li>• However, in principle approvals related to environmental decisions are obtained from the Environmental Manager (EM) or Client [Eskom Project Manager]. Site managers only collaborate with ECO (Campbell, 2012).</li> </ul>	½
	<p>KPI 4.4: ... did the verifier encourage, specify or employ the use of alternative methods, or equipment if determined to be unsuitable for the task at hand, or unnecessarily detrimental to the environment?</p>	<ul style="list-style-type: none"> <li>• Duties are clearly defined as part of the EMS document for element 4.4.1 of ISO14001 (refer to ESKOM, 2012) “Extract from the Ingula Project Construction Environmental Management Plan, in support of 4.4.1): <ul style="list-style-type: none"> <li>o Issue non-compliance warnings where necessary</li> </ul> </li> </ul>	✓

		<p>and recommend appropriate action to the supervisor.</p> <ul style="list-style-type: none"> <li>• The ESKOM CEMP requires that the ECO to “issue non-compliance warnings where necessary and recommend appropriate action to the Supervisor.” (ESKOM, 2012).</li> <li>• The ECO is involved with the update and review of the EMP [Performance Specifications] (Campbell, 2012).</li> </ul>	
	KPI 4.5: ... was the verifier involved with dispute and complaint resolution?	<ul style="list-style-type: none"> <li>• The ESKOM CEMP requires that the ECO “Manage and maintain a complaints register.” (ESKOM, 2012). Refer to the “Ingula Communication Register of March 2012 and Refer to ANNEXURE G: Evidence of the ECO involved in active community feedback in terms of a “Communication Report” and clearing actions taken to resolve impact on the community.</li> <li>• The ECO records the complaints, track progress of clearing grievances and keep records in order to make sure that what should happen happens. The actions for clearing grievances are the Client and Contractors responsibility (Campbell, 2012 interview # 4).</li> </ul>	½
<b>5. Community involvement, public participation, capacity building, and awareness</b>	<p><b>Objective 5: Participate in community involvement, public participation, capacity building and awareness.</b></p> <p><b>Judgement on worth:</b></p> <p>Sufficient evidence was found that proves the ECOs were actively involved in public participation, capacity building and awareness of the public.</p>		
	KPI 5.1: ... was there sufficient evidence available to indicate that the verifier ensured/encouraged active engagement of stakeholders in decision-making processes?	<ul style="list-style-type: none"> <li>• Refer to ANNEXURE G: Evidence of the ECO involved in active community feedback in terms of a “Communication Report” and clearing actions taken as well as feedback to the IACC forum meetings.</li> <li>• CEMP requires that the ECO “Manage and maintain a complaints register.” (ESKOM, 2012).</li> <li>• “It is important for our stakeholders and the community as all of them knows Alastair on his name, and those that don’t talks about the guy with the tooth around his neck and also, they know what his role is on site” (Stoop, 2012: interview #09).</li> </ul>	✓

	<p>KPI 5.2: ... was there sufficient evidence available to indicate that the verifier participated in awareness and capacity building campaigns, training courses and other activities to develop and sustain the interest of the community?</p>	<ul style="list-style-type: none"> <li>• The ECO was to a large extent involved in the Information posters on environmental matters that is used by the Ingula Visitors Centre for public awareness and capacity building (refer to Annexure A).</li> <li>• The ECO was involved with arranging site visits and training of the general public for example: IAIA student site visits in 2012 and 2013.</li> <li>• “An example of adding value is that one day Anville Rhode (the Environmental Manager) and/or Peter Nelson [the Conservation Officer] were not here and we had to give a presentation to a group of people [important visitors]. Alastair volunteered to give the presentation and conveyed his passion and the objectives that we at Ingula want to achieve with the environment as a team member with this group and all of a sudden they shared this passion” (Stoop, 2012: interview #09).</li> </ul>	✓
<b>6. Integration with other programmes and/or information</b>	<p><b>Objective 6: Participate in the integration of EIA follow-up with other programs and/or information.</b></p> <p><b>Judgement on worth:</b></p> <p>Sufficient evidence was found that the ECO at Ingula participated in: the implementation, operation, maintenance, review and improvement of the ISO 14001: 2004 EMS of the Project in the capacity of a member of ENCORD; and the understanding of area-wide effects and issues as an active member of the Ingula Advisory Committee, Conservation (IACC).</p>		
	<p>KPI 6.1: ... did the organization have an EMS and to what extent did the verifier participate in the monitoring and evaluation of the EMS?</p>	<ul style="list-style-type: none"> <li>• There is sufficient evidence that the ECO was actively involved in the implementation, operation, maintenance, review and improvement of an Environmental Management System of the site as part of the Environmental Coordination Committee (ENCORD Management).</li> <li>• The ECO has an approval function of certain procedures (refer to Annexure C), and an internal assessment function (refer to Annexure D).</li> </ul>	✓
	<p>KPI 6.2: ... was evidence available to indicate that the verifier was involved with area-wide programmes?</p>	<ul style="list-style-type: none"> <li>• The ECO is a member of the IACC. The Ingula Advisory Committee, Conservation is a working group formed under the Ingula Partnership Steering Committee in terms of the IPSC Memorandum of Understanding (Ekom Generation-Ingula. 2009: IACC Terms of Reference). The IPSS land will be proclaimed a Protected Area (Nature Reserve, in</li> </ul>	✓

		<p>terms of the relevant legislation) and the Ingula Advisory Committee, Conservation's (in partnership with Enkangala Grassland Project Trust, Ezemvelo Kwa-Zulu Natal Wildlife, Free State Conservation, Birdlife South Africa, Middlepunt Wetland Trust, SANBI) have the responsibilities of:</p> <ul style="list-style-type: none"><li>➤ Advise on the development of the Integrated Environmental Management Plan (IEMP) for the IPSS land, including</li><li>➤ the assessment and establishing of all necessary conservation targets and objectives;</li><li>➤ review all conservation targets and objectives on an annual basis or when deemed appropriate</li><li>➤ ensure that the conditions of the ROD are taken into account in the development and management of the IEMP; and</li><li>➤ monitoring the implementation and success thereof of the IEMP.</li></ul>
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## 2.6 Critical ingredients for ECO success

*What do you consider to be the critical ingredients for a recipe of success for an ECO (to fulfil their role, add value but also to remain independent)?*

- There needs to be much **more collaboration between the Environmental Department** and the ECO, in particular the Scorpions [Environmental Management Inspectorate] (Campbell, 2012: #1). What happens currently is that there is a massive rift between the Governmental compliances people and the people on the site that are trying to ensure that compliance goes ahead. The problem is that they are tackling it from two completely different perspectives and it needs to be a bit more intervened between the two parties. I mean, it almost becomes a witch-hunt [Government's approach]. There needs to be a bit more cohesion between the two to try and achieve the end goal, which ultimately is the benefit to the environment. In addition, that's where the independence is also vitally important. The ECO needs that level of independence.
- "Passion" (Stoop, 2012: interview #09).
- "Full-time basis, which is important" (see Stoop, 2012: interview #09). 'I think the ECO will be less effective as the ECO will not have the full context of the activities. If he does not understand the complex environment, it is difficult to come in and audit something; we see it even with our auditors (Rhode, 2012: interview #05).

## 2.7 Additional discussions

- On independence of the ECO But, it has become obvious that the independence not only is important from an assurance [client's] perspective, but also from a lot of different stakeholders involved – governmental and non-governmental organisations. They find the independence of the ECO as quite a large assurance and they take quite a lot of security out of that. Especially the Free-State Dept. of Conservation do not trust the developer but gain trust if the communication came from a different [independent ECO] perspective. It is a weird dynamic as they [these organisations] do not trust the developer to give them the right stuff [information]. However, there needs to be much more collaboration between the Environmental Department and the ECO in particular the Scorpions [Environmental Management Inspectorate]. What happens currently is that there is a massive rift between the Governmental

compliance people and the people on the site that are trying to ensure that compliance goes ahead. The problem is that they are tackling it from two completely different perspectives and it needs to be a bit more intervened between the two parties (Campbell, 2012: interview #1).

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# Annexure A: Examples of information / awareness posters for educational purposes

## 22° for energy sustainability

22° for energy sustainability Eskom

### Hot

### 22 things you can do to make Ingula more sustainable

### Cold

- 1 Keep your air-conditioner set to 22° all year round (not 30° or 16°!)
- 2 Switch off your air-conditioner if you are away for extended periods
- 3 Close your door if you step out for a moment
- 4 Use natural air flow for cooling: open your windows and switch off your air-conditioner when conditions allow
- 5 Make sure your windows and doors are closed if your air-conditioner is switched on
- 6 Make sure quick-heat or water coolers are de-activated if not in regular use
- 7 Don't print unnecessary. Carbon sequestration through filing filing cabinets with paper is a myth!
- 8 Check if lights in your office and neighbour's office are off when you leave for the day
- 9 Switch off your light when you leave your room or office
- 10 Switch off lights in the meeting venues when you leave
- 11 Don't overfill kettles when boiling: boil only as much as you need
- 12 Ensure your vehicle trip is necessary: a return trip to town results in the release of more 30 kg of CO<sub>2</sub>
- 13 Use the most efficient vehicle possible: using a full mini bus can result in emissions of only 2 kg per person per trip!
- 14 Share vehicles: 4 people in a vehicle brings emissions down to 6 kg per person per trip!
- 15 Make sure all your light bulbs are fluorescent or compact fluorescent: throw others away!

Keeping your air-conditioner at 22° all year round is your first step to sustainability

Did you know? Producing one unit of electricity (1kWh) requires:  
 • 1/3 kg coal  
 • 1.4 litre water and produces 1kg of CO<sub>2</sub> emissions

Look out for new lighting technologies: LEDs are a must here
- 17 Ensure your PC is not left on overnight
- 18 Turn your store room light switched off!
- 19 Switch off your PC: standby duty is for staff, not PCs
- 20 Banish all radiant heaters to the dim basin!
- 21 Make sure all designs include energy efficiency components: if not, review!
- 22 Start with number 1 and implement the above 21 items. (You are number 1!)

Ingula environmental hotline: 079 031 7004

## Hydrocarbon and chemical management

Hydrocarbon and chemical management Eskom

### Oil spills – why is it a problem?

Pollutes the ground and surface water systems  
 Kills local fauna and flora  
 Difficult to rehabilitate

### Prevent oil spills

Do all repairs at workshops only  
 Use bunded storage areas  
 Use drip trays

Be careful where you work

Use spill kits!

### Oil spills – fix it up!

Spill kits are available at all the major areas on site

### Report spills – don't hide them!

Report any incidents or possible problems. Why? If issues are identified and reported immediately, time and money can be saved in fixing the problem.

Why? It is better for the environment and people if problems are fixed quickly. If we work together, the project as a whole can be completed quicker and with fewer problems.

Contact your environmental officer for further assistance or to report spills

Ingula environmental hotline: 079 031 7004

## Ingula's reptiles

Ingula's reptiles Eskom

Very few of the snakes at Ingula are venomous: there are only five dangerous species on site

If you are bitten by any snake on site, remain calm and contact the on-site clinic for assistance from trained staff. Remember what the snake looks like!

Snake Clinic: 036 342 3067

Snakes will move out of your way if given the chance, keep your eyes open and you will not be at risk.

Snakes are an important part of the food chain: they are food to many other species, such as Secretary Birds, at Ingula.

Note the difference between these two species: Markings on the head!

Snakes control mice and rats on site, without the natural control mechanism rodents would be a major problem at Ingula.

It is legal to kill or injure snakes, they are protected by law

High risk Low risk No risk

Report sightings to your environmental officer or 079 031 7004 or icalm@eskom.co.za

Inspect for each site for the environment, and the project!

## Ingula protected plants

Ingula protected plants Eskom

Ingula is home to hundreds of species of plants. All plants are protected by law and may not be disturbed, removed or transported.

Some plants are endangered or vulnerable as a result of habitat loss, development (construction), unsustainable harvesting for medicinal purposes or illegal trade.

Respect for each other, the environment and for yourself!

Ingula environmental hotline: 079 031 7004

## Annexure B: Evidence of the ECO reviewing and evaluating induction training





**Real growth for people, planet and business.**

The concerns noted above may impact seriously on the effectiveness of the course, and as such, the training is not preparing site personnel adequately to operate on site within the SHEQ requirements. For example, it is a requirement of the Construction Environmental management Plan (CEMP) and the Record of Decision (RoD) that the contents of these documents are made known to all staff on the project. The current process does not allow for this as inductees can simply sign the attendance register, and complete the basic test (with provided answers) without even reading the environmental section of the programme.

The induction process forms an integral part of the SHEQ training requirements, and the intention of that is to minimize the risk to the staff, project and environment of the greater project. The lack of adequate and encompassing training may jeopardize this intention. The current method covers the Main Contractor in terms of records, but this approach merely shifts the liability and responsibility from the Contractor to the individual employee, without proactively addressing the risk reduction that is the intention of the training. In order to address the risk, an interactive and informative induction that encompasses all the requirements must be delivered to staff, and more a representative system devised for the inductee to complete thereafter.

It is strongly recommended that these concerns be addressed as a way to proactively minimize the potential risk and number of SHE incidents on site, as well as meeting the legal requirements for SHEQ purposes.

Regards

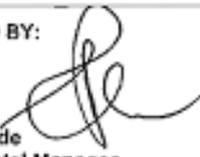
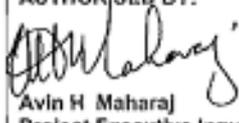
**Alistair Campbell**

**INGULA PUMPED STORAGE SCHEME - ENVIRONMENTAL CONTROL OFFICER**

**NCC ENVIRONMENTAL SERVICES**



**Annexure C: Evidence of the ECO reviewing and approving EMS documentation and procedure**

 <b>INGULA PSS</b>	Doc No: EMS 4.4.4	Rev: 3
	Temp No:	R
	Page: 1 of 30	Date: 28 Feb 2011
<b>Title:</b> <b>Ingula Environmental Management System</b> <b>4.4.4 General Overview</b>		<b>Document type:</b> Procedure
<b>This document has been seen and accepted by the following people:</b>  Anville Rhode Environmental Manager Ingula Alastar Campbell Environmental Control Officer Ingula Ingula Environmental Coordination Committee (ENCORD)		<b>COMPILED BY:</b>   P A Nelson
<b>APPROVED BY:</b>  Anville Rhode Environmental Manager	<b>AUTHORISED BY:</b>  Avin H Maharaaj Project Executive Ingula	<b>AUTHORISED BY:</b>  PTK Naidoo Plant Manager Ingula
<b>SEE PAGE 2 FOR CONTENTS</b>		
<b>CONFIDENTIALITY CLASSIFICATION:</b> Public Domain		<b>DATE OF LAST REVIEW:</b> 28 Feb 2011
Promotion of the Access to Information Act 2000		<b>DATE OF NEXT REVIEW:</b> February 2012  <i>NOTE: - These dates can be changed without effecting the revision status of the document</i>
<b>Revision Info</b>		
<b>Jan Feb 2011</b>	Update as per October 2010 Audit findings and recommendations. Reorganisation of Appendices	
<i>NOTE: The electronic master is maintained within the FMDS once this document has been copied or</i>		

**Annexure D: Evidence of the ECO roles and responsibilities in terms of internal assessments**

 <b>Eskom</b> <b>INGULA PSS</b> <b>Encord Procedure</b>	<table border="1"><tr><td>Doc No:</td><td>EMS</td><td>Rev:</td><td>5</td></tr><tr><td colspan="4">4.5.5</td></tr><tr><td>Page:</td><td>1 of</td><td>Date:</td><td></td></tr><tr><td>9</td><td></td><td>2012/03/08</td><td></td></tr></table>	Doc No:	EMS	Rev:	5	4.5.5				Page:	1 of	Date:		9		2012/03/08	
Doc No:	EMS	Rev:	5														
4.5.5																	
Page:	1 of	Date:															
9		2012/03/08															
<b>Title:</b> <b>Ingula Environmental Auditing Procedure</b>	<b>Document type:</b> <b>Procedure</b>																
<b>This document has been seen and accepted by the following people:</b>	<b>COMPILED BY:</b>																
<b>Wencord</b> <b>Ingula Environmental Coordination Committee (ENCORD)</b>	 <b>PA Nelson</b>																
<b>APPROVED BY:</b>																	
<b>Anville Rhode</b> <b>Environmental Manager</b>																	
<b>SEE PAGE 2 FOR CONTENTS</b>																	
<b>CONFIDENTIALITY CLASSIFICATION:</b> <b>Public Domain</b>	<b>DATE OF LAST REVIEW: March 2012</b>																
<b>Promotion of the Access to Information Act 2000</b>	<b>DATE OF NEXT REVIEW: March 2013</b>																
	<i>NOTE: - These dates can be changed without affecting the revision status of the document</i>																
<b>NOTE: THE ELECTRONIC MASTER IS MAINTAINED WITHIN THE INGULA DOCUMENTATION MANAGEMENT SYSTEM ONCE THIS DOCUMENT HAS BEEN COPIED OR PRINTED IT WILL BECOME A WORKING COPY ONLY!!</b>																	

## **2.5 Roles and Responsibilities**

The EO's, EM, ECO, [CEM](#) and ENCORD are responsible for conducting and implementing the internal assessments in this document within respective roles. The EM will schedule audits as per 3.3.

WENCORD members will be responsible for ensuring implementation and compliance at Contractor level.

## **2.6 Implementation Date**

The procedure will be effective immediately on signature.

## **2.7 Process for monitoring**

As per the Audit Register developed in terms of this procedure.

## **2.8 Related / Supporting Documents**

Annual Audit Register, stored under file 4.6 on the "y" drive .  
Ingula RODs and Environmental Authorisations as follows

- Main ROD
- IPSS CEMP Rev.5
- Access Road ROD & EMP
- [Ingula Bridge EMP & RoD](#)
- 400kV and Substation Integration Project EMP & RoDs
- Telecoms Tower EMP & RoD
- Green Scorpions Audit Document.
- Relevant National and Provincial legislation
- [Ingula ISO 14001 EMS](#)

# **3 Procedure**

## **3.1 Types, frequency and executors of audits and assessments**

Audits are conducted on System implementation in terms of clause 4.5.5 of ISO 14001 and on Operational implementation in terms of clause 4.5.2.

While these audits have differing objectives, they often overlap and issues are identified in terms of both 4.5.2. and 4.5.5 in each of the respective audits. As a result, the two evaluations are dealt with in the same procedure, but findings will be addressed separately.

Compliance Assessments in terms of 4.5.2

- EO assessments

---

Ingula Environmental Auditing Procedure  
Rev 4 May 2011

- Weekly by Environmental Officers (Eskom and Contractors)
- ECO Internal Assessment
  - Quarterly by independent Environmental Control Officer
- External RoD and EMP Compliance Audits
  - Quarterly external certified auditor. Must comply to requirements of SANS 19011
- Legal Reviews
  - 2 yearly or as required by Legal Auditor
- Data Integrity Audits
  - Annual by various parties

#### EMS System Audits and Reviews in terms of 4.5.5

- Internal Reviews
  - Conducted by Management Representatives
- Internal Audits
  - Accredited and / or certified auditor external to Ingula with construction experience. May or may not be external to Eskom. Must comply to requirements of SANS 19011 section 7.4
- Certification and Surveillance Audits
  - Accredited Certification body

### **3.2 Audit Criteria, Scope and Methods**

Using the relevant documents as stipulated in 2.8 of this document, as well as the ISO 14001 standard, and environmental best practice, assessment and audit checklists will be compiled for auditing Ingula PSS against, for all internal and external purposes.

#### EO Internal Assessment: (4.5.2)

EO assessments will utilize a ground level checklist to check best practises and adherence to working documents per activity/contract as well as conditions of the relevant EMP. EO's will assess the area for which they are responsible on an ongoing basis and record observations in a weekly action plan, which is shared with contractor management.

#### ECO Internal Assessment: (4.5.2)

ECO ~~assessments~~audits will utilise a checklist based on the RoD and EMP requirements. ECO will do a formal assessment of each contractor with the appropriate EO. The ECO will also conduct a final audit on completed works for closure of the relevant EMP and RoD.

#### External RoD and GEMP Compliance Audits (4.5.2)

External auditors will utilise a checklist based on the RoD and EMP requirements, as well as IFC and OECD guidelines. All activities covered by the EMP and HODs will be covered, including contractor actions.

#### External Legal Compliance Audits: (4.5.2)

Checks will be done according to the requirements of Provincial and National and Local legislation. Compliance to all legislation will be checked through review.

#### MR Reviews (4.5.5)

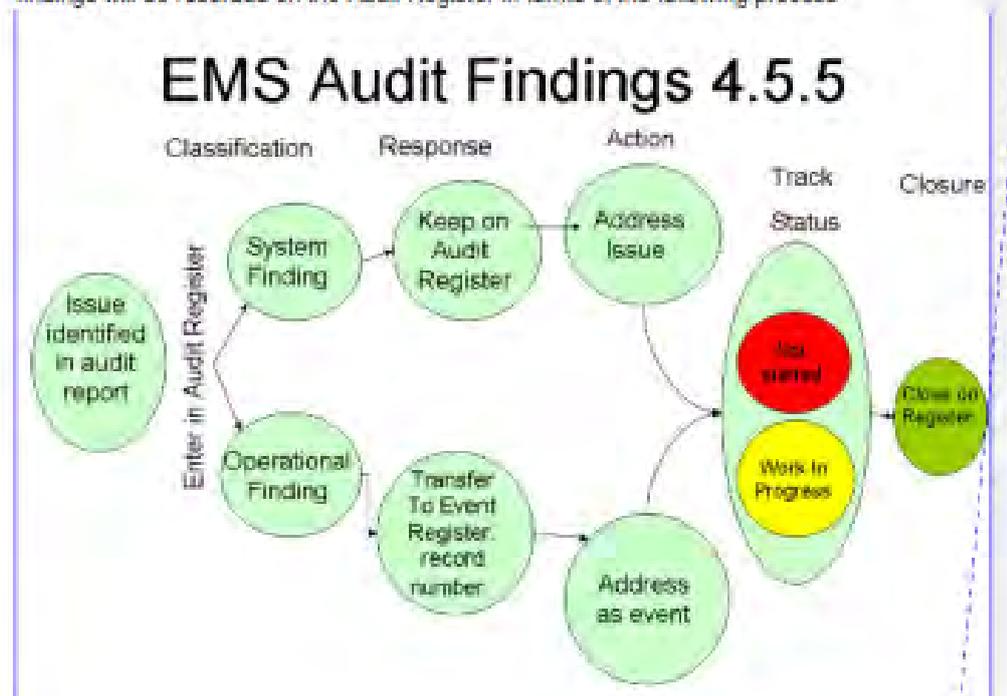
### 3.5 Audit Frequency:

Audit Type	Type	Frequency	Accountable person
EO Internal Assessments	4.5.2	Ongoing	EO's
ECO Internal Assessments	4.5.2	Quarterly	ECO
EO Internal Assessments – 400kV	4.5.2	Quarterly	EO
ECO Internal Assessments – 400kV	4.5.2	Bi-monthly	ECO
External RoD and CEMP Compliance Audits	4.5.2	Quarterly	EM
MR Reviews	4.5.5	Quarterly	EM +MRs
	4.5.2 and 4.5.5		EM
ISO/EMS External Audits	4.5.2 and 4.5.5	Annual	
External Legal Compliance Audits	4.5.2	As and when required	EM
Departmental Government Audits	4.5.2	As determined by Authority	EM

### 3.6 Audit Register

An audit register will be kept by the MR, and will be stored on the 'Y Drive'. This register will list findings for each EMS audit conducted, and monitor the progress in terms of closing out the findings. This register will be fundamental in preventing and eliminating the possibility of any repeat findings.

Each element identified as a finding, non-conformance, observation, opportunity for improvement, etc. will be recorded on the Audit register and if determined to be an operational issue, transferred to the "Event Register" to track closure. Closure of System findings will be recorded on the Audit Register in terms of the following process



Angula Environmental Auditing Procedure  
Rev 4 May 2011

This procedure is to be reviewed on an annual basis, and updated if required. The internal assessment checklists will be reviewed on an annual basis and updated, if required.

## 4 Authorisation

This procedure has been seen and accepted by:

Name	Designation
All Encord Members	
All Wencord Members	

## 5 Revisions

Date	Rev.	Remarks
March 2011	3	Update procedure in line with SANS 19011
May 2011	4	Total review to include requirements of both 4.5.2 & 4.5.5

## 6 Development team

Alastair Campbell  
Peter Nelson

# Annexure E: Evidence of the scheduled ECO assessments for the year 2012

## 2012 Year Planner

	January	February	March	April	May	June	July	August	September	October	November	December
Mon										1		Mon
Tue					1					2		Tue
Wed		1			2			1		3		Wed
Thu		2	1		3			2		4	1	Thu
Fri		3	2		4	1		3		5	2	Fri
Sat		4	3		5	2		4	1	6	3	Sat
Sun	1	5	4	1	6	3	1	5	2	7	4	Sun
Mon	2	6	5	2	7	4	2	6	3	8	5	Mon
Tue	3	7	6	3	8	5	3	7	4	9	6	Tue
Wed	4	8	7	4	9	6	4	8	5	10	7 ECO	Wed
Thu	5	9	8	5	10	7	5	9	6	11	8 ECO	Thu
Fri	6	10	9	6	11	8	6	10	7	12	9 ECO	Fri
Sat	7	11	10	7	12	9	7	11	8	13	10	Sat
Sun	8	12	11	8	13	10	8	12	9	14	11	Sun
Mon	9	13	12	9	14	11	9	13	10	15	12	Mon
Tue	10	14	13	10	15	12	10	14	11	16	13	Tue
Wed	11	15 ECO	14	11	16 ECO	13	11	15 ECO	12	17	14	Wed
Thu	12	16 ECO	15	12	17 ECO	14	12	16 ECO	13	18	15	Thu
Fri	13	17 ECO	16	13	18 ECO	15	13	17 ECO	14	19	16	Fri
Sat	14	18	17	14	19	16	14	18	15	20	17	Sat
Sun	15	19	18	15	20	17	15	19	16	21	18	Sun
Mon	16	20	19	16	21	18	16	20	17	22	19	Mon
Tue	17	21	20	17	22	19	17	21	18	23	20	Tue
Wed	18	22	21	18	23	20	18	22	19	24	21	Wed
Thu	19	23	22	19	24	21	19	23	20	25	22	Thu
Fri	20	24	23	20	25	22	20	24	21	26	23	Fri
Sat	21	25	24	21	26	23	21	25	22	27	24	Sat
Sun	22	26	25	22	27	24	22	26	23	28	25	Sun
Mon	23	27	26 EMS	23	28	25	23	27	24	29	26	Mon
Tue	24	28	27 EMS	24	29	26	24	28	25	30	27	Tue
Wed	25	29	28 EMS	25	30	27	25	29	26	31	28	Wed
Thu	26		29 EMS	26	31	28	26	30	27		29	Thu
Fri	27		30 EMS	27		29	27	31	28		30	Fri
Sat	28		31 EMS	28		30	28				29	Sat
Sun	29			29		30	29		30		30	Sun
Mon	30			30			30				31	Mon
Tue	31						31					Tue

Colour Key	
Blue	ECO Assessments
Yellow	EO Assessments
Green	EMS Audit
Red	External SA Audit
Purple	HWL Audit
Orange	Legal Audit



**Annexure G: Evidence of the ECO involved in active community feedback in terms of a “Communication Report” and clearing actions taken**

*Ingula Communication Management: Communication Report*

<b>Name of Person Submitting report</b>	Therido Makuya
<b>Contact Details of Submitter</b>	072 665 6381
<b>Submission Date</b>	12 April 2012

<b>Name of Communicant</b>	Dirk Filip De Jager
<b>Contact Details of Communicant</b>	083 300 6615
<b>Date of Communication</b>	12/04/2012
<b>Nature of Communication</b>	
<b>What</b>	Gate fence pole damaged by Contractors truck, resulting in gate not closing properly.
<b>Where</b>	400kV access to Welkom 1310 Farm on De Beers pass.
<b>When</b>	12/04/2012
<b>Cause of event</b>	Gate not closing properly
<b>Any Other Comment</b>	

*For Communication Co-ordinator use*

<b>Sequential Reference #</b>	ICR-013-01
<b>Date logged in ICR</b>	13/04/2012

*Proposed classifications, all to be endorsed by EnCord, final decision to be recorded on Events Register*

**Inclusion to Events Register** (to be ascertained by Communication Co-ordinator)

Not required	Event for Noting	Event	Legal Contravention
<b>X</b>			
<b>IF EVENT:</b>	EVENTS REGISTER NO:		

**Proposed Reporting Requirement** (to be endorsed by ENCORD)

ENCORD	Internal (Ingula)	Internal Eskom	Local DWEA	National DWEA	Other
	<b>X</b>	<b>X</b>			

**Safety Implication**

<b>Yes</b>		<b>No</b>	<input checked="" type="checkbox"/>
<i>Inform Safety Manager</i>		<i>No further requirement</i>	

### Communication Classification

Please identify what the communication is related to, and the possible significance thereof. Mark with an **X**. This will be confirmed by Communication Co-ordinator if required.

	Yes / No	Significance		
		High	Medium	Low
Access				
Aesthetics				
Alien Plants				
Biodiversity				
Dust				
Dwellers				
Erosion				
Fencing				
Fire				
Lack of Consultation				
Litter/Waste				
Positive Feedback				
Rehabilitation				
Roads				
Safety				
Security				
Sewage				
Water				
Chemical Spill				
Property Damage	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	

### Proposed Actions

Ref Number	What	Who	Target Date
013-01-01	Action responsible Contractor to repair gate.	Silondile	15/04/2012
013-01-02	Feedback to the Landowner.	ECO	Upon Completion.

## Annexure H: Evidence of the ECO involved in communication

### 4.4.3 Communication

Ingula does communicate externally on significant environmental aspects, and in addition to the systems noted below, reports via the Eskom Reporting Process.

A variety of communication systems and procedures exist on site, as follows

Message originator	Target Group	Communication Channels	Messages
ENCORD	ENCORD Members	Email	Updates on systems, general Environmental info
	Project Management	Direct	Specific info on Aspects and Impacts
	General Staff	Posters	Specific Environmental info
	General	Newsletters	Specific Environmental updates
CEO	Eskom Staff, Project managers, Contractors	Email	General staff info, Environmental messages
Visitors centre	General Public, Eskom management and staff	Newsletters, On Site Presentations, Brochures, Site visits, public Presentations	Environmental info, general site info.
IACC	NGOs, Conservation Bodies	Meetings, Email Updates	Conservation future of project
Partnership	Eskom Management Government	Direct, Reports	Environmental responsiveness of the project
CEO	GO Consultative Forum	Meetings, Email Updates	Legislative compliance on site
EM	Funders	Annual Report	Update on meeting Funders requirements where known

External environmentally related Communication with Ingula is stored on the Ingula Communication Register, maintained by the Independent ECO.

**Process:** Communication messages are identified as necessary and communicated as above. Any complaints or environmentally related communication is recorded on the Communication Register, maintained by the ECO. All complaints are referred to the ECO for tracking.

Ingula EMS General Overview 4.4.4 Page 13 of 30  
Rev 3 Feb 28 2011

*Paper copy only considered valid for day of printing. Refer to Ingula 'y' drive 4.4.4, for current document*

## Annexure I: Schedule of the data collection activities

Day 1: 24 April 2012

Time	01:00	01:00	01:00	01:00	01:00	01:30	01:00	01:00	00:00
Time-frame	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00	01:00 - 14:30	14:30 - 15:30	15:30 - 16:30	16:30
Persons	Jan-Albert & Alastair	Jan-Albert	Jan-Albert & Alastair	Jan-Albert & Alastair	Lunch	Jan-Albert & Alastair	Jan-Albert & Alastair	Jan-Albert	Jan-Albert
Action	Site orientation	Site induction	Site visit	Site visit		Accompanying inspection etc.	Document verification	Data analysis	Leave site
Place	Alastair office	Alastair office	Most areas	Most areas	???	All areas	Alastair office	Alastair office	

Day 2: 25 April 2012

Time	01:00	01:00	01:00	01:00	01:00	01:30	01:00	01:00	00:00
Time-frame	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00	01:00 - 14:30	14:30 - 15:30	15:30 - 16:30	16:30
Persons	Jan-Albert & Alastair	Jan-Albert & EM	Jan-Albert & EM	Jan-Albert & EM	Lunch	Jan-Albert & Alastair	Jan-Albert & Alastair	Jan-Albert	Jan-Albert
Action	Recap previous day	Interview	Site visit	Site visit		Accompanying inspection etc.	Document verification	Data analysis	Leave site
Place	Alastair office	Alastair office	Contractors	Contractors	???	????	?????	?????	?????

Day 2: 26 April 2012

Time	01:00	01:00	01:00	01:00	01:00
Time-frame	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00
Persons	Jan-Albert & Alastair	Jan-Albert & Proj manager	Jan-Albert & ECO	Jan-Albert & ECO	Farewell
Action	Recap previous day	Interview	Data analysis	Obtain any outstanding	Leave
Place	????	Manager's off	?????	?????	???

**ANNEXURE K: ROLLING HILLS CASE STUDY ANALYSIS REPORT**

## ECO CASE STUDY RESEARCH ANALYSIS 3: Basil Read – Rolling Hills Luxury Estate Construction

**Final Revision 24**

16 August 2013 to 4 March 2014



*Prepared by: Jan-Albert Wessels – PhD candidate at the North-West University, Potchefstroom*

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018 – 299 1580, e-mail: [janalbert.wessels@nwu.ac.za](mailto:janalbert.wessels@nwu.ac.za)*

## EXECUTIVE SUMMARY

The Rolling Hills Luxury Estate development is situated in a remote, pristine natural environment between Belfast and Machadodorp, Mpumalanga Province. The splendid development concept appears to be struggling due to the global post-2008 economic crises. At the time of the study, there was, however, still an ECO function present to fulfil certain duties as per EMP requirements.

Interestingly, three ECOs were involved on the project. Ecoleges, sub-contracted by Basil Read, provided the permanent Site Environmental Control Officer (SECO) service. Ecoleges also provided a second ECO service, the independent ECO. The ECO visited the site twice a month (every fortnight). The implementing agent of the project, Basil Read, who visited the site once a month, provided a third ECO service. The latter may be attributed to the fact that Basil Read, as the client, had an EMS, based on ISO 14001, that was implemented at the Basil Read headquarters. The RoD, however, did not require an ECO to be involved in the construction performance and/or environmental compliance monitoring.

The EMP had clear environmental and EMP objectives with supporting mitigation measures. However, the EMP sporadically referred to an “Environmental Consultant” and a “Site Environmental Officer” with certain duties. A weakness in the EMP, and other related environmental planning documents of the project, was the lack of identifying and discharging environmental roles and responsibilities for implementation and control of the performance specifications of the EMP.

The ECO services of Ecoleges were structured, well planned, documented and according to an internal quality control procedure, the “Audit Programme Including Procedures” (Ecoleges, undated). This document was drafted in line with the SANS 19011 international standard (ISO 19011, 2002).

In terms of section 1.13.7 of the Water Use License Application (WULA), “The licensee shall appoint a suitably experienced consultancy firm to assist with the public participation process”. Ecoleges who, at the time (2006), was also appointed to fulfil this function, also managed the public participation process of the RoD amendment. In this process, the ECO drafted notices and adverts, arranged documents, did the on-site work, and helped to identify the changes in land use.

A notable observation of this project is that the ECO service provider saw any inspection as an “audit”, whether it is a pre-construction inspection, first construction inspection, or monthly inspection. This is, however, not the case, as inspections and audits are not the same. A characteristic of this project is the development’s change of ownership, as well as the change and handover of ECOs during the construction phase. This resulted in Basil Read being both the client and the contractor (Mtembu, 2012: interview #10).

The following conclusions may be drawn from the evidence sourced on the worth of the ECO, based on the six KPAs:

I) OUTPUT COMPONENT: PRIOR TO PROPOSAL IMPLEMENTATION [PROJECT PLANNING AND DESIGN PHASE].

- **In terms of [Planning]** generating data, knowledge and a sustainable outcome for a project, evidence was found that the ECO function at Rolling Hills did pre-empted risks and was involved in the screening phase of projects related to the main project (RoD amendment and WULA). Moreover, the ECO was involved in the scoping phase of the RoD amendment process. However, it could not be established to what extent the ECO function was involved in the detailed assessments. Evidence was found that the ECO was involved in the review of the EMP for the Amendment of the RoD process.

II) OUTPUT COMPONENT: POST-PROPOSAL IMPLEMENTATION [PRE-CONSTRUCTION AND CONSTRUCTION PHASE].

- **With regard to [Doing] implementation** (refer to sections A: Pre-construction preparation for implementation; B: Implementing and informing decision making; and C) Reporting and Communication and related subsections of the evaluation matrix below):

2A) Evidence was found that the ECO function at Rolling Hills was involved in the handover, from planning to the implementation phase, but only to a certain extent. This was due to the ECO being appointed later than expected. Moreover, evidence show that the ECO participated in identifying, defining and allocating roles and responsibilities for the implementation, control, monitoring and evaluation, auditing and reporting of environmental specifications, through the use of the Ecoleges’ audit programme (Ecoleges,

2012). Furthermore, evidence was found that the ECO function at Rolling Hills was involved in identifying, defining and allocating financial and human resources during the project, in support of the ECO function, but that these resources were at times not enough to successfully conduct the ECO duties;

2B) Sufficient evidence was found that the ECO function at Rolling Hills did in fact do the required tasks from an environmental point of view. However, both the site manager and the technical director were of the opinion that they did not focus on the correct issues and that the ECOs did not add sufficient value to the project. However, it was found that the ECO function participated in and/or stimulated the use of sustainable technologies and processes. Sufficient evidence was available to indicate that the ECO reduced the environmental impacts by responding to actual and potential environmental emergencies. The ECO also influenced decisions related to mitigation and remediation of aspects deemed to be a variation, or not allowed for in the Environmental Performance Specifications. Moreover, sufficient evidence was found to indicate that the ECO function of Rolling Hills was involved in documenting, reviewing and approving of various documents relating to the control of procedures and processes. Sufficient evidence was also found of the ECO function being involved in informing and educating employees about environmental risks;

2C) Numerous sources of evidence indicated that the ECO function at Rolling Hills was involved in providing continuous feedback from EIA follow-up programmes to the proponent, regulator, and the community. A unique situation at Rolling Hills occurred in that the ECO function was involved in managing the public participation process of the RoD amendment. During this process, the ECO drafted notices and, adverts, arranged documents, did the on-site work, and helped to identify the changes in land use. However, no evidence was available to indicate that the ECO contributed to formal periodic feedback for internal EIA process improvement. Evidence was indeed found that the Ecoleges representative (Shaun McGregor), in his managing capacity, was involved with the Course on Post-decision implementation and enforcement of the CEM (2010 – 2013) for external EIA process improvement. However, Shaun was not the ECO at the Rollings

Hills development but influenced the project as an EAP and by drafting the Environmental Control Officer Compliance Audit Excel template. Moreover, sufficient evidence was found that the ECO contributed to openness and access to information for transparent communication.

- **In terms of [Checking]:** (see evaluation matrix sections A: Monitoring and measurement of and B: Evaluation of legal compliance (performance) and related subsections below):

3A) No evidence was found of the ECO function of Rolling Hills conducting any monitoring of environmental parameters or effects. To an extent, the ECO did contribute to the evaluation of environmental legal compliance risks and effects by completing an auditing/assessment template, which included an assessment/evaluation section that scores and rates compliance.

3B) Sufficient evidence was found to confirm that the ECO function of Rolling Hills participated in monitoring compliance and conducting internal compliance (performance) assessments. There were no formal external compliance and/or performance audits, but evidence was found that the ECO provided information in support of internal Basil Read EMS compliance audits. Evidence was found that the ECO function did, to an extent, participate in the ad hoc verification and evaluation of the audit programme and the environmental planning issues register.

3C) Sufficient evidence was found that the ECO function at Rolling Hills controlled relevant environmental records related to the relevant public participation processes, and relevant records pertaining to on-site environmental management.

- **In relation to [Acting] Management and Enforcement,** the evidence obtained from the Rolling Hills case study indicates that the ECO did not have a management and enforcement function. Moreover, no evidence was found that the ECO made or approved any decisions. Evidence was however, found of innovation in adaptive management through the change of layout plans; identifying, suggesting, promoting and encouraging the use of relevant legal processes through the amendment of the RoD; and appropriate remedial measures through Rehabilitation Register. Evidence

was found that the ECO participated in conflict management and resolving environmentally related disputes.

- Enough evidence was found that indicated that the ECO function of Rolling Hills was actively involved in public participation, capacity building and public awareness.
- Sufficient evidence was found that the ECO function at Rolling Hills participated (inadvertently) in the ISO 14001: 2004 EMS of Basil Read. However, although it was required by the relevant Government department and the public, it could not be established if the ECO function had participated in the understanding of area-wide effects and issues.

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The following colour codes were used in section 1 of the report to assist in the analysis of the interviews and documents consulted:

Colour code	Information sourced that indicates: <b>Value added</b> / <b>Partial value added</b> / <b>No value added.</b>
	Information sourced with particular reference to case.

## **1. AN OVERVIEW OF THE ECO CASE STUDY**

### **1.1 Project type**

Leisure estate development.

### **1.2 Project description and environmental authorisation background**

According to EKOTECHNIK (2005: 4), POLTIMORE TRADING LTD bought several portions of the farms Waterloo 367 J.T. and de Goedehoop 362 J.T. with the objective to develop an upmarket golf estate with a rural residential component. The construction of the project is estimated to last 8 years (thus completion in 2015). According to the Department of Agriculture and Land Administration (2004), once completed the development will consist of planning, construction and operation of the following infrastructure: Six hundred and fifty share block stands on portions 3-6 of Waterloo; Directors/Managers houses on portion 5 of De Goedehoop; One golf course; Airstrip; Two hotels; Conference facility; Shopping Centre; Restaurant on the residential area; Equestrian Centre; Chapel; Distillery; Fishing shop Existing Trout dams

However, the development concept seems to struggle financially due to the post 2008 economic climate and is viewed by some as a “White Elephant” (Anon, 2012).

### **1.3 Site location and scale**

The 1 500 Ha property is located next to N4 toll road between Belfast and Machadodorp, Mpumalanga Province (see map below and the Final Densification Proposal as Annexure A).



#### 1.4 Key role players in environmental management and governance

- **Regulator/competent authority for Environmental Impact Assessment (EIA) process:**
  - Mpumalanga Province: Department of Agriculture and Land Administration (DALA) – Environmental Management: Nkangala Region.
- **Regulator/competent authority for Water Use License Application (WULA) process:**
  - Department: Water Affairs and Forestry (DWAF).
- **The Applicant/proponent/client/permit holder:**
  - POLTIMORE TRADING LTD - St Michael's International Leisure Estate Group (Pty) Ltd

However, change of ownership was done and Basil Read took over the ownership.

- **Environmental consultant / Environmental Assessment Practitioner (EAP)**
  - EcoTechnik Environmental Consultants.
- **The Engineer/Implementing Agent**
  - Basil Read Development.
- **The Environmental Manager**
  - Basil Read Development - Group Environmental Manager.
- **The Environmental Control Officer services**
  - Site Environmental Control Officer (SECO) service provided by Ecoleges.
  - Environmental Control Officer (ECO) service provided by Ecoleges.
  - ECO service provided by the Implementing Agent (Basil Read).
- **The Site Environmental Officer services (EKOTECHNIK, 2005: 13)**
  - Ecoleges perform the Site Environmental Officer (SECO) services (see above).

- **The Contractor**

- Various but Basil Read Development were the main contractor.

## **1.5 Environmental authorisations and ECO related requirements**

### **1.5.1 Relevant Environmental authorisations**

- Mpumalanga Provincial Government - Department of Agriculture and Land Administration (DALA): RoD Ref: 17/2/14 NK 29. Authorisation to undertake a listed activity in terms of the Environmental Conservation Act 1989 (Act 73 of 1989) (section 22(3). The change of land use from agriculture to a rural residential development.
- DALA: Amended RoD of 22/01/2010.
- Department of Water Affairs and Forestry – Water Use License in terms of Chapter 4 of the National Water Act (Act No. 36 of 1998). License No.: 24075830/3,4,5,6, dated 15 June 2006 (section 4b requires that this licence shall be reviewed annually).

### **1.5.2 Authorisation requirements for EIA follow-up**

Section 1.6 of the RoD requires that **“The development must comply with all mitigatory measures as set out in the Scoping Report for the St Michael’s Leisure Estate development** (now the Rolling Hills Leisure Estate development – refer to the RoD Amendment communications in Annexure B) [these measures were incorporated into the EMP – see EMP requirements below]. Sub-section 3.3 of section 3 (Construction) requires that “The following Environmental Management Plans must be prepared and approved prior to construction:

- Management of storm water runoff.
- Management of open spaces to conserve biodiversity with emphasis on red data species.
- Waste management.
- Outdoor recreation management in open spaces.

Section 5 (Monitoring and Auditing) is focused on EIA follow-up measures and requires that: section 5.1 “The access roads to the site must be monitored for deterioration and possible erosion during the construction period; and section 5.2 “**Monitoring of water quality and invertebrates on all stream on the property should be carried out.** In terms of Reporting: section 6.1 of the RoD requires that “This authority must be notified within 24 hours in the event of non-compliance with any of the conditions of this Authorisation; section 6.2 states that “Records relating to the compliance/non-compliance with the conditions of the Authorisation must be kept in good order. Such record must be made available to this Department within seven (7) workdays from the date of a written request by the Department for such records. Section 6.4 requires that “Any complaints regarding the said development must be brought to the attention of this office within 24 hours after receiving the complaint” and that “A complaint register must be kept up to date for inspection by members of the Department”.

Moreover, the Water Use License (WULA) also provides for follow-up actions (refer to pages 3 to 12). Interestingly, section 1.12 requires that “The Licensee must conduct a public participation process within one year of receiving this licence to inform and obtain comments from all Interested and Affected Parties...” The latter is an example of a mandatory public participation process after the license was granted and the evidence indicates that the ECO service provider also provided the public participation services. Furthermore, section 1.22 specifically asks for “**An ecological monitoring programme must be compiled for in-stream components of the river and implemented accordingly within two years** of receiving this licence. A monitoring decision support system must be devised to assist with decision making and management actions which will be instituted should the status of the in-stream biota be found to deteriorate as a result of the construction activities, operation of impoundments and the application of fertilisers and pesticides. This monitoring programme and decision support system should be developed to the satisfaction of the Department of Agriculture, Conservation and Environment: Mpumalanga, and copies submitted to the Regional Director: Mpumalanga of the Department: Water Affairs and Forestry and the Department of Agriculture, Conservation and Environment: Mpumalanga”.

### **1.5.3 Contractual, Environmental Authorisation and/or EMP roles and responsibilities requirements related to the ECO function**

The Environmental Management Plan (EMP) were completed and submitted for approval 18 November 2005 by ECOTECHNIK Environmental Consultants. The EMP for the proposed development entails the establishment of environmental requirements, guidelines and standards necessary for the successful rehabilitation, mitigation and operation of activities of the proposed development in the receiving environment (ECOTECHNIK, 2005: 5). The objectives of the Management Plan are (ECOTECHNIK, 2005: 6):

- to provide an opportunity for the professional team to lay down environmental standards for the developer and contractor **to avoid unnecessary environmental damage** and where damage does occur, **to mitigate the impact thereof** to an acceptable level;
- to **focus on environmentally acceptable practices during the construction** and operation of the water supply system; and
- to **facilitate an efficient monitoring process that saves time and resources and reduces costly delays**, which could arise, where monitoring does not take place.

The abovementioned objectives of the EMP aimed to support the following environmental objectives of the project:

- Compliance to all relevant legal and statutory requirements
- Promotion of Environmental Education and Protection
- Application of the best practice principle
- Monitoring and reporting of environmental performance
- Ensure community participation
- Provide for responsible construction practices
- Ensure that environmental mitigation and control measures are implemented
- Monitoring environmental performance of all activities during the construction and operation of the development.

Interestingly there is no condition in the RoD for the appointment of an ECO(s) and/or any roles and responsibilities assigned to ECO's. However, the following roles and responsibilities are specified in the EMP and is relevant to the ECOs of the project (ECOTECHNIK, 2005):

- Construction supervisors and crews should be trained to recognize archaeological or cultural historical “chance finds” during construction, and such finds will be brought to the immediate attention of the Environmental Consultant.
- In relation to the construction of services and facilities “The Site Environmental Officer must take reasonable precautions to prevent the pollution of the ground and water resources on and adjacent to the sites as a result of his activities”.
- The Site Environmental Officer must ensure that all personnel immediately deposit waste in the waste bins provided.
- During construction the Site Environmental Officer will protect all areas susceptible to erosion by installing all the necessary, temporary and permanent drainage works as soon as possible and by taking such other measures as may be necessary to prevent surface water being concentrated in water sources and from scouring the slopes, banks and other areas.
- During the contract period, the Site Environmental Officer will ensure that temporary water attenuation and drainage structures are maintained in a state in which they can optimally perform their function.
- Upon completion of the construction period, the Site Environmental Officer will ensure that the temporary access roads are returned to a state no worse than prior to construction commencing.
- With regards to Site Clean-up and Rehabilitation (Impact 17 of the EMP) “The Site Environmental Officer must ensure that all temporary structures, materials, waste and facilities used for construction activities are removed upon completion of the project.

Apart from the documents mentioned above, Ecoleges developed an Environmental Control Officer Compliance Audit Excel template document that aids the Ecoleges ECOs to “Verify ongoing compliance with the EA or to determine the extent to which the audit criteria (determined by the EA and client) are fulfilled during the construction and

rehabilitation” (Ecoleges, undated). The Template includes an assessment/evaluation section that scores and rates compliance to the Record of Decision (ROD), Environmental Management Plan (EMP), Scoping Report (EIA) and Water-Use Licence (WULA).

**Table 1: Persons and their role in the case study**

#	Person	Role in Project	Organisation	Role in case study
1	Jan-Albert Wessels	Researcher (Phd candidate)	North-West University	<ul style="list-style-type: none"> <li>Investigated the role, value, instruments and independence of the ECO function on site.</li> </ul>
2	Philip Radford	Environmental Control Officer (offsite)	Ecoleges	<ul style="list-style-type: none"> <li>Provided assistance to the researcher for general needs and clarification of communication channels.</li> <li>Helped researcher obtain relevant documents.</li> <li>Participated in interviews.</li> <li>Participated in a site visit.</li> </ul>
3	Fortunate Ngwenya	Site Environmental Control Officer (SECO)	Ecoleges	<ul style="list-style-type: none"> <li>Helped to identify and obtain documents.</li> <li>Participated in an interview.</li> <li>Participated in a site visit.</li> </ul>
4	Stix de Jager	Contractor Director (or similar person of authority)	Basil Read	<ul style="list-style-type: none"> <li>Participated in a 1 hour interview.</li> </ul>
5	Noxolo Mtembu	Group Environmental Manager	Basil Read	<ul style="list-style-type: none"> <li>Participated in a 1 hour interview.</li> </ul>

In order not to interfere too significantly with daily tasks of the persons involved, I had to follow a strict time frame that enabled me to obtain the necessary information to successfully and meaningfully conduct the case study investigation (refer to the schedule below – Annexure C).

## 2. CASE STUDY QUESTIONS AND RESULTS

### Subject under review's background information:

- Name:** Phillip Radford
- Position:** Environmental Control Officer
- Qualification:** Bsc. Hons. Environmental Science; Post Graduate Diploma: Environmental Protection
- Experience (in construction):** 18 years at Environmental Protection – Waste Sites in the United Kingdom; and 3 years with Ecoleges.
- Experience with or as an ECO:** 2 years as an ECO at Ecoleges.

### 2.1 The ECO's own views on the role and value of ECOs before the Structured interview (Radford, 2012)

- Radford (2012: interview #3): "The ECO's role depends on the commitment of the Client and the Contractor. A central role is to provide focus on environmental protection. Monitoring is done to fulfil the need of more regulatory control or more guidance on that role. The ECO's role is essentially to protect the environment or to ensure that the scope of work do not go outside the authorised activities and site."
- Radford (2012: interview #01) "...my role is to do a first inspection [pre-construction inspection/audit] in order to determine/pre-empt conditions and one of those, the important one is to delineate where the actual footprint is and make sure that they are going to develop in the area".

### 2.2 Extraordinary examples of adding value

**Show me/tell me where you had a major influence in the course of events.**

Story 1:

An important story is the identification of a number of unlawful activities that was not identified in the original EIA application process (e.g. the Dam 3 construction within the 1:10 floodline or within 32m for the bank of a wetland) by the ECO. Moreover, the ECO also identification of the amendment to the RoD and associated Section 24G 'rectification of unlawful commencement or continuation of listed activity' under section

24G of the NEMA due to the change of processes (e.g. the STP). Furthermore, the ECO also identified listed activities that will commence on the development in the future such as the 'utilisation of borehole water'; the increase in unit density due to increase in the number of stands and reduction of footprint to accommodate the sensitive environments (that warranted and RoD amendment), the construction of bridges on the estate (that warranted RoD amendments and which is listed activities in terms of the ECA and NWA), the construction of roads on the estate (listed activities at the time under the ECA GN R 1182(d) of 1997) which were not listed in the RoD. Moreover the temporary storage of waste such as hazardous substances in a waste storage facility exceeding 150m<sup>3</sup> and planned bioremediation of hazardous waste were identified as listed activities (in GN R 718) that needed to be licensed in terms of the National Environment: Waste Management Act (Act 59 of 2008) by the ECO.

### Story 2:

According to the Comments and Response report (see Annexure B - Minutes of the meeting of 16 March 2012) the "footprint has in fact become smaller due to the development nodes being reduced to more accurately accommodate the Environmental Sensitive Areas (which largely forms the motivation for the amendment)".

Radford (2012: interview #01) indicates that: "We were inspecting conditions and became aware that they were constructing in the wetland area. So as the ECO as an independent party we suggested that they need to stop and amend their layout plan. We also realised that this development plan was eating into this rock-barren outcrops and that the original hotel site was allocated on this rocky outcrops. We actually contracted an ecologist to re-survey these areas and we recommended [based on the re-survey] that the RoD be amended to make provision for these sites [Wessels, 2012: interview #01 – response to information: "the ECO also recommended and that an Ecological Offset be developed to compensate for the loss of the sensitive areas]. This is a very good example of an ECO that influence the footprint of developments in the post proposal phase of a project.

## 2.3 Role / expectations

### 2.3.1 What in your opinion is the most important role of the ECO in this project?

*ECO (Phillip Radford, 2012) and the SECO's (Furtunate Ngwenya, 2012) opinions*

- Radford (PR) (2012: interview #01) on the implementation of the audit programme: “One of the first thing we do is in **pre-construction my role is to do a first inspection in order to determine/pre-empt conditions** and one of those, the important one is to **delineate where the actual footprint is** and make sure that they are going to develop in the area. This is done in accordance with the Ecoleges Audit Programme that Shaun [McGregor] developed in-line with SANS 19011 standard. The Programme is made available to you and this [programme] actually defines my role...” Refer to the Data Evaluation Matrix and Box 1 below:
- Radford (2012: interview #01): “The main thing is you want to make sure that they are planning to do as specified in the authorisation”. “At this site the ECO (originally Justin Bowers) appointed was made in 2007” (Phillip Radford, being the current ECO, was not sure if the construction had at that time already started). “There was a handover due to time management issues and he being involved in two other projects” Radford (2012: interview #01).
- Ngwenya (2012: interview #04): “You should not have any relation to the Client in order for me to write good reports and not monitor myself. **Thus it is very important to be independent.**” “I do inspections on a site. When I see non-compliance I write a Non-compliance Report (NCR), and make recommendations for remedying and make sure they are implemented. I also remedy and thus do management also.”
- Ngwenya (2012: interview #04): “Thus I think it is the role of the **ECO to ensure legal compliance and to give advice on issues**”. “As the SECO I make sure and take initiative in order to ensure that the issues are implemented whereas the ECO advices”.

**Box 1:** 2B.5 Documenting and document control of procedures and processes.

According to Ecoleges (undated) “Those [ECOs] assigned the responsibility for managing the audit programme should: establish, implement, monitor, review and improve the audit programme, and identify the necessary resources and ensure they are provided”.

The ECO must compile (Ecoleges, undated):

a checklist;

A (monthly compliance audit) CA;

A checklist of conditions that require written verification to prove compliance;

A pre-construction compliance report; and

A Compliance Report (CR) template using the above documents.

A blue compliance file.

Evidence was also found of the ECO drafting registers: Rehabilitation Register; and Review of environmental planning issues register.

- **Environmental manager’s opinion:**

- See comments below from the Likert Scale. In essence it is communicating with the neighboring community and ensuring that environmental liabilities are reduced.

- **Senior manager’s opinion:**

- De Jager (2012: interview #09): “On this development the ECO has been involved from the beginning in relation to the EMP and to maintain the approval of the EMP they are needed as they have a connection with the Department (DALA). As soon as we obtain the amended RoD then I foresee that their role will be reduced as our internal ECO’s will then largely takeover their role.
- Wessels: “I understand as there is no legal requirement to have an external independent ECO on the site”.

## 2.4 Need and value

### 2.4.1 In the ECO's opinion an ECO add value to the following aspects of the construction project:

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Partly Agree</i>	<i>Partly Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Unable to Judge</i>
<i>In my opinion an ECO add value to:</i>							
a) Ensuring the project is completed as per project schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Ensuring that the community surrounding the project is protected/helped/informed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
d) Ensuring that the environment is protected	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
e) No value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

#### 2.4.1.1 Any comments on the abovementioned?

- On a) PR (2012: interview #06): **“Don’t think that is part of our scope really. We are not trying to get the schedule completed”** Thus strongly disagree.”
- On b) **“Not my role to try to avoid them getting a fine. It seems that you try to cover things up in order to avoid fines.”**

#### 2.4.1.2 Apart from the above in what other areas do an ECO add value?

- “Marketing environmental – selling the green.
- **“We also improve communication lines; I do feel that there is a breakdown at times from management to site and we fill that gap sometimes internally and also externally as we are often used as the middle person stepping outside the ECO role to do consulting”** (Radford, 2012: interview #06).

**2.4.2 Middle Management:** In the site manager’s opinion (Attie de Villiers, 2012: interview #05) an ECO add value to the following aspects of the construction project:

	Strongly Agree	Agree	Partly Agree	Partly Disagree	Disagree	Strongly Disagree	Unable to Judge
<i>In my opinion an ECO add value to:</i>							
a) Ensuring the project is completed as per project schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Ensuring that the community surrounding the project is protected/helped/informed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Ensuring that the environment is protected	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) No value	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**2.4.2.1 Any comments on the abovementioned?**

- On b) de Villiers (2012: interview #05): “Ja kyk daaroor is ek baie befok, saam met hulle” (The very strong Afrikaans statement translated into censored English means: “I am with them very serious about legal liabilities on this site”).
- On c) de Villiers (2012: interview #05): “Yes, with this I agree; they did actually do this. Phillip visited me last week and he also visited all the neighboring people in the area”.
- On d) de Villiers (2012: interview #05): “This they can actually do fucking well (laughing).” (Ensuring that the environment is protected)
- On e) de Villiers (2012: interview #05): “I do not think they [ECO and SECO] should be here to sort out nonsense as here is really currently nothing happening on-site. I always gave her [the SECO] two people to help her but I’ve stopped it. At this stage I cannot tell you when they will start building [infrastructure such as housing and the hotel] and I don’t think we really need them here. They just (“karring”) stir over everything – that is all.

2.4.2.2 In your experience and/or opinion do you think there is a need for an ECO and what value does the ECO add to the project (apart from the above areas)?

- De Villiers (2012: interview #05): “I would say no. What do they actually do here? They just show me where the plants are and similar stuff that needs to be removed. I mean... They stir over things such as the rocky outcrop; that’s why I’ve told them about it this morning, and I cannot just go and remove the rocks We (South African roads authority - SANRAL) have to move a fence and they’ve sent me now a plan [letter] that asks me to get them more involved. I mean I cannot ask them to do things every time. I get instructions from Head Office and it clashes with their views. Wessels: “Moaning wife principle”. De Villiers “Yes, exactly – you see we have deadlines to meet in April and we will all be knee deep in sh... if we do not finish on time, they must understand this” [it seems that the site manager is of the opinion that the ECO’s do not understand/realise the importance of time context]

**2.4.3 In the senior manager’s (Stix de Jager: Technical Director for Basil Read Development) opinion an ECO add value to the following aspects of the construction project:**

	Strongly Agree	Agree	Partly Agree	Partly Disagree	Disagree	Strongly Disagree	Unable to Judge
<i>In my opinion an ECO add value to:</i>							
a) Ensuring the project is completed as per project schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Ensuring that the community surrounding the project is protected/helped/informed.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Ensuring that the environment is protected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) No value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.4.3.1 Any comments on the abovementioned?

- On b): De Jager (2012: interview #06): “At a stage I told Phillip you should not sent that report [Audit report] to the Department as per law you only need to submit the report once or twice to the Department. Our argument was that; if we cannot even

get the amended RoD through the Department, then why do we have to give them reports. We get no feedback from them. I feel that you should not give the Department a monthly report as the same issues always are raised and some of those cannot be resolved before the amended RoD is not approved.”

- On c) De Jager (2012: interview #06): “Yes they do this because they inform the community”.
- On d) De Jager (2012: interview #06): “Look, we all agree that they should protect the environment, but they are according to me; focusing on the wrong issues.”

2.4.3.2 In your experience do you think the ECO add value to the project (apart from the above areas such as making meaningful and workable recommendations as required)?

- De Jager (2012: interview #09): “From a developer’s point of view there must be such a person as we have an ISO 14001 Environmental management system (EMS) that we need to conform to and we are audited by external auditors. Thus, we need a “policeman function” to look after the organisation’s needs.”
- De Jager (2012: interview #09): “My personal opinion on the value is that our internal ECO will add more value as these type of external service providers want to justify their existence. Our internal ECO have a better understanding of Government’s challenges and better access to obtain approval and get the documents through. I feel that on this terrain the ECOs did not do enough from their side. We always have to ask where is this, and that, whereas our own guy would have driven to the Department and ask them for the reasons for delay.”
- De Jager (2012: interview #09): “I would not say that they’ve had no value. They got the documentation in place and did good work in the amendment of the RoD. But the implementation thereof, I feel will be done more efficiently by Stanley (the internal Basil Read ECO). It may be a race thing as the Department tend to ignore Justin but if Stanley approaches them things just happens. It is just so.”

## 2.5 Appraising the value of ECOs

This section of the report aims to capture, combine the evidence sourced and make a value judgment of the subject participation in the achievement of objectives. The keys below were used to give an indication that objectives were achieved by subject

participation. According to Owen (2007) “judgment on worth is the process of synthesizing and integrating evidence into a judgment of merit of worth”.

**Table 2: Description of Assessment Keys**

Key	Description
NA	Not applicable to case study.
?	Status could not be established.
x	Very limited or no evidence of participation to support achievement of objective(s).
½	Some evidence to support partial participation to support achievement objective(s).
✓	Sufficient evidence of participation to support achievement of objective(s).
–	Indicator with particular reference to case.

For the ordinal scale evaluation and ranking of data I assigned: x for very limited to no evidence available; ½ as the median (halfway point) for some evidence; and ✓ as sufficient evidence available to indicate that a Key Performance Indicator (KPI) was achieved, partially achieved or not achieved. An underlined evaluation (e.g. x, ½, ✓) indicates a particular interesting or unique reference to a case study.

**Table 3: Data evaluation matrix – Rolling Hills**

<p><b>Key performance areas (KPA's)</b>  <i>"Topic related to principles"</i>  <i>(Derived from ISO, 2004; Arts, 1998, Arts et al, 2001; DEA, 2011; and Hullet and Diab, 2002)</i></p>	<p><b>Objectives</b>  <i>"Indication of what needs to be achieved to"</i>  <i>(UNEP-ITC, 2002: 59-67; South Africa, 1998: 5; Du Plessis, 2002; Morrison-Saunders &amp; Arts, 2004)</i></p>	<p><b>Key performance indicators (KPI's )</b>  <i>"Questions that provide an indication to what extent the objectives were achieved by subject participation"</i>  <i>(derived from South Africa, 1998; Morrison-Saunders &amp; Arts, 2004, Singapore Environmental Agency, undated, and DWAF, 2005 as proposed by Retief, 2007a: 91)</i>  <i>Note that all questions start with: "To what extent..."</i></p>	<p><b>Evidence provided that objective were achieved, partially achieved or not achieved.</b></p>	<p><b>Appraisal</b></p>
<p><b>I) OUTPUT COMPONENT: PRIOR TO PROPOSAL IMPLEMENTATION [PROJECT PLANNING &amp; DESIGN PHASE].</b></p>				
<p><b>1. [Plan]: Generate data, knowledge and a sustainable vision or outcome</b></p>	<p><b>Objective 1: Participate in the early components of EIA prior to proposal implementation.</b>                      (Ex-ante evaluation: Preliminary assessment: Screening/Scoping; Detailed assessment: Impact analysis/mitigation measures/Reporting/EIS review/Decision-making; and EIA follow-up plans: EMP, CEMP etc.)</p> <p><b>Judgement on worth:</b>                      In terms of generating data, knowledge and a sustainable outcome, evidence was found that the ECO function at Rolling Hills did pre-empted risks and was involved in the Screening phase of projects related to the main project (RoD amendment and WULA). Moreover, the ECO was involved in the Scoping phase of the RoD amendment process. However, it could not be established to what extent the ECO function was involved in the Detailed assessments. Evidence was also found that the ECO was involved in the review of the EMP for the Amendment of the RoD process.</p>			
	<p>KPI 1.1: ...was the verifier involved in establishing whether an EIA was required for the project and other project related projects (Screening)?</p>	<ul style="list-style-type: none"> <li>• The Ecoleges (undated) "Audit Programme including Procedures" requires the ECO to liaise and interview the consulting engineer (CE) and/or project manager (preferably by phone) and to obtain all relevant documents from the Environmental Assessment Practitioner (EAP) (including RoD, EIA, Scoping Reports, Vegetation Assessments, Aquatic Assessment, approved Development Layout Plans (if applicable), WUL or General Authorisation (GA), Mining Permit, Waste Management License etc. Also refer to comments by Radford (2012: interview #01) on the implementation of the audit programme.</li> <li>• Ecoleges (2010: 1-4), in the capacity as the ECO, reviewed</li> </ul>	<p>✓</p>	

		<p>planning issues relating to the development and found that the following authorisations needed to be obtained due to change in footprint and processes:</p> <ul style="list-style-type: none"><li>• Sewer Treatment Plant (STP): “The original application or issued RoD does not provide for the authorisation of the STP as the original intention was to use a Reedbed system. The STP needs to be licensed in terms of the new National Environment: Waste Act (59 of 2008) and the existing RoD needs to be amended to reflect the STP sewerage treatment process. If determined to be unlawful a ‘rectification of unlawful commencement or continuation of listed activity’ under section 24G of the NEMA.</li><li>• New dam 3: “The dam has been constructed within the 1:10 year floodline or within 32m from the bank of a wetland. This is [was pre 2010 EIA regulation amendments] a listed activity in terms of Government Notice No.386 of 2006 (activity 1m) and Government Notice No. 387 (activity 1k). A rectification of unlawful commencement or continuation of listed activity’ under section 24G of the NEMA is needed for this activity and an amendment application may be lodged to the RoD as the dam forms part of the approved layout”.</li><li>• Furthermore, the ECO also identified listed activities that will commence on the development in the future such as the ‘utilisation of borehole water’; the increase in footprint due to increase in the number of stands (that warranted and RoD amendment), the construction of bridges on the estate (that warranted RoD amendments and which is listed activities in terms of the ECA and NWA), the construction of roads on the estate (listed activities at the time under the ECA GN R 1182(d) of 1997) which were not listed in the RoD. Moreover the temporary storage of waste such as hazardous substances in a waste storage facility exceeding 150m<sup>3</sup> and planned bioremediation of hazardous waste were identified as listed activities (in GN R 718) that needed to be licensed in terms of the National Environment: Waste Management Act (Act 59 of 2008) by the ECO.</li></ul>
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		<ul style="list-style-type: none"> <li>• Radford (2012: interview #02) states that “initially there were a number of listed activities that triggered authorisations that were not authorised in the RoD. The problem was that there are holes in the RoD as they were assessed initially in the EIA but they were omitted in the RoD.</li> </ul>	
	KPI 1.2: ...was the verifier involved in identifying key issues and impacts to be addressed in the project and other project related projects (Scoping)?	<ul style="list-style-type: none"> <li>• Yes, refer to the Amendment of the RoD process, where the ECO also played a role.</li> </ul>	✓
	KPI 1.3: ...was the verifier involved with compiling and reporting the: Environmental Impact Report (EIR)/Statement (EIS); the sustainability vision; and/or the Environmental Management Plan (EMP) of the project and other project related projects?	<ul style="list-style-type: none"> <li>• STATUS COULD NOT BE ESTABLISHED.</li> </ul>	?
	KPI 1.4: ...was the verifier involved with the preparation and submission of the Environmental Management Plan of the project other project related projects?	<ul style="list-style-type: none"> <li>• There was a RoD amendment, which led to the review of the existing EMP. The ECO did participate to an extent in this process.</li> </ul>	½
<b>II) OUTPUT COMPONENT: POST PROPOSAL IMPLEMENTATION [PRE-CONSTRUCTION &amp; CONSTRUCTION PHASE].</b>			
<b>2A. [Do]: Pre-construction preparation for implementation of specifications</b>	<p><b>Objective 2A: Participate in the pre-construction preparation and commissioning of the environmental Performance Specifications.</b> (E.g. identifying: resources required, roles and responsibilities; documenting procedures, processes and checklists).</p> <p><b>Judgement on worth:</b> Evidence was found that the ECO function at Rolling Hills was involved with the handover (planning to the implementation phase) but only to a certain extent as the ECO was appointed later than expected. Moreover, evidence suggests (refer to Ecoleges (2012) that the ECO participated in identifying, defining and allocating roles and responsibilities for the implementation, control, monitoring and evaluation, auditing and reporting of environmental specifications through the use of the Ecoleges audit programme. Furthermore, evidence was found that the ECO function at Rolling Hills was involved in the identifying, defining and allocating financial and human resources during the project for support of the ECO function, but that these resources were at times not enough to successfully conduct the ECO duties.</p>		
	KPI 2A.1: ... was the verifier involved with the handover of environmental Performance Specifications from the planning phase to the implementation phase	<ul style="list-style-type: none"> <li>• For this project the Ecoleges (undated) “Audit Programme including Procedures” requires the ECO to liaise and interview the consulting engineer (CE) and/or project manager (preferably by phone).</li> <li>• The ECO is also required to obtain all relevant documents from the Environmental Assessment Practitioner (EAP) (including RoD, EIA, Scoping Reports, Vegetation</li> </ul>	½

		<p>Assessments, Aquatic Assessment, approved Development Layout Plans (if applicable), WUL or General Authorisation (GA), Mining Permit, Waste Management License etc (Ecoleges, undated).</p> <ul style="list-style-type: none"> <li>• The ECO should also “Contact and invite the client’s representative (i.e. consulting engineer), contractor and surveyor to accompany the ECO when conducting a Pre-construction site inspection.</li> <li>• According to Radford (2012: interview #01): “By conducting the per-construction audit we actually do a <i>Due Diligence</i> audit before they start”.</li> <li>• Radford (2012: interview #01) comments that: “We will have the pre-construction inspection or audit normally before they start, but we do not always have that luxury as the ECO will be appointed late and they’ll already have started construction.” Radford (2012: interview #01) also states that: “...we actually do a <i>Due Diligence</i> audit before they start but unfortunately at my projects you are appointed late the ECO is like an afterthought and then you are on-site and they’ve already started and you come out and try to catch-up”.</li> <li>• <u>EVIDENCE IS THUS AVAILABLE TO INDICATE THAT THE ECO WAS INVOLVED WITH HANDOVER BUT ONLY TO A CERTAIN EXTENT AS THE ECO WAS APPOINTED LATER THAN EXPECTED.</u></li> </ul>	
	<p>KPI 2A.2: ... was the verifier involved in identifying, defining and allocating roles and responsibilities for the implementation, control, monitoring, evaluation, auditing and reporting of environmental specifications?</p>	<ul style="list-style-type: none"> <li>• According to Ecoleges (2012) [as the ECO service provider] “Those [ECOs] assigned the responsibility for managing the audit programme should: establish, implement, monitor, review and improve the audit programme, and identify the necessary resources and ensure they are provided”.</li> </ul>	✓
	<p>KPI 2A.3: ... was the verifier involved in identifying, defining and allocating, financial and human resources for the implementation, control, monitoring, evaluation, auditing and reporting of environmental specifications?</p>	<ul style="list-style-type: none"> <li>• According to Ecoleges (2012) “Those [ECOs] assigned the responsibility for managing the audit programme should: establish, implement, monitor, review and improve the audit programme, and identify the necessary resources and ensure they are provided”.</li> <li>• According to Radford (2012: interview #3): “In order for the</li> </ul>	1/2

		<p>ECO to be effective there must be some sort of commitment, financial commitment from the Client. <b>The feeling of I cannot achieve what I want to on a site is financially based.</b></p> <ul style="list-style-type: none"> <li>• According to Radford (2012: interview #03): <b>"No there is not always enough resources to fulfil the ECO work. You often find not enough resources to complete rehabilitation or time of labour force to implement those recommendations. It's not always the case and at times thing can turn around quickly."</b></li> </ul>	
<p><b>2B. [Do]: Implement, inform decision making in construction and parallel process.</b></p>	<p><b>Objective 2B: Participate in the implementation of the environmental Performance Specifications.</b>  (E.g. implementing processes: internal housekeeping, project control &amp; control of impacts; documenting procedures and processes; establishing emergency procedures and responses; education and induction of employees; and communication of EMP).</p> <p><b>Judgement on worth:</b></p> <p>Evidence was found that the ECO function at Rolling Hills did in fact do the required tasks (from an environmental point of view). However, both the site manager and the Technical Director were of the opinion that they did focus on the correct issues and did not add sufficient value to the project. It was found, however, that the ECO function participated in and/or stimulated the use of sustainable technologies and processes. Sufficient evidence was available to indicate that the ECO reduced environmental impacts through responding to actual and potential environmental emergency situations and that the ECO influenced decisions related to mitigation and remediation of aspects deemed to be a variation, or not allowed for in the Environmental Performance Specifications. Moreover, sufficient evidence was found to indicate that the ECO function at Rolling Hills was involved with documenting, reviewing and/approving of various documents relating to the control of procedures and processes. Sufficient evidence was also found of the ECO function being involved with informing and educating employees about environmental risks.</p>		
	<p>KPI 2B.1: ... did the verifier perform the defined and discharged roles and responsibilities until the completion of the ECO service?</p>	<ul style="list-style-type: none"> <li>• <u>The answer to this is two sided as enough evidence was found that the ECOs did in fact do their tasks (from an environmental point of view). However, both the site manager and the Technical Director were of the opinion that they did focus on the correct issues and did not add value to the project.</u></li> </ul>	<p>1/2</p>
	<p>KPI 2B.2: ... did the verifier participate in and/or stimulate the use of sustainable technologies and processes?</p>	<ul style="list-style-type: none"> <li>• According to the Minutes of the meeting of 16 March 2012 refer to Comments and Response report: Annexure B) the <b>"footprint has in fact become smaller due to the development nodes being reduced to more accurately accommodate the Environmental Sensitive Areas</b> (which largely forms the motivation for the amendment)". <u>This is a very good example of an ECO that influence the footprint of developments in the post proposal phase of a project.</u></li> </ul>	<p>✓</p>

		<ul style="list-style-type: none"> <li>• Radford (2012: interview #01): “We were inspecting conditions and became aware that they were constructing in the wetland area. So as the ECO as an independent party we suggested that they need to stop and amend their layout plan. We also realised that this development plan was eating into this rock-barren outcrops and that the original hotel site was allocated on this rocky outcrops. We actually contracted an ecologist to re-survey these areas and we recommended [based on the re-survey] that the RoD be amended to make provision for these sites [Wessels, 2012: interview #01 – response to information: “the ECO also recommended and that an Ecological Offset be developed to compensate for the loss of the sensitive areas].</li> <li>• WULA (DWAF, 2006: 5) requires that the “Licensee shall apply water conservation and demand measures to meet the requirements of the Water Demand Management Guidelines for the Responsible Authority of and when implemented”.</li> <li>• The following evidence was found to indicate the ECO involvement of using the Enviro-Loo concept:</li> </ul> 	
	KPI 2B.3: ... was the verifier involved with reducing environmental impacts	<ul style="list-style-type: none"> <li>• Ecoleges (undated) states that “When evaluating a finding</li> </ul>	✓

	through responding to actual and potential environmental emergency situations?	<p>(Actual or potential non-compliance), [the ECO must] determine the root cause so that you [the ECO] can address it when making recommendations in the CR, i.e. training, lack of appropriate equipment, etc.</p> <ul style="list-style-type: none"> <li>• A blue On-site Environmental compliance file must be kept by the ECO (Ecoleges, undated) and must contain "Control of Emergency Incidents procedures and guidelines".</li> <li>• Radford (2012: interview #03) states that "if there is a big issue [emergency incident] I will go directly to the department within 24 hours".</li> </ul>	
	KPI 2B.4: ... did the verifier influence decisions related to mitigation and remediation of aspects deemed to be a variation, or not allowed for in the environmental Performance Specifications?	<ul style="list-style-type: none"> <li>• Ecoleges (undated) states that "When evaluating a finding (Actual or potential non-compliance), [the ECO must] determine the root cause so that you can address it when making recommendations in the CR, i.e. training, lack of appropriate equipment, etc.</li> <li>• Ecoleges (2011: 1-9) drafted a "Rehabilitation Register" that: identifies areas to be remediated; suggests mitigation measures to be implemented; ...</li> </ul>	✓
	KPI 2B.5: ... was the verifier involved with documenting, reviewing and/approving of policies, plans, programmes, operational procedures, registers and emergency procedures?	<ul style="list-style-type: none"> <li>• According to Ecoleges (undated) "Those [ECOs] assigned the responsibility for managing the audit programme should: establish, implement, monitor, review and improve the audit programme, and identify the necessary resources and ensure they are provided".</li> <li>• The ECO must compile (Ecoleges, undated): <ul style="list-style-type: none"> <li>• a checklist;</li> <li>• A (monthly compliance audit) CA;</li> <li>• A checklist of conditions that require written verification to prove compliance;</li> <li>• A pre-construction compliance report; and</li> <li>• A Compliance Report (CR) template using the above documents.</li> <li>• A blue compliance file.</li> </ul> </li> <li>• Evidence was also found of the ECO drafting registers:</li> </ul>	✓

		Rehabilitation Register; and Review of environmental planning issues register.	
	KPI 2B.6: ... was the verifier involved with internal capacity building and awareness to inform & educate employees about environmental risks of their work and the manner in which their tasks must be performed?	<ul style="list-style-type: none"> <li>• According to Ecoleges (undated) the ECO must “Prepare the induction [training], including: most of the RoD mitigations; site specific mitigations from the EMP (excluding design details); and site specific concerns identified during the pre-construction site inspection”.</li> <li>• The ECO should “Conduct induction with the contractor and his staff and hand over the blue on-site Environmental File” (Ecoleges, undated).</li> <li>• The Timesheet for April 2012 of the SECO indicates that the SECO conducted Toolbox talks and induction training.</li> <li>• “Forthunate (the SECO) is responsible for induction training (Radford, 2012: interview #03).</li> <li>• According to Ngwenya (2012: interview #04): “I give toolbox talks after an NCR was raised”.</li> </ul>	
<b>2C. [Do]: Reporting and Communication</b>	<p><b>Objective 2C: Participate in reporting and communicating by informing the stakeholders as well as the general public about the results of EIA follow-up.</b></p> <p><i>Communication is "Informing the stakeholders as well as the general public about the results of EIA follow-up (in order to provide feedback on project/plan implementation as well as feedback on EIA processes)". According to DEA (2013:97) communication of: plans and participation across all levels of the organisation, especially senior staff and politicians, relevant sectors, academia, professional bodies, civil society and NGOs, etc.</i></p> <p><b>Judgement on worth:</b></p> <p>Numerous sources of evidence indicated that the ECO function at Rolling Hills was involved with providing continuous feedback from EIA follow-up programmes to the: proponent; regulator; and the community. A unique situation at Rolling Hills occurred in that the ECO function was involved with managing the public participation process of the RoD amendment. In this process the ECO drafted notices, the adverts, arranged documents, did the leg work [on site work], and helped to identify the changes in land uses. However, no evidence was available to indicate that the ECO contributed to formal periodic feedback for internal EIA process improvement. Evidence was also found that Shaun McGregor as the Ecoleges representative was involved with the Course on Post-decision implementation and enforcement of the CEM (2010 – 2013) for external EIA process improvement. However, Shaun was not the ECO at the Rolling Hills development and only influenced the project as an EAP and by drafting the Environmental Control Officer Compliance Audit Excel template. Moreover, sufficient evidence was found that the ECO contribute to openness and access to information for transparent communication.</p>		
	KPI 2C.1: ... did the verifier report or gave feedback to the site proponent on actual and/or potential harmful environmental conditions and/or situations?	<ul style="list-style-type: none"> <li>• The ECO should also “Contact and invite the client's representative (i.e. consulting engineer), contractor and surveyor to accompany the ECO when conducting a Pre-</li> </ul>	✓

		<p>construction site inspection (Ecoleges, undated).</p> <ul style="list-style-type: none"> <li>• Moreover, the ECO should “Attend the site handover meeting and raise any outstanding concerns” and “Get the site meeting timetable form the Project Manager”; “Attend the site meeting for its full duration” (Ecoleges, undated).</li> <li>• Also refer to the Ecoleges (2010: 1-4) review of planning issues relating to the development that was continually communicated to the developer; and Ecoleges (2011: 1-9) Rehabilitation Register.</li> <li>• The Timesheet for April 2012 of the SECO indicates that the SECO attended regular site meetings for example on: the 2<sup>nd</sup>, 5<sup>th</sup>, 9<sup>th</sup>, 12<sup>th</sup>, 16<sup>th</sup>, 17<sup>th</sup>, 20<sup>th</sup>, 23<sup>rd</sup>, 24<sup>th</sup>, 25<sup>th</sup>, and 26<sup>th</sup> of April 2012.</li> <li>• According to Radford (2012: interview #01) we use photographic evidence to report a non-compliance as well as verbal evidence to communicate, we discuss with the site manager the root cause and then you have your notebook to keep your own records.</li> <li>• Improve communication lines; I do feel that there is a breakdown at times from management to site and we fill that gap sometimes” (Radford, 2012: interview #06).</li> </ul>	
	<p>KPI 2C.2: ... did the verifier report or gave feedback to the Regulator on actual and/or potential harmful environmental conditions and/or situations?</p>	<ul style="list-style-type: none"> <li>• The WULA requires monthly reporting of information to DWAF (DWAF, 2006: 11).</li> <li>• According to Ecoleges (undated) “Construction phase site inspections, reports and audits go to DALA”.</li> <li>• Radford (2012: interview #03) states that “if there is a big issue [emergency] I will go directly to the department within 24 hours as non-compliances must be reported to the Department. There is a ladder of communication; if there is a problem I’ll go to the site manager, if it happens then nice if not then we have a meeting, set dates and if nothing still happens then it goes higher [to the Department]”. <ul style="list-style-type: none"> <li>• Minutes of the Meeting 16 March 2010 indicates that “As part of the amendment, water harvesting will be discussed with the Department of Water Affairs” (refer to Ecoleges, undated (b) Comments and</li> </ul> </li> </ul>	<p>✓</p>

		Response report: Annexure B)	
	KPI 2C.3: ... did the verifier report or gave feedback to the Community on actual and/or potential harmful environmental conditions and/or situations?	<ul style="list-style-type: none"> <li>• According to Radford (2012: interview #01): “As part of the pre-construction audit that focus on the EMP and RoD conditions, it may be required that the I&amp;APs be notified of the approval of the authorisations”</li> <li>• According to Radford (2012: interview #03) “Ecoleges, managed the public participation process of the RoD amendment. In this process the ECO drafted notices, the adverts, arranged documents, did the leg work [on site work], helped identified the changes in land uses. In a sense we fulfilled the EAP role”.</li> <li>• The ECO and ECO service provider (Ecoleges) managed the public participation process of the RoD amendment and the Water Use Licence Application (WULA). The WULA (DWAF, 2006) states that “The arrangement and conducting of public participation processes and meeting shall be conducted to ensure that all Interested and Affected Parties have been duly consulted”.</li> </ul>	✓
	KPI 2C.4: ... was the verifier involved with formal periodic feedback, communication of EIA predictions into the planning stage to be implemented moving forward?	<ul style="list-style-type: none"> <li>• NO EVIDENCE.</li> </ul>	X
	KPI 2C.5: ... was the verifier involved in active feedback/communication/training for ensuring improved EIA	<ul style="list-style-type: none"> <li>• Shaun McGregor as the Ecoleges representative was involved with the Course on Post-decision implementation and enforcement of the CEM (2010 – 2013). However, Shaun was not the ECO at the Rollings Hills development and only influenced the project as an EAP and by drafting the Environmental Control Officer Compliance Audit Excel template.</li> </ul>	½
	KPI 2C.6: ... did the verifier ensure openness, access to information for transparent communication with all stakeholders involved?	<ul style="list-style-type: none"> <li>• The post-decision public participation process was managed by the ECO. According to DWAF WULA section 1.13.2 (DWAF, 2006: 4) “The compilation of documents that will openly and transparently, in sufficient detail, explain the licensees operations including its current and future water uses and it’s associated and potential impacts.”</li> </ul>	✓

<p><b>3A. [Check]: Monitoring and measurement of effects</b></p>	<p><b>Objective 3A: Participate in the monitoring and measurement of environmental effects.</b> (Ex-post evaluation: measuring, comparing, assessing &amp; auditing – environmental effects &amp; parameters)</p> <p><b>Judgement on worth:</b> No evidence was found that the ECO function at Rolling Hills conducted monitoring of environmental parameters or effects. The ECO do to an extent contribute to the evaluation of environmental legal compliance risks and effects by completing an auditing/assessment template that included an assessment/evaluation section that scores and rates compliance.</p>		
	<p>KPI 3A.1: ... was there sufficient evidence to confirm that the verifier collected data on environmental effects?</p>	<ul style="list-style-type: none"> <li>• There are many requirements in the WULA for the monitoring of environmental parameters and effects of quantity and quality of surface and groundwater, soil pollution as well as biological monitoring of the rivers (refer to DWAF, 2006: 9-13). However, <b>no evidence is available to indicate the ECO(s) monitor these effects and/or parameters by use of monitoring instruments.</b> Moreover, the WULA also refer to methods of analysis to be used (DWAF, 2006: 11) but no evidence suggest that the ECO are responsible or have the task to monitor any of these parameters.</li> <li>• <b>Physically we do not use environmental monitoring equipment” (Radford, 2012: interview #01).</b></li> </ul>	<p>x</p>
	<p>KPI 3A.2: ... was the verifier involved with risk assessment and evaluation of environmental aspects and the risks, consequences and alternative options for mitigation of activities?</p>	<ul style="list-style-type: none"> <li>• Ecoleges (undated) states that <b>“When evaluating a finding (Actual or potential non-compliance), [the ECO must] determine the root cause</b> so that you can address it when making recommendations in the CR, i.e. training, lack of appropriate equipment, etc.”</li> <li>• Ecoleges developed an Environmental Control Officer Compliance Audit Excel template document that aids the Ecoleges ECOs to “Verify ongoing compliance with the EA or to determine the extent to which the audit criteria (determined by the EA and client) are fulfilled during the construction and rehabilitation” (Ecoleges, undated). <b>The Template includes an assessment/evaluation section that scores and rates compliance</b> to the Record of Decision (ROD), Environmental Management Plan (EMP), Scoping Report (EIA) and Water-Use Licence (WUL).</li> </ul>	<p>½</p>

<p><b>3B. [Check]: Monitoring and evaluation of legal compliance (performance)</b></p>	<p><b>Objective 3B: Participate in internal and external compliance (performance) evaluation.</b> (Ex-post evaluation: measuring, comparing, assessing &amp; auditing - legal compliance/performance to Environmental Specifications)</p> <p><b>Judgement on worth:</b> Sufficient evidence was found to confirm that the ECO function at Rolling Hills participated in: monitoring compliance; and conducting internal compliance (performance) assessments. There are no formal external compliance and/or performance audits but evidence was found that the ECO provided information in support of internal Basil Read EMS compliance audits. Evidence was also found that the ECO function did participate to an extent in the ad hoc verification and evaluation of the audit programme and the environmental planning issues register.</p>	
	<p>KPI 3B.1: ... did the verifier collect data on environmental legal compliance?</p>	<ul style="list-style-type: none"> <li>• According to Ecoleges (2012) "Those [ECOs] assigned the responsibility for managing the audit programme should: establish, implement, monitor, review and improve the audit programme, and identify the necessary resources and ensure they are provided".</li> <li>• Evidence was found that the SECO conducted daily site inspections (Timesheet of April 2012).</li> <li>• According to Radford (2012: interview #01) "I would say that I do inspections twice a month and during the final inspection I will compile an audit spreadsheet for the month based on the non-compliances and evidence from the inspections."</li> <li>• "As the ECO I do compliance, I monitor compliance against EMP and RoD Conditions" (Radford, 2012: interview #03).</li> </ul>
	<p>KPI 3B.2: ... did the verifier use a formal (systematic and objective) assessment approach (internal auditing) to compare environmental effects and compliance data with norms, prediction and expectations?</p>	<ul style="list-style-type: none"> <li>• Yes; Ecoleges developed an Audit Programme including Procedures to be used by their contracted ECOs. This programme/procedure is an example of best practice for the ECO and is in-line with the ISO 19011 international standard for auditing.</li> <li>• According to Ecoleges (2012) "Those [ECOs] assigned the responsibility for managing the audit programme should: establish, implement, monitor, review and improve the audit programme, and identify the necessary resources and ensure they are provided". It is also the responsibility of the ECO to "Define the Audit Criteria according to the requirements of the EA and client" (Ecoleges, undated).</li> <li>• The ECO must compile (Ecoleges, undated) "A pre-</li> </ul>

		<p><b>construction compliance report”.</b></p> <ul style="list-style-type: none"> <li>• The ECO <b>must complete and submit the Compliance Report (CR)</b> (and audit) on the same day as the inspection...”</li> </ul>	
	KPI 3B.3: ... was the verifier involved with formal (systematic and objective) external conformance assessments (external audits)?	<ul style="list-style-type: none"> <li>• Radford (2012: interview #06): <b>“On this site we do not have an external legal compliance audit.</b> Tomorrow the Basil Read Environmental Manager will do a legal compliance audit [internal audit/assessment] as part of their Environmental Management system”.</li> <li>• The <b>ECO did contribute to this audit to an extent by providing information in the audit.</b></li> </ul>	1/2
	KPI 3B.4: ... was the verifier involved with the ad hoc verification and evaluation of policies, plans, programmes, operational procedures, reports and the subsequent implementation of mitigation measures?	<ul style="list-style-type: none"> <li>• According to Ecoleges (undated) “Those [ECOs] assigned the responsibility for managing the audit programme should: establish, implement, monitor, <b>review and improve the audit programme</b>, and identify the necessary resources and ensure they are provided”.</li> <li>• Evidence was also found of the <b>ECO reviewing the environmental planning issues register.</b></li> </ul>	✓
<b>3C. [Check]: Controlling records.</b>	<p><b>Objective 3C: Participate in the control of records.</b></p> <p><b>Judgement on worth:</b></p> <p>Sufficient evidence was found that the ECO function at Rolling Hills controlled relevant environmental records related to the relevant public participation processes and relevant records pertaining to on-site environmental management.</p>		
	KPI 3C: ... was there sufficient evidence available to indicate that the verifier controlled records to ensure information remains accessible	<ul style="list-style-type: none"> <li>• The post-decision public participation process was managed by the ECO (in the capacity of the EAP). According to DWAF WULA section 1.13.5 and 1.13.6 (DWAF, 2006) <b>“all public participation actions shall be documented and documents compiled during the public participation process shall be submitted to the Department within 6 months after completion of the process”.</b></li> <li>• <b>A blue On-site Environmental compliance file must be kept by the ECO (Ecoleges, undated) and must contain:</b> <ul style="list-style-type: none"> <li>• Public complaints register.</li> <li>• Environmental Incident Logbook.</li> </ul> </li> </ul>	✓

		<ul style="list-style-type: none"> <li>• On Site Diary – to be completed by the ECO at every visit or daily by the SECO.</li> <li>• Compliance Reports – the contractor must print and file these.</li> <li>• Record of Decision (Environmental Authorisation).</li> <li>• EIA/EMP.</li> <li>• Permits and Licences (e.g. protected tree). WUL should be obtained by the developer. General authorisation is issued provincially and should be obtained before commencement and is usually obtained by the EMP team.</li> <li>• Control of Emergency Incidents procedures and guidelines.</li> <li>• Evidence was also found of the ECO keeping records in the form of: Rehabilitation Register; and Review of environmental planning issues register.</li> <li>• Evidence was also provided that the SECO and ECO keeps records of the daily activities of the SECO in the form of a Timesheet (example provided for the month of April 2012).</li> <li>• According to Radford (2012: interview #01): "...then you have your notebook to keep your own records..."</li> </ul>	
<p><b>4. [Act]: Management and enforcement</b></p>	<p><b>Objective 4: Participate in management and enforcement.</b>  <i>(E.g. ensuring accountability; making decisions; maintaining decision-making flexibility; employing the modes of environmental management best suited ; promoting adaptive management; and resolving disputes through conflict management)</i></p> <p><b>Judgement on worth:</b></p> <p>The evidence obtained from the Rolling Hills case study indicates that the ECO did not have a management and enforcement function. Moreover, no evidence was found that the ECO made or approved any decisions. Evidence was, however, found of innovative in adaptive management by: change of layout plans; identifying, suggesting, promoting and encouraging the use of relevant legal processes through the amendment of the RoD; and the appropriate remedial measures through Rehabilitation Register. Evidence was also found that the ECO participated in conflict management and resolving of environmentally related disputes.</p>		
	<p>KPI 4.1: ... did the verifier have the authority to: cease, modify or control any act, activity or process causing [or that may cause] the pollution or degradation; containing, preventing the movement of pollutants or the</p>	<ul style="list-style-type: none"> <li>• Radford (2012: interview #03) states that: "The ECO cannot physically do it [environmental actions], you can note the problems, warn them of non-compliance which are</li> </ul>	<p>x</p>

	<p>causing of degradation; eliminate the source of the pollution or degradation; and or remedy the effects of the pollution or degradation?</p>	<p>around the corner. However, I do find them to take a number of weeks to resolve the issue. It's the Department's role."</p> <ul style="list-style-type: none"> <li>• "There was the idea that one day the SECO may direct a team to rehabilitate a certain disturbed areas. However, this did not work" (Radford, 2012: interview #03).</li> </ul>	
	<p>KPI 4.2: ... did the verifier have authority to police or enforce follow-up activities and may hold the Proponent, Implementing Agent and Contractors responsible, accountable, liable and answerable to non-compliances?</p>	<ul style="list-style-type: none"> <li>• Radford (2012: interview #03): "I often feel that I haven't got the power to stop them or to deter them like an EMI. This is the Governmental</li> <li>• According to Radford (2012: interview #03): "In my experience in one project there was a penalty system that worked effectively where they have a finding of someone that do not comply to the EMP. I've never seen on a RoD but on a number of road projects where the project manager did impose fines on sub-contractors. It still had to go to the Environmental Department; there was unfortunately no back-up from them. That fining system was really the last resort. [However, the fining system was imposed by the project manager on the recommendation of the ECO and not by the ECO himself].</li> <li>• "In the Basil Read EMP[of their EMS] there is a fining system but it has never been incorporated on this site"</li> <li>• "On this site, what I've probably not highlighted enough is what Justin has incorporated [Justin Bower – the previous ECO]. I think there has been a certain amount of control due to Justin's reign here, the Client really incorporated conditions. The Client said "look we've got the authorisation now we can go ahead. But Justin raised certain issues (refer to the pre-construction audit and the environmental planning issues raised - Annexure A) that the Client is willing to address due to wanting to do the right thing. So I think there has been a certain amount of control on this site". "Although I monitor compliance, the frustrating thing is I have no enforcement power and I cannot issue any notice on them".</li> </ul>	<p>x</p>
	<p>KPI 4.3: ... was the verifier involved with making and/or approving decisions on matters that are deemed to be a variation, or not allowed for in</p>	<ul style="list-style-type: none"> <li>• NO EVIDENCE WAS AVAILABLE.</li> </ul>	<p>x</p>

	the environmental Performance Specifications?		
	KPI 4.4: ... did the verifier encourage, specify or employ the use of alternative methods, or equipment if determined to be unsuitable for the task at hand, or unnecessarily detrimental to the environment?	<ul style="list-style-type: none"> <li>• Yes, evidence indicates that the ECO identified, suggests, promoted and encouraged the use of relevant legal processes through the amendment of the RoD; and the appropriate remedial measures through Rehabilitation Register. Evidence in the minutes of the amendment meeting suggests that the ECO was promoting and employing adaptive management measures sufficiently. Moreover, adaptive management measures are evident in the change of the layout plan (reducing the footprint) to accommodate sensitive areas (see Ecoleges, undated (b) Comments and Response report: Annexure B).</li> <li>• According to Radford (2012: interview #03) "the development changed ownership and the ECO position was also handed over and changed during this period. The ECO had to ensure that the changes did not happen outside the conditions of the authorisation and that all parties [regulator] are notified of the changes and also to ensure that the environment was not impacted in a way that the EIA and the authorisation was planning for."</li> </ul>	✓
	KPI 4.5: ... was the verifier involved with dispute and complaint resolution?	<ul style="list-style-type: none"> <li>• The Comments and Response report (refer to Ecoleges, undated (b) - Annexure B) indicate that many issues, complaints and disputes were raised by I&amp;APs and that the ECO did indeed attended to and at times resolved situations of conflict.</li> </ul>	✓
<b>5. Community involvement, public participation, capacity building, and awareness</b>	<b>Objective 5: Participate in community involvement, public participation, capacity building and awareness.</b> <u>Judgement on worth:</u> Enough evidence was found to indicate that the ECO function at Rolling Hills was actively involved in public participation, capacity building and awareness of the public.		
	KPI 5.1: ... was there sufficient evidence available to indicate that the verifier ensured/encouraged active engagement of stakeholders in decision-making processes?	<ul style="list-style-type: none"> <li>• Interestingly, section 1.12 of the WULA requires that "The Licensee must conduct a public participation process within one year of receiving this licence to inform and obtain comments from all Interested and Affected Parties..." The latter is an example of a mandatory public participation process after the license was granted and the evidence indicates that the ECO service provider also provided the</li> </ul>	✓

		<p>public participation services.</p> <ul style="list-style-type: none"> <li>• There is sufficient evidence (see Annexure B) of a public participation and involvement process managed by the ECO.</li> <li>• On c) [Ensuring that the community surrounding the project is protected/helped/informed] de Villiers (2012: interview #05) stated: "Yes, with this I agree; they did actually do this. Phillip visited me last week and he also visited all the neighboring people in the area"</li> </ul>	
	<p>KPI 5.2: ... was there sufficient evidence available to indicate that the verifier participated in awareness and capacity building campaigns, training courses and other activities to develop and sustain the interest of the community?</p>	<ul style="list-style-type: none"> <li>• In a response to a question of the public meeting on the 16<sup>th</sup> of March 2012, an I&amp;AP wanted to know what will happen with the people who could not attend the meeting. The ECO responded that "we will contact them and go through the presentation [of the amendment and change proposal] (see Ecoleges, undated (b) Comments and Response report: Annexure B)</li> </ul>	✓
<p><b>6. Integration with other programmes and/or information</b></p>	<p><b>Objective 6: Participate in the integration of EIA follow-up with other programs and/or information.</b></p> <p><b>Judgement on worth:</b></p> <p>Sufficient evidence was found that the ECO function at Rolling Hills participated (without knowledge of it) in the ISO 14001: 2004 EMS of the Client. However, although it was required by the relevant Government department and the public it could not be established if the ECO function participated in the understanding of area-wide effects and issues.</p>		
	<p>KPI 6.1: ... did the organization have an EMS and to what extent did the verifier participate in the monitoring and evaluation of the EMS?</p>	<ul style="list-style-type: none"> <li>• The site and related operations were not certified, however, the Client/Contractor as Basil Read, do have a certified ISO 14001: 2004 EMS. The ECO, although not aware of it played a verification role in this EMS of Basil Read.</li> <li>• De Jager (2012: interview #09): "From a developer's point of view there must be such a person as we have an ISO 14001 Environmental management system (EMS) that we need to conform to and we are audited by external auditors. Thus, we need a "policeman function" to look after the organisation's needs."</li> <li>• Mtembu (2012: interview #010): "This site is different as Basil Read being both the Client and the Contractor. I thus get more communication [value] from the independent ECO as on other sites. On other sites it is really an independent</li> </ul>	1/2

		<p>job, but here they are so much more involved. The way it helps me is that I'm aware, even if I do not come here. If I get 3 or 4 non-conformances a month then I will pick up the phone and say is the thing cleared or how far is it? They are not really focusing on our ISO system but more on compliance to conditions of the EMP and RoD. I will do my own legal compliance inspection [audit] as part of the system when I'm here (Mtembu, N. 2012: interview #10).</p> <ul style="list-style-type: none"> <li>• Wessels: "The site is not part of the system certification, thus what elements of the system are then applicable to this site?"</li> <li>• Mtembu (2012: interview #010): "Legal and Other requirements (4.3.2) and thus their function is a safety guard as the RoD and EMP requirements are legal requirements. In terms of the system incident reporting is also applicable to them [ECO's] (element 4.5.3 Non-conformity, Corrective and Preventative Action".</li> <li>• Mtembu (2012: interview #010): "Sometimes for me it is important to have back-up, especially independent back-up. If I want to stop an action on a site then I can refer back to the ECO's report because that is legal compliance inspections of the EMP which is a legal document.</li> </ul>	
	<p>KPI 6.2: ... was evidence available to indicate that the verifier was involved with area-wide programmes?</p>	<ul style="list-style-type: none"> <li>• The WULA (DWAF, 2006: 4) requires the Licensee to become a member of the Elands River water User Association". No evidence was, however, found that this was indeed done.</li> <li>• According to the Comments and Response Report of the meeting of 16 March 2012 (Ecoleges, undated (b)), the ECO (in capacity of EAP) stated that "we are currently in discussions with several service providers to service the site and dispose of waste at a licensed facility as the Machadodorp landfill site is not." Marianne Joubert (Emakhazeni local municipality) responded that "We are having the same problem with waste management; service providers do not want to come and collect waste from Dullstroom, Belfast, St Micheil's and Waterval Boven which [the actions of the development through the ECO/EAP service/investigation] will really assist us to get rid of the</li> </ul>	<p>x</p>

		<p>waste”.</p> <ul style="list-style-type: none"><li>• According to the Comments and Response Report Gerbrand Coetzee (as an I&amp;AP) posted on the comment sheet to Phil Radford on 24/04/2012 that “Veld &amp; Forest Fire Act 100 of 1998: You must join a fire ward and make fire breaks. Contact – G. Coetzee at 082 921 2961”. The ECO/EAP responded by stating “The site manager has been notified of the requirements of the Act and the ECO will ensure that those requirements are fulfilled including the necessary fire breaks.” No evidence was, however, found that this was indeed done.</li></ul>	
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## 2.6 Critical ingredients for a recipe for ECO success

***What do you consider to be the critical ingredients for a recipe of success for an ECO (to fulfil their role, add value but also to remain independent)?***

- **Timeous appointment of ECO:** Radford (2012: interview #01) comments that: “We will have the pre-construction inspection or audit normally before they start, but we do not always have that luxury as the ECO will be appointed late and they’ll already have started construction.” Radford (2012: interview #01) also states that: “...we actually do a Due Diligence audit before they start but unfortunately at my projects you are appointed late the ECO is like an afterthought and then you are on-site and they’ve already started and you come out and try to catch-up. It makes it very difficult if the Contractor and Client is already on the site and they are well on their way and at times you try to get that other applications [authorization processes as identified in the pre-construction inspection/audit]. “Thus timeous appointment of the ECO is critical and Shaun McGregor actually wrote in the 2011 survey that the ECO should be appointed AT LEAST a month before construction starts (Wessels, 2012: interview #01)”
- Wessels (2012: interview #01): “What is your opinion on objectivity/independence of ECO’s being on site on a permanent basis or involved with the project as a team member?” PR (2012: interview #01): **“In my experience as an Environmental Officer in the UK, we will operate in a team and we might rotate projects just to get a fresh pair of eyes. You can be on a site, and not become involved, but you might omit something. You always need to take a step back not to become too familiar with the people on site.** Obviously you need to stay professional”.
- Commitment of Client is needed.
- Efficient resources are needed.
- Promote environmental education and protection.

## 2.7 Additional discussions

McGregor (2012: email correspondence): Good morning Reece and Johan,

Please can you advise on the following concern that I have regarding my presentation on “Auditing and Facilitating Audits: Case study experiences” before I start revising it.

As mentioned in the last workshop at TCTA, I struggled to differentiate between the roles and responsibilities of an ECO and Auditor, specifically regarding monitoring (regular site inspections) and reporting versus auditing. Allow me to elaborate and provide an explanation for this confusion. As you know, we focused our service on monitoring rather than implementation in order to retain our independence. Consequently, we did not provide permanent on-site SECOs. We undertake regular site inspections and the frequency is determined, inter alia, by the size and nature of the project. Furthermore, Ecoleges based and structured its ECO service on the ISO 19011 guideline document for EMS auditing because of the lack of ECO-specific guidelines or standards. We adapted and aligned the definition of an Audit Programme to suite our ECO work; each month our ECOs prepare an ECO (Audit) Programme involving a set of one or more site inspections (audits) planned for a specific timeframe (one month) and towards a specific purpose (measuring compliance, specifically the Overall Project Compliance Score (%) for that month). Furthermore, we used the audit process to inform our ECO activities. Can you see how I unintentionally blurred the distinction between an ECO and Auditor, at least for myself? Our service is structured as follows. We undertake one or more site inspections per month. We complete a site inspection report containing the findings of each site inspection. Each ECO inspection seeks to verify compliance with all the audit criteria (in the EA and EMPr). Those reports (or findings) then feed into an excel sheet that scores compliance with the ‘audit criteria’ and spits out an Overall Project Compliance Score (%) at the end of and for that month. In isolation, each inspection and report is just an ECO inspection and report of the ECO’s findings, but all inspections and reports undertaken during that month are combined to produce our monthly excel spreadsheet, which we called the audit.

I now know, from Johan's answer at the workshop, that our excel spreadsheet (when considered on its own) is not an audit, but a ‘check.’ Having said that, and taking into account the background information, does the structure and process/activities contained in our monthly programme constitute an internal audit? I think, by incorporating the ISO 19011 guideline into our ECO service, we may have inadvertently provided an internal audit service. Our monthly ECO programmes may qualify as an audit, which then forms part of the bigger audit programme. For example, if a project is 8 months long, the Audit Programme involves a set of one or more (8 monthly) audits planned for a specific timeframe (8 months) and towards a specific purpose (to comply with the EA by measuring ongoing compliance during the construction/audit period of 8 months). I don’t know what is traditionally expected of an ECO. If it is monitoring and reporting on selected criteria or random findings observed during an inspection, then we have created a service that offers more than this. If you agree, then I can provide a presentation on (internal) auditing that incorporates the background that I have described above and our way of doing it. If not, then I am not experienced to talk about internal audits, and external auditing (when independence is required) is already covered in another one of your courses (A Lead Auditor Course Based on ISO 19011...) by better qualified CEM presenters. I hope that I am not being complicated, but our core business is ECO work. We have incorporated aspects of the ISO 19011 guideline for auditing into that service and thought we were ECO-ing and auditing at the same time even though ECOs were not required to audit in the EAs (mostly Mpumalanga) we have worked with. If we need to undertake an isolated and independent audit, then we apply what I learnt from CEM’s Lead Auditor Course Based on ISO 19011. Please advise.

Just another interesting concept. Audits measure conformance/compliance at one point in time (a snapshot measure). So if an EA requires an ECO to undertake compliance monitoring for the duration of construction, is it not asking for recurrent compliance audits?

Yours sincerely, Shaun

- Wessels: “How does the ECO function fit into your EMS?”
- Noxolo Mtembu (Basil Read’s Environmental Manager – EMS representative) (2012: interview #010): “This site is different as Basil Read being both the Client and the Contractor. I thus get more communication [value] from the independent ECO as on other sites. On other sites it is really an independent job, but here they are so much more involved. The way it helps me is that I’m aware, even if I do not come here. If I get 3 or 4 non-conformances a month then I will pick up the phone and say is the thing cleared or how far is it? They are not really focusing on our ISO system but more on compliance to conditions of the EMP and RoD. I will do my own legal compliance inspection [audit] as part of the system when I’m here (Mtembu, N. 2012: interview #10).
- Wessels: “The site is not part of the system certification, thus what elements of the system are then applicable to this site?”
- Mtembu (2012: interview #010): “Legal and Other requirements (4.3.2) and thus their function is a safety guard as the RoD and EMP requirements are legal requirements. In terms of the system incident reporting is also applicable to them [ECO’s] (element 4.5.3 Non-conformity, Corrective and Preventative Action”.
- Mtembu (2012: interview #010): “Sometimes for me it is important to have back-up, especially independent back-up. If I want to stop an action on a site then I can refer back to the ECO’s report because that is legal compliance inspections of the EMP which is a legal document.

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## Annexure B: Example of ECO communication with the public during the RoD amendment

### APPENDIX F

COMMENTS & RESPONSE REPORT			
Name	Correspondence	Comment	Response
Justin Bowers	Email to Chris Froneman on 22/03/12	<p>Hi Chris,</p> <p>Following the Rolling Hills public meeting last week several concerns were raised by several parties present, to which we have to respond to, which is recorded in an "Issues and response" register that forms part of the amendment submission paperwork. Please can you respond on the issue raised below and provide some form of verification where possible.</p> <ol style="list-style-type: none"> <li>1. The visual impact of the Sectional Title units was raised as a concern by the directly adjacent neighbours. Please can you supply figures on the difference in the roof heights between the ORIGINAL housing units (when the theme was still "Scottish") and the double storey Sectional Title units.</li> </ol> <p>Many thanks,</p>	<p>Email on 26/03/12</p> <p>Hi Justin,</p> <p>I not 100% sure about the previous "Scottish Theme" design parameters - but if I'm not mistaking all the houses where double story with pitched roofs.</p> <p>The proposed Sectional Title Units are double story with 5deg pitched Roofs which is probably lower than the double story houses proposed previously.</p> <p>In my view, this will have less of an visual impact than the previous proposed "Scottish" house.</p> <p>I trust the above is in order.</p> <p>Kind Regards,</p>
	Email to Chris Theron on 22/03/12	<p>Hi Chris,</p> <p>Following the public meeting for the Rolling Hills ROD amendment application, several concerns were raised by the I&amp;AP's present. We would appreciate your inputs on the following issues to be able to appropriately and accurately respond to their concerns (this information will be captured in the "Issues and Response</p>	<p>Dear Justin,</p> <p>The above-mentioned subject, and your email below have reference.</p> <p>Find herewith attached:</p> <ul style="list-style-type: none"> <li>• Final layout plan, dated November 2011.</li> </ul> <p>We will provide you with all the needed information, as</p>

		<p>register" that is supplied to the Department to fully capture the I&amp;AP concerns).</p> <ol style="list-style-type: none"> <li>1. Several I&amp;AP's have requested a copy of the final layout. We have a version on our system, but would appreciate the latest version to ensure we are disseminating the correct information.</li> <li>2. While the legend on the new township layout provides density figures in terms on units per hectare, they would like information on the original total development footprint vs. the revised one.               <ol style="list-style-type: none"> <li>a. They would also like figures on the new stand sizes and the percentage hard surface. You did supply us a table for all units previously, but am not sure if it still current.</li> </ol> </li> <li>3. The local municipality is concerned that District Municipal approval has been granted, and the information has never filtered down to the local municipal level. Can you submit all town planning approvals to date that we can in turn forward to the local municipality.</li> </ol> <p>Many thanks for your assistance,</p>	<p>specified below, by early next week:</p> <ul style="list-style-type: none"> <li>• All information regarding the impact: original vs. proposed;</li> <li>• Documents regarding the approved townships, as well as additional approved rezoning applications.</li> </ul> <p>If you require any additional information, kindly contact the undersigned.</p> <p>Regards, Andria van Graan Hunter Theron Inc. Town and Regional Planners</p> <p>Dear Justin,</p> <p>The above-mentioned matter and your email requesting the previous approvals have reference.</p> <p>Herewith the following documents, to assist you:</p> <ul style="list-style-type: none"> <li>• St Micheil's township approval and Conditions of Establishment;</li> <li>• St Micheil's division of township approval;</li> <li>• Rezoning &amp; Consolidation of Erf 270 – 286 St Micheil's (including the approved SG Plans);</li> <li>• Council resolution regarding the applications currently submitted to Council; and</li> <li>• Extension of Time until October 2012.</li> </ul> <p>Trusting that the above is sufficient, kindly advise if you require any additional information.</p> <p>Regards, Andria van Graan</p>
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## Annexure C: Schedule of the data collection activities

Day 1: 14 May 2012

Time	01:00	01:00	01:00	01:00	01:00	01:30	01:00	01:00	00:00
Time-frame	8:30 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00	01:00 - 14:30	14:30 - 15:30	15:30 - 16:30	16:30
Persons	Jan-Albert & Philip	Jan-Albert Philip	Jan-Albert Fortunate	Jan-Albert & Philip	Lunch	Jan-Albert & Fortunate	Jan-Albert & Philip	Jan-Albert Philip	Jan-Albert
Action	Arrival, induction	Site orientation	Process orientation	Interview 1		Site visit	Site visit	Document verification	Leave site
Place	Site camp	Offices	Offices	Offices	Offices	Site	Offices	Offices	

Day 2: 15 May 2012

Time	01:00	01:00	01:00	01:00	01:00	01:30	01:00	01:00	00:00
Time-frame	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00	01:00 - 14:30	14:30 - 15:30	15:30 - 16:30	16:30
Persons	Jan-Albert & Philip	Jan-Albert & Fortunate	Jan-Albert & Philip	Jan-Albert & Fortunate	Lunch	Jan-Albert & Philip	Jan-Albert & Philip	Jan-Albert	Jan-Albert
Action	Recap previous day	Interview 2	Accompany inspection	Accompany inspection		Interview 3: de Villiers	Document verification	Data analysis	Leave site
Place	Offices	Offices	Site	Site	Offices	Offices	Offices	Offices	

Day 3: 16 May 2012

Time	01:00	01:00	01:00	01:00	01:00	01:00
Time-frame	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00	13:00 - 14:00
Persons	Jan-Albert & Audit team	Jan-Albert & Audit team	Jan-Albert & Audit team	Jan-Albert & Stix de Jager	Lunch	Jan-Albert & Basil Read
Action	Observe	Observe	Observe	Interview		Interview
Place	Offices	Site	Site	Offices	Offices	Offices

**ANNEXURE L: TULBAGH CASE STUDY ANALYSIS REPORT**

# ECO CASE STUDY RESEARCH ANALYSIS 4: Tulbagh - AECOM SA (Pty) Ltd – Reconstruction and upgrade of a Trunk Road

**Final Revision 18**

**16 August 2013 to 4 March 2014**



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## EXECUTIVE SUMMARY

This project is a small-scale linear development in the Western Cape region (Southern part of South Africa), which makes it unique from the other case studies investigated. An interesting characteristic of this project is the borrow pits for which the required mining authorisation was obtained.

There was no formal EMS developed for the construction site and/or the implementing agent (AECOM SA (Pty) Ltd). The environmental management requirements were largely found within the very detailed CEMP and, to a lesser extent in the RoD. The CEMP appeared to be a generic document that might be used for any other project (except for the borrow pit mining assessment and reporting commitments). Swanepoel (2013: interview #04) comments that the CEMP is a “stock-standard” EMP that is used in all similar road projects in the Western Cape. It was based on the guideline document of the DWA (2005) and appeared to be overdesigned for the specific project, with many environmental roles and responsibilities allocated to many individuals, especially to the ECO.

One part-time ECO was involved on the project. The ECO was required to be independent as per EMP conditions, but evidence was found that this requirement was not adhered to, as the ECO was a full-time employee of the implementing agent. The ECO was an experienced individual and had extensive duties and responsibilities to fulfil as per CEMP. The ECO was appointed after construction commenced and was also responsible for reviewing the CEMP. The roles and responsibilities of the ECO consisted of implementation, monitoring, verification, auditing and reporting. The ECO was per contractual agreement required to be on-site on a monthly basis to ensure compliance to specifications of the construction phase EMP. The allocated time for the ECO to perform the ECO duties were, however, changed as per ECO request, namely to visit the site as and when required.

There was no specific requirement for the independence of an ECO but the CEMP requires that this person be an independent consultant. According to Swanepoel (2013: interview #12), the ECO on this site is employed by the implementing agent and is therefore not independent. This appointment was therefore not in-line with the EMP requirement for the ECO to be independent. According to Swanepoel (2013: interview #12) “an ECO on smaller sites, such as the Tulbagh project, have both an assuring and

ensuring role”. A very important component of the ECO function on this project is training, and all the interviewees were of the opinion that training was one of the central roles of the ECO.

The following conclusions may be drawn from the evidence sourced on the worth of the ECO, based on the six KPAs:

I) OUTPUT COMPONENT: PRIOR TO PROPOSAL IMPLEMENTATION [PROJECT PLANNING AND DESIGN PHASE].

- **In terms of [Planning]** generating data, knowledge and a sustainable outcome for a project, evidence was found that the ECO function at the Tulbagh Road Construction project did pre-empted risks and was involved in the Screening phase of a project related to the main project (construction of contractor’s camp). However, no evidence was found that the ECO was involved in conducting preliminary assessments like scoping and detailed assessments for the project and other project-related projects; and/or compiling the EMP. Evidence was, however, found that the ECO tried to review the EMP (refer to section 2B.5 of the assessment matrix).

II) OUTPUT COMPONENT: POST PROPOSAL IMPLEMENTATION [PRE-CONSTRUCTION AND CONSTRUCTION PHASE].

- **With regard to [Doing] implementation** (refer to sections A: Pre-construction preparation for implementation; B: Implementing and informing decision making; and C) Reporting and communication and related subsections of the evaluation matrix below):

2A) No evidence was found that the ECO function at the Tulbagh Road Construction project was involved in the handover from planning to the implementation phase, as the ECO was appointed after construction started. Moreover, no evidence was found that the ECO participated in identifying, defining and allocating roles and responsibilities for the implementation, control, monitoring and evaluation, auditing and reporting of environmental specifications. However, evidence was found that the ECO was involved in allocating financial resources and time during the project, in support of the ECO function;

- 2B) Evidence was found that the ECO function at the Tulbagh Road Construction project did indeed perform the required tasks. However, evidence was found there was at times deviation from the “stock-standard” EMP, such as keeping a complaints register (EIs, 2013: interview #05). Moreover, although the EMP allows for the approval of certain decisions, evidence obtained from the interviewees indicated that this was not the function of the ECO. It was found that the ECO function participated in, and/or stimulated the use of, sustainable technologies and processes. Some evidence indicated that the ECO was involved in reducing the environmental impacts by responding to actual and potential environmental emergency situations. Evidence was found to indicate that the ECO was mandated to influence decisions and, to some extent, did indeed influence decisions related to mitigation and remediation of aspects deemed to be a variation, or not allowed for in the environmental performance specifications. However, some of the interviewees were of the opinion that the influencing of decisions may have been a weak area on the project, as the ECO was not always informed on the decisions and works on site. Moreover, sufficient evidence was found to indicate that the ECO function of the Tulbagh Road Construction project was involved in documenting, reviewing and/approving of various documents relating to the control of procedures and processes and it was found that the ECO was involved with informing and educating employees about environmental risks. It was found that training and awareness was central to the role of the ECO on this project.
- 2C) Numerous sources of evidence indicated that the ECO of the Tulbagh Road Construction project was involved in providing continuous feedback from EIA follow-up programmes to the proponent and regulator. However, providing feedback to the community was not done. Evidence was found that the ECO contributed to formal periodic feedback for internal EIA process improvement. Some evidence indicated that the ECO added value by providing formal feedback on external EIA process improvement at the IAIA conference in 2012 on “Roles and responsibilities of parties involved in construction implementation of projects.” Moreover, evidence was found that the ECO contributed to openness and access to information for transparent communication.

- **In terms of [Checking]:** (see evaluation matrix sections A: Monitoring and measurement of and B: Evaluation of legal compliance (performance) and related subsections below):
  - 3A) No evidence was found that the ECO function at the Tulbagh Road Construction conducted, or was involved in, the monitoring of environmental parameters or effects. Moreover, the ECO did not participate in risk assessments;
  - 3B) Sufficient evidence was found to confirm that the ECO function at the Tulbagh Road Construction participated in: monitoring compliance; and conducting internal compliance (performance) assessments. There were no formal external compliance and/or performance audit requirements for this project. Evidence was found that the ECO function participated in the ad hoc verification and evaluation, by reviewing the EMP, reviewing the EIA and RoD, and assisting the EO with method statements;
  - 3C) Sufficient evidence was found that the ECO of the Tulbagh Road Construction project controlled relevant environmental records.
- **In relation to [Acting] Management and Enforcement,** the evidence obtained from the Tulbagh Road Construction project indicates that the ECO did not have a management and enforcement function, although there were requirements to do so. These requirements included the ECO to be responsible for the implementation of the EMP; and the ECO and EO to ensure the minimisation of the loss of natural vegetation. The ECO was of the opinion that he did in a sense, fulfil these requirements. Moreover, although the EMP allows for the approval of certain decisions by the ECO, evidence obtained from the interviewees indicates that this was not the ECO's function. However, evidence was found of some innovative adaptive management measures, by finding solutions to construction of the crusher; recommending the use of hay bales for reducing sedimentation into rivers; and reviewing method statements. No evidence was, however, found to confirm that the ECO participated in conflict management and resolving environmentally related disputes.

- No evidence was found that indicated that the ECO function at the Tulbagh Road Construction project participated, or was actively involved, in public participation, capacity building and public awareness.
- Participation in certification schemes was not applicable to the ECO of the Tulbagh Road Construction project, as the site and AECOM do not have EMSs. Some evidence was found that the ECO did, in the past (the 2006 and 2007 years), participate in understanding greater area-wide effects through the involvement in the Fynbos Forum. However, it could not be established that the ECO was still involved in these projects/forums at the time of the case study site visit.

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The following colour codes were used in section 1 of the report to assist in the analysis of the interviews and documents consulted:

Colour code	Information sourced that indicates: <b>Value added</b> / <b>Partial value added</b> / <b>No value added.</b>
	Information sourced with particular reference to case.

## **1. AN OVERVIEW OF THE ECO CASE STUDY**

### **1.1 Project type**

Reconstruction and upgrade of a Trunk Road.

### **1.2 Project description and environmental authorisation background**

The Western Cape Provincial Department (WCPA), Department of Transport and Public Works proposed the upgrade of a Trunk Road (TR) 22 Section 1 (KM 5 - 20,6) and Main Road 305 (KM 0 - 2,4). The WCPA appointed BKS (Pty) Ltd to undertake the engineering design for the proposed road upgrade and associated borrow area. CCA Environmental (Pty) Ltd was appointed by BKS to act as an independent environmental consultant for the Environmental Impact Assessment (EIA) Regulations (GN R1182 of 5 September 1997 as amended) compliance process. The EIA process commenced in February 2006 and hence the EIA was undertaken under the Environmental Conservation Act (ECA) and the Environmental Impact Report (EIR) was submitted to the Western Cape's Department of Environmental Affairs and Development Planning (DEA&DP) for consideration in January 2009 and a Record of Decision (ROD) was issued on 11 September 2009. Moreover, the Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) requires an Environmental Management Programme (EMPr) be submitted to the Department of Mineral Resources (DMR) before any mining activities, including the operation of a borrow pit is allowed. An EMPr was compiled for the proposed borrow area (TR22/6.700L) and submitted for approval in 2009. Approval for the latter was received in August 2010 (Tender Construction EMP C3.208, undated).

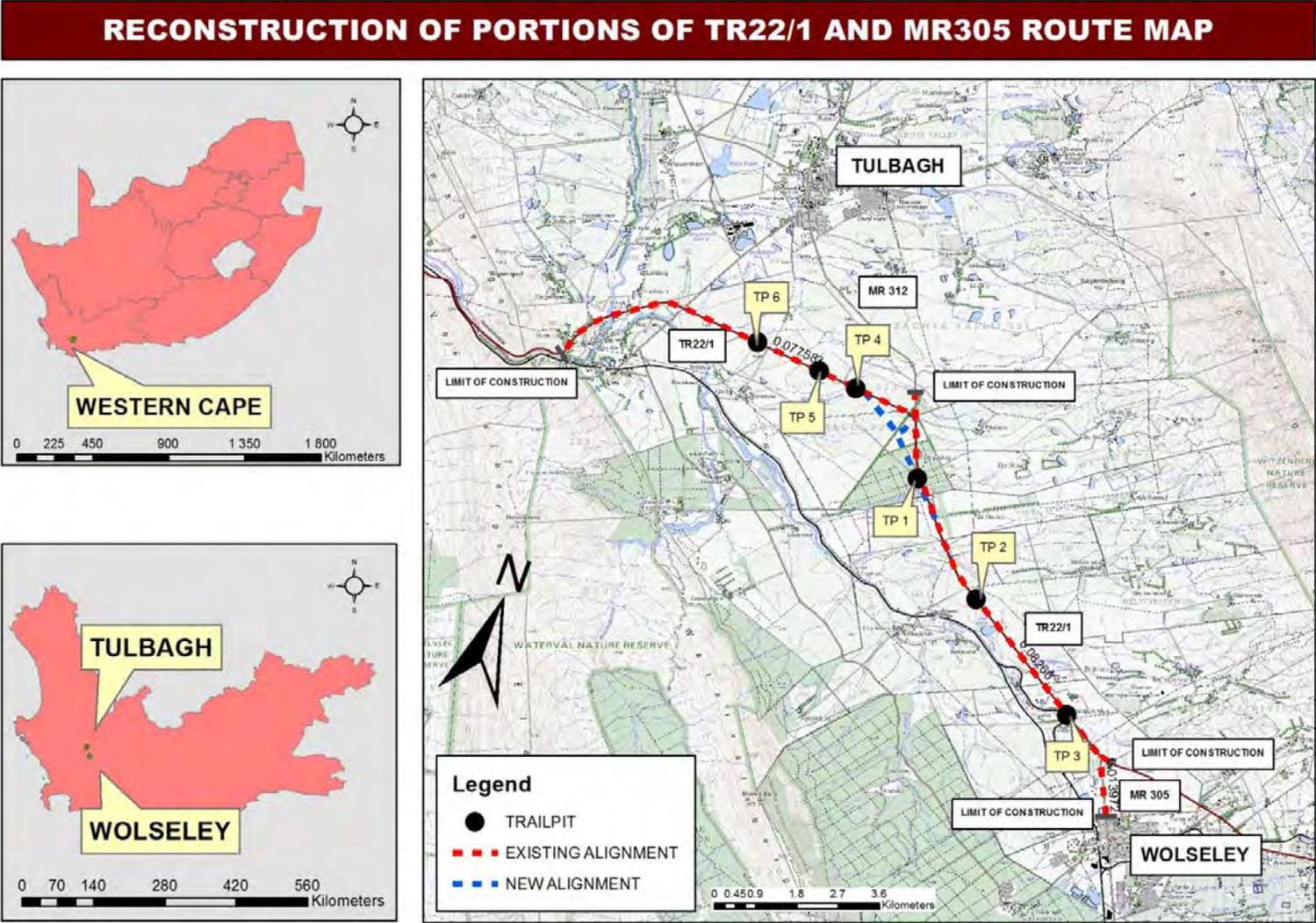
According to Swanepoel (2011), the construction related activities commenced on the 14<sup>th</sup> of February 2011 and the ECO was appointed on 15 June 2011. At the time of the appointment of the ECO a Construction and Operational phase EMP as required by the RoD was not submitted to the Directorate (of DEADP) for approval. At the time of drafting the communication to the DEADP, the client (WCPA) was in the process of reviewing the applicability of the current (at that stage) EMP in order to ensure compliance with the requirements of the RoD. However, the approved EMPr (as approved by the DMR on 19/07/2011) was used and were available on site (Swanepoel,

2011). Swanepoel (2013: interview #12) also mentions that he [as the ECO] tried to update the EMP but it did not happen.

### **1.3 Site location and scale**

The Trunk Road (TR) 22 Section 1 (KM 5 - 20,6) and Main Road (MR) 305 (KM 0 - 2,4) is situated between Gouda and Wolseley in the Tulbagh area of the Western Cape province of South Africa.

Figure 1: Map: Case study location and infrastructure



## 1.4 Key role players in environmental management and governance

- **Regulator/competent authority:**
  - Western Cape Department of Environmental Affairs and Development Planning (DEA&DP)
- **The Applicant/proponent/client/permit holder:**
  - The Western Cape Provincial Department (WCPA), Department of Transport and Public Works.
- **Environmental consultant / Environmental Assessment Practitioner (EAP)**
  - CCA Environmental
- **The Engineer/Implementing Agent:**
  - AECOM SA (Pty) Ltd [(BKS (Pty) Ltd was bought over by AECOM)]
- **The Environmental Control Officer services:**
  - AECOM SA (Pty) Ltd
- **The Environmental Officer services (SHE Rep):**
  - Boland Joint Venture / How and Inglis' (SHE Officer)
- **The Contractor:**
  - Boland Joint Venture
- **Independent Environmental Auditor (EA):**
  - The ECO of AECOM
- **Internal auditor(s):**
  - The ECO of AECOM

## 1.5 Environmental authorisations and ECO related requirements

### 1.5.1 Relevant environmental authorisations

- DEA&DP: RoD Ref: E12/2/1 – AA8-Trunk Rd, Wolseley.

- DMR: approval of the EMPr dated 19/07/11.
- DWA: General Authorisation Ref: 16/2/7/G200/A/8.

### 1.5.2 Authorisation requirements for EIA follow-up

Section 10 of the RoD requires that “The applicant must compile and submit an acceptable **construction and operational phase Environmental Management Plan (EMP)** and must be approved before by the Directorate before any construction activities commences.” Moreover, The EMP must (according to section 11 of the RoD) address, but not be limited to, the following issues

- 11.1 Quarrying/Borrow pits;
- 11.2 Erosion control;
- 11.3 Include a contingency plan to address issues such as accidental oil spills;
- 11.4 Rehabilitation of the quarry area, wetlands and rivers flow paths after construction; and
- 11.5 Incorporate the conditions of authorization given in this RoD, as appropriate to the operational phase of this project. **The applicant must implement and ensure compliance with this EMP.**

### 1.5.3 Contractual, Environmental Authorisation and EMP roles and responsibilities requirements for the ECO

One part-time ECO is involved on the project. The ECO is per contractual agreement required to be **on-site on a monthly basis to ensure compliance to specifications** of the construction phase EMP. The **allocated time was changed as per ECO request as to visit the site as and when required.**

*The following ECO related Roles and Responsibilities are specified in the authorisations:*

- Section 10 of the RoD requires that “The applicant must appoint a suitably experienced Environmental Control Officer (ECO) (or Site Agent where appropriate) before commencement of any land clearing or construction activities to **ensure that the measures and conditions referred to in this Record of Decision are implemented and to ensure compliance with the provisions of the construction phase EMP**”.

- Section H of the RoD requires that “Disturbance due to construction activities will be restricted within the new proposed fence line and an ECO will be appointed to monitor removal of natural vegetation.
- The purpose of the EMP was to “ensure that impacts on the environment associated with the construction phase are prevented and, where they cannot be prevented, are kept to a minimum and rehabilitated. This includes ensuring that the mitigation measures described in the Final EIR are implemented and to ensure continued monitoring of the construction phase activities.

*The following ECO related Roles and Responsibilities are specified in the EMP:*

- **The employer Western Cape Provincial Department (WCPA), Department of Transport and Public Works:**
  - Is responsible for the appointment of... and Environmental Control Officer (ECO).
  - Shall address any site problems pertaining to the environment at the request of DEA&DP, Project Engineer and/or ECO.
- **The Engineer:**
  - Shall address any site problems pertaining to the environment at the request of the RE and/or ECO.
  - The Engineer, in consultation with the RE and the ECO, shall determine the amount of the penalty fine.
- **The Contractor have the following responsibilities:**
  - If the Contractor encounters difficulties with specifications, he/she must discuss alternative approaches with the RE or ECO prior to proceeding.
  - To report any incidents of non-compliance with the Construction EMP to the RE and/or ECO.
  - To rehabilitate any sensitive environments damaged due to the Contractor’s negligence. This shall be done in accordance with the RE’s and ECO’s specifications.
  - The Contractor shall submit written Method Statements to the RE and ECO for all environmentally sensitive aspects of the work.

- **The Resident Engineer:**
  - Reviewing and approving the Contractor's Method Statements **with input from the ECO** where necessary.
  - Assisting the Contractor in finding environmentally responsible solutions to problems **with input from the ECO** where necessary.
  - Providing input **into the ECO's ongoing internal review of the Construction EMP.**
- **The Environmental Control Officer (ECO):**
  - will be **an independent environmental consultant** appointed by the Engineer to act as the Employer's representative to monitor and review the on-site environmental management and implementation of this Construction EMP by the Contractor, and duties shall include *inter alia*, the following:
    - **Reviewing Method Statements** [submitted by the Contractor] (the ECO may request inclusion of additional information over-and-above the required Construction EMP to be included in Method Statements)].
    - **Advising the Contractor and/or the RE** on environmental issues within defined construction areas.
    - **Undertaking regular site visits to ensure compliance** with the Construction EMP and verifying that environmental impacts are kept to a minimum throughout the contract.
    - **Completing environmental checklist** during the site visits.
    - **Keeping a photographic record** of progress on site from an environmental perspective.
    - **Assisting the Contractor and / or the RE** in finding environmentally **acceptable solutions** to construction problems.
    - **Recommending additional environmental protection measures** should this be necessary.
    - **Keeping a register of complaints** and recording and **dealing with any community issues or comments.**
    - Giving a **report back** on any environmental issues at site meetings.
    - **Ensuring that DEA&DP is informed** of work progress on site.
    - **Reporting any incidents** that may or have caused damage to the environment or breaches of the EMP to DEA&DP.

- **Prepare environmental audit report** at the conclusion of the construction phase.
  - **Compiling a Performance Assessment Report** regarding the Borrow Area EMPr and its implementation during the construction period after completion of the contract and **submitting this report to the Employer and DMR (if requested by DMR)**.
- Other duties as contained in the detailed text of the Construction EMP include:
- The **ECO shall be responsible for the implementation and distribution** of any “approved” revisions of the EMP.
  - The RE and/or the **ECO shall specify any additional Method Statements** that may be required. Where relevant the Method Statements indicated above can be combined on **agreement with the RE or ECO**.
  - The **ECO shall meet with the RE and EO on a monthly basis**, or more frequently as required during the initial stages of the project. The ECO shall attend scheduled construction site meeting on a monthly basis throughout the contract period.
  - The **ECO shall visit and inspect the site once a month to ensure that correct operational procedures are being implemented** and that the Contractor is complying with the environmental specifications in the Construction EMP. Additional site inspections by the ECO may be needed during the initial stages of the project. The general cleanliness of the site shall form part of the RE’s and ECO’s inspections.
  - The **ECO shall address any queries to the RE**. If the queries cannot be resolved at this level, they shall be referred to the Engineer and, if necessary, to DEA&DP.
  - The RE, **ECO and EO shall keep a record of activities on site**, including but not limited to meetings attend, Method Statements received and approved, issues arising on site, cases of non-compliance with the Construction EMP, penalties/fines issued and corrective action taken to solve problems that arise.
  - The **ECO shall monitor all sensitive work environments**, which may also include photographic monitoring.

- Where necessary, and upon the recommendation of the RE and/or the ECO, procedures that require modification shall be changed to improve the efficiency of the Construction EMP.
- At the conclusion of the project an environmental audit report shall be compiled and submitted to DEA&DP. This report shall be compiled by the ECO.
- The ECO and EO must ensure that the loss of natural vegetation is minimised and temporary structures and facilities shall be decommissioned to the satisfaction of the ECO.
- All declared no-go areas will be demarcated by temporary fencing, the position of which shall be agreed to by the RE and ECO.
- The RE may declare additional no-go areas at any time during the construction phase as deemed necessary and/or at the request of the ECO.
- The siting of toilets shall be done in consultation with the RE or ECO...
- The Contractor shall be responsible for ensuring that all ablution facilities are maintained in a clean condition to the satisfaction of the RE or ECO.
- Collected waste shall be stored in a central waste area within the construction camp that has been approved by the RE and ECO.
- Where reasonably practical, maintenance activities shall only be undertaken in a demarcated maintenance area (as agreed to with the RE and ECO).
- Where reasonably practical, vehicles shall only be refuelled in a demarcated refuelling/servicing area (as agreed to with the RE and ECO).
- The surface under the refuelling/servicing area shall be protected against pollution to the satisfaction of the RE and ECO...
- Areas for the temporary stockpiling of excavated material and other construction material shall be as agreed with the RE and ECO.
- All plant construction equipment, vehicles or other items shall be stored within the construction camp, unless prior arrangements have been made with the RE and ECO.
- Any accidental leak and spill of fuel, oil or other hazardous substances is to be reported to the RE or ECO immediately so that the best remediation method can be quickly implemented.
- The Contractor shall ensure that water runoff from fuel depots, workshops, truck washing area and concrete swills passes through an oil separation /

settlement system before being released or alternatively is directed into a conservancy tank for disposal at a site approved by the ECO and local authority.

- The method of stabilisation shall be determined in consultation with the RE and ECO.
  - Damage to stabilised areas shall be repaired and maintained by the Contractor to the satisfaction of the RE and ECO.
  - Any features affected by the Contractor in contravention of this clause shall be restored/rehabilitated to the satisfaction of the RE and ECO (in terms of protection of natural features, flora and fauna).
- **The Contractor’s Designated Environmental Officer (EC):**
    - Assisting the RE and ECO in finding environmentally responsible solutions to problems and Reporting any incidents of non-compliance with the Construction EMP to the RE and/or the ECO.

**Table 1: Persons and their role in the case study**

#	Person	Role in Project	Organisation	Role in case study
1	Jan-Albert Wessels	Researcher (Phd candidate)	North-West University	<ul style="list-style-type: none"> <li>• Investigated the role, value, instruments and independence of the ECO function on site.</li> </ul>
2	Robin Swanepoel	Environmental Control Officer	AECOM SA (Pty) Ltd	<ul style="list-style-type: none"> <li>• Provided assistance to the researcher for general needs and clarification of communication channels.</li> <li>• Helped researcher obtain relevant documents.</li> <li>• Participated in interviews.</li> <li>• Participated in a site visit.</li> </ul>
3	Gerrit Els	Project Director / Construction Manager	AECOM SA (Pty) Ltd	<ul style="list-style-type: none"> <li>• Participated in a 1 hour interview.</li> </ul>
4	Andre de Villiers	Engineering Representative (Resident Engineer/RE)	AECOM SA (Pty) Ltd	<ul style="list-style-type: none"> <li>• Participated in a 1 hour interview.</li> </ul>

In order not to interfere too significantly with daily tasks of the persons involved, I had to follow a strict time frame that enabled me to obtain the necessary information to successfully and meaningfully conduct the case study investigation (refer to the schedule below as Annexure B).

## 2. CASE STUDY QUESTIONS AND RESULTS

### Subject under review's background information:

- Name:** Robin Swanepoel
- Position:** Chief Scientist – Tulbagh Road Construction ECO
- Qualification:** B.Tech Nature Conservation & B.Tech Environmental Management
- Experience (in construction):** 9 years
- Experience with or as an ECO:** 12-13 years.

### 2.1 The ECO's own views on the role and value of ECOs before the Structured interview

Robin Swanepoel (2013): 2 April 2013.

- Swanepoel (interview #01): We [the implementers] thought that the EIA had been completed as per current legislation in the Western Cape once the Environmental Authorisation has been issued. There was, however, an appeal process that had to be dealt with and not many people perceive that to be part of the construction. In terms of the “Cradle-to-Grave” aspect of the whole EIA process, people see the EIA through to authorisation and do not see the EIA continuation until construction. However, the EMP is an outcome of the EIA process.
- Swanepoel (interview #01): In terms of the South African Council of Professional Scientists (SACNASP), which is now enacted is in my opinion an “Old Boys Club” and is academically driven. In terms of the Minimum requirements of the Act, if you do not meet those minimum requirements then you cannot consult. They are all academically driven; they are specialist in my opinion in the EIA process and specialists here and there in the construction, but not in dealing with the day-to-day construction requirements on-site. EAPs are more specialists in their own field (EIA) as opposed to ECO work. Unfortunately there is no legislation specifying what an ECO do, what the minimum qualifications and/or experience requirements are etc.
- Swanepoel (interview #02): In relation to aquatic specialists [and other EAPs] – “being a specialist in the field is giving advice, but he [the specialist] knows his stuff but he doesn't know how to implement it on-site” That could [can] cause a problem.

Each person is a specialist in their field and unfortunately people that is specialists in their field is coming over to the ECO field and by doing that they give ECOs a bad name. Specifically as I am working at a large “multi-national” [organisation]; engineers see the greenies as greedy, although they see it, touches it and that is clearly because of the past the environmental change is about trees, bunnies and stuff that is their perception. Because of the whole EIA process in the past, **many of the projects that I worked on, an EAP don't expect the full potential scale of the potential impacts and activities associated with the project.** As soon as the environmental authorization is issued and they start designing then they (the engineers that design the project) appoint experienced **ECOs who soon then realizes that the two [the designs and the EMP] aren't “gelling” and that they doesn't offer direction, and then one have to go through the whole process again [identifying and assessing risks of aspects and impacts].** They [the EAPs] should have done this [the assessment]. All of a sudden it **becomes the ECO's burden** and then ECOs are painted with the same brush [as being a “greenie’] as we [the ECOs] are also then a burden [because of the poor assessment].

- Swanepoel (interview #02): “On a large contract, you'll have various contractors EO's that will undertake aspects of a project and a person who collates all these information, work, and reports will then be your EM and will then be filtered to your ECO. The EM will then learn how the engineering side works and once they are capable and competent [in terms of these] then they move to the ECO level. Instead of then just ticking of a checklist like almost a 100% of ECOs currently do, the ECO will then be able to **pre-empt or foresee problems and will then influence the project further** down the line.
- Wessels: “Before we go into the details of the specific project, in general what do you think the value of an ECO do add in Environmental Management?”
- Swanepoel: “Are you talking about EAPs that is ECOs [without the required construction experience] **or ECOs that is ECOs? [With the required construction experience]** as **I've seen ECOs horrific things that happens on sites where ECOs [EAPs that is ECOs] cause more damage to the environment due to not having construction experience.**
- Swanepoel: “It is typical to have them [ECOs]. The Client will in the Authorisation see there is an ECO required, and then they will purely appoint someone because

the Environmental Authorisation says so. From an Engineering perspective, they do not want a person double checking them in terms of environmental perspective. So in many times may they may exclude the ECO from planning, program design etc. if an ECO is supposed to be reviewing certain documentation. **The perception is that the ECO walks around with a big stick** so rather than cooperating they [the Contractors] will only start cleaning up towards the end of the month before the monthly inspection and will hide problems. **The ECO will then walk around with a checklist and will not provide a proper service** [the Gorilla effect – see Retief; IAIA presentation, Wild Coast Sun, 2012). I think if there is a more regulated system then **the ECOs may add more value.** At the moment **many of the Engineers that I work with deem it [the ECO function] as a financial liability and it is just that they have to have that person on the site.** **They will ensure that the person is involved with in the process as little as possible and not adding any value.** So if there are minimum standards in place I definitely think they [the ECOs] will be looked at with greater respect and being involved from a greater aspect in the project as present.

- Swanepoel: **“They [the ECOs] are also perceived as to slowing the construction process down,** especially those ECOs that do not have experience in construction. Unfortunately they [the ECOs] do not have that big an impact in the Country (SA) as they supposed to have.

## 2.2 Extraordinary examples of adding value

**Show me/tell me where you had a major influence in the course of events.**

General: Swanepoel (2013 interview #04)

- **“Picking things up before they happen.** Picking-up shortcomings in EIA applications [refer to Story 1 below] and **finding innovative and thankfully legal ways** to address the Clients requirements. This saved money and they were impressed with us and we were awarded two other projects”.

Story 1:

- Swanepoel (interview #02): [following the Gorilla Effect story of Wessels] “To give you an example: one illegal activity by the Contractor was to set-up a base camp that was not done in accordance with specifications. They went and set-up their own contractors camp. When a contractor’s camp is set-up they need to source

their own water and they need to go through the whole WULA, the change of agricultural land processes and even an EIA, which could take up to six months [and longer]. If a contractor gets appointed in good faith and they expect that the whole environmental component to be sorted out. However the EAP did not consider all of the contractors needs and we [the ECO and Engineer] had to identify sites for their construction camps. In certain cases the Client may not want the EAP to identify all of these [listed] processes as they want the contractors to take responsibility for these. The ECO then comes in and identifies an illegal activity even before the Contractor start with the project in good faith.

#### Story 2:

- Swanepoel (interview #04): “At this project the Client did not want to do the rehabilitate and actually wanted to leave it. The ECO identified this as a legal contravention in terms of the NEMA and as a result a Rehabilitation Specialist was appointed who made recommendations for rehabilitation that the EMP was short on. The sad thing is that this is a “Stock-standard” EMP that is used in all similar road projects in the Western Cape that I had to review. It did not comply with the NEMA section 24N requirements and did not identify rehab measures.

#### Story 3:

- De Villiers (2013: interview #10): “It is the small thing that one does not really are aware of. For example, we had to construct a pit for the construction of a bridge and we never thought it would be detrimental to pump this muddy water back to the river. He [the ECO] made a recommendation that we filter the water first through hay bales. This measure did actually work.”

#### Story 4:

- At the Berg River project I was awarded a National Award on Environmental work as the Environmental work was “gelled” with the Engineering work.”

## 2.3 Role / expectations

### 2.3.1 What in your opinion is the most important role of the ECO in this project?

#### ECO's opinion:

- Swanepoel (2013, interview #02): "I actually wanted to ask you that question **as some people have different perceptions on what an ECO is supposed to do on a job.** Are they merely an Auditor/; other people perceive them as implementers of an EMP and that the ECO is supposed to provide guidance; advise and give direction on what needs to be done on management measures etc. The concern with the latter is that as soon as you start implementing on behalf of the contractor; that the auditor, who is supposed to be the ECO will then audit his own advice. So theoretically if the Contractor does something wrong, the ECO will have to issue a Non-conformance request (NCR) that was based on the ECOs advice, the ECO should then supposedly give himself the NCR". So, I would like to ask what is defined as an ECO in your mind in terms of this discussion, because every company that offers ECO services will tell you a different story.
- Wessels: explains his definition of an ECO by referring to the article of Wessels and Morrison-Saunders (2011).
- Swanepoel (interview #02): "You try to remain independent by knowing the problem can be resolved by asking those specific questions".
- Swanepoel (interview #02): "**Educating**" RS (interview #06) "As there is currently not a competent EO on site my main role is to train them and my colleagues as well as imparting some knowledge on the client on environmental aspects. The **ultimate goal is to uplift them [in terms of environmental management] and the short term is ensuring compliance to the EMP and the relevant regulations and all Acts.**
- Wessels: "What is your view on ECO's reviewing EMP's for other projects"?
- Swanepoel (interview #02): One of the reasons I've left the previous company to join an Engineering company like this is that there [at the previous company] they will be supplying an ECO at the very end after the Environmental Authorisation was issued and then you'll go and start picking-up the pieces. Where here, I've no got quite

involved with review of Environmental Authorisations, EIA's and EMPs as they come in to check if they are legally compliant, is any worth to the project and client.”

#### **Middle management's (Construction Manager's) opinion:**

- Els (2013 interview #05): “Due to the “not so sensitive” environment that this project is operating in, the instruction to the ECO was to visit the site once every two to three months and **to keep us on our toes in relation to environmental matters**”.
- Els (2013 interview #05): “We've seen that the ECO should not communicate through the Contractors EOs but rather have the Resident Engineer with him on site visits so that the **ECO can communicate and report directly to the Engineer**”.
- Els (2013 interview #05): **“Ensuring that the environment is protected is for me his key role on this project”**.

#### **Senior manager's opinion:**

- De Villiers (2013: interview #10): “My opinion is **that the ECO is a person that observe and make recommendations**”.
- De Villiers (2013: interview #10): “To **identify pollution** such as oil spills. That he [the ECO] did.”
- De Villiers (2013: interview #10): **“Such a person should be on the site before construction start and provide a list of things that should be in-place** and this is what is needed to get everything into place.” “The ECO should thus be made part of the project at the beginning [pre-construction] to explain me [the Project Manager] and the Contractors what should be done as we do not know many of these things [conditions of the authorization and the legal requirements]”.
- De Villiers (2013: interview #10): **“Currently the ECO is needed due to the state of the Construction industry. We at time have to appoint Contractors that do not have a clue on even how to do the basic work, not to even to mention environmental work. There is thus in a sense policing needed.”**
- De Villiers (2013: interview #10): **“Training also. Training is very important as it does not help that one explains to a worker that he cannot pump that water back into the river. One must explain why it should not be done”**.
- Wessels (2013: interview #10). “It appears that training is a central role of the ECO on this project as all three of you [the interviewees] have a similar view on training”.

## 2.4 Need and value of the ECO

### 2.4.1 In the ECO's opinion an ECO add value to the following aspects of the construction project:

	Strongly Agree	Agree	Partly Agree	Partly Disagree	Disagree	Strongly Disagree	Unable to Judge
<i>In my opinion an ECO add value to:</i>							
a) Ensuring the project is completed as per project schedule	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Ensuring that the community surrounding the project is protected/helped/informed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Ensuring that the environment is protected	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) No value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

#### 2.4.1.1 Any comments on the abovementioned?

- On a) “Yes, the ECO does have the assurance role but also in a sense to ensure compliance to performance expectations and thus ensure that Contractors do their work”. However, an ECO with no experience may influence the project schedule on a negative way and the more on-site the ECO is the more the ECO can help with projects schedule” (Swanepoel, 2013).
- On b) “I think so yes. Issues were raised where potential for fines were there. For example the LUPO story (the Contractors base camp – change of land use from agricultural to industrial use). Thus agree”.
- On c) “No, was not involved in community liaison. However, awareness of impacts on the community is put into my reports and I regularly chat with guys on site to say that they should be aware of this thing. We are doing it on other projects though. On this Project though, yes I am, but more indirectly so. Thus agree”.
- On d) “Strongly agree. I assure that the project goes ahead but in a sound manner and making sure that the environmental and engineering components can marry.”

- On e) “The ECO did add value but not as much as I would have liked to see”.

2.4.1.2 In your experience and/or opinion do you think there is a need for an ECO and what value does the ECO add to the project (apart from the above areas)?

- Swanepoel (interview #02): “As a preventative measure as an ECO giving advice and then being wrong, and therefore issuing yourself with an NCR, I ask leading questions to the Contractor or the EO. I know where I want to go – or need to go and I thus draw it [solutions/recommendations] out of them. For example: I’ll say “out of all these questions and answers, that do you think is the best?” and they then, having thought about it, they then independently put a method statement together. We [I] haven’t told them what to do, but they needed direction in that thought process. I gave them the pros and cons and then it is their baby. Contractually they then presented the solution to you.”
- Wessels: “What you are saying is that giving guidance and advice is not what the ECO should do?”
- RS (interview #02): “You thus pre-empt, which is better than fixing the problem”.
- Wessels: “What is your view on ECO’s reviewing EMP’s for other projects”?
- Swanepoel (interview #02): One of the reasons I’ve left the previous company to join an Engineering company like this is that there [at the previous company] they will be supplying an ECO at the very end after the Environmental Authorisation was issued and then you’ll go and start picking-up the pieces. Where here, I’ve no got quite involved with review of Environmental Authorisations, EIA’s and EMPs as they come in to check if they are legally compliant, is any worth to the project and client.”
- Swanepoel (interview #02): “All the projects that I’ve been involved with missed identifying listed activities. In the ECO experience we’ve picked-up all these irregularities. We were able to assist the Engineer to let him know about this. This thing [irregularities] will then go back to the client to mitigate”.
- Wessels: “This has been observed in all the other case studies. It is part of the Gorilla Effect, where the EAPs are so focused on obtaining the Environmental Authorisation for the project at hand that they will miss many of the other listed activities [in for example; the NEMWA; NWA; NEMAQA etc] (the Gorilla effect – see

Relief; IAIA presentation, Wild Coast Sun, 2012). Refer to Extraordinary example RS story #1 (above).

- Following on the Swanepoel Story #1 above - Wessels: “What happens in scenarios like this”? [Meaning raising non-compliances to regulatory authorities]. RS: “Well, that’s why I’m not on site that often. **I’ve raised this non-compliance in one of my reports and the Client said that “we’re not interested in following the letter of the law. We’ve been doing this for years and this is how we operate and we will continue to operate like this”.** Wessels: “Should the role and value that ECO’s add in this scenario not be to report this non-compliance to the relevant authorities?” Swanepoel: **“We’ve raised issues like this in the past and the ECO got fired”.** At the company that I’ve worked for in the past, we’ve raised a similar non-compliance and wanted to report this to the authorities. The Client’s response [in this case] was that if you report us then thanks you and goodbye” and we got fired. So what do you do? You need to work for money and need to get the job done but if one do report the Client then the Client goes and blacklist you.” Swanepoel: “That’s why I’ve change the approach on this site slightly: **I try to keep to the law at the camps but also try to change them [the Client and Contractors] and tried to get more buy-in from them, to train and educate them and thus slowly getting more buy-in [commitment] in the company on environmental stuff. Thus to change the perception that the ECO is the “Big-stick” and rather a resource that is there to help resolve the problem before they come problems** and that the auditing part is merely there to confirm to the world that you are complying to the EMP and legal requirements.
- RS (interview #04): **“An experienced ECO can confidently talk Rand and Cents with Project Managers [and Engineers] and can recommend actions and related these measures** to rough estimates on amount of cost and amount of man hours for the guys that needs to implement it. This gives credibility to what you are saying, whereas EAPs for example [who do not have the level of project experience] cannot”. EAPs may make recommendations; “try this and try that” that may be way off [in terms of money and hours] and the Contractor won’t listen to ECOs again in future projects”.
- Swanepoel (2013: interview #12) “ **CO is employed by the Implementing Agent and is therefore not independent** (which is not in-line with the EMP requirement for the

ECO to be independent). **However, there is a flip side to independence as if you are an external party you may not have that influence”.**

**2.4.2 Middle Management: In the Construction Manager’s (Gerrit Els) opinion an ECO add value to the following aspects of the construction project:**

	Strongly Agree	Agree	Partly Agree	Partly Disagree	Disagree	Strongly Disagree	Unable to Judge
<i>In my opinion an ECO add value to:</i>							
a) Ensuring the project is completed as per project schedule	■	□	□	□	□	□	□
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	□	■	□	□	□	□	□
c) Ensuring that the community surrounding the project is protected/helped/informed.	□	□	□	□	■	□	□
d) Ensuring that the environment is protected	■	□	□	□	□	□	□
e) No value	□	□	□	□	■	□	□

2.4.2.1 Any comments on the abovementioned?

- On a) “Yes, but **the actions of the ECO should then be proactive and not reactive.** Thus **identify [pre-empt] certain challenges that may happen.** Then the ECO is part of the team.”
- On b) **“the ECO identified that the law; NEMA, dictate that correct Rehabilitation measures are taken.** It will depend and differ from ECO to ECO.
- On c) **“for this project no – that is not his function”.**
- On d) **“That for me is his key role on this project”.**
- On e) **“I do not agree with that.** However, **there may be projects where ECOs lose perspective.”**

2.4.2.2 In your experience and/or opinion do you think there is a need for an ECO and what value does the ECO add to the project (apart from the above areas)?

- Wessels: why is there a need for a third party like the ECO?
- Els: “[in general] we struggle with the concept. The environmental guys are at times a major hurdle in projects”. For example if we want to mine material for filling then these “specialists” will identify a little plant and have a major problem with the project in that area. They will ignore the fact that in our opinion there are millions of these plants in the same region. For us it will be like “guys let us be realistic, we need these products as we cannot maintain the roads if we do not have this product. We thus have at times that type of conflict with the environmental people and the ECOs. Robin [the ECO] is also typically viewed as part of this “environmental class of people” that is usually adding more hurdles in the project than providing help”.
- Els: “For this project we’ve not experienced such a hurdle effect with the ECO. The nature of the project is such that it may not have many impacts on the environment and surrounding community and we can ask “would the project outcomes have been different if the ECO was not involved?” He [the ECO] focused a lot on waterways [storm water control] and measures to be taken to avoid pollution. He must be given credit that he came up with the idea that we can use Hay Bales in the water channels to prevent pollution. This was a cheap solution to a problem. Some guys will ask “ja, but so what? Is that little pollution that we create really such a big issue given the environmental context that we work in?” But the way that he presented the solution was done in such a way that it did not create tension. Robin [the ECO] does his job but in such a way that is acceptable to everyone and the therefore got support from everyone”.
- Els: “One should realise that if the RoD did not require an ECO then there would have most probably not been one appointed. We would have thought about it and it would have depended on the Client. In the light of the Client’s policy to be seen as “a responsible organization” the Client would most probable have said that we should appoint an ECO [thus reputational value].
- Els: “The contractor wants to finish the job as quickly as possible without any delays and challenges and will not give thought on a tree, bush or anything environmentally related. It is therefore; actually good to have someone like this to give us a “conscious” that will make us aware of these little things and which may make at the end of the day a difference”.
- Wessels: “what is the value and role of the ECO?”

- “The Client for this project **expects that the ECO should give feedback and stand strongly on their views** as in the past the opinion was that the ECOs are too afraid to say what they need to. It was also said in the past that the ECOs just focus on small operational issues such as drums, bins etc. and there has been comments by the Client (the Province) that they do not know if these people (the ECOs) are really worth the trouble. They cost a lot of money but do not really add value to the project. **So we motivated to the ECO that they should see themselves as adding value** otherwise the Client won’t appoint them.”
- Els: “On this project Robin [the ECO] had a problem with the disposal of construction rubble [rocks & gravel] and he assisted us in **getting the relevant paperwork completed and that the process was done legally correct as well as with the liaison with the concerned property owner.**”
- Els: “In my opinion it is always good to have a third party involved just to **make sure that one is doing the right thing** and that someone informs one if you are not”. This person can also **make one aware of better ways of managing certain challenges and processes.**”
- Els: “ECOs do add value in projects with a potential high impact, thus it really depends on the type of project.”
- Els: “**One of the values that the ECO add is an educational value. Due to the involvement of the ECO the Client, Contractors and Project Advisors are definitely more sensitive to the environment.** We come from an era that if one considers Maslow’s Hierarchy that no one really cares what we do for the construction of a road, as long as the road is built. These days the need of people are different, but the need of the road builders have not really changed. We still just want to dig holes and built a road but now the environmental awareness is cultivated in us.

**2.4.3 Senior Management: In the senior manager’s opinion an ECO add value to the following aspects of the construction project**

*(Andre de Villiers, 2013: interview #10 – translated from Afrikaans to English):*

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	Strongly Agree	Agree	Partly Agree	Partly Disagree	Disagree	Strongly Disagree	Unable to Judge
In my opinion an ECO add value to:							
a) Ensuring the project is completed as	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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	Strongly Agree	Agree	Partly Agree	Partly Disagree	Disagree	Strongly Disagree	Unable to Judge
per project schedule							
b) Ensuring that the risks of the project is managed by avoiding environmental fines and liabilities	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Ensuring that the community surrounding the project is protected/helped/informed.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Ensuring that the environment is protected	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) No value	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### 2.4.3.1 Any comments on the abovementioned?

- On a) “No, look he [the ECO] helped us to do things right but not to complete the project in the planned timeframe”.
- On c): “Not really part. However, an indirect effect on the community as a result of what he [the ECO] does”.

#### 2.4.3.2 In your experience and/or opinion do you think there is a need for an ECO and what value does the ECO add to the project (apart from the above areas)?

- De Villiers (2013: interview #10): “Currently the ECO is needed due to the state of the Construction industry. We at time have to appoint Contractors that do not have a clue on even how to do the basic work, not to even mention environmental work. There is thus in a sense policing needed.”
- De Villiers (2013: interview #10): “One last thing; I must admit, I was in the beginning very anti-ECO and wondered what will this guy do on the site? (Laughing). But I realised, that one needs to see the positive side [of the ECO] as there is a need for this and yes; I will definitely recommend that such a person be part of the project on the condition that they are there from the beginning [pre-construction].”
- De Villiers (2013: interview #10 – translated from Afrikaans to English): “Some of the ECOs try to tell one what should and what should not be done. However, it is at time difficult to enforce these recommendations onto the contractors. They are not always open for understanding these recommendations as certain actions have been done the same way in the past.”

- De Villiers (2013: interview #10): “It is the small thing that one does not really are aware of. For example, we had to construct a pit for the construction of a bridge and we never thought it would be detrimental to pump this muddy water back to the river. He [the ECO] made a recommendation that we filter the water first through hay bales. This measure did actually work. However, ECOs are at times over the top [too strict and/or unrealistic]. For example; trying to enforce/recommend that the workers must be provided with an eating area at the working area [not stationary at one place]. One cannot put up 12 places to eat and then move it again the next day?”
- De Villiers (2013: interview #10): “The ECO should not focus on Health and Safety as we have another guy that do just that”.
- De Villiers (2013: interview #10): “The value of the ECO is obvious; to ensure environmental conservation”.
- Wessels (2013). “What other value may the ECO have?”
- De Villiers (2013: interview #10): “To restore the scars that the road construction site leave”.

## 2.5 Appraising the value of ECOs

This section of the report aims to capture, combine the evidence sourced and make a value judgment of the subject participation in the achievement of objectives. The keys below were used to give an indication that objectives were achieved by subject participation. According to Owen (2007) “judgment on worth is the process of synthesizing and integrating evidence into a judgment of merit of worth”.

**Table 2: Description of Assessment Keys**

Key	Description
NA	Not applicable to case study.
?	Status could not be established.
x	Very limited or no evidence of participation to support achievement of objective(s).
½	Some evidence to support partial participation to support achievement objective(s).
✓	Sufficient evidence of participation to support achievement of objective(s).
—	Indicator with particular reference to case.

For the ordinal scale evaluation and ranking of data I assigned: x for very limited to no evidence available;  $\frac{1}{2}$  as the median (halfway point) for some evidence; and ✓ as sufficient evidence available to indicate that a Key Performance Indicator (KPI) was achieved, partially achieved or not achieved. An underlined evaluation (e.g. x,  $\frac{1}{2}$ , ✓) indicates a particular interesting or unique reference to a case study.

**Table 3: Data evaluation matrix – Tulbagh Road Construction**

<p><b>Key performance areas (KPA's)</b>  <i>"Topic related to principles"</i>                      (Derived from ISO, 2004; Arts, 1998, Arts et al, 2001; DEA, 2011; and Hullet and Diab, 2002)</p>	<p><b>Objectives</b>  <i>"Indication of what needs to be achieved to"</i>                      (UNEP-ITC, 2002: 59-67; South Africa, 1998: 5; Du Plessis, 2002; Morrison-Saunders &amp; Arts, 2004)</p>	<p><b>Key performance indicators (KPI's )</b>  <i>"Questions that provide an indication to what extent the objectives were achieved by subject participation"</i>                      (derived from South Africa, 1998; Morrison-Saunders &amp; Arts, 2004, Singapore Environmental Agency, undated, and DWAF, 2005 as proposed by Retief, 2007a: 91)                      Note that all questions start with: "To what extent..."</p>	<p><b>Evidence provided that objective were achieved, partially achieved or not achieved.</b></p>	<p><b>Appraisal</b></p>
<p><b>I) OUTPUT COMPONENT: PRIOR TO PROPOSAL IMPLEMENTATION [PROJECT PLANNING &amp; DESIGN PHASE].</b></p>				
<p><b>1. [Plan]: Generate data, knowledge and a sustainable vision or outcome</b></p>	<p><b>Objective 1: Participate in the early components of EIA prior to proposal implementation.</b>                      (Ex-ante evaluation: Preliminary assessment: Screening/Scoping; Detailed assessment: Impact analysis/mitigation measures/Reporting/EIS review/Decision-making; and EIA follow-up plans: EMP, CEMP etc.)  <u><b>Judgement on worth:</b></u>                      In terms of generating data, knowledge and a sustainable outcome, evidence was found that the ECO function at the Tulbagh Road Construction did pre-empted risks and was involved in the Screening phase of a project related to the main project (construction of contractor's camp). However, no evidence was found that the ECO were involved with: conducting Preliminary assessments: Scoping; conducting detailed assessments for the project and other project related projects; and/or compiling the EMP. Evidence was, however, found that the ECO tried to review of the EMP (refer to 2B.5).</p>			
	<p>KPI 1.1: ...was the verifier involved in establishing whether an EIA was required for the project and other project related projects (Screening)?</p>	<ul style="list-style-type: none"> <li>• Yes. According to Swanepoel (RS interview #02): "All the projects that I've been involved with missed identifying listed activities. In the ECO experience we've picked-up all these irregularities."</li> <li>• According to Swanepoel (2013: interview #01): "Picking things up before they happen. Picking-up shortcomings in EIA applications and finding innovative and thankfully legal ways to address the Clients requirements. This saved money and they were impressed with us and we were awarded two other projects".</li> <li>• Yes, "the Komati Water Scheme Augmentation project. The EIA was done and identified only four listed activities. I picked-up nine listed activities of which one was borrow-pits (DMR mining listed activity) (Swanepoel, 2013</li> </ul>		<p>✓</p>

		<p>interview #02).</p> <ul style="list-style-type: none"> <li>• "Part of my current role at the Engineering firm is to review EIA applications on our projects on an ad hoc basis and to screen for the listed activities identified" (Swanepoel, 2013 interview #02).</li> <li>• <b>THE ECO DID IDENTIFY LISTED ACTIVITIES FOR CONSTRUCTION CAMP.</b></li> </ul>	
	KPI 1.2: ...was the verifier involved in identifying key issues and impacts to be addressed in the project and other project related projects (Scoping)?	<ul style="list-style-type: none"> <li>• Yes; Swanepoel (interview #02): One of the reasons I've left the previous company to join an Engineering company like this is that there [at the previous company] they will be supplying an ECO at the very end after the Environmental Authorisation was issued and then you'll go and start picking-up the pieces. <b>Where here, I've no got quite involved with review of Environmental Authorisations, EIA's and EMPs</b> as they come in to check if they are legally compliant, is any worth to the project and client." [thus reviewing for adding value].</li> <li>• <b>HOWEVER, THE ECO DID NOT ADD THIS VALUE TO THE TULBAGH ROAD CONSTRUCTION PROJECT.</b></li> </ul>	x
	KPI 1.3: ...was the verifier involved with compiling and reporting the: Environmental Impact Report (EIR)/Statement (EIS); the sustainability vision; and/or the Environmental Management Plan (EMP) of the project and other project related projects?	<ul style="list-style-type: none"> <li>• According to Swanepoel (2013 interview #02) "we had to do an Amendment to the EIA/RoD for an additional four listed activities at the Komati Water Scheme Augmentation project. Myself and the Pipeline design head <b>had to work on alternatives in order for the Amendment to incorporate all the listed activities</b> and to find an alternative route to make sure that the pipeline did not go through all the proposed water bodies."</li> <li>• <b>HOWEVER, THE ECO DID NOT ADD THIS VALUE TO THE TULBAGH ROAD CONSTRUCTION PROJECT.</b></li> </ul>	x
	KPI 1.4: ...was the verifier involved with the preparation and submission of the Environmental Management Plan of the project other project related projects?	<ul style="list-style-type: none"> <li>• At the time of the appointment of the ECO; a Construction and Operational phase EMP, as required by the RoD, had not been submitted to the Directorate (of DEADP) for approval.</li> <li>• Swanepoel (interview #010: "The ECO in this case were responsible to complete the EIA application process as this was not done, although it was thought to be completed" (Swanepoel, 2013).</li> <li>• Swanepoel (2013: interview #12) also mentions that <b>he [as</b></li> </ul>	x

		the ECO] tried to update the EMP but it did not happen	
<b>II) OUTPUT COMPONENT: POST PROPOSAL IMPLEMENTATION [PRE-CONSTRUCTION &amp; CONSTRUCTION PHASE].</b>			
<b>2A. [Do]: Pre-construction preparation for implementation of specifications</b>	<p><b>Objective 2A: Participate in the pre-construction preparation and commissioning of the environmental Performance Specifications.</b> (E.g. identifying: resources required, roles and responsibilities; documenting procedures, processes and checklists).</p> <p><b>Judgement on worth:</b> No evidence was found that the ECO function at the Tulbagh Road Construction project was involved with the handover (planning to the implementation phase) as the ECO was appointed after construction started. Moreover, no evidence was found that the ECO participated in identifying, defining and allocating roles and responsibilities for the implementation, control, monitoring and evaluation, auditing and reporting of environmental. However, evidence was found that the ECO fat was involved in the allocating financial resources and time during the project for support of the ECO function.</p>		
	KPI 2A.1: ... was the verifier involved with the handover of environmental Performance Specifications from the planning phase to the implementation phase	<ul style="list-style-type: none"> <li>• <b>NO EVIDENCE WAS FOUND AS THE ECO WERE APPOINTED A WHILE AFTER CONSTRUCTION STARTED.</b></li> </ul>	x
	KPI 2A.2: ... was the verifier involved in identifying, defining and allocating roles and responsibilities for the implementation, control, monitoring, evaluation, auditing and reporting of environmental specifications?	<ul style="list-style-type: none"> <li>• RoD requires that "The applicant must appoint a suitably experienced Environmental Control Officer (ECO) (or Site Agent where appropriate) before commencement of any land clearing or construction activities to ensure that the measures and conditions referred to in this Record of Decision are implemented and to ensure compliance with the provisions of the construction phase EMP"</li> <li>• <b>NO EVIDENCE WAS HOWEVER FOUND OF THE ECO BEING INVOLVED IN IDENTIFYING, DEFINING AND ALLOCATING ROLES AND RESPONSIBILITIES FOR THE IMPLEMENTATION, CONTROL, MONITORING, EVALUATION, AUDITING AND REPORTING OF ENVIRONMENTAL SPECIFICATIONS.</b></li> </ul>	x
	KPI 2A.3: ... was the verifier involved in identifying, defining and allocating, financial and human resources for the implementation, control, monitoring, evaluation, auditing and reporting of environmental specifications?	<ul style="list-style-type: none"> <li>• Swanepoel "Unfortunately finances are always an issue. We had to unfortunately budget the same price as the competition. So although we wanted to put a decent budget across we could not. On this job we don't have a significant budget. There is not enough money".</li> <li>• According to Swanepoel (2013: interview #2): "the initial time budget and allocated for the project was to have the</li> </ul>	✓

		<p>ECO on-site once a month, which in my opinion was not enough. I was then told to come as and when required” (Refer to AECOM SA (Pty) Ltd (2013): Project Detail Charges).</p> <ul style="list-style-type: none"> <li>• EVIDENCE WAS FOUND THAT THE ECO MOTIVATED FOR ADDITIONAL TIME AND FUNDS FOR VISITING THE SITE MORE OFTEN THAN INITIALLY PLANNED FOR.</li> </ul>	
<p><b>2B. [Do]: Implement, inform decision making in construction and parallel process.</b></p>	<p><b>Objective 2B: Participate in the implementation of the environmental Performance Specifications.</b>  (E.g. implementing processes: internal housekeeping, project control &amp; control of impacts; documenting procedures and processes; establishing emergency procedures and responses; education and induction of employees; and communication of EMP).</p> <p><b>Judgement on worth:</b>  Evidence was found that the ECO function at the Tulbagh Road Construction project did do the required tasks. However, evidence was found there is at times deviation from the “Stock Standard” EMP such as: keeping a complaints register (see Els (2013: interview #05); and although the EMP allows for approval of certain decisions the evidence obtained from the interviewees indicates that this is not the function of the ECO. It was found that the ECO function participated in and/or stimulated the use of sustainable technologies and processes. Some evidence was available to indicate that the ECO were involved with reducing environmental impacts through responding to actual and potential environmental emergency situations. Evidence was found to indicate that the ECO was mandated to and to some extent influenced decisions related to mitigation and remediation of aspects deemed to be a variation, or not allowed for in the Environmental Performance Specifications. However, some of the interviewees were of the opinion that influencing decisions may have been a weak area on the project as the ECO was not always informed on the decisions and works on site. Moreover, sufficient evidence was found to indicate that the ECO function at the Tulbagh Road Construction project was involved with documenting, reviewing and/approving of various documents relating to the control of procedures and processes and it was found that the ECO was involved with informing and educating employees about environmental risks. It appears that training and awareness was central to the role of the ECO on this project.</p>		
	<p>KPI 2B.1: ... did the verifier perform the defined and discharged roles and responsibilities until the completion of the ECO service?</p>	<ul style="list-style-type: none"> <li>• Yes. The AECOM SA (2013) Project Detail Charges keeps record of the activities conducted by the ECO for financial quantification and costing. Evidence in this document indicate that the ECO conducted the following in the period 22/02/2011 to 15/03/2013;</li> <li>• Review of EMP; Attended site meetings; Compiled EMP audit checklist template; Reviewed EIA and RoD; Discussed EMP and Water Use Licence (WULA) specifications with RE; Site visits; Giving guidance to Contractors; Conducted and Compiled audit report; Source information outstanding pertaining to RoD conditions; Provision of information on asbestos regulations; Provided legal information to RE with regards to Operations EMP; Drafted letters for communication with Regulator (DEA&amp;DP); Compiled ECO inspection report; Compiled</li> </ul>	<p>1/3</p>

		<p>monthly audit reports; Responded to Contractors queries on establishment of crusher; Assisting EO with Method Statement on training; Communicating with Contractors on Audit queries; Reported and discussed serious concerns (deviations from specifications) with RE and Contractors; Discussed measures for site closure with Contractors.</p> <ul style="list-style-type: none"> <li>• <b>HOWEVER, THERE IS AT TIMES DEVIATION FROM THE "STOCK STANDARD" EMP SUCH AS: KEEPING A COMPLAINTS REGISTER (SEE ELS (2013: INTERVIEW #05); ALTHOUGH THE EMP ALLOWS FOR APPROVAL OF CERTAIN DECISIONS THE EVIDENCE OBTAINED FROM THE INTERVIEWEES INDICATES THAT THIS IS NOT THE FUNCTION OF THE ECO.</b></li> </ul>	
	<p>KPI 2B.2: ... did the verifier participate in and/or stimulate the use of sustainable technologies and processes?</p>	<ul style="list-style-type: none"> <li>• The idea of the hay bales for siltation management is an example of stimulating the use of ecologically responsible construction processes.</li> <li>• Evidence was also found that according to Swanepoel (2013: interview #01): "The ECO Picked-up shortcomings in EIA applications and found innovative and thankfully legal ways [methods and processes] to address the Clients requirements. This saved money and they were impressed with us and we were awarded two other projects".</li> <li>• According to Els (2013): "On this project Robin [the ECO] had a problem with the disposal of construction rubble [rocks &amp; gravel] and he assisted us in getting the relevant paperwork completed and that the process was done legally correct as well as with the liaison with the concerned property owner. This person can also make one aware of better ways of managing certain challenges and processes."</li> </ul>	✓
	<p>KPI 2B.3: ... was the verifier involved with reducing environmental impacts through responding to actual and potential environmental emergency situations?</p>	<ul style="list-style-type: none"> <li>• The CEMP requires that "Any accidental leak and spill of fuel, oil or other hazardous substances is to be reported to the RE or ECO immediately so that the best remediation method can be quickly implemented."</li> <li>• Evidence in the form of the case study organogram of consultant indicates communication lines (adapted from Tender Construction EMP, undated: C3-210). Communication between ECO and contractors – emergency instructions.</li> </ul>	✓

KPI 2B.4: ... did the verifier influence decisions related to mitigation and remediation of aspects deemed to be a variation, or not allowed for in the environmental Performance Specifications?

- Sufficient evidence is available to indicate that the ECO was involved in influencing decisions and include there are however evidence of deviation from the EMP requirements and evidence that this was not always possible, see Els (2013: interview #05):
- In terms of the Construction EMP requirements:
  - All declared no-go areas will be demarcated by temporary fencing, the position of which shall be agreed to by the RE and ECO...
  - The RE may declare additional no-go areas at any time during the construction phase as deemed necessary and/or at the request of the ECO.
  - The siting of toilets shall be done in consultation with the RE or ECO...
  - The Contractor shall be responsible for ensuring that all ablution facilities are maintained in a clean and sanitary condition to the satisfaction of the RE or ECO.
  - Advising the Contractor and/or the RE on environmental issues within defined construction areas.
  - All plant construction equipment, vehicles or other items shall be stored within the construction camp, unless prior arrangements have been made with the RE and ECO.
  - The surface under the refuelling/servicing area shall be protected against pollution to the satisfaction of the RE and ECO.
- According to the Construction EMP:
  - "Temporary structures and facilities shall be decommissioned to the satisfaction of the ECO."
  - Any features affected by the Contractor in contravention of this clause shall be restored/rehabilitated to the satisfaction of the RE and ECO (i.t.o. Protection of natural features, flora and fauna).
  - Damage to stabilised areas shall be repaired and maintained by the Contractor to the satisfaction of

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		<p>the RE and ECO.</p> <ul style="list-style-type: none"> <li>• RS (interview #04): “At this project the Client did not want to do the Rehab and actually wanted to leave it. The ECO identified this as a legal contravention in terms of the NEMA and as a result a Rehab Specialist was appointed who made recommendations for rehabilitation that the EMP was short on. The sad thing is that this is a “Stock-standard” EMP that is used in all similar road projects in the Western Cape that I had to review. It did not comply with the NEMA section 24N requirements and did not identify rehab measures.</li> <li>• According to the Construction EMP: “Where necessary, and upon the recommendation of the RE and/or the ECO, procedures that require modification shall be changed to improve the efficiency of the Construction EMP.”</li> <li>• According to AECOM SA (2013) - Project Detail Charges: The ECO Gave guidance to Contractors. However, Swanepoel (2013) states that “It depends on the specific role of the ECO. On this project the ECO ask leading questions”.</li> <li>• According to de Villiers (2013: interview #10): “It is the small thing that one does not really are aware of. For example, we had to construct a pit for the construction of a bridge and we never thought it would be detrimental to pump this muddy water back to the river. He [the ECO] made a recommendation that we filter the water first through hay bales. This measure did actually work.</li> <li>• According to Els (2013: interview #05) this may have been a weak area on the project as the ECO was not always informed on the decisions and works on site. According to Els (2013: interview #05) “we did on occasion contact the ECO for recommendations on certain abnormal situations – but that was my prerogative” However, this changes from project to project and on high impact projects that ECO may be more involved.</li> </ul>	
	<p>KPI 2B.5: ... was the verifier involved with documenting, reviewing and/approving of policies, plans, programmes, operational procedures, registers and emergency procedures?</p>	<ul style="list-style-type: none"> <li>• Yes, the AECOM SA (Pty) Ltd Project Detail Charges (AECOM, 2013) indicate cost incurred for the “review of EMP and Spec and provision of comments thereto as well as discussed with Gerrit Els (RE)”.</li> </ul>	✓

		<ul style="list-style-type: none"> <li>• According to the Construction EMP the Resident Engineer is responsible for “Reviewing and approving the Contractor’s Method Statements with input from the ECO where necessary.” According to the AECOM SA (Pty) Ltd Project Detail Charges (AECOM, 2013) the ECO: “Assisted the EO with Method Statement on training.</li> <li>• According to Els (2013): “On this project Robin [the ECO] had a problem with the disposal of construction rubble [rocks &amp; gravel] and he assisted us in getting the relevant paperwork completed and that the process was done legally correct as well as with the liaison with the concerned property owner.</li> <li>• Swanepoel (2013: interview #12) also mentions that he [as the ECO] tried to update the EMP but it did not happen.</li> </ul>	
	<p>KPI 2B.6: ... was the verifier involved with internal capacity building and awareness to inform &amp; educate employees about environmental risks of their work and the manner in which their tasks must be performed?</p>	<ul style="list-style-type: none"> <li>• According to de Villiers (2013: interview #10): “Training is also part of the ECO role. Training is very important as it does not help that one explains to a worker that he cannot pump that water back into the river. One must explain why it should not be done”.</li> <li>• Els (2013) noted that: “One of the values that the ECO add is an educational value. Due to the involvement of the ECO the Client, Contractors and Project Advisors are definitely more sensitive to the environment.</li> <li>• According to Swanepoel (2012): “Awareness of impacts on the community is put into my reports and I regularly chat with guys on site to say that they should be aware of this thing.”</li> <li>• Wessels (2013: interview #10). “It appears that training and awareness is a central role of the ECO on this project as all three of you [the interviewees] have a similar view on training”.</li> <li>• According to the AECOM SA (Pty) Ltd Project Detail Charges (AECOM, 2013) the ECO: “Assisted the EO with Method Statement on training”</li> </ul>	✓
<p><b>2C. [Do]: Reporting and Communication</b></p>	<p><b>Objective 2C: Participate in reporting and communicating by informing the stakeholders as well as the general public about the results of EIA follow-up.</b>  <i>Communication is "Informing the stakeholders as well as the general public about the results of EIA follow-up (in order to provide feedback on project/plan implementation as well as feedback on EIA processes)". According to DEA (2013:97) communication of: plans and participation across</i></p>		

	<p><i>all levels of the organisation, especially senior staff and politicians, relevant sectors, academia, professional bodies, civil society and NGOs, etc.</i></p> <p><b>Judgement on worth:</b></p> <p>Numerous sources of evidence indicated that the ECO at the Tulbagh Road Construction project was involved with providing continuous feedback from EIA follow-up programmes to the proponent and regulator. However, providing feedback to the community was not done. Evidence was found that the ECO contributed to formal periodic feedback for internal EIA process improvement. Some evidence was available that indicate that the ECO added value by providing formal periodic feedback for external EIA process improvement at IAIA Conference in 2012 on “The roles and responsibilities of parties involved in construction implementation of projects.” Moreover, evidence was found that the ECO contribute to openness and access to information for transparent communication.</p>
	<p>KPI 2C.1: ... did the verifier report or gave feedback to the site proponent on actual and/or potential harmful environmental conditions and/or situations?</p> <ul style="list-style-type: none"> <li>• According to the Construction EMP: “The ECO shall be responsible for the implementation and distribution of any “approved” revisions of the EMP.”</li> <li>• As required in the Construction EMP part of the role and responsibilities of the ECO is: <ul style="list-style-type: none"> <li>○ Giving a report back on any environmental issues at site meetings.</li> <li>○ Reporting any incidents that may or have caused damage to the environment or breaches of the EMP to DEA&amp;DP.</li> <li>○ The ECO shall address any queries to the RE. If the queries cannot be resolved at this level, they shall be referred to the Engineer and, if necessary, to DEA&amp;DP.</li> </ul> </li> <li>• According to AECOM (2013) the ECO conducted the following duties: Attended site meetings; Discussed EMP and Water Use Licence (WULA) specifications with RE; Site visits; Giving guidance to Contractors; Provision of information on asbestos regulations; Provided legal information to RE with regards to Operations EMP; Compiled ECO inspection report; Compiled monthly audit reports; Responded to Contractors queries on establishment of crusher; Assisting EO with Method Statement on training; Communicating with Contractors on Audit queries; Reported and discussed serious concerns (deviations from specifications) with RE and Contractors; Discussed measures for site closure with Contractors.</li> </ul>
	<p>KPI 2C.2: ... did the verifier report or gave feedback to the Regulator on actual and/or potential harmful environmental conditions and/or situations?</p> <ul style="list-style-type: none"> <li>• According to Swanepoel (2013: interview #12): “In terms of NEMA I am allowed to communicate. I have contacted the Department [Western Cape] out of my own, raised my concern, seeked guidance from them, went and chatted</li> </ul>

		<p>with Gerrit [the RE] and said; listen I have a concern and discussed it with the Department. I then put it on a letter and had it sent out. It was not a condemning letter but indicated that the client is no doing what the RoD and authority require of them. The letter officially went to DEADP.”</p> <ul style="list-style-type: none"> <li>• According to AECOM (2013) the ECO drafted letters for communication with Regulator (DEA&amp;DP).</li> <li>• As required in the Construction EMP part of the role and responsibilities of the ECO is: <ul style="list-style-type: none"> <li>• Ensuring that DEA&amp;DP is informed of work progress on site.</li> <li>• The ECO shall address any queries to the RE. If the queries cannot be resolved at this level, they shall be referred to the Engineer and, if necessary, to DEA&amp;DP.</li> <li>• Evidence was available of that the ECO “Drafted letters for communication with Regulator (DEA&amp;DP) (see AECOM SA (Pty) Ltd, 2013)</li> </ul> </li> </ul> <p>However, there was little support from Government in terms of the EMP (Swanepoel, 2013)</p>	
	<p>KPI 2C.3: ... did the verifier report or gave feedback to the Community on actual and/or potential harmful environmental conditions and/or situations?</p>	<ul style="list-style-type: none"> <li>• ECO is responsible for “Keeping a register of complaints and recording and dealing with any community issues or comments” (Construction EMP requirement). However, there is no evidence that this register is indeed kept and is thus a deviation from the “Stock Standard” EMP such as: keeping a complaints register (see EIs (2013: interview #05)</li> <li>• According to Swanepoel (2012): “No, I was not involved in community liaison.”</li> </ul>	<p>x</p>
	<p>KPI 2C.4: ... was the verifier involved with formal periodic feedback, communication of EIA predictions into the planning stage to be implemented moving forward?</p>	<ul style="list-style-type: none"> <li>• According to the Construction EMP: “The ECO shall meet with the RE and EO on a monthly basis, or more frequently as required during the initial stages of the project. The ECO shall attend scheduled construction site meeting on a monthly basis throughout the contract period.”</li> <li>• Evince was also supplied of the ECO giving feedback at the Monthly Site Meeting on for example the improvement of measures to protect water resources.” (AECOM SA (Pty)</li> </ul>	<p>✓</p>

		Ltd, 2013c).	
	KPI 2C.5: ... was the verifier involved in active feedback/communication/training for ensuring improved EIA	<ul style="list-style-type: none"> <li>ECO presented at IAIAAs Conference in 2012 on the roles and responsibilities of parties involved in construction implementation of projects.</li> </ul>	✓
	KPI 2C.6: ... did the verifier ensure openness, access to information for transparent communication with all stakeholders involved?	<ul style="list-style-type: none"> <li>According to Swanepoel (2013: interview #12): "In terms of NEMA I am allowed to communicate. I have contacted the Department [Western Cape] out of my own, raised my concern, sought guidance from them, went and chatted with Gerrit [the RE] and said; listen I have a concern and discussed it with the Department. I then put it on a letter and had it sent out. It was not a condemning letter but indicated that the client is no doing what the RoD and authority require of them. The letter officially went to DEADP. Even if I'm not allowed to I will not keep silent. I believe that is what NEMA requires from me in any case".</li> </ul>	✓
<b>3A. [Check]: Monitoring and measurement of effects</b>	<p><b>Objective 3B: Participate in internal and external compliance (performance) evaluation.</b>  (Ex-post evaluation: measuring, comparing, assessing &amp; auditing – environmental effects &amp; parameters)</p> <p><b>Judgement on worth:</b>  No evidence was found that the ECO function at the Tulbagh Road Construction conducted or was involved with the monitoring of environmental parameters or effects. Moreover, the ECO did not participate in risk assessments.</p>		
	KPI 3A.1: ... was there sufficient evidence to confirm that the verifier collected data on environmental effects?	<ul style="list-style-type: none"> <li>According to Swanepoel (2013: interview #02) "Essentially the Contractors EO monitors that those results are correct, for example taking samples, taking these to the lab to verify the results. If correct, I [in the capacity of the ECO] agree with that [thus the ECO verifies monitoring].</li> <li>Section H of the RoD requires that "An ECO will be appointed to monitor removal of natural vegetation.</li> <li>According to the Construction EMP "The ECO shall monitor all sensitive work environments, which may also include photographic monitoring."</li> <li>There is thus a deviation from the EMP in terms of monitoring environmental effects. It appears that the</li> </ul>	x
	KPI 3A.2: ... was the verifier involved with risk assessment and evaluation of environmental aspects and the risks, consequences and alternative options for mitigation of activities?	<ul style="list-style-type: none"> <li>No evidence.</li> </ul>	x
<b>3B. [Check]:</b>	<b>KPI 3B: To what extent was the ECO involved with internal and external compliance (performance) evaluation?</b>		

<b>Monitoring and evaluation of legal compliance (performance)</b>	(Ex-post evaluation: measuring, comparing, assessing & auditing - legal compliance/performance to Environmental Specifications) <b>Judgement on worth:</b> Sufficient evidence was found to confirm that the ECO function at the Tulbagh Road Construction project participated in: monitoring compliance; and conducting internal compliance (performance) assessments. There are no formal external compliance and/or performance audit requirements for this project. Evidence was also found that the ECO function did participate in the ad hoc verification and evaluation by: reviewing the EMP; reviewing the EIA and RoD; and assisting the EO with Method Statements.		
	KPI 3B.1: ... did the verifier collect data on environmental legal compliance?	<ul style="list-style-type: none"> <li>• According to Swanepoel (2013): "The ECO does have the assurance role but also in a sense to ensure compliance to performance expectations and thus ensure that Contractors do their work".</li> <li>• The Construction EMP requires the ECO to:             <ul style="list-style-type: none"> <li>• Undertaking regular site visits to ensure compliance with the Construction EMP and verifying that environmental impacts are kept to a minimum throughout the contract.</li> <li>• <b>Completing environmental checklist during the site visits.</b></li> <li>• "ECO shall visit and inspect the site once a month to ensure that correct operational procedures are being implemented and that the Contractor is complying with the environmental specifications in the Construction EMP".</li> </ul> </li> <li>• AECOM SA (2013) Project Detail Charges evidence: also indicate <b>numerous site visits for checking legal compliance.</b></li> </ul>	✓
	KPI 3B.2: ... did the verifier use a formal (systematic and objective) assessment approach (internal auditing) to compare environmental effects and compliance data with norms, prediction and expectations?	<ul style="list-style-type: none"> <li>• <b>Evidence of internal audits was sourced for audits conducted</b> on 23 June 2011; 18 August 2011; 7 September 2011; 5 October 2011; 17 November 2011; 6 March 2012; 19 June 2012; 12 September 2012 and 1 March 2013 (refer to AECOM (Pty) Ltd, 2013b).</li> </ul>	✓
	KPI 3B.3: ... was the verifier involved with formal (systematic and objective) external conformance assessments (external audits)?	<ul style="list-style-type: none"> <li>• No external systems of legal audits on the site. Only the compliance assessments requirements (audits) of the ECO and at the time of the site visit none of these were performed.</li> <li>• However, the ECO is required to (Construction EMP):             <ul style="list-style-type: none"> <li>○ <b>Prepare environmental audit report at the conclusion of the construction phase.</b> More specifically the CEMP requires that "At the conclusion of the project an environmental audit report shall be compiled and submitted to DEA&amp;DP. This report shall be compiled</li> </ul> </li> </ul>	1/2

		<ul style="list-style-type: none"> <li>○ by the ECO.”</li> <li>○ Compiling a Performance Assessment Report regarding the Borrow Area EMPr and its implementation during the construction period after completion of the contract and submitting this report to the Employer and DMR (if requested by DMR).</li> </ul>	
	KPI 3B.4: ... was the verifier involved with the ad hoc verification and evaluation of policies, plans, programmes, operational procedures, reports and the subsequent implementation of mitigation measures?	<ul style="list-style-type: none"> <li>• According to AECOM (2013) the ECO invoiced for the following actions completed: Review of EMP; Reviewed EIA and RoD; Assisting EO with Method Statement on training; Communicating with Contractors on Audit queries; Reported and discussed serious concerns (deviations from specifications) with RE and Contractors; Discussed measures for site closure with Contractors.</li> </ul>	✓
<b>3C. [Check]: Controlling records.</b>	<b>Objective 3C: Participate in the control of records.</b> <u>Judgement on worth:</u> Sufficient evidence was found that the ECO at Tulbagh Road Construction project controlled relevant environmental records.		
	KPI 3C: ... was there sufficient evidence available to indicate that the verifier controlled records to ensure information remains accessible	<ul style="list-style-type: none"> <li>• Construction EMP requirements specify the ECO have the role of: <ul style="list-style-type: none"> <li>○ Keeping a photographic record of progress on site from an environmental perspective.</li> <li>○ ...keep a record of activities on site, including but not limited to meetings attend, Method Statements received and approved, issues arising on site, cases of non-compliance with the Construction EMP, penalties/fines issued and corrective action taken to solve problems that arise.</li> </ul> </li> <li>• Swanepoel (2013: interview #07) also comments that the ECO must: “Make sure the paperwork is full-proof (document control). All the documentation and records must be 100%. This is critical.”</li> </ul>	✓

<p><b>4. [Act]: Management and enforcement</b></p>	<p><b>Objective 4: Participate in the management and enforcement.</b>  <i>(E.g. ensuring accountability; making decisions; maintaining decision-making flexibility; employing the modes of environmental management best suited ; promoting adaptive management; and resolving disputes through conflict management)</i></p> <p><b>Judgement on worth:</b></p> <p>The evidence obtained from the Tulbagh Road Construction project indicates that the ECO did not have a management and enforcement function (although there were requirements such as: ECO shall be responsible for the implementation of the EMP; the ECO and EO must ensure that the loss of natural vegetation is minimised and that the Eco was of the opinion that he did in a sense ensure compliance). Moreover, although the EMP allows for approval of certain decisions by the ECO, the evidence obtained from the interviewees indicates that this is not the function of the ECO at this project. Evidence was, however, found of some innovative adaptive management measures by: finding solutions to construction of the crusher; recommending the use of hay bales for reducing sedimentation into rivers; and reviewing Method Statements. No evidence was, however, found that the ECO participated in conflict management and resolving of environmentally related disputes.</p>		
	<p>KPI 4.1: ... did the verifier have the authority to: cease, modify or control any act, activity or process causing [or that may cause] the pollution or degradation; containing, preventing the movement of pollutants or the causing of degradation; eliminate the source of the pollution or degradation; and or remedy the effects of the pollution or degradation?</p>	<ul style="list-style-type: none"> <li>• According to Swanepoel (2013): "The ECO does have the assurance role but also in a sense to ensure compliance to performance expectations and thus ensure that Contractors do their work."</li> <li>• According to the Constuction EMP: "The ECO shall be responsible for the implementation and distribution of any "approved" revisions of the EMP."</li> <li>• According to the Construction EMP "The ECO and EO must ensure that the loss of natural vegetation is minimised."</li> <li>• However, the ECO does not have the capacity or authority to cease, or modify (EIs, 2013: interview #05).</li> <li>• According to de Villiers (2013: interview #10) "the Implementing Agent (Engineer) is the only one that have the authority to give instructions..."</li> <li>• Methods are employed by the Contractor and the EO.</li> </ul>	<p>1/2</p>
	<p>KPI 4.2: ... did the verifier have authority to police or enforce follow-up activities and may hold the Proponent, Implementing Agent and Contractors responsible, accountable, liable and answerable to non-compliances?</p>	<ul style="list-style-type: none"> <li>• According to EIs (2013 interview #05) "No, the ECO do not have managing or controlling authority. In this project the Client has the view that the Engineer is representing the Client and that the Engineer has the authority to give instructions. However, the Engineer may appoint specialists to advise him on certain matters. The Engineer will be unwise then not to follow the recommendations of the ECO."</li> <li>• De Villiers (2013: interview #10): "I am the only person [capacity of Engineer/Implementing Agent] to give instructions on the site. He may give advice and tell me</li> </ul>	<p>x</p>

		<p>what we are doing wrong [but no authority].”</p> <ul style="list-style-type: none"> <li>• According to Swanepoel (2013: interview #06) “the ECO assure rather than ensure. I see myself as part of the team rather than walking around with the “Big Stick”. On another project where I was playing a policing role the guys would go behind my back and will not bother telling me about it”</li> </ul>	
	<p>KPI 4.3: ... was the verifier involved with making and/or approving decisions on matters that are deemed to be a variation, or not allowed for in the environmental Performance Specifications?</p>	<ul style="list-style-type: none"> <li>• Construction EMP requirements specify the ECO have the following decision making and approval role: <ul style="list-style-type: none"> <li>o Collected waste shall be stored in a central waste area within the construction camp that has been approved by the RE and ECO.</li> <li>o The Contractor shall ensure that water runoff from fuel depots, workshops, truck washing area and concrete swills passes through an oil separation / settlement system before being released or alternatively is directed into a conservancy tank for disposal at a site approved by the ECO and local authority.</li> </ul> </li> <li>• De Villiers (2013: interview #10): “My opinion is that the ECO is a person that observe and make recommendations”. According to de Villiers (2013: interview #10) “the Implementing Agent (Engineer) is the only one that have the authority to give instructions...”</li> </ul> <p><b>THUS, ALTHOUGH THE EMP ALLOWS FOR APPROVAL OF CERTAIN DECISIONS THE EVIDENCE OBTAINED FROM THE INTERVIEWEES INDICATES THAT THIS IS NOT THE FUNCTION OF THE ECO AT THIS PROJECT.</b></p>	<p>x</p>
	<p>KPI 4.4: ... did the verifier encourage, specify or employ the use of alternative methods, or equipment if determined to be unsuitable for the task at hand, or unnecessarily detrimental to the environment?</p>	<ul style="list-style-type: none"> <li>• According to the Construction EMP the ECO has the role of: <ul style="list-style-type: none"> <li>o “Assisting the Contractor and / or the RE in finding environmentally acceptable solutions to construction problems.” This was evident in for example construction of the crusher.</li> <li>o “Recommending additional environmental protection measures should this be necessary.” This was evident after a site inspection where after the ECO “Reported and discussed serious concerns (deviations from specifications) with RE and Contractors; and gave guidance to Contractors</li> </ul> </li> </ul>	<p>✓</p>

		(AECOM SA, 2013) <ul style="list-style-type: none"> <li>The Resident Engineer and/or the ECO shall specify any additional Method Statements that may be required. Where relevant the Method Statements indicated above can be combined on agreement with the RE or ECO.</li> </ul>	
	KPI 4.5: ... was the verifier involved with dispute and complaint resolution?	No evidence of any complaints received by the ECO, no complaints register and thus no evidence of response to complaints.	x
<b>5. Community involvement, public participation, capacity building, and awareness</b>	<b>Objective 5: Participate in community involvement, public participation, capacity building and awareness.</b> <u>Judgement on worth:</u> No evidence was found to indicate that the ECO function at the Tulbagh Road Construction project participated in, or was actively involved in public participation, capacity building and awareness of the public.		
	KPI 5.1: ... was there sufficient evidence available to indicate that the verifier ensured/encouraged active engagement of stakeholders in decision-making processes?	<ul style="list-style-type: none"> <li>No evidence. According to Swanepoel (2012): "No, I was not involved in community liaison. However, awareness of impacts on the community is put into my reports and I regularly chat with guys on site to say that they should be aware of this thing."</li> </ul>	x
	KPI 5.2: ... was there sufficient evidence available to indicate that the verifier participated in awareness and capacity building campaigns, training courses and other activities to develop and sustain the interest of the community?	<ul style="list-style-type: none"> <li>No evidence.</li> </ul>	x
<b>6. Integration with other programmes and/or information</b>	<b>Objective 6: Participate in the integration of EIA follow-up with other programs and/or information.</b> <u>Judgement on worth:</u> The participation in certification schemes was not applicable to the ECO of the Tulbagh Road Construction project as the site and AECOM do not have environmental management systems. Some evidence was found that the ECO did in the past (2006 and 2007) participate in understanding the greater area wide effects by being involved in the Fynbos Forum. However, it could not be established that the ECO was still involved in these projects/forums at the time of the case study site visit.		
	KPI 6.1: ... did the organization have an EMS and to what extent did the verifier participate in the monitoring and evaluation of the EMS?	<ul style="list-style-type: none"> <li>Not applicable as this site and or AECOM do not have an EMS.</li> </ul>	NA
	KPI 6.2: ... was evidence available to indicate that the verifier was involved with area-wide programmes?	<ul style="list-style-type: none"> <li>The ECO is/was involved with environmental forums (Fynbos Forum 2006 &amp; 2007).  <b>HOWEVER, IT COULD NOT BE ESTABLISHED THAT THE ECO WAS STILL INVOLVED IN THESE FORUMS</b></li> </ul>	?

## 2.6 Critical ingredients for ECO success

### ***What do you consider to be the critical ingredients for a recipe of success for an ECO (to fulfil their role, add value but also to remain independent)?***

- Swanepoel (2013: interview #07) “Make sure the paperwork is full-proof (document control). All the documentation and records must be 100%.”
- Unfortunately, there is no legislation specifying what an ECO do, what the minimum qualifications and/or experience requirements are etc.
- There should be a standardised name for governmental and a standardized name for the private sector. The term officer has got an official ring to it and potentially reserve that for the governmental official; those people that issue the fine – the Green Scorpions (the Environmental Management Inspectorate (EMI)). Then have a wording for example: “Environmental Compliance Monitor” as an ECO – or something like that.
- In my opinion that ECO can only be an ECO once he’s been a Contractors EO and learn what the Contractors shortcuts are, and processes and learn the terminology, how they function etc.
- RS (2013: interview #02): “I think if there is a more regulated system then the ECOs may add more value. At the moment many of the Engineers that I work with deem it [the ECO function] as a financial liability and it is just that they have to have that person on the site. They will ensure that the person is involved with in the process as little as possible and not adding any value. **So if there are minimum standards in place I definitely think they [the ECOs] will be looked at with greater respect and being involved from a greater aspect in the project as present.**” RS (2013: interview #07) “The ECO industry must get together and draft minimum standards and that those minimum standards should then be voluntary accepted by relevant role players”.
- RS (2013: interview #02): **ECOs should be involved in the EIA process, especially the design of project phase.** RS (2013: interview #02): **The ECO should ensure the contractor comply with minimum requirements from the start** [project handover; pre-construction activities]. According to AdV (2013: interview #10): “The ECO should be made part of the project at the beginning [pre-construction] **to explain me [the**

**Project Manager] and the Contractors what should be done as we do not know many of these things** [conditions of the authorization and the legal requirements]”.

- Swanepoel (2013: interview #02): ECOs should also be involved in the pre-contract agreement for appointment clarification.
- Swanepoel (2013: interview #02): The ECO should be involved with the appointment of the EO and more budget should be allocated to cater for more time on-site.
- Swanepoel (2013: interview #02): Should have more influence on the job [works].
- Swanepoel (2013: interview#06): “Need some sort of classification system e.g. for projects over a million R the ECO need to be on-site once a week; R100million full time etc.”

## **2.7 Additional discussions**

- Wessels: “What is your opinion on the term ‘ECO’?”
- Swanepoel (interview #02): “I can understand that the argument [that the term is not really suited for the role] because at present we got Governmental ECO’s and Governmental Eos etc. If one looks at the private sector; I do believe that any “Tom, Dick and Harry” create his/her own terms for his/her own project including: environment site agent; contracting environmental officer; environmental EO’s, which in terms of NEMA will be the environmental officer etc. This list goes on... it does become very confusing. There should be a standardised name for governmental and a standardized name for the private sector. The term officer has got an official ring to it and potentially reserve that for the governmental official; those people that issue the fine – the Green Scorpions (the Environmental Management Inspectorate (EMI)). Then have a wording for example: “Environmental Compliance Monitor” as an ECO – or something like that, which then becomes industry standard terminology. This term/s should then either be published or documented with a proper description of these accepted terms. For example a client may quote for an EO and the he then becomes the ECO, then he’s got an EO level person with limited experience fulfilling the role of an ECO.
- According to Swanepoel (2013: interview #12) “an ECO on smaller sites [such as the Tulbagh project] have both an assuring and ensuring role.”

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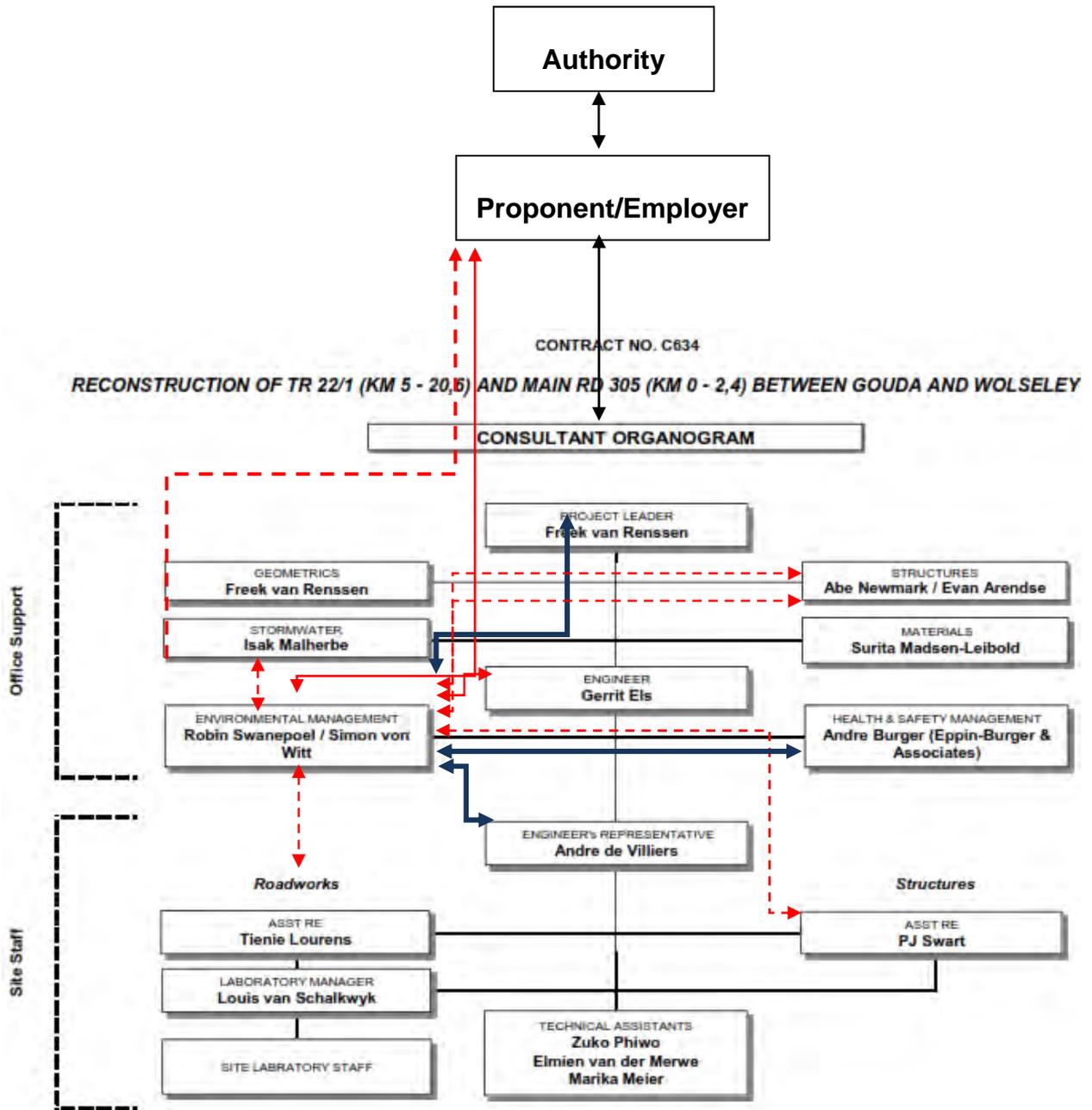
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**Annexure A: Case study organogram of consultant indicating communication lines**



(adapted from Tender Construction EMP, undated: C3-210)

-  Communication between ECO Consultant (Implementing Agent); SHE and Engineer.
-  Communication between Consultant (Implementing Agent), employer and authority.
-  Communication between ECO and other role players.
-  Communication between ECO and contractors – emergency instructions.

## Annexure B: Schedule of the data collection activities

Day 1: 2 April 2013

Time	01:00	01:00	01:00	01:00	01:00	01:30	01:00	01:00	00:00
Time	8:30 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00	01:00 - 14:30	14:30 - 15:30	15:30 - 16:30	16:30
Persons	-	-	-	Jan-Albert & ECO	Lunch	Jan-Albert & ECO	Jan-Albert & ECO	Jan-Albert & ECO	Jan-Albert & ECO
Action	-	-	-	Interview 1	Lunch	Interview 1	Interview 1	Interview 1	Leave site
Place	-	-	-	Offices	Offices	Offices	Offices	Offices	Offices

Day 2: 3 April 2013

Time	01:00	01:00	01:00	01:00	01:00	01:30	01:00	01:00	00:00
Time	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00	01:00 - 14:30	14:30 - 15:30	15:30 - 16:30	16:30
Persons	Jan-Albert & ECO	Jan-Albert & EO	Jan-Albert & EO	Jan-Albert & EO	Lunch	Jan-Albert & Proj Manager	Jan-Albert & ECO	Jan-Albert	Jan-Albert
Action	Recap previous day	Interview 2	Accompanying inspection	Accompanying inspection	Lunch	Interview 3	Document verification	Data analysis	Leave site
Place	Offices	Offices	Site	Site	Site	Offices	Offices	Offices	

Day 3: 4 April 2013

Time	01:00	01:00	01:00	01:00	01:00	01:00
Time	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00	13:00 - 14:00
Persons	Jan-Albert & ECO	Jan-Albert & ECO	Jan-Albert & ECO	Jan-Albert	Lunch	Jan-Albert
Action	Follow-up actions	Follow-up actions	Follow-up actions	Follow-up actions	Lunch	Follow-up on documents
Place	Offices	Offices	Offices	Offices	Offices	Leave site

**ANNEXURE M: CONSENT FROM FOR CO-AUTHORS**

### Letter of consent

Permission is hereby granted for the submission by the first author, J.A. Wessels, of the following two articles for examination purposes, towards the obtainment of a Ph.D degree in Geography and Environmental Management:

- *Defining the Role of the Independent Environmental Control Officer (ECO) in Compliance Monitoring and Enforcement.*
- *Appraising the Value of independent EIA follow-up verifiers in South Africa: Perspectives from industry.*



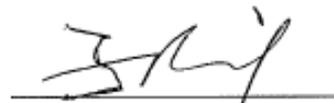
Prof. A. Morrison-Saunders  
Co-author and Co-supervisor

Date: 16 April 2014

### Letter of consent

Permission is hereby granted for the submission by the first author; J.A. Wessels, of the following article for examination purposes towards the obtainment of a Ph.D degree in Geography and Environmental Management:

- Wessels, J.A., Retief, F.P. & Morrison-Saunders, A. 2014. Appraising the value of independent EIA follow-up verifiers. *Environmental Impact Assessment Review*, In print, expected date of publication, November 2014.



Prof. F.P. Retief

Co-author and Promoter

Date: 3/11/2014

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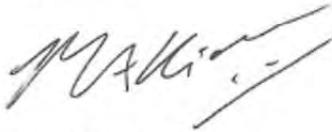
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The South African Journal of Environmental  
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VOLUME 18 NUMBER 1 (2011)

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**The Duty to Adapt to Climate Change**

*Marthán Theart*

**Defining the Role of the Independent Environmental  
Control Officer in Compliance Monitoring and  
Enforcement**

*Jan-Albert Wessels and Angus Morrison-Saunders*

**Climate Change Induced Movement of Persons in Africa:  
Human Rights Responses to Aspects of Human Security?**

*Oliver C Ruppel and Sanita van Wyk*

# DEFINING THE ROLE OF THE INDEPENDENT ENVIRONMENTAL CONTROL OFFICER IN COMPLIANCE MONITORING AND ENFORCEMENT

Jan-Albert Wessels\* and Angus Morrison-Saunders\*\*

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## Abstract

Currently an entire unregulated industry of Environmental Control Officers (ECOs) is active at various construction sites across South Africa. While the expected role of ECOs is generally to ensure that environmental authorisation (EA) conditions are implemented and monitored, differing views on the role and independence of the industry still exist between practitioners. This paper presents quantitative and qualitative response results from a questionnaire survey of 50 South African environmental practitioners on the role and independence of the ECO industry with an emphasis on practitioner comments reproduced in their own words and 'voice'. The practitioners identified: compliance monitoring; implementation and enforcement; ensuring legal compliance; advising and/or consulting; communicating; reporting; and raising awareness as the key roles of an ECO. It was also noted that competency and independence of an ECO should be consistently reflected in EA and EMP requirements to avoid confusion on these issues in practice. They also identified competence and the regulation thereof, as well as support from developers, government, and other role-players as core needs of the industry to successfully fulfil their roles. Furthermore, independence to all role-players was held in high regard and they had a cautionary message to avoid obsessing the independence issue to such an extent that it compromises the ability to fulfil their roles. In order to streamline future practices and to provide some consensus, this paper concludes with a proposed definition for the role of an independent ECO by drawing together the views presented by the practitioners.

## 1 Introduction

One of the most significant challenges facing the South African Environmental Impact Assessment (hereafter EIA)<sup>1</sup> system is compliance monitoring<sup>2</sup> and enforcement<sup>3</sup> of

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\*\* Professor, School of Environmental Sciences and Development, North-West University, South Africa; and Senior Lecturer in Environmental Assessment, School of Environmental Science, Murdoch University, Australia.

<sup>1</sup> Many notable works describe the elements of a generic EIA process, which includes: firstly a preliminary assessment phase that consists of screening and scoping; secondly a detailed assessment phase consisting of impact analyses, drafting mitigation and management plans as well as an environmental impact statement/report, the review of the report and a decision on the application; and finally an implementation and follow-up phase, which consists of post-decision management and implementation, monitoring and auditing of implementation and post decision analyses. More specific details of the South African EIA process can be found in s 24 (1)(a), (4)(a)(i) to (iv) and s (4)(b)(i) to (vii) of the National Environmental Management Act 107 of 1998 (hereafter the NEMA). See also the Environmental Impact Assessment Regulations in GN R543 GG 33306 of 18 June 2010 (hereafter the EIA regulations); J Glazewski (ed) *Environmental Law in South Africa* (2<sup>nd</sup> ed 2005) at 249; and PJ Aucamp *Environmental Impact Assessment: A Practical Guide for the Discerning Practitioner* (2009) at 6. For international literature see for example: the International Association for Impact Assessment and Institute for Environmental Assessment (IAIA) UK 1999 *Principles of Environmental Impact Assessment Best Practice*

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# IMPACT ASSESSMENT AND PROJECT APPRAISAL

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cumulative effects public participation  
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## Factors that influence the independence of EIA follow-up verifiers: a developing country perspective

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(Received 3 October 2012; final version received 26 June 2013)

Independent verification is an important aspect of practice for ensuring the credibility of an Environmental Impact Assessment (EIA). However, the independence of verifiers such as checkers, auditors, and Environmental Control Officers, may be influenced by various factors that may lead to a conflict of interest between role-players in EIA and EIA follow-up. Identifying these factors is, therefore, important. A total of 18 factors were identified by analysing literature from established verification professions and data derived within the South African context by means of interviews and workshops dedicated to clarifying independence of verifiers. The factors were divided into five categories: financial; commercial; professional; personal; and other. By shedding light on factors that influence the independence of EIA follow-up verifiers, this research aids in anticipating and avoiding potential conflicts of interest.

**Keywords:** Factors; independence; EIA follow-up; verifiers; conflict of interest

### Introduction

Independence is central to current-day ethical discussions (Everett et al. 2005, p. 416) and is viewed as a cornerstone of the ethical foundations of verification fields such as chartered and public accounting, arbitration and auditing (Hong-Lin & Shore 2003, p. 935; Everett et al. 2005, p. 416; ISO 2006, p. 2). The International Association of Impact Assessment (IAIA) identify independent verification as an important component of the basic principle of a 'credible EIA' and state that 'a credible EIA process should be carried out with professionalism, rigor, fairness, objectivity, impartiality and balance, and be subject to independent checks and verification' (IAIA 1999, p. 3). Independent checks and verification also form an integral part of environmental impact assessment (EIA) follow-up and the related activities of monitoring, auditing, evaluation, management and communication (Arts 1998, p. 26; Lee & George 2000, p. 6; Wood 2003, p. 7; Morrison-Saunders & Arts 2004, p. 2). Moreover, follow-up is widely recognized as the weakest area of EIA systems and is of particular concern in developing countries (e.g. ECA 2005, pp. 46–47; Wood 2003, p. 255; DEA 2011a, pp. 7–10).

The purpose of this paper is to identify what factors might influence the independence of verifiers from a developing country perspective with a view to better anticipate and avoid conflict of interest. Examples and experience from South Africa along with perspectives drawn from the international literature provide the basis of my analysis. It is my hope that the research findings will be of relevance and interest to a broad range of EIA practitioners, notwithstanding the particular emphasis on the follow-up stages of the process.

With reference to South Africa as a typical developing country, Craigie et al. (2009, pp. 44–45) state that 'The historical application of unjust and discriminatory laws,

which has been compounded by a regime of inadequate legal enforcement, has unquestionably undermined the development of a culture of legal compliance and clouded the application of the rule of law in South Africa and negatively affected the environmental sector.' As a result South Africa's environmental authorities were compelled to rely heavily on self-monitoring by industry (Craigie et al. 2009, p. 50) and, owing to trust issues, great emphasis has been placed on the independence of EIA practitioners (DEA 2011a, p. 16 and 25). The recent review of the South African Environmental Impact Assessment and Management Strategy (EIMS) of South Africa also referred to the importance of an independent party with no vested interest in the outcome of a particular activity as being the best way of implementing an effective compliance and enforcement regime (Wessels & Morrison-Saunders 2011, p. 30). Furthermore, a study conducted in 2011 on the independence of EIA follow-up verifiers in South Africa (termed environmental control officers, ECOs) highlighted that independence of the ECOs (from developers, government and other parties) is a concern that needs urgent attention and clarification from government and developers (Wessels & Morrison-Saunders 2011, pp. 43–44). Moreover, the South African Department of Environmental Affairs (DEA) mentions that 'there are strongly opposing views on the issue of "independence" that are unlikely to be resolved in the short-term' (DEA 2011b, p. 12).

Contradictory views on independence of verifiers involved in EIA and EIA follow-up create the potential for a conflict of interests between parties involved. Interestingly, the Code of Conduct of the IAIA requires members 'to disclose to employers and clients and in all written reports, any personal or financial interest that could reasonably raise concerns as to a possible conflict of interest' (IAIA 2013). This may, therefore, also include

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## Appraising the value of independent EIA follow-up verifiers

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## ABSTRACT

Independent Environmental Impact Assessment (EIA) follow-up verifiers such as monitoring agencies, checkers, supervisors and control officers are active on various construction sites across the world. There are, however, differing views on the value that these verifiers add and very limited learning in EIA has been drawn from independent verifiers. This paper aims to appraise how and to what extent independent EIA follow-up verifiers add value in major construction projects in the developing country context of South Africa. A framework for appraising the role of independent verifiers was established and four South African case studies were examined through a mixture of site visits, project document analysis, and interviews. Appraisal results were documented in the performance areas of: planning, doing, checking, acting, public participating and integration with other programs. The results indicate that independent verifiers add most value to major construction projects when involved with screening EIA requirements of new projects, allocation of financial and human resources, checking legal compliance, influencing implementation, reporting conformance results, community and stakeholder engagement, integration with self-responsibility programs such as environmental management systems (EMS), and controlling records. It was apparent that verifiers could be more creatively utilized in pre-construction preparation, providing feedback of knowledge into assessment of new projects, giving input to the planning and design phase of projects, and performance evaluation. The study confirms the benefits of proponent and regulator follow-up, specifically in having independent verifiers that disclose information, facilitate discussion among stakeholders, are adaptable and proactive, aid in the integration of EIA with other programs, and instill trust in EIA enforcement by conformance evaluation. Overall, the study provides insight on how to harness the learning opportunities arising from EIA follow-up through the appointment of independent verifiers.

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## Introduction

Independent environmental verification is often done by individuals and/or groups of independent verifiers such as: Independent Environmental Monitoring Agencies in Canada (Ross, 2004); Environmental Checkers in Hong Kong (Au and Hui, 2004); and environmental supervision individuals and/or teams in China, Latin America and the World Bank (Acerbi et al., 2014; Wang, 2013; World Bank, 2012, 2014). The term "Environmental Control Officers" is used to describe independent verifiers in Singapore and South Africa (Singapore National Environment Agency, 2001, 2002; Wessels and Morrison-Saunders, 2011). While this literature covers the function of independent verifiers in the broader context of EIA follow-up, our interest for this paper revolves around the added value of this role.

This paper provides insight into the methodology used and results of an appraisal of the value of independent EIA follow-up verifiers during the construction phase of major development projects within a developing country context. The appraisal was done by: identifying and designing relevant performance standards, followed by measuring the performance of independent verifiers against the standards at four construction case studies. South Africa was identified as an ideal developing country to explore the value of verifiers because of its current focus on major infrastructure development as well as having an established environmental assessment and management system (Presidential Infrastructure Coordinating Commission of South Africa, 2014; Wood, 2003).

The aim of the paper is to appraise how and to what extent independent EIA follow-up verifiers add value in major construction projects in the developing country context of South Africa. Although Marshall et al. (2005) notes that "EIA follow-up should be sustained over the entire life of the activity" [construction, operation, rehabilitation and closure] the focus of this study is on the construction phase as South African ECOs are currently only active during this phase of projects. The following sections of the paper give a brief theoretical background on sustainable

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# ENVIRONMENTAL IMPACT ASSESSMENT REVIEW

AUTHOR INFORMATION PACK

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As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

##### *References in a special issue*

Please ensure that the words 'this issue' are added to any references in the list (and any citations in the text) to other articles in the same Special Issue.

##### *Reference management software*

This journal has standard templates available in key reference management packages EndNote (<http://www.endnote.com/support/enstyles.asp>) and Reference Manager (<http://refman.com/support/rmstyles.asp>). Using plug-ins to wordprocessing packages, authors only need to select the appropriate journal template when preparing their article and the list of references and citations to these will be formatted according to the journal style which is described below.

##### *Reference formatting*

There are no strict requirements on reference formatting at submission. References can be in any style or format as long as the style is consistent. Where applicable, author(s) name(s), journal title/book title, chapter title/article title, year of publication, volume number/book chapter and the pagination must be present. Use of DOI is highly encouraged. The reference style used by the journal will be applied to the accepted article by Elsevier at the proof stage. Note that missing data will be highlighted at proof stage for the author to correct. If you do wish to format the references yourself they should be arranged according to the following examples:

##### *Reference style*

*Text:* All citations in the text should refer to:

1. *Single author:* the author's name (without initials, unless there is ambiguity) and the year of publication;
2. *Two authors:* both authors' names and the year of publication;
3. *Three or more authors:* first author's name followed by 'et al.' and the year of publication.

Citations may be made directly (or parenthetically). Groups of references should be listed first alphabetically, then chronologically.

Examples: 'as demonstrated in wheat (Allan, 2000a, 2000b, 1999; Allan and Jones, 1999). Kramer et al. (2010) have recently shown ....'

*List:* References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters 'a', 'b', 'c', etc., placed after the year of publication.

*Examples:*

Reference to a journal publication:

Van der Geer J, Hanraads JAJ, Lupton RA. The art of writing a scientific article. *J Sci Commun* 2010;163:51-9.

Reference to a book:

Strunk Jr W, White EB. *The elements of style*. 4th ed. New York: Longman; 2000.

Reference to a chapter in an edited book:

Mettam GR, Adams LB. How to prepare an electronic version of your article. In: Jones BS, Smith RZ, editors. *Introduction to the electronic age*. New York: E-Publishing Inc; 2009. p. 281-304.

Note shortened form for last page number. e.g., 51-9, and that for more than 6 authors the first 6 should be listed followed by "et al." For further details you are referred to "Uniform Requirements for Manuscripts submitted to Biomedical Journals" (*J Am Med Assoc* 1997;277:927-34) (see also [http://www.nlm.nih.gov/bsd/uniform\\_requirements.html](http://www.nlm.nih.gov/bsd/uniform_requirements.html)).

*Journal abbreviations source*

Journal names should be abbreviated according to the List of Title Word Abbreviations: <http://www.issn.org/services/online-services/access-to-the-ltwa/>.

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Electronic archiving of supplementary data enables readers to replicate, verify and build upon the conclusions published in your paper. We recommend that data should be deposited in the data library PANGAEA (<http://www.pangaea.de>). Data are quality controlled and archived by an editor in standard machine-readable formats and are available via Open Access. After processing, the author receives an identifier (DOI) linking to the supplements for checking. As your data sets will be citable you might want to refer to them in your article. In any case, data supplements and the article will be automatically linked as in the following example: doi:10.1016/0016-7037(95)00105-9. Please use PANGAEA's web interface to submit your data (<http://www.pangaea.de/submit/>).

### Google Maps and KML files

KML (Keyhole Markup Language) files (optional): You can enrich your online articles by providing KML or KMZ files which will be visualized using Google maps. The KML or KMZ files can be uploaded in our online submission system. KML is an XML schema for expressing geographic annotation and visualization within Internet-based Earth browsers. Elsevier will generate Google Maps from the submitted KML files and include these in the article when published online. Submitted KML files will also be available for downloading from your online article on ScienceDirect. For more information see <http://www.elsevier.com/googlemaps>.

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### Submission checklist

The following list will be useful during the final checking of an article prior to sending it to the journal for review. Please consult this Guide for Authors for further details of any item.

#### Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:

- E-mail address
- Full postal address
- Telephone

All necessary files have been uploaded, and contain:

- Keywords
- All figure captions
- All tables (including title, description, footnotes)

Further considerations

- Manuscript has been 'spell-checked' and 'grammar-checked'
- All references mentioned in the Reference list are cited in the text, and vice versa
- Permission has been obtained for use of copyrighted material from other sources (including the Web)
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<http://dx.doi.org/10.1016/j.physletb.2010.09.059>

When you use a DOI to create links to documents on the web, the DOIs are guaranteed never to change.

**ANNEXURE P: NORTH-WEST UNIVERSITY'S EXPLANATORY NOTES  
ON THE ARTICLE MODEL**

## **EXPLANATORY NOTES ON THE ARTICLE MODEL FOR MASTER'S DISSERTATIONS, MINI-DISSERTATIONS AND DOCTORAL THESES IN THE FACULTY OF NATURAL SCIENCES, POTCHEFSTROOM CAMPUS, NORTH-WEST UNIVERSITY, SOUTH AFRICA**

### **1. BACKGROUND**

The Faculty of Natural Sciences adopted the article model for the submission of the research component of postgraduate studies in terms of the general rules of the North-West University, which make provision for this model. Advantages are that this encourages publication of the research results in scientific journals and also that students are trained in article writing in the course of their postgraduate studies.

This note provides a short explanation of the requirements, rules and guidelines for the use of this model.

### **2. REQUIREMENTS OF MASTER'S AND DOCTORAL TRAINING**

The basic quality and scientific requirements for Master's and Doctoral students who prefer the article format, are the same as for the traditional model concerning completion of a dissertation, mini-dissertation or a thesis.

In the article format, the document could include either published research articles or unpublished manuscripts in article format. If more than one article or manuscript is used, it must still be presented as a unit, supplemented by an overarching problem statement, a focused literature analysis and integration, and a summarised concluding discussion (General Rule A.7.5.7).

### **3. STRUCTURE AND CHARACTERISTICS OF THE ARTICLE MODEL**

#### **3.1 Structure**

Typically, the structure of the document will include the following (as described in the University's *Manual for Postgraduate Studies*):

- Title page
- An abstract
- Acknowledgements
- Table of contents
- A preface comprising the following:
  - A statement that the article format has been selected
  - The student's share in the research in the case of co-authors for the article(s)/manuscript(s)

- For each article which was submitted, but not yet published, the name of the journal concerned.
- Permission from co-authors that the article(s)/manuscript(s) can be submitted for degree purposes
- Permission from the editor of the journal if any copyright is involved
- Literature review.
- Methods (optional, depending on the type of articles/manuscripts)
- Manuscripts
  - Unpublished manuscripts or
  - Published articles
- Each article must be preceded by a copy of the guidelines for authors for the journal concerned.
- Conclusion
- Bibliography (may be given for each article separately at the end of the thesis).
- Addenda

### **3.2 Literature review and introduction**

The literature review that is presented in an article is less comprehensive than in a traditional dissertation. However, it must still be taken into account that especially in a dissertation the student must provide proof of being familiar with and in control of the appropriate subject literature. A focussed literature analysis must form part of the dissertation. Such a review may also be in the form of a review article.

The introduction can be integrated with the literature review, depending on the nature of the research subject. It will, amongst others, give some brief background and motivation of the research, the questions asked and will explain the structure of the document to the reader. The introduction has to contextualise the research in a logical and coherent manner.

### **3.2 Conclusion**

The conclusion at the end of the document is written specifically to provide an integrated summary and discussion of the relevant conclusions and should contain specific recommendations for practice and/or further research. Some of the content in the conclusion could be repetition of what has been discussed in the individual manuscripts.

## **4. ARTICLES THAT MAY BE USED**

In addition to other requirements that are stated in the formal prescriptions, unless the student provides an acceptable motivation, **only** articles that flow forth directly from the student's research **after** registration for the master's or doctoral degree at NWU, for a dissertation or thesis, under supervision of his supervisor/promoter, may be submitted in article format.

## **5. QUANTITY AND QUALITY**

There is no prescribed number of articles in this model. However, the number of articles submitted must convince the examiners in terms of the number and/or extent that the candidate has truly complied with the requirements for a master's or doctoral degree.

The quality, nature and extent of the research that is described in the articles may not differ from that of a traditional dissertation/thesis. The difference is only found in the presentation of the results.

## **6. MANUSCRIPTS VERSUS PUBLISHED ARTICLES**

- Students must indicate to which journal they intend to submit any unsubmitted manuscripts. The publication of the manuscripts that are included in the document is not a prerequisite for the examination of the document.
- The submission of the manuscript(s) for publication will be left to the discretion of the study leader / supervisor to determine readiness.
- In the case of submitted publications, students must indicate to which peer reviewed scientific journal it was sent.
- An important focus in evaluating a dissertation in article format will be if articles that have not yet been accepted for publication will indeed be suitable or ready for publication. A guideline for students and supervisors is to avoid presenting research results in article format if they do not really intend to publish such articles.

## **7. CO-AUTHORSHIP**

In some cases, students participate in research conducted by teams. Most of the articles from this kind of research are co-authored. Students who are part of these research teams, must therefore indicate what their own contribution to the research was, and also include the permission that was obtained from the co-authors to use an article as part of their document.

A student may be indicated as the first author of some of the manuscripts used, if applicable and based on the contribution of the student. A study leader of a project can, after consultation with students, be first author of manuscripts, based on the nature of the subject and the level of involvement of their students.

**30 May 2012**