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APPRAISING THE VALUE OF INDEPENDENT EIA FOLLOW-UP VERIFIERS

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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 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.

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

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.

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 and 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 and 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 and Morrison-Saunders, 2003; Morrison-Saunders and Arts, 2004), 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 and 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 (KPAs) 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).

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 behavior 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”.

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.

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).

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 source 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; and 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 KPIAs.

The categorization of the KPIA 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 1. Linkages between principles, objectives, KPAs and KPIs

Output component	<p>Relevant Sustainability, IEM, EIA & EIA follow-up principles "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></p>	<p>KPAs "Topic related to principles" <i>(Derived from ISO, 2004; Arts, 1998, Arts et al, 2001; DEA, 2011; and Hullet and Diab, 2002)</i></p>	<p>Objectives "Indication of what needs to be achieved to" <i>(UNEP-ITC, 2002: 59-67; South Africa, 1998: 5; Du Plessis, 2002; Morrison-Saunders & Arts, 2004)</i></p>	<p>Key Performance Indicators (KPIs) "Questions that provide an indication to what extent the objectives were achieved by subject participation" <i>(derived from South Africa, 1998; Morrison-Saunders & Arts, 2004, Singapore Environmental Agency, undated, and DWAF, 2005 as proposed by Retief, 2007a: 91)</i> Note that all questions start with: "To what extent..."</p>
Prior to implementation [Planning & Design]	<p><u>UNEP principle 17:</u> 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. <u>NEMA s(4)(i):</u> 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. <u>Follow-up principles 13 & 16:</u> 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] <i>Generate data, knowledge and a sustainable vision or outcome.</i></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)? 1.2: ... was the verifier involved in identifying key issues and impacts to be addressed in the project and other project related projects (Scoping)? 1.3: ... was the verifier involved with compiling and reporting the: Environmental Impact Report (EIR)/Statement (EIS); and the sustainability vision? 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>
Post proposal implementation [Pre-construction & Construction phase].	<p><u>UNEP principle 16:</u> National authorities should endeavor 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... <u>NEMA s. 2(n):</u> Global and international responsibilities relating to the environment must be discharged in the national interest. <u>Follow-up principles 12 & 17:</u> HOW? EIA follow-up should have a clear division of roles, tasks and responsibilities; and HOW? Adequate resources should be provided.</p>	<p>2A. [Do] <i>Pre-construction preparation for implementation of specifications.</i></p>	<p>2A. Participate in the pre-construction preparation and commissioning of the environmental Performance Specifications.</p>	<p>2A.1: ... was the verifier involved with the handover of environmental Performance Specifications from the planning phase to the implementation phase? 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? 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><u>UNEP Principle 16:</u> National authorities should endeavor to promote the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution... <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; <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. <u>NEMA s. 2 (4) (h):</u> Community wellbeing and empowerment must be promoted through environmental education, awareness, sharing of knowledge and experience... <u>Follow-up principles 1 & 10:</u> WHY? Is essential to determine EIA outcomes; and WHAT? Should be timely, adaptive and action-oriented.</p>	<p>2B. [Do] <i>Implement, inform decision making in construction and parallel process.</i></p>	<p>2B. Participate in the implementation of the environmental Performance Specifications.</p>	<p>2B.1: ... did the verifier perform the defined and discharged roles and responsibilities until the completion of the ECO service? 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? 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 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?</p>

Output component	Relevant Sustainability, IEM, EIA & EIA follow-up principles "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>	KPAs "Topic related to principles" <i>(Derived from ISO, 2004; Arts, 1998, Arts et al, 2001; DEA, 2011; and Hullet and Diab, 2002)</i>	Objectives "Indication of what needs to be achieved to" <i>(UNEP-ITC, 2002: 59-67; South Africa, 1998: 5; Du Plessis, 2002; Morrison-Saunders & Arts, 2004)</i>	Key Performance Indicators (KPIs) "Questions that provide an indication to what extent the objectives were achieved by subject participation" <i>(derived from South Africa, 1998; Morrison-Saunders & 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>UNEP Principle 10:</u> Environmental issues are best handled with participation of all concerned citizens, at the relevant level. Nations shall facilitate and encourage public awareness and participation by making environmental information widely available. <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 & 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? 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.</p>	<p>2C. <i>[Do]</i> 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: ... <i>did the verifier report or gave feedback to the site proponent on actual and/or potential harmful environmental conditions and/or situations?</i> 2C.2: ... <i>did the verifier report or gave feedback to the Regulator on actual and/or potential harmful environmental conditions and/or situations?</i> 2C.3: ... <i>did the verifier report or gave feedback to the Community on actual and/or potential harmful environmental conditions and/or situations?</i> 2C.4: ... <i>was the verifier involved with formal periodic feedback, communication of EIA predictions into the planning stage to be implemented moving forward?</i> 2C.5: ... <i>was the verifier involved in active feedback/communication/training for ensuring improved EIA predictions, methods and techniques?</i> 2C.6: ... <i>did the verifier ensure openness, access to information for transparent communication with all stakeholders involved?</i></p>
	<p><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,...</p> <p><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, ...</p>	<p>3A. <i>[Check]</i> Monitoring and measurement of effects.</p>	<p>3A. Participate in the monitoring and measurement of environmental effects.</p>	<p>3A.1: ... <i>was there sufficient evidence to confirm that the verifier collected data on environmental effects?</i> 3A.2: ... <i>was the verifier involved with risk assessment and evaluation of environmental aspects and the risks, consequences and alternative options for mitigation of activities?</i></p>
	<p><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;...</p>	<p>3B. <i>[Check]</i> Monitoring and evaluation of legal compliance (conformance).</p>	<p>3B. Participate in internal and external compliance (conformance) evaluation.</p>	<p>3B.1: ... <i>did the verifier collect data on environmental legal compliance?</i> 3B.2: ... <i>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?</i> 3B.3: ... <i>was the verifier involved with formal (systematic and objective) external conformance assessments (external audits)?</i> 3B.4: ... <i>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?</i></p>
	<p><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.</p>	<p>3C. <i>[Check]</i> Controlling records.</p>	<p>3C. Participate in the control of records.</p>	<p>3C: ... <i>was there sufficient evidence available to indicate that the verifier controlled records to ensure information remains accessible?</i></p>
	<p><u>UNEP Principle 10:</u> Environmental issues are best handled with participation of all concerned citizens, at the relevant level.</p>	<p>4. <i>[Act]</i> Management and</p>	<p>4. Participate in management and</p>	<p>4.1: ... <i>did the verifier have the authority to: cease, modify or control any act, activity or process causing [or that may cause] the pollution or</i></p>

Output component	Relevant Sustainability, IEM, EIA & EIA follow-up principles "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>	KPAs "Topic related to principles" <i>(Derived from ISO, 2004; Arts, 1998, Arts et al, 2001; DEA, 2011; and Hullet and Diab, 2002)</i>	Objectives "Indication of what needs to be achieved to" <i>(UNEP-ITC, 2002: 59-67; South Africa, 1998: 5; Du Plessis, 2002; Morrison-Saunders & Arts, 2004)</i>	Key Performance Indicators (KPIs) "Questions that provide an indication to what extent the objectives were achieved by subject participation" <i>(derived from South Africa, 1998; Morrison-Saunders & 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.4(a) & (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...</p> <p><u>Follow-up principles 1, 10, 14 & 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.</p> <p><u>UNEP Principle 22</u>: Indigenous people and their communities and other local communities have a vital role in environmental management...</p> <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 & 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>UNEP Principle 10: Environmental issues are best handled with participation of all concerned citizens, at the relevant level. 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>enforcement.</i></p> <p><i>5. Community involvement, public participation, capacity building, and awareness.</i></p> <p><i>6. Integration with other programmes and/or information.</i></p>	<p><i>enforcement.</i></p> <p>5. Participate in community involvement, public participation, capacity building and awareness.</p> <p>6. Participate in the integration of EIA follow-up with other programs and/or information.</p>	<p><i>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?</i></p> <p>4.2: ... <i>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?</i></p> <p>4.3: ... <i>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?</i></p> <p>4.4: ... <i>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?</i></p> <p>4.5: ... <i>was the verifier involved with dispute and complaint resolution?</i></p> <p>5.1: ... <i>was there sufficient evidence available to indicate that the verifier ensured/encouraged active engagement of stakeholders in decision making processes?</i></p> <p>5.2: ... <i>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>6.1: ... <i>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>6.2: ... <i>was evidence available to indicate that the verifier was involved with area-wide programmes?</i></p>

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) Tulbach- 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.

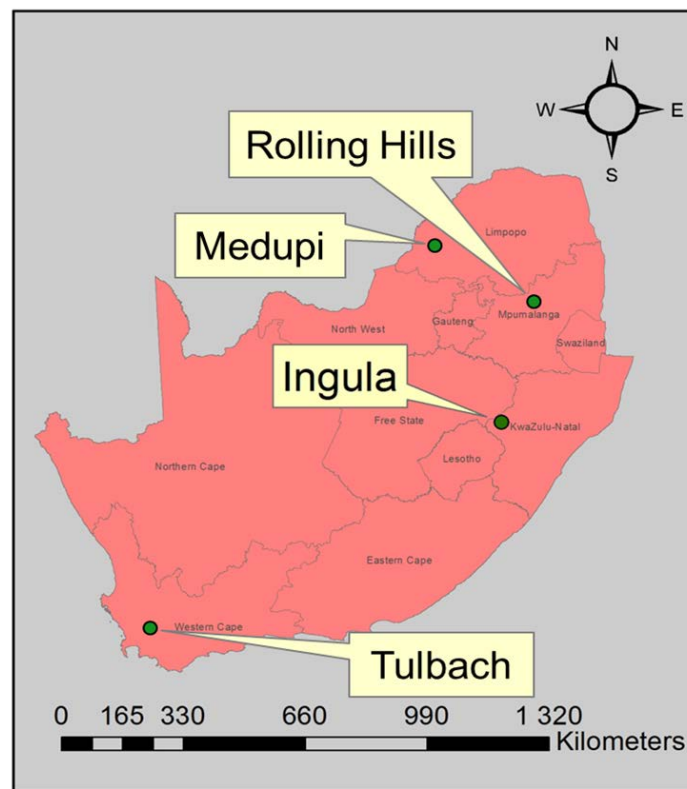


Figure 1: Map indicating location of case studies in South Africa

Table 2. Summary profile of ECO construction case studies

Cases	Project description and background	Location and scale	Type	Interviewees
Medupi	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).	Lephalale in the Limpopo Province of South Africa and is approximately 1200 Ha in size.	Coal-fired power station.	<ul style="list-style-type: none"> • Asset manager • Environmental Manager • Lead ECO • ECO • Waste Control Officer • Assistant ECO
Ingula	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 been maintaining a certified and matured ISO14001:2004 system for a number of years.	The Ingula site is situated 55 kilometers from Ladysmith and spans the provincial boundary between the Free State and Kwazulu-Natal provinces.	Pumped storage power scheme.	<ul style="list-style-type: none"> • Project Manager • Environmental Manager • ECO
Rolling Hills	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.	The 1500 Ha property is located next to N4 toll road between Belfast and Machadodorp, Mpumalanga Province.	Luxury golf estate development.	<ul style="list-style-type: none"> • Contractor Director • Group Environmental Manager • ECO • On-site ECO
Tulbach	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.	The site is situated between Gouda and Wolseley in the Tulbach area of the Western Cape province of South Africa.	Upgrade of a Trunk Road.	<ul style="list-style-type: none"> • Project Director / Construction Manager • Engineering Representative • ECO

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 in Table 3 were used to provide an indication of the extent to which objectives were achieved:

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 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 Key Performance Indicator (KPI) was achieved, partially achieved or not achieved. An underlined evaluation (e.g. x, ½, ✓) indicate a particular interesting or unique reference to a case study.

Table 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	Tulbach
Prior to proposal implementation	1. Participate in the early components of EIA prior to proposal implementation.				
	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	2A. Participate in the pre-construction preparation and commissioning of the environmental Performance Specifications.				
	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	✓
	2B. Participate in the implementation of the environmental Performance Specifications.				
	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?	✓	✓	✓	✓
	2C. Participate in reporting and communicating by informing all the stakeholders about the results of EIA follow-up.				
	2C.1: ...did the verifier report or gave feedback to the site proponent on actual and/or potential harmful environmental conditions and/or situations?	✓	✓	✓	✓
	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?	✓	✓	½	✓	
2C.6: ... did the verifier ensure openness, access to information for transparent communication with all stakeholders involved?	✓	✓	✓	✓	

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	Tulbach
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?		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?		½	½	½	X
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)?		½	½	½	½
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?		✓	✓	✓	✓
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?		✓	✓	✓	✓
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?		X	½	X	½
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	½	X	X
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?		½	✓	✓	✓
4.5: ... was the verifier involved with dispute and complaint resolution?		✓	½	✓	X
5. Participate in community involvement, public participation, capacity building and awareness.					
5.1: ... was there sufficient evidence available to indicate that the verifier ensured/encouraged active engagement of stakeholders in decision-making processes?		✓	✓	✓	X
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?		✓	✓	✓	X
6. Participate in the integration of EIA follow-up with other programs and/or information.					
6.1: ... did the organization have an EMS and to what extent did the verifier participate in the monitoring and evaluation of the EMS?		✓	✓	½	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.

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 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.

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^{KPI 2.A.1}, and participated in identifying, defining and allocating roles and responsibilities^{KPI 2.A.2} 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^{KPI 2.A.3} for effective support of the ECO function. Apart from Rolling Hills, evidence was also found at the Medupi and Tulbach cases that verifiers were involved with the identification, allocation of financial and human resources for EIA follow-up activities^{KPI 2.A.3}. At Medupi, Marrel (2012) notes, “as construction activities increased an Assistant ECO and two more ECO positions were created and filled”. At the Tulbach 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 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^{KPI 2B.2}; responding to actual and potential environmental emergency situations^{KPI 2B.3}; documenting, reviewing and/approving of policies, plans, programmes, and operational procedures, registers^{KPI 2B.5}; and internal capacity building and awareness^{KPI 2B.6}. 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^{KPI 2B.1} at the Medupi, Rolling Hills and Tulbach 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 Tulbach 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^{KPI 2B.4}.

In relation to stimulating the use of sustainable technologies and processes^{KPI 2B.2} 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 Tulbach 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^{KPI 2B.6}. 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 Tulbach 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 Tulbach 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^{KPI 2C.4}, 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 and Campbell, 2012). Another interesting observation is that at all the cases; the verifiers fulfill the responsibility of giving feedback to the community^{KPI 2C.3} (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 instill 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 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^{KPI 3A.2}; and risk assessment/evaluation of environmental aspects, risks and alternatives^{KPI 3A.2}. 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 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^{KPI 3B.1}; do formal internal assessments^{KPI 3B.2}; are involved with ad hoc verification and evaluation of policies, plans, programmes, operational procedures, reports and the subsequent implementation of mitigation measures^{KPI 3B.4}. 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 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^{KPI 4.1}; 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^{KPI 4.2}. 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 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”. 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^{KPI 4.4}. The results also show that they were to a partial extent involved with dispute and complaint resolution^{KPI 4.5}, 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 Tulbach case study did not participate in dispute resolution which coincides with the results of KPIs 2C.3 (feedback to community); and KPIs 5.1 and 5.2 that showed that the verifier was not involved in community participation. The Tulbach 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^{KPI 5.1}; 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^{KPI 5.2}. 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 neighboring 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 talks 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 localize community, most definitely yes”. The results coincides with KPIs 2C.3 and KPIs 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 Tulbach 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 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^{KPI 6.1} and actively participated in the understanding of area-wide effects and issues^{KPI 6.2}. 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 Perdicoulis 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^{KPI 6.2} at Rolling Hills. The status of KPI 6.2 for the Tulbach could not be established.

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 instill 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; instill trust in EIA enforcement by conformance evaluation.

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