Reflections on the quality of mining EIA reports in South Africa

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Synopsis

Environmental impact assessment (EIA) in South Africa is administered by the Department of Minerals and Energy (DME) for the mining industry, and the Department of Environmental Affairs and Tourism (DEAT) for all other sectors. Thus far, EIA research has focused on the process under the auspices of DEAT but none has focused on the EIA process that has been mandatory in the South African mining industry since 2004. Using the Lee and Colley (Lee *et al.*[13]) review package as a basis, a review model specifically tailored to the needs of the mining industry was applied to review the quality of a sample of 20 environmental impact reports (EIRs) approved by the DME. Results reveal that 85% of the EIRs are of a satisfactory quality. Presentational and descriptive components generally achieved higher quality grades than the analytical components such as impact magnitude and alternatives. The results show that in spite of some areas of weakness, and in spite of being conducted in terms of different legislation, EIR quality in the mining sectors appears to conform to the overall standard of quality of EIRs in other sectors in South Africa, and is also on a par with quality abroad. Hence, despite the criticism that DME is usurping the role of DEAT, it is concluded that EIRs of comparable standard are being produced, and that the quality of EIRs in the mining sector do not provide supporting evidence for this criticism. However, EIR quality is only a single aspect of EIA effectiveness, others including action and implementation of EIA proposals and mitigation measures.

Introduction

Environmental impact assessment (EIA) was first introduced in the USA in 1969 and is considered one of the most successful policy interventions of the last few decades, with over one hundred countries practising environmental assessment (Glasson *et al.*[10]; Interparliamentary Union[12]; Lee and George[14]; Wood[29]). However, internationally the effectiveness of EIA is a particular concern amongst EIA practitioners (Barker and Wood[2]; Wood[29]; Christensen *et al.*[5]). One important causal component of effectiveness deals with the quality of the report emanating from the EIA process, i.e. the environmental impact report (EIR), also referred to as the environmental impact statement (EIS) or simply the environmental statement (ES). It is argued that poor quality reports would invariably lead to ineffectiveness since they contain the information that serves as the basis for decision making.

South Africa adopted mandatory EIA in 1997 at a relatively late stage of its global diffusion, by virtue of a set of regulations promulgated in terms of the Environment Conservation Act (ECA), Act No. 73 of 1989 (South Africa[21, 23]). These regulations contained a list of activities for which EIA was mandatory. Notably, mining activities were excluded from this list. In 1998, the ECA was partially repealed in favour of the National Environmental Management Act, Act No. 107 of 1998 (NEMA) (South Africa[24]), with only a few sections, including 21, 22 and 26, together with the regulations promulgated in 1997, remaining in force. These were finally repealed in 2006 when EIA regulations in terms of NEMA came fully into effect after a lengthy revision process. The NEMA is framework legislation allowing for other government departments such as the Department of Minerals and Energy (DME) and the Department of Water Affairs and Forestry (DWAF) to promulgate separate sets of sectoral specific legislation. Since the beginning of mandatory EIA, the designated competent authority for EIA authorization was the national Department of Environmental Affairs and Tourism (DEAT), and the various provincial environmental departments, with the exception of mining projects, for which the Department of Minerals and Energy (DME) was the competent authority. This resulted in the unique dualistic South African system for environmental authorizations.

This dualistic system was caused partly by a different route for EIA development in the

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mining sector. In 1991, while voluntary EIAs were being conducted in various other sectors, the Department of Minerals and Energy (DME) introduced their own set of environmental legislation (South Africa[22]), and published a set of guidelines (the Aide Memoire) for the creation of the so called environmental management programme reports (EMPR) (South Africa[22]). The EMPR was a diluted form of EIA, but was largely ineffective because the legal requirements at the time were less stringent than is currently the case, and were rarely enforced (Fourie & Brent[8]). This legislation was superseded in 2002 with the introduction of the Minerals and Petroleum Resources Development Act (MPRDA) (South Africa[26]). The sections dealing with environmental concerns came into force in 2004 with the introduction of a set of regulations (R527) that provide specific guidelines for the practice of EIA in the mining industry (South Africa[26, 27]) and as a consequence the old Aide Memoire became obsolete and was not updated. The new EIA system was a much improved and comprehensive process than the EMPR, and was much closer to international norms for best practice EIA, but the DME remained as the competent authority. Despite the explicit requirements of the Constitution and NEMA for cooperative governance (Du Plessis[6]), the DME has 'usurped' the environmental mandate of DEAT by including environmental authorizations in the MPRDA and thereby retaining its position as the lead agent for EIA authorizations.

Since EIA become mandatory in South Africa in 1998, limited research has been conducted for both the effectiveness of the EIA system and the quality of the reports produced by the EIA system (EIR) (Carrol[4]; Sandham and Pretorius[18]; Sandham *et al.*[19]; Wood[28]). Results so far indicate that, in general, the reports produced by the South African EIA system are of an acceptable standard, in line with international findings (Barker and Wood[2]; Canelas *et al.*[3]; Geraghty[9]; Lee and George[14]).

However, no research has been published on the quality of EIR in the South African mining industry. In view of the dualistic nature of EIA in South Africa, and the challenges posed to effective cooperative environmental governance, this is an area in need of research attention, hence the subject of this study. Specifically, the issue of whether the separate system of EIA pursued by DME can produce EIRs of comparable and acceptable quality needs to be investigated. The latter is particularly relevant in view if criticism levelled at DME for essentially acting as 'referee and player' within the mining context. This situation has its historical roots in the dominant role of mining in the growth and development of the South African economy. The ministry of mining has traditionally had the mandate of developing the mineral resources for the benefit of the national economy. The requirement for environmental management, including EIA, has placed this ministry and the industry in the invidious position of having to police itself, posing Juvenal's question—'Who will guard the guards themselves?'

The paper is structured around four sections. Firstly the methodology is explained, after which the analysis and results are presented. This is followed by a discussion of the key research findings. The paper ends with some overall conclusions on report quality and suggestions for future research.

Materials and methods

Package use

Internationally the use of so-called review packages has been the main methodological approach to report quality review. For this research the well-established Lee and Colley review package, developed in the United Kingdom, was used as the basis for the research methodology design. The package is hierarchically arranged with the review subcategories contained in the lowest level, as illustrated in Figure 1.

Upon examination of an EIR, the review begins at the lowest level, and a grade is awarded ranging from A to F, depending on how well a specific task was performed. The results are then recorded on a collation sheet. The grading symbols are as follows.

Symbol	Explanation
A	Generally well performed, no important tasks left incomplete
B	Generally satisfactory and complete, only minor omissions and inadequacies
C	Can be considered just satisfactory despite omissions and/or inadequacies
D	Parts are well attempted but must, as a whole, be considered just unsatisfactory because of omissions or inadequacies
E	Not satisfactory, significant omissions or inadequacies
F	Not satisfactory, important task(s) poorly done or not attempted

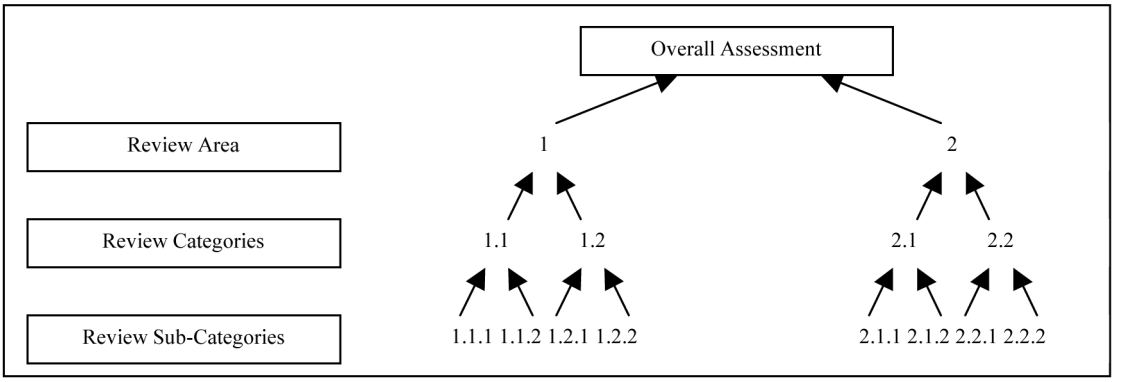

Figure 1—Hierarchical structure of the Lee and Colley (1999) EIR review package. Level 4—overall assessment EIR; Level 3—assessment of review areas; Level 2—assessment of review categories; Level 1—assessment of review sub-categories

N/A Not applicable. The review topic is not applicable or irrelevant in the context of this EIA report

Package adaptation

Using the Lee and Colley review package (Lee and George[14]; Simpson[20]) as methodological basis and MPRDA regulations (R.527) as the point of departure for the contents, a review package specifically tailored to the South African mining industry was developed. This package was then applied to a sample of 20 approved EIRs that had been submitted to the DME after the MPRDA regulations came into effect in 2004. The Lee and Colley review package was chosen to serve as basis due top its adaptability, ease of use and consistency (Barker and Wood[2]; Sandham *et. al.*[19]; Pretorius[15]; Rzeszot[17]; Simpson[20]).

Access to information and review sample

Access to information was requested of the DME in terms of the Promotion of Access to Information Act, Act No. 2 of 2000. Upon receiving permission to access the EIRs, the package was first tested and refined on a pilot sample of four EIRs, before the full review of 20 EIRs was conducted. The 20 selected EIRs had all been submitted in accordance with the requirements of the MRDPA and represent a large proportion of the approved EIRs in the North West Province at that time. The total of approved EIRs was estimated at roughly 50–60, although according to DME officials, the number pending approval was close to 300. It is also worth noting that the sample covers a wide variety of mines including small scale open cast mining and deep underground platinum mines.

Review methodology

Two reviewers were used to review the reports. Firstly reports were reviewed separately and then a consensus discussion was held. While there were some small differences between the allocated grades at the level of sub-categories, these were eliminated as the review moved up the hierarchy, and there were no differences at the level of review areas or overall grades. Consensus results were recorded on a collation sheet. A summary of grades at the top three tiers appears in Table I.

Results and analysis

A grade of C or higher at any of the reviewing tiers indicates that the EIRs in question are satisfactory to a greater or lesser degree, and therefore the A, B and C grades were grouped together to interpret the percentage 'satisfactoriness'. A critical boundary is that between C and D since it separates satisfactory from unsatisfactory. High grades in that range indicate that information is of marginal quality. A and B grades were also grouped together to provide an indication of good performance, i.e. strengths, and by the same token E and F grades were grouped together as indicators of weakness (see Table I).

Overall grades

Analysis of overall EIR grades reveals that 85% of the sample was rated as satisfactory (A–C). Not one EIR received the highest grade, but 40% were rated as generally satisfactory (B), and another 45% rated as just satisfactory despite omissions and/or inadequacies (C). Two reports were rated as just unsatisfactory (D), a single report was rated as a poor attempt (E), and none as not attempted (F). The most common grade was C, followed by B, generally satisfactory.

Quality of review areas

It was found that EIRs in the mining industry tended to grade higher in review areas 1 and 4, and lower in review areas 2 and 3 (Figure 2), which was also the case in a comparative study (Barker and Wood[2]) as well as other international studies (Canelas *et al.*[3]; Christensen *et al.*[5]).

Review area 3 (RA3), concerning alternatives and mitigation, received the lowest overall grade of 65% in the range of percentage of EIR scoring C or better while review area 2 (RA2), identification and evaluation of key impacts, scored 70%. Although these results are in line with international findings, especially for other emerging economies with

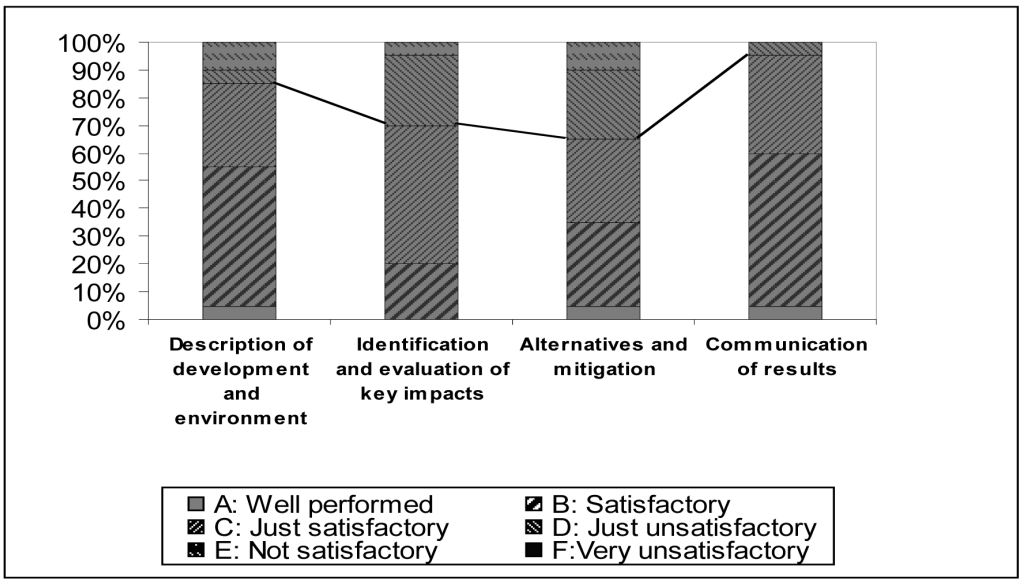

Figure 2—Grades for review areas. Note: the connecting line indicating the boundary between satisfactory (A–C) and unsatisfactory (D–F)

recent introduction of EIA (Androulidakis and Karakassis[1]; Canelas *et al.*[3]), it is still relatively low in comparison to countries in which EIA has been practised longer.

Review area 1—description of the development and the environment

The aim of this review area is to describe the site, the environment in which it is situated, and the baseline conditions that prevail. In each of these three categories, 85% of the EIRs were rated as satisfactory. Several of the sub-categories display a relatively even distribution of grades ranging form A to F, highlighting certain problem areas, including the estimated duration of the different project phases, means of transporting raw materials to and from the site, and the collection of data for determination of baseline conditions. But overall the requirements were well covered.

Review area 2—identification and evaluation of key impacts

It was found that 70% of EIRs received a satisfactory grading in this review area, but none was graded as well done (A).

Dealing with wastes (category 2.6) received the best grading at 100%, and three other categories also had high percentages (85%) of satisfactory grades, i.e. methods for identification of impacts, scoping, and assessment of impact significance. The poorest category performance was the prediction of impact magnitude where just over a third of reports were graded as satisfactory, and 35% were rated in the two weakest grades (E–F), making this the worst performing category in the entire review.

Particular weaknesses related to indication of gaps in data, methods used for determining impact significance and assumptions in compiling data. Omissions and deficiencies observed in this review area included investigation of socio-cultural impacts, public meetings, and the involvement of independent consultants in the public participation process.

Review area 3—alternatives and mitigation

Only 65% of all EIRs received a grade of C or better and 10% received the weakest grades, making this the least well-performed review area. All the categories achieved a majority of satisfactory grades (65%, 85% and 75%), but this is also the only review area where fewer than half of all of the categories were graded in the two highest grades (A–B). Poorer performances were observed in the sub-categories dealing with alternatives where E–F grades were awarded to 20–25% of the EIRs. Comparative studies of alternative sites and methods of extraction (sub-category 3.1.3) were poorly performed or absent.

In contrast, mitigation measures achieved an entirely different grading pattern, with 75% or better satisfactory grades for all sub-categories, and no E or F grades.

Review area 4—communication of results

This was the best performed review area, with 95% of EIRs graded as satisfactory and 60% in the well-performed zone (A–B). All four categories received the same high grades, and the high standard is also evident at sub-category level. The layout of the report (category 4.1) received a single D grade, and emphasis, i.e. there should be no lobbying for a point of view other than the environment (category 4.3) received a single E. The 'weakest' performance was for the executive (non technical) summary (category 4.4), with one D and one F. However, although the overall grades here are high, there is nevertheless a marked drop-off between A and B grades, particularly noticeable in categories 4.3 and 4.4.

Key findings

The review category grades in each review area allowed for strengths and weaknesses to be determined by calculating the respective percentages of A–B and E–F grades for review areas and categories (Table I).

The categories that obtained a percentage of A-B grades higher than 50% and can therefore be regarded as strengths are, in decreasing order:

- Presentation (4.2) (best performed)
- Scoping (2.3)
- Layout of the report (4.1)
- Description of the site (1.1)
- Description of the baseline conditions (1.3), wastes (2.6) and executive summary (4.4), all 60% best grades.

There were no categories with only E and F grades, but the categories with poorest performances were:

- Prediction of impact magnitude (2.4)—worst performed
- Consideration of alternatives (Category 3.1)
- Description of the site (1.1) and baseline conditions (1.3), both scoring 15% in the poorest grades. These are somewhat anomalous, since both categories also scored over 60% of best grades.

It is evident from the distribution of A and B scores that there are some areas of strength, mainly in review areas 1 and 4, but interestingly, also in review area 2, where the weakest category occurs. The distribution of E and F scores reveals no significant weakness at category level, apart from two categories in which over a quarter of reports received the poorest grades.

The rest of the rankings are in general accord with findings elsewhere (Barker and Wood[2]; European Commission[7]; Lee and George[14]; Sandham and Pretorius[18])

Discussion

What is revealed about EIA practice for the mining industry?

The findings revealed results similar to those from other South African studies on EIA quality (Sandham and Pretorius[18]; Sandham *et al.*[19]), as well as to results from studies abroad (European Commission[7]). EIA practice in the mining sector has produced reports of generally satisfactory quality, with strengths and weaknesses as shown above.

The relatively poorer performance in the analytical areas (RA2 and RA3) in comparison to the more descriptive and presentational areas (RA1 and RA4) reflect similar trends in quality review worldwide, and can most likely be ascribed to the greater complexities required in RA2 and RA3, both of which require not only the study of the environment, but also to make predictions based on scientific data as well as experience on the part of the consultant.

Due to this, differences of opinion or skill may begin to play a role in how well an EIR is compiled. The lower number of EIRs receiving a grade of C or better could be explained by the legislation, which mentions only alternative sites and not alternative processes. This could lead to inconsistent

Table I

Summary of results: overall EIR, review area and review category grades, and percentage of EIRs in various grade groupings at these review levels

	Summary of category grades	A	B	C	D	E	F	% A–C	% A–B	% C–D	% E–F
1.1	Site description	2	11	4	0	3	0	85	65	20	15
1.2	Environmental description	3	7	7	3	0	0	85	50	50	0
1.3	Baseline conditions	6	6	5	0	3	0	85	60	25	15
2.1	Identification of all potential impacts	0	5	9	5	1	0	70	25	70	5
2.2	Methods for identification of impacts	2	7	8	1	0	2	85	45	45	10
2.3	Scoping	5	10	2	2	1	0	85	75	20	5
2.4	Prediction of impact magnitude	0	2	5	6	3	4	35	10	55	35
2.5	Assessment of impact significance	0	10	7	3	0	0	85	50	50	0
2.6	Wastes	6	6	8	0	0	0	100	60	40	0
3.1	Alternatives: feasible alternatives considered	4	5	4	3	2	2	65	45	35	20
3.2	Scope and effectiveness of mitigation measures	0	8	8	4	0	0	80	40	60	0
3.3	Monitoring	6	2	7	4	0	1	75	40	55	5
4.1	Layout of EIR	6	8	5	1	0	0	95	70	30	0
4.2	Presentation	2	15	3	0	0	0	100	85	15	0
4.3	Emphasis	0	10	9	0	1	0	95	50	45	5
4.4	Executive (non technical) summary	4	8	6	1	0	1	90	60	35	5
	Summary of review area grades										
1	Description of development and environment	1	10	6	1	2	0	85	55	35	10
2	Identification and evaluation of key impacts	0	4	10	5	1	0	70	20	75	5
3	Alternatives and mitigation	1	6	6	5	2	0	65	35	55	10
4	Communication of results	1	11	7	1	0	0	95	60	40	0
	Overall EIR grades	0	8	9	2	1	0	85	40	55	5

Keys to grades: A – well performed, B – generally satisfactory, C – just satisfactory, D – just unsatisfactory, E – poor attempt, F – did not attempt, N – not applicable, % satisfactory (A–C), % best (A–B), % worst (E–F), % boundary grades (C–D)

interpretations of the legislation on the part of the consultants. Some reports mention alternatives only in terms of location, stating that no alternatives are possible due to the relevant material to be mined only being present on the location under consideration. None mentioned alternative mining methods, and in only three cases were process alternatives considered.

The good performance of scoping and public participation reflects the extensive guidance given in the legislation, driven by the long South African history of social injustice during which large parts of the population were excluded from decisions at many levels in society. Moreover, it also reflects the development of a corps of experienced environmental assessment practitioners following the implementation in 1997 of mandatory EIA in terms of the Environment Conservation Act. This allowed for informal training and experience development for several years until EIA became mandatory in the mining sector in 2004. This body of skill was additional to the EIA experience developed in South Africa through the conduct of voluntary EIAs (Wood[28]) in the period 1970 to 1997.

The good performance of issues relating to waste is somewhat surprising since this area often performs poorly, but is most likely due to the very large amounts of waste involved in mining, as well as the strict requirements for rehabilitation, including the provision of sufficient funds in a rehabilitation trust.

The poor performance in consideration of alternative sites can be ascribed to the perception of alternative sites as irrelevant since a mine cannot realistically or cost-effectively be located anywhere else than where the resource is located. The latter argument has, however, been seriously challenged in the wake of the destruction of koppies due to granite mining, which could also have been conducted right next to the koppies, admittedly at a higher cost. Poor consideration of alternative methods of mineral extraction reflects the absence of such a requirement in the legislation, and hence is an instance of good practice not being followed. This relates to a wider issue, also noted in other research, i.e. that EIA in South Africa has been enforced by regulation, and has therefore been largely compliance driven. Anecdotal evidence suggests that this practice has been reinforced by a widely held perception that environmental assessment is merely an administrative hurdle to be crossed with minimum cost (Retief[16]).

What can be improved?

In spite of generally satisfactory performance, there are areas where improvement is required.

The poor performance of prediction of impact magnitude is not only one of the key components of EIA, but is also a regulatory requirement, in this as well as the other EIA system functioning under ECA and NEMA. While the

methods are not specified in the regulations for mining EIAs, they are spelled out in the regulations for EIA in ECA. Since the consultants conducting mining EIAs come from the same body of practitioners, the poor execution of this aspect of impact assessment cannot be ascribed to ignorance or lack of skill, and it is therefore a matter of some concern. This situation highlights the critical role of the independent consultant in the EIA process. In the absence to date of an accreditation system for consultants, or of enforced criteria for qualifying as a consultant, this can be regarded as a critical weakness in the current EIA system.

Although 85% of the EIRs were graded as satisfactory and therefore of an acceptable standard, none were graded A, only 40% were graded B and 45% of them were graded C. The latter indicates marginal performance. Clearly, improvement is needed in order for reports to achieve predominantly A and B grades.

Conclusion

The results show that for this sample, in terms of the review package, EIR quality in the mining industry is of a generally satisfactory standard. Few EIRs scored significantly below acceptable limits. However, the results also indicate that several key areas do not receive the attention they should, especially the consideration of alternatives, definition of impacts and prediction of impact magnitude. These areas are of critical importance if EIA is to guide the mining industry towards more sustainable options. But at least the fear of sub-standard EIA reports of the mining industry has been refuted to some extent.

Therefore, the fact that the results reflect the results of other studies, both nationally and internationally, indicates that although the specific legislation may vary, there is nevertheless conformity to an overall standard of EIA in South Africa. It appears, that despite criticism that DME is usurping the environmental mandate of DEAT by 'running its own EIA show', it is indeed producing EIRs of comparable standard to that of the DEAT-driven EIA system.

However, in conclusion it should be stressed that report quality does not imply effectiveness of the EIA system. Report quality is but one factor determining the eventual effect of EIA on decision making and ultimately sustainability. True effectiveness relies on action and implementation of the EIA proposals and mitigation measures. At the very least this research suggests that the point of departure for implementation and mitigation actions, i.e. the content of the EIA reports, is providing an acceptable basis from which to work.

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