

A commentary on the reporting of Coal Exploration Results, Coal Resources and Coal Reserves

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The purpose of this aid memoire is to address the prevalence of poor public reporting practices of Coal Exploration Results, Coal Resources and Coal Reserves in southern Africa. Currently, the reporting of coal tonnage without supporting coal qualities or “saleable” tonnes and quality is a poor reporting practice that occurs far too often. Not all coal is equal – therefore it is extremely important that investors or potential investors are provided with the full details of both run-of-mine (“ROM”) and Saleable coal tonnage, their associated qualities and other material and relevant information.

Competent Persons should note that publicly reported information should be sufficient to enable an informed reader to make a reasonable and balanced assessment of the significance of the information provide. “Companies are encouraged to provide information in their Public Reports, which is as comprehensive as possible” (CRIRSCO, 2013): too often this isn’t the case and material matters are either not reported or inadequately disclosed. According to the SANS 10320:2014 draft document - “tonnage and coal quality that will be available for sale, either in the raw ROM state (raw Saleable) at a specified moisture content, or after beneficiation of the ROM coal by processing operations to produce materials at specified qualities, size ranges and moisture contents. The assessments must demonstrate that at the time of reporting, the marketing of the products is reasonably justified. The basis of the predicted practical product yield to achieve the Saleable Coal Reserve must be stated. The moisture basis of reporting shall be stated.”

As an example to why coal qualities are so important to the public, the requirements of Eskom’s power stations are highlighted. The Kendal power station, commissioned in 1988, operates at a Calorific Value (“CV”) range of 19MJ/kg to 20MJ/kg, an Ash content between 29 and 34% and Volatiles between 20 to 21%. Other power stations, such as Kriel or Hendrina, may require different qualities such as a CV range of 22MJ/kg to 23MJ/kg, an Ash content between 20 and 28% and Volatiles between 22 to 23%. Thus, in terms of domestic saleable coal, it isn’t just about reporting the coal qualities but also informing the investor as to which power station the coal is intended to be sold as “boilers are designed to burn particular qualities of coal” and “it is not always possible to transfer coal between stations because of different quality requirements at each station” (Chetty, 2010). Sulphur content is also another important quality with the ideal coal content having a quality of less than 1% Sulphur.

On more than one occasion the author has viewed studies that declare coal prices that are not substantiated by the actual stated coal qualities. For example export quality coal prices (i.e. High CV>27MJ/Kg) and low Ash content (>15%) while the coal product is of a moderate CV and Ash (%) content.

The Reporting of Exploration Results, Coal Resources and Coal Reserves

The following section highlights some of the more common or serious mistakes in reporting exploration results, Coal Resources and Coal Reserves. Table 1 provides an example of poor reporting.

Table 1: Example of a 2013 coal Resource and Reserve statement.

Summary of Coal Resources and Coal Reserves (million tonnes) 2013						
Coal Resources				Coal Reserves		
Seam	GTIS	Reconnaissance	Measured	Total	MTIS	ROM
4 Seam	0.06		0.06	0.06	0.06	0.06
2 Seam	0.73		0.69	0.69	0.69	0.60
4 Seam	0.08		0.08	0.08	0.08	0.07
Total	0.87		0.82			
4 Seam	40.80	9.79				
2 Seam	14.81	14.81				

An examination of Table 1 provides insight into a number of common reporting mistakes:

(1) The failure to report the coal qualities.

The above example only reports coal tonnages. According to Clause 58 of the SAMREC Code (2016), “The coal quality must be reported for all Coal Resources and Coal Reserve categories. The basis of reporting of the coal quality parameters must be reported. The quality of the coal must be expressed according to parameters relevant to specific applications of coal products e.g. steam coal, type of metallurgical coal, etc.”

(2) Saleable Coal Reserves are not reported nor are the ROM Coal Reserves subdivided into categories of “Probable” or “Proved”.

The coal reserve should, as required in Figure 2 and Clause 57 of the SAMREC Code (2016), be reported as Saleable Coal Reserves and must be subdivided “in order of increasing confidence into Probable Saleable Coal Reserves and Proved Saleable Coal Reserves”.

3) The Coal Exploration Results tonnage is not reported as a range nor is a range of the quality of the coal presented.

Exploration Results or Exploration Targets (Reconnaissance) as defined in Clause 21 of the SAMREC Code 2016 must be “quoted as a range of tonnages and grade or quality”.

Table 2 and Table 3 depict examples of a 2016 Coal Resource and Coal Reserve Statement. The company reporting the Coal Resource (Table 2) provided the following commentary in its public statement – “the quality and quantity of underlying mineral resource forms the basis for the company’s intrinsic value. The Group’s mineral resource statement as at May 2016 is shown below”. A cursory review of the Coal Resource statement indicates a complete lack of understanding in the reporting of Coal Resources. Once again, coal qualities are not reported nor is the category of the coal resource stated.

Table 2: Example of a 2016 Coal Resource statement

Coal Resource May 2016			
Project	GTIS (Mt)	TTIS (Mt)	MTIS (Mt)
Project A	27.30	24.57	24.57
Project B	3.06	2.60	2.60
Project C	N/A	N/A	N/A
Project D	N/A	N/A	N/A
Project E	1.51	1.28	1.28
Project F	11.18	10.05	10.005
Project G	11.21	10.42	8.51
Total	54.25	48.92	47.01

Table 3 provides an example of a Coal Reserve being reported without providing the associated coal qualities. In addition, the term “Proven Reserve” is incorrectly used i.e. the term “Proved Coal Reserves” is the correct, SAMREC-compliant, term. Without the Competent Person reporting coal qualities the Coal Reserve Statement is almost useless to an investor. Unfortunately, this reporting *faux pas* is common within the South African Coal industry and it is a trend that must be stopped immediately.

Table 3: Example of a Coal Reserve Statement

Coal Resource May 2016						
Operation	Resource Category	MTIS (Mt)	ROM Tonnes (Mt)	Saleable Primary Tonnage (Mt)	Saleable Primary Tonnage (Mt)	Attributable Interest (%)
Mine A	Proven	23.806	25.280	4.666	9.68	100
Mine B	Proven	29,228	19.693	10.276	5.10	74
Total Proven		53,034	44.973	14.941	14.785	
Mine A	Probable	301,371	266.115	47,848	117,751	100
Mine B	Probable					
Mine C	Probable	188,250	172.757	25,637	44,536	74
Total Probable		489,622	438,872	73,485	162,287	
Grand Total		542,656	483,845	88,426	177,072	

Reporting of Reasonable and realistic Prospects

On a number of occasions the author has observed public reporting that fails to demonstrate that a deposit has reasonable prospects for eventual economic extraction. In a couple of instances, Coal Reserves have been declared on projects that haven’t completed a study or Life of Mine (LOM) plan to a Prefeasibility (“PFS”) level. Competent Persons must be careful when applying modifying factors to brownfield projects without fully understanding the potential change in the modifying factors. Transportation costs is just one aspect that is often overlooked by the Competent Person. Capital requirements must also be investigated carefully and the Competent Person must ensure that these inputs are, at least, to a PFS level. The underestimation of the capital requirements can lead to an

unprofitable operation and the incorrect declaration of Coal Resource and Coal Reserves. The author has experience with a coal project which underestimated the capital cost requirements of a 30 km haul road and the cost to establish a port for the export of the coal. The updated capital cost changed the coal project from a positive to a negative return on the project.

As a further cautionary note, one should be very careful when evaluating a project that is based on limited geological information, yet has applied a mine design to largely Inferred Coal Resource without sufficient washability data of the coal deposit.

In terms of Public Reporting, compliance requires reporting in accordance with the principles and guidelines of the SAMREC Code (2016).

Best Practice

Competent Persons, executives, and other interested parties of publicly listed companies are reminded that the SAMREC Code (2016) sets out the required minimum standards for Public Reporting. Competent Persons, as authors, must insist that they provide written approval (JSE Listing Requirement) of specific documentation that is referred in a Public Report or statement. The Competent Person must be satisfied as to the form, content, and context in which that documentation is to be included in a Public Report.

The previous sections have focused on poor practices that are still prevalent in area of small to medium tier coal companies operating in southern Africa. However it must be stressed that not all coal companies fall short of the standards required by the SAMREC Code (2016). Many companies and Competent Persons adhere to the underlying principles of the SAMREC Code (2016) (Figure 1), which are Materiality – providing all relevant information that would be required and expected for the purpose of making a reasoned and balanced judgement; Competency – work is done responsibly by a suitably qualified and experienced person; and Transparency – Public Report provides sufficient information which is clear and unambiguous so that the reader understands the report and is not misled (SAMREC Code, 2016) .

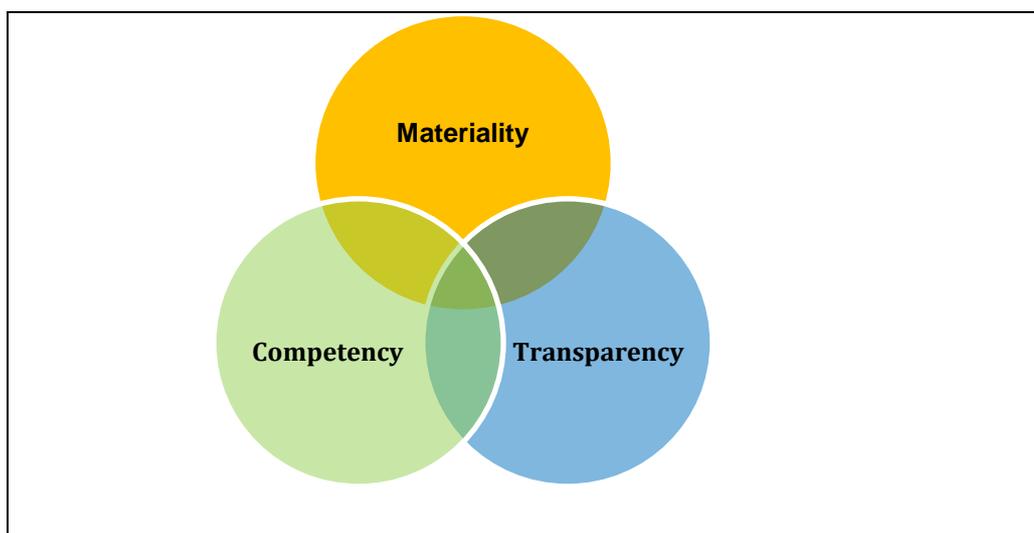


Figure 1. Underlying principles of the SAMREC Code.

Good, or best, reporting practices ensure that all relevant (material) information is available

to the various stakeholders. Thus, the public report provides sufficient information, which is clear and unambiguous, such that the stakeholder is neither misled or material information is omitted in the public report. Transparent reporting provides the public with confidence. The final principle of good reporting is the underlying condition that all technical work is completed by a competent person who is not unduly affected by outside influences and remains able to present a fair and accurate report.

Examples of reporting in accordance to the SAMREC Code (2009) reporting of coal resources are shown in Table 4 and Table 5. The reader should note as of 2016 that Gross Tonnes *in situ* (GTIS) as per the updated SANS 10320:2014 is considered “an intermediate calculation step and it is not acceptable to quote Coal Resources on a GTIS basis alone”. However, in the SANS 10320:2004 this clarification regarding reporting in situ tonnage and quality was not made clear.

Table 4: Example of a 2009 Coal Resource (SRK, 2009)

Seam name	Coal area (m ²)	Seam thickness (m)	RD	SAMREC classification	<i>In-situ</i> tonnage (Mt)
B	1 819 028	1,88	1,57	Measured	5,38
CU	5 399 594	1,17	1,65	Measured	10,41
CL	5 050 285	1,16	1,54	Measured	9,02
Total Measured					24,81
B	777 976	1,86	1,56	Indicated	2,26
CU	1 900 262	1,18	1,65	Indicated	3,69
CL	1 697 176	1,14	1,55	Indicated	2,98
Total Indicated					8,93
B	574 265	1,82	1,55	Inferred	1,60
CU	939 820	1,23	1,65	Inferred	1,90
CL	974 814	1,25	1,57	Inferred	1,80
Total Inferred					5,3

- (1) Coal Resources have been reported in accordance with the classification criteria of the South African Code for the Reporting of Mineral Resources and Mineral Reserves (the SAMREC Code).
- (2) Coal Resources are inclusive of Coal Reserves.
- (3) Coal Resources are not Coal Reserves and have not been evaluated for economic viability.
- (4) Coal Resources are reported on an air-dried, uncontaminated basis (ad, uc).
- (5) GTIS – Gross Tons *In-situ*, TTIS – Total Tons *In-situ*.

Table 5: Example of a 2009 Coal Resource (SRK, 2009)

SAMREC category	Seam name	GTIS (Mt)	RD	Ash %	IM %	VM %	CV MJ/kg	TS %
Inferred	B	1,6	1,55	25,2	2,8	24,7	23	1,19
Inferred	CU	1,9	1,65	30,9	3	21	20,6	1,17
Inferred	CL	1,8	1,57	26,7	2,1	28,1	22,7	1,52
Indicated	B	2,26	1,56	25,3	2,8	24,4	22,9	1,18
Indicated	CU	3,69	1,65	32,2	2,9	21,2	20,1	1,16
Indicated	CL	2,98	1,55	26,3	2,3	28	22,9	1,39
Measured	B	5,383	1,57	26,3	3	24	22,4	1,13
Measured	CU	10,407	1,65	31,8	2,9	21,3	20,3	1,14
Measured	CL	9,019	1,54	24,9	2,5	27,6	23,6	1,33

Drilling Density

The author would be remiss if commentary wasn't made regarding the use of borehole spacings to determine a Coal Resource classification. Proposed borehole density for thin multiple coal seams are shown in Figure 2 (SANS 10320:2004).

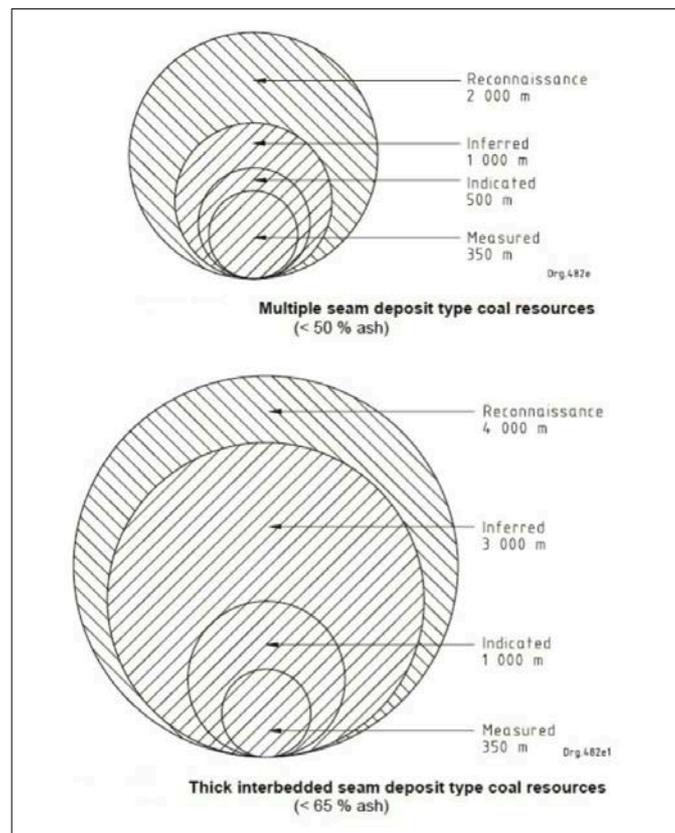


Figure 2. Coal Resource classification diagram (SANS 10320:2004).

“Although the minimum borehole density allows for a reasonable estimate of the Coal Deposit with a low level of confidence in most situations, this does not necessarily hold true for sedimentologically and structurally complex areas. The Competent Person shall make the judgement as to whether the physical continuity can be assumed, and state the basis of the decision” (SANS 10320:2014). Although emphasis is placed on the role of the Competent Person to determine the appropriateness of the borehole spacing, it is recognised that guidelines are often considered “prescriptive, and as a set of standards” (Hancox and Pinheiro, 2016). Therefore, care and diligence must be undertaken by the Competent Person when using these guidelines as, what may be appropriate in one coal field, for example the Witbank coal field, may not be appropriate in one of the other 18 coal fields found in South Africa. Importantly, the Competent Person shall not only make the judgement as to the physical continuity **BUT** must also state the basis of the decision – actions which support the guiding principle of the SAMREC Code.

Devolatilised coal, low volatile coal, lean coal and semi-anthracite

The inclusion of Devolatilised Coal (<16% Volatiles), sometimes described as low volatile coal, lean coal or semi-anthracite, in Coal Resources can be complicated. Critical in the declaration of a Coal Resource is the consideration of “reasonable prospects for eventual economic extraction” and the Competent Person should “demonstrate [this] through the application of an appropriate consideration of the potential viability of [Coal] Resources”. It is important that the market for the Devolatilised Coal products has to be established. Although it is easy to state that the Devolatilised Coal will be sold in the local and/or export market, the sales price of the Devolatilised Coal versus associated off-mine costs generally makes this low volatised coal un-saleable.

The Competent Person should give priority to: (i) the value of the intended product; (ii) market factors; and (iii) applicability of the market criteria to the deposit being assessed. Therefore, without a confirmed market, which implies letters of intent or understanding, no Competent Person should include Devolatilised Coal in a Coal Resource statement.

Conclusions

The mining industry is a vital contributor to national, regional, and international economies. Therefore the mining industry 'depends on the trust and confidence of investors and other stakeholders for its operational well-being' (Lomberg and Rupprecht, in press).

In preparing a Public Report the Competent Person must satisfy the requirements of the SAMREC Code and acknowledge that the aim of the SAMREC Code is to provide guidance in terms of reporting practices. “Competency and diligence of the is still required when applying the SAMREC Code, as the Competent Person must balance the unique situation of a deposit with best practices. Despite having the SAMREC Code [available for guidance], the Competent Person must are still required to be prepared to defend themselves to their peers and take responsibly for their work (Lomberg and Rupprecht, In Press).”

The amount of effort that may be required in complying with the SAMREC Code and the reporting of Coal Exploration Results, Coal Resources and Coal Reserves must not be underestimated. However, the goal is that the industry will see improved communication and the positive progression of projects and mines as a result of these changes.

Common pitfalls in public reports by Coal Companies include:

- Failing to subdivide Coal Reserves
- State Coal Resources are inclusive or exclusive of Coal Reserves
- Declaring Coal Reserves without conducting at least a PFS or Life of Mine plan
- Failing to Report Coal Reserves as ROM and Saleable tonnes and quality
- Failing to report coal qualities
- Failing to declare Coal Reserve
- Minimum seam thickness

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