SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

The SAMREC Code – manual or guide

Ken Lomberg (Coffey Mining) and
Steven Rupprecht (University of Johannesburg)

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Outline

- Background
- The Importance of the Reporting Codes
- Role of the SAMREC Code
- Role of the Competent Person
- Changes to The SAMREC Code

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Chairman of SAMREC

coffey

Ken Lomberg

BSc(Hons) Geology, BCom, MEng

FGSSA, Pr.Sci.Nat.

Senior Principal Consultant

Coffey Mining

30 years experience in SA

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Deputy Chairman of SAMREC

Steven Rupprecht

BSc, PhD, Pr.Eng.

Senior Lecturer

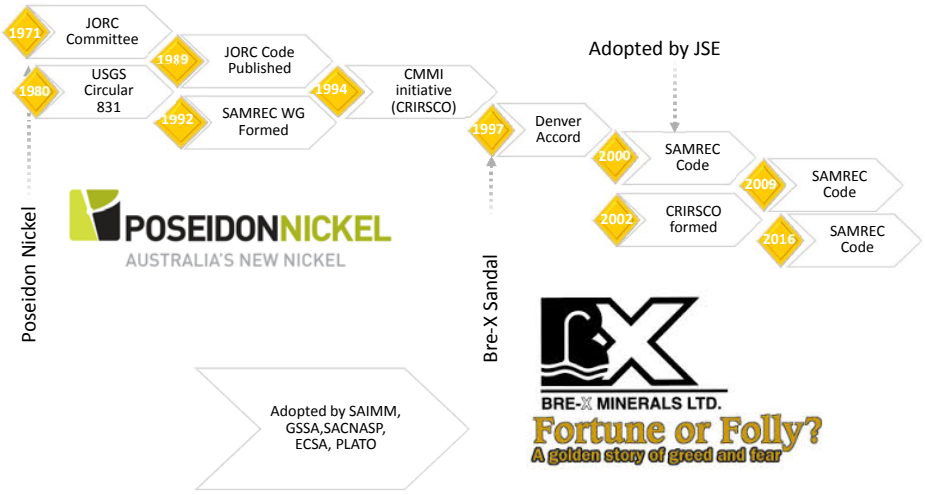
University of Johannesburg

UNIVERSITY OF JOHANNESBURG

30 years experience in SA

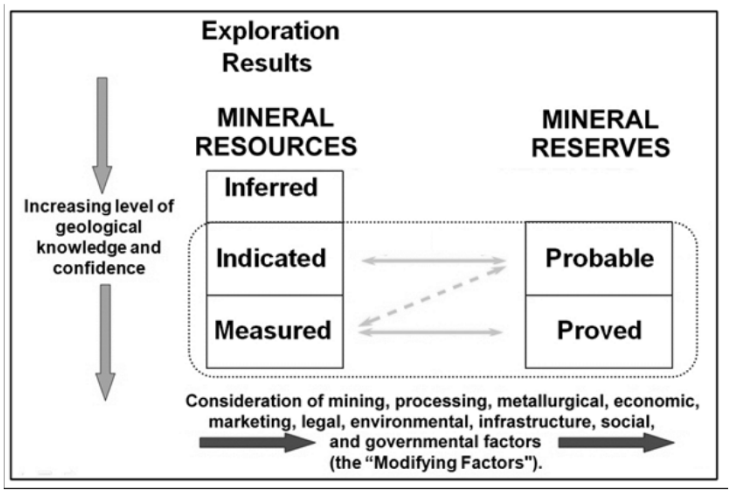
SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Background and History of the SAMREC Code



SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

CRIRSCO Template – Figure 1

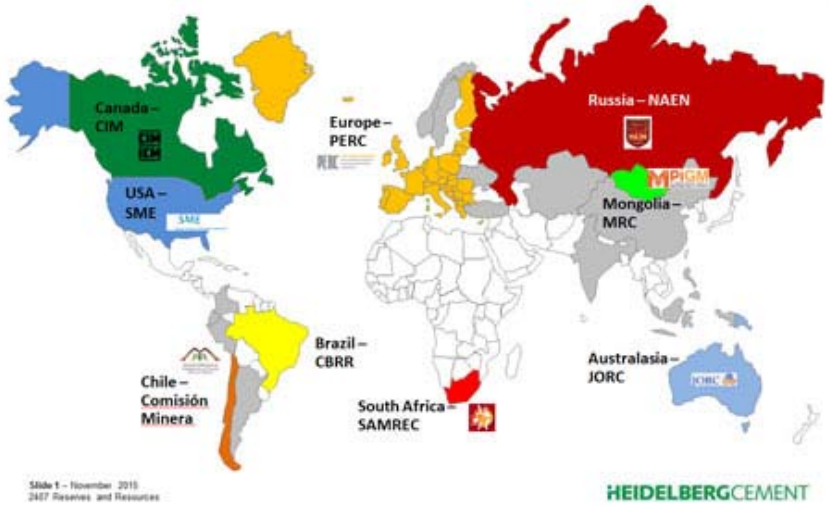


Denver Accord 1997

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

CRIRSCO – National Reporting Organisations



The SAMREC Code – manual or guide

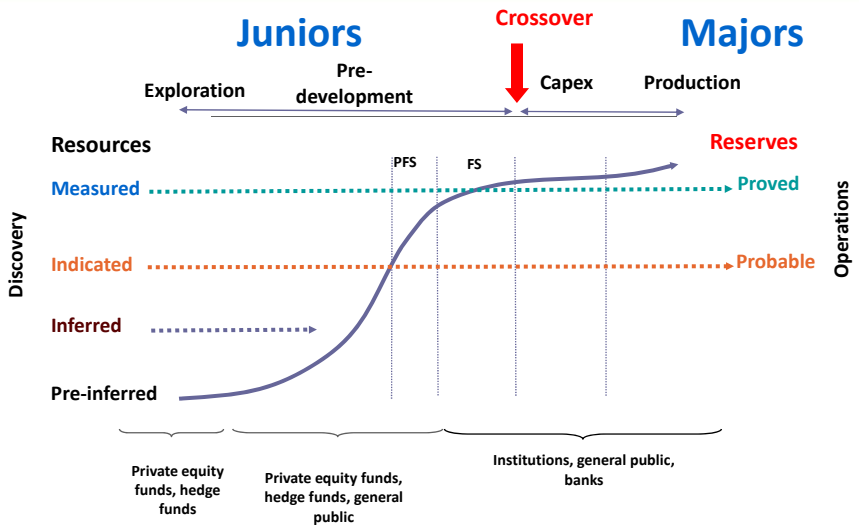
SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

crirsco COMMITTEE FOR MINERAL RESERVES INTERNATIONAL REPORTING STANDARDS

The mining industry is a vital contributor to national and global economies; never more so than at present with soaring demand for the commodities that it produces. It is a truly international business that depends on the trust and confidence of investors and other stakeholders for its financial and operational well-being. Unlike many other industries, it is based on depleting mineral assets, the knowledge of which is imperfect prior to the commencement of extraction. It is therefore essential that the industry communicates the risks associated with investment effectively and transparently in order to earn the level of trust necessary to underpin its activities.

(CRIRSCO Website)

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES



The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

The Importance of the Reporting Codes

- Provides minimum standards for reporting of Exploration Results, Mineral Resources and Mineral Reserves;
- Adds credibility to declarations by project promoters and assists in comparisons due to the uniform basis of declaration;
- Assists professionals by providing guidance; and
- Assists the Competent Person to demonstrate the legitimacy of the declaration and provides credibility to the Public Report.
- Promoting High Standards of Reporting
- Maintaining the trust of investors and other interested parties

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Role of the Competent Person

- Fully Understand the meaning and the responsibilities
- What it is not just:-
  - about the professional training received
  - Suitable experience
  - having a supervisory role
  - Being designated
- Takes responsibility for that part of the Public Report
- Key professions supported by other professionals
  - geologists
  - Surveyors
  - Mining engineers
  - economists
  - metallurgists
  - Engineers (geotechnical, ventilation, civil, mechanical, electrical
  - environmentalists
  - social scientists/practitioners, and
  - lawyers etc.

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

- Contributing professionals to justify and document their technical inputs
- This approach relies on the professional to be prepared to face their peers and being willing to take responsibility for the result.
- The guidelines
  - support these declarations,
  - the sustainability of the industry and
  - the efficient exploration of minerals.

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

PLATO

South African Geomatics Council (SAGC) and Institute of Mine Surveyors of South Africa (IMSSA) replace PLATO

INSTITUTE OF MINE SURVEYORS OF SOUTH AFRICA
DILIGENTIA ET FIDES
FREE STATE
NORTH WEST
MPUMALANGA

SOUTH AFRICAN COUNCIL FOR PROFESSIONAL AND TECHNICAL SURVEYORS
Land · Engineering · Photogrammetric · Mining · GIScience · Hydrographic

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Analogy of a Competent Person

Commercial Pilots Licence

- Private Pilots Licence
- Night qualification
- Multi-Engine Rating
- Instrument Rating
- Type rating of a specific aircraft
- Regular checks and updates

Competent Person

- Basic qualification
- 5 Years experience
- Registration – Pr.Sci.Nat.
- (Specific) Relevant experience
- Regular training

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Motivation to review and upgrade the Code

- The mineral industry has advanced and changed focus as the prevailing economic and political circumstances have changed;
- The manner in which projects and mines are funded, developed, and operated, is continually changing;
- There are shifting requirements by the investment community, government and society (social licence to operate);
- There is a need to promote greater efficiency in the capital raising and fund utilisation for exploration, mining, and production companies; and
- SAMREC must keep abreast of the advances made by other international reporting codes and eliminate possible contradictory reporting practices.

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

CRIRSCO Definitions adopted

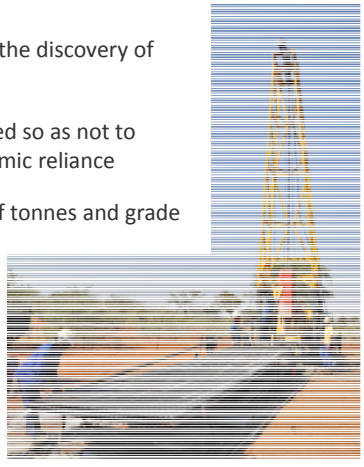
- *Measured Resources*
- *Mineral Reserve*
- *Probable Reserve*
- *Proved Reserve*
- *Scoping Study*
- *Pre-Feasibility Study*
- *Feasibility Study*
- *Public Reports*
- *Competent Person*
- *Modifying Factors*
- *Exploration Target*
- *Exploration Results*
- *Mineral Resource*
- *Indicated Resource*
- *Inferred Resource*

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Exploration Results

- Been used (and occasionally abused)
- Represents the entry level to declarations
- "presented in a way that unreasonably implies the discovery of potentially economic mineralisation"
- Referring to the deposit as Mineralisation is used so as not to communicate any degree of technical or economic reliance
- Exploration Targets unchanged in that ranges of tonnes and grade



The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Exploration Results

- It is hoped that this will clearly indicate the low level of confidence in the information and ensure that a reported Exploration Target cannot be misconstrued or misrepresented as a Mineral Resource or Mineral Reserve

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Risks and Table 1

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Expansion of aspects of Table 1

- New format
- Tried to follow table of contents
- Looked widely at other codes and requirements
- Specific Coal requirements
- Specific Gemstones and Diamonds
- Specific Industrial Minerals
- Specific Metal Equivalents
- Emphasis on economics & transparency/materiality
- Issue of what investors require – noted in Readers Panel
- Information about the assessment of RPEEE

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Updated Table 1

Exploration Results	Mineral Resources	Mineral Reserves
General		
Section 1: Project Outline		
Section 2: Geological Setting, Deposit, Mineralisation		
Section 3: Exploration and Drilling, Sampling Techniques and Data		
Section 4: Estimation and Reporting of Exploration Results and Mineral Resources		
Section 5: Technical Studies		
Section 6: Estimation and Reporting of Mineral Reserves		
Section 7: Audits and Reviews		
Section 8: Other Relevant Information		
Section 9: Qualification of Competent Person(s) and other key technical staff. Date and Signature Page		
Section 10: Reporting of for Coal Resources and Reserves		
Section 11: Reporting of Diamonds and Gemstones		
Section 12: Reporting of Industrial Minerals		
Section 13: Reporting using Metal Equivalents		

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

			Exploration Results	Mineral Resources	Mineral Reserves
Section 4: Estimation and Reporting of Exploration Results and Mineral Resources					
4.1	Geological Model and Interpretation	(i)	Describe the geological model, construction technique and assumptions that forms the basis for the Exploration Results or Mineral Resource estimate. Discuss the sufficiency of data density to assure continuity of mineralisation and geology and provide an adequate basis for the estimation and classification procedures applied.		
		(ii)	Describe the nature, detail and reliability of geological information with which lithological, structural, mineralogical, alteration or other geological, geotechnical and geometallurgical characteristics were recorded.		
		(iii)	Describe any obvious geological, mining, metallurgical, environmental, social, infrastructural, legal and economic factors that could have a significant effect on the prospects of any possible exploration target or deposit.		
		(iv)		Discuss all known geological data that could materially influence the estimated quantity and quality of the Mineral Resource.	
		(v)		Discuss whether consideration was given to alternative interpretations or models and their possible effect (or potential risk), if any, on the Mineral Resource estimate.	
		(vi)		Discuss geological discounts (e.g. magnitude, per reef, domain, etc.) applied in the model, whether applied to mineralised and / or unmineralised material (e.g. potholes, faults, dykes, etc.).	
4.2	Estimation and Modelling Techniques	(i)	Describe in detail the estimation techniques and assumptions used to determine the grade and tonnage ranges.		
		(ii)		Discuss the nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values (cutting or capping), compositing (including by length and/or density), domaining, sample spacing, estimation unit size (block size), selective mining units, interpolation parameters and maximum distance of extrapolation from data points.	
		(iii)		Describe assumptions and justification of correlations made between variables.	
		(iv)		Provide details of any relevant specialised computer program (software) used, with the version number, together with the estimation parameters used.	
		(v)		State the processes of checking and validation, the comparison of model information to sample data and use of reconciliation data, and whether the Mineral Resource estimate takes account of such information.	
		(vi)		Describe the assumptions made regarding the estimation of any co-products, by-products or deleterious elements.	

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

'if not, why not'

- Agreed to the principle
- Used of a verb i.e. ask a question
- Not an additional reporting requirement
- Triggers:
  - Maiden announcement
  - Significant change of a Material Project

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Technical Studies

- More definition and guidelines included for:
  - Scoping Study
  - Pre-feasibility Study
  - Feasibility Study
- Guideline Table added
- Additional table in line with SME

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Technical Studies

A Scoping Study is an order of magnitude technical and economic study of the potential viability of Mineral Resources that includes appropriate assessments of realistically assumed Modifying Factors together with any other relevant operational factors that are necessary to demonstrate at the time of reporting that progress to a Pre-Feasibility Study can be reasonably justified.

A Pre-Feasibility Study is a comprehensive study of a range of options for the technical and economic viability of a mineral project that has advanced to a stage where a preferred mining method, in the case of underground mining, or the pit configuration, in the case of an open pit, is established and an effective method of mineral processing is determined. It includes a financial analysis based on reasonable assumptions on the Modifying Factors and the evaluation of any other relevant factors which are sufficient for a Competent Person , acting reasonably, to determine if all or part of the Mineral Resource may be converted to a Mineral Reserve at the time of reporting. A Pre-Feasibility Study is at a lower confidence level than a Feasibility Study

A Feasibility Study is a comprehensive technical and economic study of the selected development option for a mineral project that includes appropriately detailed assessments of applicable Modifying Factors together with any other relevant operational factors and detailed financial analysis that are necessary to demonstrate at the time of reporting that extraction is reasonably justified (economically mineable). The results of the study may reasonably serve as the basis for a final decision by a proponent or financial institution to proceed with, or finance, the development of the project. The confidence level of the study will be higher than that of a Pre-Feasibility Study

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Table 2 – Capital Costs

Capital Cost Category	Scoping Study	Prefeasibility Study	Feasibility Study
Basis of Estimate to include the following areas: Civil/structural, architectural, piping/HVAC, electrical, instrumentation, construction labour, construction labour productivity, material volumes/amounts, material/equipment, pricing, infrastructure	Order-of-magnitude, based on historic data or factoring. Engineering < 5% complete.	Estimated from historic factors or percentages and vendor quotes based on material volumes. Engineering at 5-20% complete.	Detailed from engineering at 20% to 50% complete, estimated material take-off quantities, and multiple vendor quotations
Contractors	Included in unit cost or as a percentage of total cost	Percentage of direct cost by area for contractors; historic for subcontractors	Written quotes from contractor and subcontractors
Engineering, procurement, and construction management (EPCM)	Percentage of estimated construction cost	Percentage of detailed construction cost	Calculated estimate from EPCM
Pricing	FOB mine site, including taxes and duties	FOB mine site, including taxes and duties	FOB mine site, including taxes and duties
Owner's costs	Historic estimate	Estimate from experience, factored from similar project	Estimate prepared from detailed zero-based budget
Environmental compliance	Factored from historic estimate	Estimate from experience, factored from similar project	Estimate prepared from detailed zero-based budget for design engineering and specific permit requirements
Escalation	Not considered	Based on entity's current budget percentage	Based on cost area with risk
Accuracy Range (Order of magnitude)	±50%	±15-25%	±10-15%
Contingency Range (Allowance for items not specified in scope that will be needed)	30-50%	15-30%	10% - 15% (actual to be determined based on risk analysis)

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

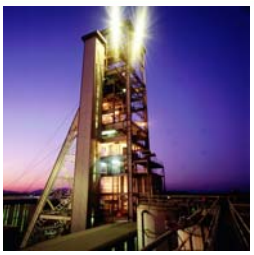
Table 2 – Operating Costs

Operating Cost Category	Scoping Study	Prefeasibility Study	Feasibility Study
Basis	Order-of-magnitude, based on historic data or factoring.	Estimated from historic factors or percentages and vendor quotes based on material volumes.	Detailed estimate
Operating quantities	General	Specific estimates with some factoring	Detailed estimates
Unit costs	Based on historic data for factoring	Estimates for labour, power, and consumables, some factoring	Letter quotes from vendors; minimal factoring
Accuracy Range	±25-50%	15% - 25%	10% - 15%
Contingency Range (Allowance for items not specified in scope that will be needed)	+ 25%	+ 15%	+ 10% (actual to be determined based on risk analysis)

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Point of Reference



- Introduction of the principle
- Point of sale applicable to bulk commodities and industrials minerals
- Shaft head for precious and base metals
- The reference point at which Reserves are defined, usually the point where the ore is delivered to the processing plant, must be stated. It is important that, in all situations where the reference point is different, such as for a saleable product, a clarifying statement is included to ensure that the reader is fully informed as to what is being reported.

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Site Visit

The SAMREC Code – manual or guide

Revision of aspects relating to Coal

The Systematic evaluation of Coal Deposits, Coal Resources and Coal Reserves (SANS 10320) provides the methodologies and definitions of the relevant terms that **should be considered** when preparing reports on Coal Resources and Coal Reserves.

Table 1 still applies

The confidence levels in the modifying factors must be disclosed for all ROM and Saleable Reserves.

The SAMREC Code – manual or guide

Diamond and Gemstone section

- More comprehensive definition and general discussion
- Concern with alluvial diamonds addressed

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Introduction of a section on Industrial Minerals

- Adoption of JORC approach
- Guidance provided on deleterious minerals and product specifications

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Introduction of a section on Metal Equivalence

- Adoption of JORC approach
- Guidance provided on use of price, grade and metallurgical recovery

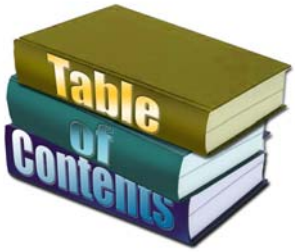
The SAMREC Code – manual or guide

Table of Contents

SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Introduction of a Table of Contents

Along the lines of NI 43-101



RECOMMENDED TABLE OF CONTENTS FOR COMPETENT PERSONS REPORT ("CPR")

This table of contents is given only as a guide to the compilation of CPR's. It is designed to incorporate all of the requirements of Table 1. It must be read in conjunction with Table 1 and the Code.

Title Page

Include a title page setting out the title of the CPR, the general location of the mineral project, the name and professional designation of each CP, the effective date of the CPR and the date of signature.

Executive Summary

Briefly summarize important information in the CPR, including property description and ownership, geology and mineralisation, the status of exploration, development and operations, Mineral Resource and Mineral Reserve estimates, and the CP's conclusions and recommendations.

Table of Contents

Provide a table of contents listing the contents of the CPR, including figures and tables.

1 Introduction
- Terms of reference and scope of work
- Sources of information
- Units and currency
- Site inspection or Field involvement of CP
- Disclaimers and reliance on other experts or third party information

2 Project Outline
- Property description
- Property location
- Country profile
- Legal aspects and permitting
- Royalties and liabilities

3 Accessibility, Physiography, Climate, Local Resources and Infrastructure
- Topography, elevation and vegetation
- Climate and weather
- Access
- Proximity to population centres and nature of transport
- General infrastructure

4 Project History
- Previous ownership
- Previous exploration and/or development
- Previous Mineral Resource Estimates
- Previous Mineral Reserve Estimates

Signature page

SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Inclusion of an "Certificate of Competent Person"

CERTIFICATE OF COMPETENT PERSON

Certificate of Competent Person
As the author of the report entitled [report title], I hereby state:-
1. My name is [Competent Person's name] and [details – position in company, company name, address]..
2. [profession and details of registration body].
3. [qualifications]
4. [relevant experience].
5. I am a "Competent Person" as defined in the SAMREC Code.
6. [Work undertaken or services rendered].
7. [Site inspection details]
8. [details of aspects of this report for which the CP is responsible].
9. I am not aware of any material fact or material change with respect to the subject matter of the Report, which is not reflected in the Report, the omission of which would make the Report misleading.
10. I declare that this report appropriately reflects the Competent Person's/author view
11. I am independent/not independent of [name of issuer].
12. I have read the SAMREC Code (2015) and the Report has been prepared in accordance with the guidelines of the SAMREC Code.
13. I do not have nor do I expect to receive a direct or indirect interest in the [project/mine details] or [name of issuer] **OR** I am an employee/shareholder/director or other interested party in respect of the issuer [name of issuer] or the mineral asset.
14. At the effective date of the Report, to the best of my knowledge, information and belief, the Report contains all scientific and technical information that is required to be disclosed to make the Report not misleading.

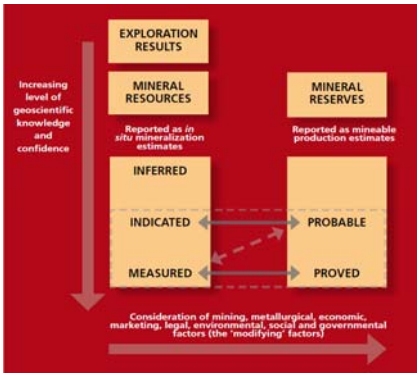
Dated at [place] and [date]

[Signed]
[name of CP]

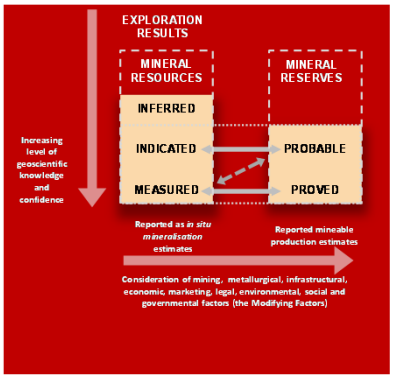
SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Classification Diagram

Current



New

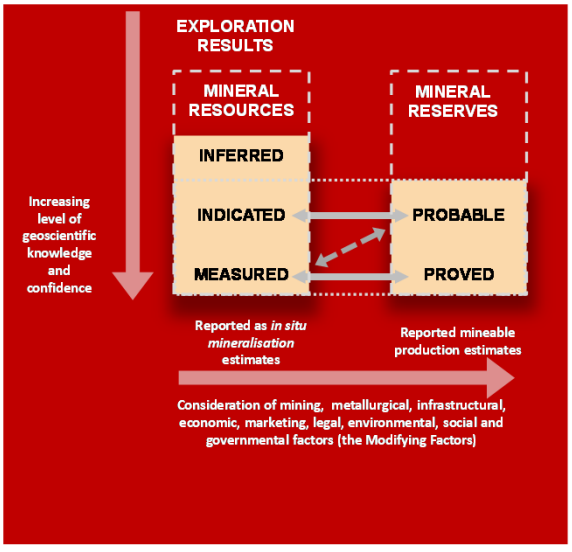


Modifying Factors are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors.

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

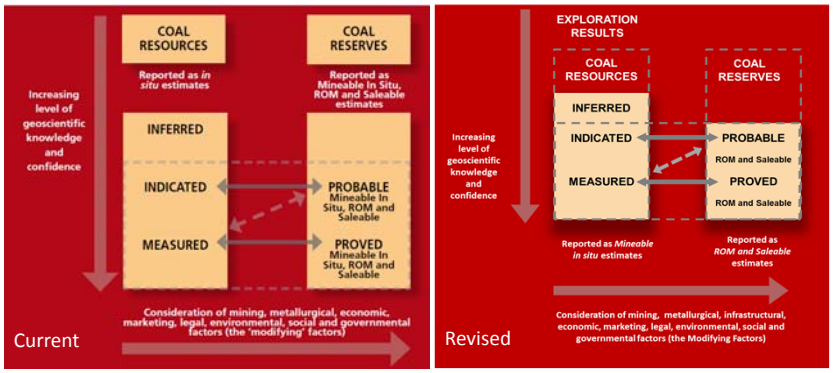
Classification Diagram



The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Classification Diagram: Coal

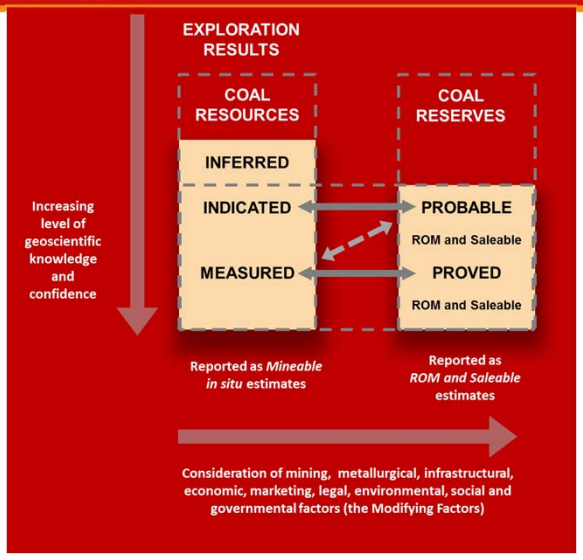


A 'Mineable Tonnes In Situ Coal Resource' is the tonnage and coal quality, at a specified moisture content, contained in the coal seams or sections of the seams at the theoretical mining height, adjusted by the geological loss factors.

The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

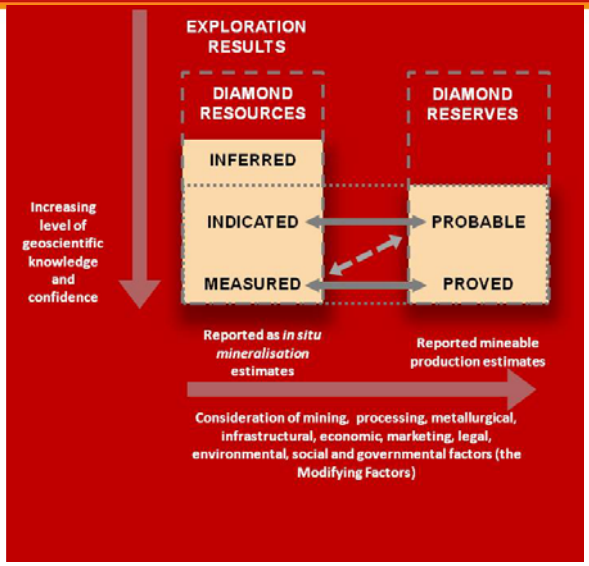
Classification Diagram: Coal



The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Classification Diagram: Diamonds and Gemstones



The SAMREC Code – manual or guide

SAMCODES
SAMCODES STANDARDS COMMITTEE
THE SOUTH AFRICAN MINERAL REPORTING CODES

Guideline or Manual?

- Does not specify the technical details
- The interpretation of the raw data requires the input of specialists
- Provides these guidelines
- Mechanism to assist in the progression of mining projects
- Holding various registered professionals accountable for their work

The SAMREC Code – manual or guide

SAMCODES
THE SOUTH AFRICAN MINERAL REPORTING CODES

WEBSITE

www.samcodes.co.za

SAIMM GSSA

43