



COMMITTEE FOR MINERAL RESERVES
INTERNATIONAL REPORTING STANDARDS



CRIRSCO International Reporting Template and its Application to Classification and Reporting of Polymetallic Seabed Nodules

Prepared by Pat Stephenson, Co-Chairman CRIRSCO 2005/06. Based on presentations prepared by Roger Dixon, South Africa representative, CRIRSCO, and Deborah McCombe, Past-President CRIRSCO.

Presented by Pat Stephenson on behalf of Dr Harry Parker, Deputy Chair, CRIRSCO

Workshop on Polymetallic Nodules Resource Classification

International Seabed Authority & Ministry of Earth Sciences, Government of India

Goa, India, October 2014

- 43 years mining industry experience, with special emphasis on Resource / Reserves
- Member JORC 1988-2006, Secretary 1992-1999, Chairman 1999-2005
- Co-Chairman CRIRSCO 2005/06
- Resident Canada, close familiarity with NI 43-101 / CIM standards
- Authored / co-authored over 20 technical papers on Resource / Reserve classification and reporting
- Close involvement in CRIRSCO negotiations in 2005/06 with IASB, UNFC & SPE
- Expert Witness on Mineral Resources and public reporting in several court cases

- Overview of CRIRSCO
- CRIRSCO International Reporting Template (IRT)
- Special clauses of IRT that address specific aspects of coal, diamonds / gemstones and industrial minerals reporting
- Application of IRT to classification and reporting of polymetallic seabed nodules reporting
- Recommendation of way forward

To promote best practice in the international public reporting of Mineral Exploration Results, Mineral Resources and Mineral Reserves.

CRIRSCO is an international coordination and advisory body, relying on its constituent members to ensure regulatory and disciplinary oversight at a national level.

It recognises the truly global nature of the minerals industry and the agreed need for international consensus on reporting standards.

- Promote uniformity, excellence and continuous improvement in public reporting of Mineral Exploration Results, Mineral Resources and Reserves.
- Represent the international minerals industry on Resources and Reserves issues with other international organizations.
- Encourage development of international reciprocity of Competent/Qualified Persons through national Recognized Professional Organizations (RPOs).

- Formed as sub-committee of CMMI in 1994
- Denver Accord on definitions of Resources and Reserves in 1997
- UNECE agreement November 1999, resulting in incorporation into the United Nations Framework Classification (UNFC)
- CRIRSCO formed in Cairns, Australia 2002
- International Reporting Template initiated Reston, Virginia, 2003, published 2006, latest edition 2013
- Granted ISA Observer status, July 2014

- CRIRSCO became a Task Force (2007) and later Strategic Partner (2009) of the International Council for Mining and Metals (ICMM), charged with promoting and maintaining best practice reporting.
- ICMM is CEO-led industry group that addresses key priorities and emerging issues within the sector. It seeks to play a leading role by promoting good practice and improved performance internationally and across different commodities.
- ICMM provides a platform for industry and other key stakeholders to share challenges and develop solutions based on sound science and the **principles of sustainable development**.

Current Members	Potential New Members	
Australasia (JORC)	Argentina	Scandinavia
Canada (NI 43-101, CIM)	China	Colombia
Chile (Certification Code)	Indonesia	
Europe & UK (PERC)	Mongolia	
Russia (NAEN)	Peru	
South Africa (SAMREC)	Philippines	
USA (SME)	Turkey	

Securities Regulators' Recognition

Securities Regulator	Main CRIRSCO-Type Reporting Standard Recognized
ASIC / ASX / NZSE (Australasia)	JORC
Securities Commissions, TSX (Canada)	NI 43-101 (incorporating CIM)
Santiago SX (Chile)	Certification Code
ESMA, AIM (Europe & UK)	PERC, all CRIRSCO-aligned standards
Hong Kong SX	JORC, 43-101, SAMREC
NYSE & NASDAQ (USA)	None (SEC Industry Guide 7)
JSE (South Africa)	SAMREC
Moscow (Russia)	NAEN

Importance of CRIRSCO-type standards to the international mining industry

Mining companies listed on stock exchanges that use CRIRSCO-type reporting standards account for over 80% of the listed capital of the world's mining industry.

CRIRSCO has engaged with the Society of Petroleum Engineers to produce the CRIRSCO-SPE Mapping Report, which links the CRIRSCO Template to the SPE PRMS (Petroleum Resources Management System 2007). The objective was to demonstrate the similarity at a high level of minerals and petroleum reporting systems and definitions.

This has enabled CRIRSCO-SPE to have the CRIRSCO Template and the SPE PRMS recognised as the commodity-specific standards of the UNFC of 2009.

CRIRSCO – International Accounting Standards

CRIRSCO and SPE have been involved in advising the International Accounting Standards Board (IASB) on the development of new International Financial Reporting Standards for the Extractive Industries.

The mapping project between the CRIRSCO Template and the SPE PRMS arose from these discussions and has enabled the mining and petroleum industries to present a united front to the IASB

CRIRSCO Template		UNFC-2009 minimum Categories			UNFC-2009 Class
Mineral Reserve	Proved	E1	F1	G1	Commercial Projects
	Probable			G2	
Mineral Resource	Measured	E2	F2	G1	Potentially Commercial Projects
	Indicated			G2	
	Inferred			G3	
Exploration Results		E3	F3	G4	Exploration Projects

**Chairperson: Edmundo Tulcanaza
(IMEC)**



**Past Chairperson: Deborah McCombe
(CIM)**



**Deputy Chairperson: Harry Parker
(SME)**



**Secretary: Ian Goddard
(JORC)**



- Executive elected for a two year term
- Secretary's term may be extended for continuity



COMMITTEE FOR MINERAL RESERVES INTERNATIONAL REPORTING STANDARDS

INTERNATIONAL REPORTING TEMPLATE

for the public reporting of

EXPLORATION RESULTS, MINERAL
RESOURCES AND MINERAL RESERVES

November 2013

- Advisory, but based on well-established national reporting standards (JORC Code since 1989)
- National standards / codes take precedence
- Encapsulates the best of national reporting standards / codes
- Model for development of new standards / codes
- Includes special clauses to cater to specific characteristics of some deposit types

- Materiality
- Transparency
- Competency

- Annual Reports
- Quarterly Reports
- Information Memoranda
- Websites
- Public Presentations
- Stock Exchange Information Systems
- **In summary, any reports prepared for the prime purpose of informing investors or potential investors**

Standard definitions

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

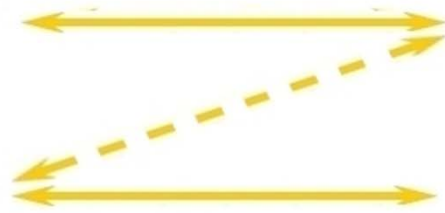
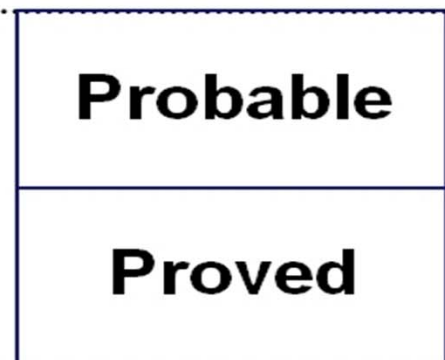
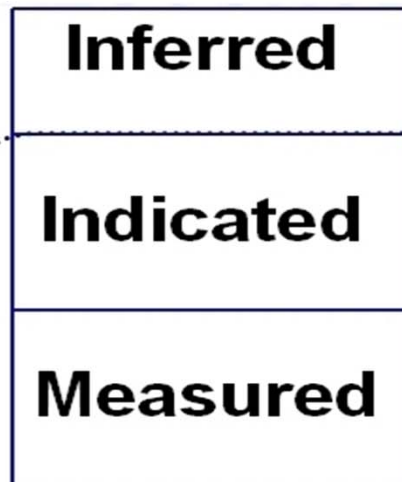
Fundamental Framework

Exploration Results

MINERAL RESOURCES

MINERAL RESERVES

Increasing level of geological knowledge and confidence

Consideration of mining, processing, metallurgical, economic, marketing, legal, environmental, infrastructure, social, and governmental factors (the "Modifying Factors").



- **Exploration Results** include data and information generated by exploration programmes that may be of use to investors but is not part of a formal declaration of Mineral Resources or Reserves
- Tonnage and grade not to be reported!

- Concentration or occurrence of material of economic interest in or on the earth's crust in such form quality and quantity that there are ***reasonable prospects for eventual economic*** extraction
- Measured, Indicated and Inferred, each (even Measured) being subject to estimation uncertainty
- The Indicated – Inferred boundary is critical, because it dictates what can be converted to Mineral Reserves
- Not an inventory of all mineralization sampled – must have “reasonable prospects”

- The ***economically mineable*** part of Measured and/or Indicated Mineral Resource
- Includes dilution and losses
- Appropriate assessments have been carried out and Modifying Factors have been considered
- Demonstrated at time of reporting that extraction is reasonably justified
- Proven and Probable

Modifying Factors

- Mining
- Processing
- Metallurgical
- Economic
- Marketing
- Legal
- Environmental
- Social
- Infrastructure
- Governmental

Competent Person

- Member or Fellow of professional body with enforceable code of ethics
- At least five years experience *relevant* to type of mineralization and deposit and the activity being undertaken
- Competency is largely a matter of self-declaration (although some countries maintain registers). However, must be satisfied in own mind that he / she could face peers and demonstrate competence in the commodity, type of deposit and situation

- Critical part of the regimes of CRIRSCO-style reporting standards
- Responsibility of National Reporting Organizations (NRO)
- International agreements through Recognized Professional Organizations (RPO)

Competent Person

De Re Metallica - 1556

- “Those who take an interest in the methods and precepts of mining and metallurgy should consult **expert mining people.**”
- “Should the foremen be convicted of fraud, they are **beaten with rods**; or of theft, they are **hanged.**”

Reasons for success of CRIRSCO-style Reporting Standards

- CRIRSCO-aligned reporting standards are accepted as the preferred system for classification and reporting by majority of world's mining stock exchanges, regulators and lending institutions.
- Reasons for popularity and success include:
 - Relative simplicity (2D framework, intentional avoidance of overly prescriptive definitions and requirements)
 - Applicability to wide range of commodities and deposit types (potentially including polymetallic seabed nodules)
 - Regulatory backing
 - Professional bodies' ability and willingness to discipline Competent Persons
 - Industry-driven origins
 - Commitment to communication and to continued evolution of the codes and standards

Special clauses in International Reporting Template

- There are special clauses to deal with specific aspects of some commodities or deposit types:
 - Coal – clauses 42 to 44
 - Diamonds / gemstones – clauses 45 to 48
 - Industrial minerals – clauses 49 to 50
- The “specific aspects” can be grouped under:
 - Terminology (coal, diamonds / gemstones, industrial minerals)
 - Characteristics of deposits (particularly diamonds / gemstones)
 - Reporting of Reserves (coal, industrial minerals)
 - Importance of markets (industrial minerals)
- **Special clauses can be drafted to cover polymetallic seabed nodules**

Some potentially “special” aspects of polymetallic seabed nodules (1)

- Seafloor topography important criteria, particularly for Reserve estimation
- Estimation of quantity (“abundance”) is more challenging than estimation of quality
- Underestimation of abundance using photography and free fall grab samples
- QA/QC issues, particularly with older data
- Competent Person experience

Some potentially “special” aspects of polymetallic seabed nodules (2)

- How to judge “reasonable prospects for eventual economic extraction”
- Different legal / tenure situation to land-based minerals
- Non-proven mining methods on full operational scale
- Special environmental conditions
- Processing options; issues with scaling up bench scale tests

Application of International Reporting Template to polymetallic seabed nodules

- Although extensive discussion will be required with all interest groups, extension of the IRT to cover polymetallic seabed nodules is relatively straightforward and is recommended
- CRIRSCO is very willing , if requested, to coordinate this process together with experienced representatives from other interest groups
- Suggested take-away from this workshop is the appointment of a small group or sub-committee to produce recommendations on the extension of the IRT to polymetallic seabed nodules



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Thank you