An independent view of Global Mineral Resources and Mineral Reserves Certification

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Public Reporting

• Disclosure by public companies
  – Reliable and transparent communication with investors
    • CRIRSCO standards

• Reporting at national and international level
  – Reliable mineral inventory for policy and planning purposes
    • UN Framework Classification

• general overview about the challenges and opportunities related to resources & reserves certification;

• characteristics of the core model of certification
International Standards

• Key definitions and terminology are common to the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) and the United Nations Framework Classification (UNFC)

• Alignment through collaboration since 1990s
A scheme for global understanding

- History (De re metallica, 1556)
- Initiative (JORC 1971)
- Collaboration (CMMI/CRIRSCO 1994)
- Global (UNFC 1997/2009)
- Iteration (2001 – 2014)
- Potential new members
- Convergence (today)
CRIRSCO
Committee for Mineral Reserves International Reporting Standards
originally
Combined Reserves International Reporting Standards Committee,

- **JORC** established 1971
- Original JORC 1989
  - Included transition to mineral resources
- 1994 **Council for Mining and Metallurgical Institutions** (CMMI) taskforce to develop MRMR code based on original JORC
- International Reporting Template 2006
- Recognised by International Accounting Standards Board (IASB), United Nations Economic Commission for Europe (UNECE) and ICMM, as the key international organisation representing the mining industry
- **International Council on Mining and Metals (ICMM)** includes IBRAM
CRIRSCO – scope and aims

• All solid minerals

• Promote international best practise for public reporting
  – International consensus on standards
  – Consistent and high quality reporting
  – Competent/Qualified Person standards

• Developed by and for the minerals industry, financial institutions, stock exchanges and investors
CRIRSCO Reporting Template

- 3 Principles
  - Transparency
  - Materiality
  - Competence

- To inform investors and/or regulators
- Minimum standards
- Uncertainty, inaccuracy and confidence levels
- Modifying factors
CRIRSCO Reporting Template

• Reporting of:
  – Exploration
  – Mineral Resources
  – Mineral Reserves

• Definitions

• Geological and grade continuity

• Categories based on levels of confidence
CRIRSCO Reporting Template

• Declaration of resources requires "reasonable prospects"
• Estimates not calculations
• Preliminary Feasibility Study for Mineral Reserves
  – Dilution and losses
  – Reasonable assumptions
  – Modifying factors
• Exclusion of "uneconomic" and "undiscovered" materials
CRIRSCO Reporting Template

• Standard definitions and principles
  – The template is a model for new code development
  – Advisory only
  – Intention to assist in promotion of international best practise
  – Helps global comparison
  – The CRIRSCO "club" of codes are almost identical
  – For the geoscientist, identical classification between codes
CRIRSCO Classification

- **Exploration Results**
  - **MINERAL RESOURCES**
    - Inferred
    - Indicated
    - Measured
  - **MINERAL RESERVES**
    - Probable
    - Proved

- **Increasing level of geological knowledge and confidence**

- **Consideration of mining, processing, metallurgical, economic, marketing, legal, environmental, infrastructure, social, and governmental factors (the “Modifying Factors”).**
UNFC

• UNFC = United Nations Framework Classification
• Developed in 1990s under UN Economic and Social Council mandate
• Generic classification framework for solid minerals, oil and gas
• Tool for global and governmental communication
UNFC

• Differs from CRIRSCO:
  – Not a public reporting standard
  – No certification of competency
  – Includes "uneconomic" and "undiscovered" material

• Provides mapping from or to CRIRSCO template
UNFC/CRIRSCO

Exploration Results

MINERAL RESOURCES

Inferred
Indicated
Measured

MINERAL RESERVES

Probable
Proved

Increasing level of geological knowledge and confidence

Application of mining, processing, metallurgical, economic, marketing, legal, environmental, infrastructure, social, and governmental factors (the “Modifying Factors”).
## UNFC / CRIRSCO

*(modified mapping by Norman Lock)*

<table>
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<tr>
<th>CRIRSCO Template</th>
<th>UNFC-2009 “minimum” Categories</th>
<th>UNFC-2009 Class</th>
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- **Purple cells are Exploration Target/Potential (JORC/NI43-101)**
- **Reported as a Range of Tonnes and Grade**
UNFC/CRIRSCO

- What does not map from UNFC to CRIRSCO?
  - Discovered, not economic & Discovered, unrecoverable
  - Undiscovered and unrecoverable
  - Discovered but limited data
UNFC/CRIRSCO

• Why?
  – Must have "reasonable prospects for economic extraction"

• However...
  – Included in UNFC for resource management and policy formulation
UNFC/CRIRSCO

• Which system to use?
  – Not a competition
  – UNFC is a global umbrella
  – Disclosure & QAQC is separate from classification
    • CRIRSCO covers both
    • UNFC requires classifiers and end users to agree
  – UNFC for government & NGOs
  – But companies may use internally
CRIRSCO

• Timeline for Development of Codes
• Potential New Members of CRIRSCO
The combined value of mining companies listed on the stock exchanges of these countries accounts for more than 80% of the listed capital of the mining industry.
Potential New Members of CRIRSCO

• Argentina
• China
• Indonesia
• Mongolia
• Peru
• Philippines
• Colombia
Conclusions

• Public Reporting
  – By companies = CRIRSCO
  – By government = UNFC
• CRIRSCO template and CRIRSCO-style reporting codes
• UNFC mapping of categories
• "Reasonable prospects"
• Timeline for Reporting Code development & iteration
• Convergence
• Potential new members
QUESTIONS?

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