INTERNATIONAL REPORTING STANDARDS

Stephen Henley,
International Raw Materials Observatory
• Geologist
• Founded "DATAMINE" mining software group in 1980s
• Independent consultant for last 25 years.
• Experience of working in Russia since 1990.
• Resource modelling and "due diligence" on a number of projects in Russia and central Asia.
• 2004-2011, independent geological adviser to Petropavlovsk plc
• Member of PERC since 2006, former chairman, represented PERC on CRIRSCO 2008-2013.
• 2018, appointed president of the International Raw Materials Observatory.
Why do we need reporting standards?

The mining industry – an international business and a vital contributor to national and global economies;

Based on depleting mineral assets - knowledge is imperfect before extraction.

Requires clear communication of risks – depends on the trust and confidence of investors and other stakeholders for its financial and operational well-being.
Reporting: TWO main purposes

- For GOVERNMENT – to estimate raw materials supplies to assist development of national economic policy ("minerals inventory") and for administration and taxation

- For INDUSTRY – to provide information for an accurate assessment of financial risks for investors ("resources and reserves")
• GKZ formed: State Commission on Mineral Reserves

• Protocol No.1 of 31 May 1927

• Defined reserves categories “Proved”, “Probable”, and “Possible”
The Russian (GKZ) Reporting System

- Published 1966, updated 1981 and 2008 (and 2018?)
- Entire range of resources and reserves from regional exploration planning to detailed blocked-out reserves in operating mines
- Integrated with Russian mining law and taxation system
- Intended for administration, management, and planning, not primarily for market financing
International: UNFC-2009 classification
This is a classification, not a reporting standard. No procedures for its use are defined.
Some major financial scandals related to minerals reporting during 1960s to 1990s. Examples:

- (Australia, 1970) Poseidon nickel boom / bust
- (Canada, 1997) Bre-X large-scale fraud

Necessary formalisation of reporting standards: first in Australia, US, UK, Canada, South Africa

Self-regulation imposed by stock exchanges

CRIRSCO was formed in 2002 to standardise minerals reporting internationally
Importance of Mineral Reporting Codes

Mines are based on
• Depleting Assets
• Imperfect knowledge before extraction starts

Developing a mining project or mine involves
• Technical expertise
• Long term, large capital investment
• Carries numerous risks: not just geological but engineering, environmental, social, political, and financial
Why was CRIRSCO created?

For the mining industry:
"To promote International Best Practice in the Reporting of Mineral Exploration Results, Mineral Resources and Mineral Reserves"

Provides the framework for a required minimum standard for the Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves

Relevant to all solid minerals

Common concepts applicable worldwide
Figure 1: the 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").
<table>
<thead>
<tr>
<th>Standard Definitions</th>
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</thead>
<tbody>
<tr>
<td>• Public Reports</td>
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<tr>
<td>• Competent Person</td>
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<tr>
<td>• Exploration Target</td>
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<td>• Exploration Results</td>
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<td>• Mineral Resource</td>
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<tr>
<td>• Mineral Reserve</td>
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<td>• Probable Reserve</td>
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<td>• Proved Reserve</td>
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<tr>
<td>• Scoping Study</td>
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<tr>
<td>• Pre-Feasibility Study</td>
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<tr>
<td>• Feasibility Study</td>
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# The Competent Person

**Requirements for a Competent Person**

<table>
<thead>
<tr>
<th>A minerals industry professional</th>
<th>Often a geologist or mining engineer</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Active in the extractive industry</td>
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<td></td>
<td>May work locally or internationally</td>
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</table>

<table>
<thead>
<tr>
<th>A member of a Recognised Professional Organization (RPO)</th>
<th>Appropriate membership level</th>
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<td></td>
<td>Subject to ethics and disciplinary codes</td>
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<tr>
<th>Minimum five years relevant experience</th>
<th>Style of mineralization</th>
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<tbody>
<tr>
<td></td>
<td>Type of deposit</td>
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<td></td>
<td>Activity or area of technical input which that person is undertaking</td>
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Can the Competent Person face their peers and demonstrate competence in the commodity, type of deposit and reporting activity they are undertaking?

**Note:** These requirements are also subject to any additional restrictions or conditions which may be required by relevant stock exchanges or governmental/regulatory authorities.
CRIRSCO comprises 13 self regulating national bodies

<table>
<thead>
<tr>
<th>National Body</th>
<th>Year</th>
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<tbody>
<tr>
<td>JORC (Australasia)</td>
<td>1994</td>
</tr>
<tr>
<td>CBRR (Brazil)</td>
<td>2015</td>
</tr>
<tr>
<td>CIM (Canada)</td>
<td>1994</td>
</tr>
<tr>
<td>Comision Minera (Chile)</td>
<td>2003</td>
</tr>
<tr>
<td>CCRR (Colombia)</td>
<td>2018</td>
</tr>
<tr>
<td>PERC (Europe)</td>
<td>1994 (as IMM Code)</td>
</tr>
<tr>
<td>Kombers-KCMI (Indonesia)</td>
<td>2017</td>
</tr>
<tr>
<td>KAZRC (Kazakhstan)</td>
<td>2016</td>
</tr>
<tr>
<td>MPIGM (Mongolia)</td>
<td>2014</td>
</tr>
<tr>
<td>NAEN (Russia)</td>
<td>2011</td>
</tr>
<tr>
<td>SAMCODES (South Africa)</td>
<td>1994</td>
</tr>
<tr>
<td>UMREK (Turkey)</td>
<td>2018</td>
</tr>
<tr>
<td>SME (United States of America)</td>
<td>1994</td>
</tr>
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</table>

The National Reporting Organizations (NROs)
Global reach, providing a single view
What is an NRO?

**National Reporting Organisation**
- Represents a single country or defined group of countries
- Develops and is responsible for reporting code, standards and guidelines

**Single or multiple professional bodies (RPOs)**

- Other participating bodies
  (may also be advisors or observers)

**Practising mineral professionals/experts**

- Company representation
- Regulatory/government agencies
- Stock exchanges

- NROs are self-funded and managed bodies
- Structures and organizational arrangements vary depending on national/regional needs
- NROs may also act as the RPO
- There is no one 'standard' model for NROs

**CRIRSCO does not define or direct activities of NROs**
Russia joined CRIRSCO in 2011

- **2006**
  - GKZ-CRIRSCO working group founded to address basic questions

- **2008**
  - Protocol of Intent GKZ-CRIRSCO

- **2010**
  - Guidelines for harmonisation of reporting standards
  - Protocol of Intent GKZ-CRIRSCO-OERN

- **2011**
  - Russian CRIRSCO-aligned Code for public reporting exploration results, resources, and reserves
  - Adoption of the Code for public reporting
  - Seminar on International Standards for reporting mineral reserves and resources
  - International conference: “Russia and international reporting standards for mineral resources and reserves”
The Russian (NAEN) Code

- Developed by NP NAEN, OERN, GKZ, CRIRSCO
- Based on the CRIRSCO Template with guidelines from the Russian national system
- Establishes minimum requirements for public reporting by mining and exploration companies
- Designed for use in international markets, used in parallel with the Russian national classification
PERC: Pan-European Reserves & Resources Reporting Committee

PERC is registered in Brussels as a not-for-profit organization (absl)

**Executive**
- Pim Demecheleer (Chair) EFG
- Neil Wells (Deputy Chair) IoM3
- Edmund Sides (Executive Secretary) IGI
- Ruth Allington (Treasurer) EFG

**Trustees**
- Gordon Riddler
- John Clifford
- Steve Henley IoM3

**RPOs** *
- EFG: European Federation of Geologists
- GSL: Geological Society of London
- IGI: Institute of Geologists of Ireland
- IOM3: Institute of Materials, Minerals and Mining
- FAMMP: Fennoscandian Association for Minerals and Metals Professionals
- IBEM: Iberian Mining Engineers Board

**Co-opted Members**

* RPO = Recognised Professional Organisation
PERC: EU “Horizon 2020” Projects

INTRAWer (2015-2018)

- EU “Horizon 2020” project, led by EFG to establish a European “Raw Materials Observatory” on mineral non-energy raw materials
- PERC is a consortium partner, with the project co-ordinated by the EFG
- Collaboration with participants from Australia, South Africa and United States


- Developing harmonised European regulatory guidance and policy framework for defining and safe-guarding *mineral deposits of public importance* to ensure their future *best use*
- Promoting mineral security and raising mineral planning profile in land use considerations
The International Raw Materials Observatory
a not for profit international association,
The International Raw Materials Observatory
a not for profit international association, to support worldwide cooperation on mineral raw materials
• research & innovation
• education & outreach
• industry & trade
• recycling, management & substitution
Platform for dialogues

NFP international association

Foresight on raw materials
Future scenarios for the world of raw materials 2050

Scenario 2: UNLIMITED TRADE
Increased global consumption leads to raw materials growth.

In 2050, the world of raw materials has experienced steady growth, mainly due to ever-growing consumption. International cooperation and dialogue have created new opportunities to produce and trade raw materials. Access to capital has led to industry integration, technology development and productivity improvements alike.

- The growth of the BRICS states has been amplified by other fast-growing economies (Mexico, Indonesia etc.).
- The world’s economic giants (the U.S., China and India) have opted to intensify dialogue and to cooperate.
- Despite the wide existence of backup strategies related to interrupted supply, raw material prices remain stable.
- As capital is available, the extraction of raw materials goes on and new mines are opened.
- Open data repositories enable collaborative research, innovation and planning.
- Secondary raw materials play an increasingly important role, but cannot satisfy total demand.
- Positive public image of mining — it is regarded as a diverse and high-tech industry.
- Technological progress has many effects (better exploration, higher automation, reduced need for energy & water, mining of previously sub-economic mines).

increased demand for raw materials due to growing consumption
vertical integration of processing industry

international cooperation and elimination of trade barriers
increased use of high tech for exploration and extraction
recycling gains importance
wide application of remote mining
Future scenarios for the world of raw materials 2050

Scenario 3: NATIONAL WALLS
Economic standstill gives rise to nationalist politicians and protectionist measures.

In 2050, the world of raw materials got stuck as social and demographic pressures triggered a long period of economic standstill, which lead to a rise of protectionist measures. The absence of leadership and insufficient political will didn’t help to improve the situation. Each country fights for its own agenda. There is little progress in mining practices as reforms have stalled and private investments are low.

- Conflicts related to the access to raw materials arise. International institutions are weak, they can barely settle disputes.
- Big countries dominate the raw material value chain.
- Disparities between countries got worse, there is little economic growth.
- Securing access to raw materials is a major challenge, especially for the resource-poor countries. Old alliances are re-established.
- Nations focus on solving their own problems. They run national economic development programmes.
- Resource-poor countries re-start mining and invest into recycling, reuse & substitution.
- Resource-rich countries favour technologies that are readily available.

- Countries that abandoned mining, have re-started.
- No collaboration across national borders.
- Mining technology development is at a standstill, but some countries have to catch up.
- Little economic growth, mostly boosted by national government.
- Acceptance of mining (it is a necessity).

Mining practices are basically the same as 40 years ago.
Less mining employees than 30 years ago.
Future scenarios for the world of raw materials 2050

Scenario 1: SUSTAINABILITY ALLIANCE

A new generation puts sustainability above everything else to keep deposits for future generations.

In 2050, the circular economy has become the norm in the big advanced economies. A new generation of political leaders has pushed forward a series of reforms that focus on increasing sustainability, not only in the raw materials industry. Almost every product is produced in an environmentally-friendly way with the aid of green technologies.

- Severe environmental problems have reached a tipping point. Governments agree to place sustainability above growth and profit.
- Concerted actions incentivize the shift towards more sustainable approaches (not only in the raw materials industry but also in agriculture, energy, logistics etc.)
- Recycling and substitution technologies have reached a new level of maturity. Prices for secondary (recycled) material fell over time.
- Only high-tech, low-impact mining is tolerated. Consumers reward resource-efficiency, waste reduction and durable products.
- Sophisticated environmental monitoring, prevention and mitigation technologies are being deployed.

Political leaders form an alliance to push reforms that focus on increasing sustainability.

- There is only green mining and a reduced consumption of primary raw materials.
- Environment-friendly way of producing with the aid of green technologies.
- Increased use of high tech for exploration and extraction.
- Substantial progress in re-use, recycling and substitution of materials.
This project has received funding from the European Union’s Framework Programme for Research and Innovation Horizon2020 under grant agreement nº 642130
Diverse membership:
• Academic
• Industry
• Professional associations
• Research organisations
• Government

Open to all stakeholders

Services include:
• Reports & fact sheets
• Data repository
• Foresight studies
• Platform for dialogues
• A world barometer

This project has received funding from the European Union’s Framework Programme for Research and Innovation Horizon2020 under grant agreement nº 642130
CRIRSCO Reporting Standards

• National CRIRSCO-aligned Standards are regularly updated

• Best features integrated into CRIRSCO Template updates

• Current update cycle includes
  • New guidance on specific commodities (dimension stone, industrial minerals)
  • Refinement of underlying principles

Transparency, Materiality, Competence, Independence
CRIRSCO continues to grow

Recent new members

• Mongolia, Kazakhstan, Turkey, Indonesia
• Brazil, Colombia

Candidate members

• Argentina, Peru, Philippines
• ….. But most significantly……
CRIRSCO continues to grow

- **CHINA**
- **INDIA**
- Both expect to join soon. This will complete the BRICS representation in CRIRSCO
- CRIRSCO is very positive towards involvement in the Belt-and-Road Initiative
Downloadable from www.percstandard.eu/documents.asp