

InBrief

Responsible reporting of mineral assets

The Committee for Mineral Reserves International Reporting Standards
April 2013



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Introduction

This publication describes the work of the Committee for Mineral Reserves International Reporting Standards, known as CRIRSCO, a volunteer-run international organization aimed at establishing international standards for the reporting of mineral resource and reserve estimates.

With the global nature of the mining and metals industry and the need for international consensus on reporting standards, CRIRSCO aims to promote leading practice in public reporting. CRIRSCO enjoys a strategic alliance with ICMM which has provided financial and administrative support to its work since 2007. CRIRSCO's objectives are to:

- promote uniformity, excellence and continuous improvement in national and international reporting standards through consultation and co-operation
- represent the international minerals industry on resource and reserve reporting issues, including discussions with other international organizations, attending international meetings and providing written submissions
- encourage the continued development of international reciprocity of competent/qualified persons through nationally based recognized professional organizations.

Encouraging leading practice in resource estimation is consistent with ICMM's goals on sustainable development. It brings added assurance that a nation's mineral wealth is being developed in a responsible manner.

A unified approach

Public reporting of a mining company's main assets – its mineral resources and mineral reserves – needs to be presented in a consistent, reliable and transparent manner across the international spectrum of market regulators and investors. This allows the comparison of projects with similar geology and stage of development anywhere in the world, giving investors reliable data on which to base investment decisions.

CRIRSCO is a specialist advisory body for promoting and maintaining leading practice in the reporting of exploration results, including assurance for the integrity of mineral resource and mineral reserve estimates. While it is the function of stock market regulators to govern disclosure to investors, national reporting organizations (NROs) co-ordinated by CRIRSCO provide the technical direction and methodology that support the requirements of regulatory bodies.

NROs nominate representatives to CRIRSCO who work together to ensure consistency of reporting standards and the development of leading practice. CRIRSCO has published the *International Reporting Template for Exploration Results, Mineral Resources and Mineral Reserves* which is based on the reporting codes and standards of its members and is kept on CRIRSCO's website.

Most developed countries use almost identical resource and reserve definitions as defined in the reporting template, and new codes and standards are being based on the template. This unified approach has provided the mining industry, regulators and investors with a common framework to report and interpret mineral resource and mineral reserve estimates, thereby facilitating funding to the mining industry through improved investor understanding and confidence.

The need for accurate estimates

One of the challenges of mining is the estimation with reasonable precision of the quantity and quality of minerals and metals lying unseen beneath the surface of the ground. Obviously this must take place before the massive and expensive task of developing a mine.

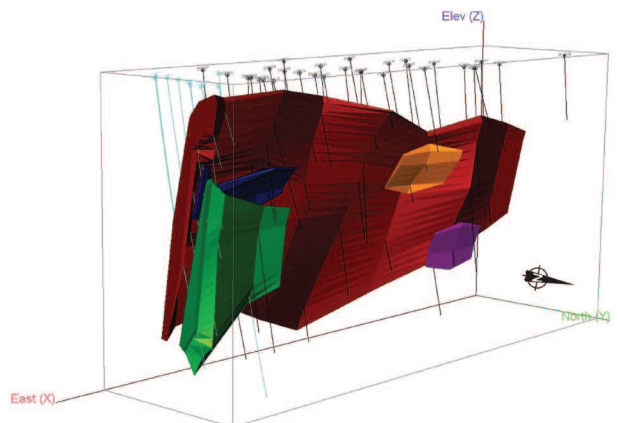
The commercial viability of the hidden mineral deposit is expressed in the size of the mineralized system and its concentration of minerals and metals.

Before commercial viability is established, there are often many years of exploration work. This involves finding a promising setting for mineralization, drilling a large number of drillholes, testing rock and core samples, and interpreting drill data. With the help of computers, a mineral deposit is mapped out like a ghostly presence, its outlines sprawling beneath the surface of the Earth. The results can be quantified as containing, for example, 62 million tonnes of rock made up of 0.85 per cent copper and 0.30 grams of gold per tonne.

From these tiny concentrations – one gram per tonne is one part in a million – the amount of recoverable metal can be estimated. Based on metal price forecasts and expected operating and capital costs, investors can calculate returns on the investment capital required to develop the mine. CRIRSCO's reporting template is a means for ensuring that mineral resource and reserve estimates have been competently assessed.

How the estimates are arrived at and described is the province of science and engineering. It requires competence, rigour, integrity and professional oversight to create the necessary confidence in the data, as well as transparency, so that investors are willing to put up the money to recover the metals for market.

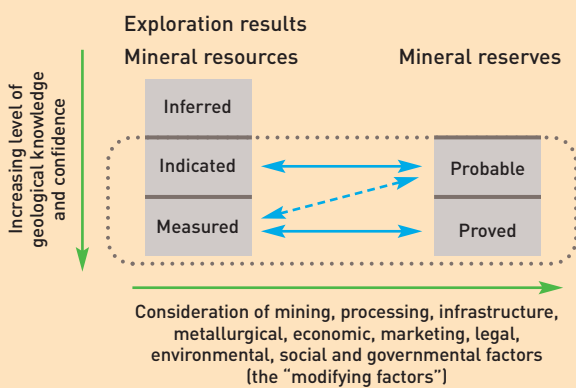
The diagram below shows a geological model – a computer generated representation of a body of rock underground based on geological information in drillholes.



Mineral resource and mineral reserve definitions

A **mineral resource** is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a mineral resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Mineral resources are sub-divided, in order of increasing geological confidence into inferred, indicated and measured categories.

A **mineral reserve** is the economically mineable part of a measured and/or indicated mineral resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at pre-feasibility or feasibility level as appropriate that include application of modifying factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified. 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. Mineral reserves are sub-divided in order of increasing confidence into probable and proved categories.



History

CRIRSCO became a strategic partner of ICMM in 2007, with ICMM providing financial and administrative support. CRIRSCO was however formed 15 years earlier, under the auspices of the Council of Mining and Metallurgical Institutes (CMMI).

A Mineral Definitions Working Group was formed by the CMMI in 1994, made up of representatives from Australia, Canada, South Africa, the UK and the US. The main aim was to develop a set of international standard definitions for the reporting of mineral resources and mineral reserves.

The initiative assumed greater urgency in March 1997 with the notorious Bre-X scandal. This was one of mining's greatest frauds, when a penny stock soared to CAD\$286 per share before becoming worthless when an independent audit found that drill samples had been "salted" by adding gold particles.

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In October 1997 there was a major breakthrough when the participants of the working group met in Denver, US and reached provisional agreement for the definitions of mineral resources and mineral reserves, and their respective sub-categories: measured, indicated and inferred mineral resources, and proved and probable mineral reserves. Following this agreement, mineral reporting codes and guidelines developed in major countries became standardized to a significant extent. The professional bodies of the CMMI agreed in May 2002 to disband the combined body in favour of less formal bi- and multi-lateral links, with a preference for electronic communications.

Largely due to the enthusiasm and commitment of its members, the working group was re-formed as the Combined Reserves International Reporting Standards Committee, or CRIRSCO. The name was later changed to the Committee for Mineral Reserves International Reporting Standards, but the acronym was retained.

Membership

CRIRSCO's members are the NROs, the country specific bodies that are responsible for developing mineral reporting codes, standards and guidelines.

Known mainly by their acronyms, the NROs are: in Australasia (JORC), Chile (Comision Mineral), Canada (CIM), Europe (PERC), Russia (NAEN), South Africa (SAMREC) and the US (SME). The NROs nominate representatives to CRIRSCO, two per NRO for a committee currently numbering 14.

An NRO must meet the following criteria to be accepted for CRIRSCO membership:

- Produce and be responsible for maintaining a reporting standard that is compatible with CRIRSCO's reporting template and which is recognized as the standard for public reporting, or has the wide support of professional bodies, in its country or region.
- Agree to conduct international consultation with NROs represented on CRIRSCO before making amendments to its national or regional reporting standard.
- Include credible, self-regulating, professional bodies that provide disciplinary systems and codes of ethics that govern the behaviour of competent persons or equivalents as defined in the template.
- Commit to engaging in CRIRSCO activities.

Chile is the only Latin American country in CRIRSCO. The Chilean Mining Commission is currently promoting the formation of national commissions in Argentina, Peru, Colombia, Brazil, and Ecuador.

The US Securities and Exchange Commission (SEC) remains a significant exception to the unified industry approach promoted by CRIRSCO. The SEC requires adherence to its own standard, only partly compatible with CRIRSCO-type standards, with adverse and costly implications for companies listed in the US. However, CRIRSCO has worked with the SEC through SME to update its standard in line with the reporting template.

The International Council on Mining and Metals (ICMM) was established in 2001 to improve sustainable development performance in the mining and metals industry. Today, it brings together many of the world's largest mining and metals companies as well as national and regional mining associations and global commodity associations. Our vision is one of leading companies working together and with others to strengthen the contribution of mining, minerals and metals to sustainable development.

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Activities

Reporting template

The reporting template is CRIRSCO's primary tool for the achievement of its objectives. With the governing principles of transparency, materiality and competence, the template is intended as a guideline for countries developing their own reporting standards, and a benchmark for comparison with other international reporting systems.

As each new or updated national reporting standard is developed, it is reviewed by members of CRIRSCO in co-operation with the particular NRO, to ensure that it continues to maintain compatibility with other standards. Improvements introduced by the most recent standard can be captured and built into the template. This rolling process is highly effective and ensures that changes are kept to a sensible minimum and that the most recent standard is generally seen as leading practice.

United Nations Framework Classification (UNFC)

During the 1990s the UN Economic Commission for Europe (UNECE) devised a uniform system for classifying and reporting reserves and resources of solid fuels and minerals in response to the wishes of member countries to develop a standard reporting system.

The result was the creation in 1997 of the United Nations Framework Classification for Reserves and Resources of Solid Fuels and Mineral Commodities (UNFC). During 1999, CRIRSCO began to engage with the UNECE, and the standard definitions from CRIRSCO's reporting template which address solid minerals were accepted by the UNECE.

In 2004 the classification was extended to apply to petroleum (oil and natural gas) and uranium, following which steps were taken to ensure its worldwide application. This offered the opportunity to harmonize existing reserves and resources classifications such as the reporting template and the petroleum resources management system.

While few individual companies report their resources and reserves using the UNFC, the system is still accepted as a basis for reporting by some governments, including those of China, India and some Eastern European countries. Because of the relevance of these countries to future mining developments, including stock exchange listings, CRIRSCO continues to work with countries to map government systems to the template and vice versa. For example, Russia mapped its system to the template in 2009 leading to the CRIRSCO-compatible NAEN code in 2011.

International financial reporting standards for the extractive industries

CRIRSCO advises the International Accounting Standards Board (IASB) regarding the use of mineral reserves and mineral resources for financial reporting purposes. The IASB is considering the development of a new accounting standard for the extractive industries as part of its international financial reporting standards (IFRS).

The role of mineral resources and mineral reserves in calculating depreciation and impairment is highly relevant to a mining or exploration company's financial reporting. The IASB recently indicated a preference for existing, widely accepted reporting systems, primarily CRIRSCO's reporting template,

rather than attempt to develop its own resource and reserve definitions and standards.

With the general global acceptance of IFRS, CRIRSCO believes it is increasingly important to engage with regulators such as the IASB and the US Securities and Exchange Commission to ensure that the eventual standards do not disadvantage mining companies, and that the various current national reporting standards are used.

Convergence of definitions between hydrocarbons and solid minerals

There is a perception outside the extractive industries that the hydrocarbon and solid minerals sectors are essentially the same, and that resource and reserve definitions should be compatible.

CRIRSCO is participating in discussions to demonstrate the similarities, and considerable differences, between reporting systems in the two industries. Continuous contact has been maintained with the Society of Petroleum Engineers (SPE) Oil and Gas Reserves Committee since early 2006, and in 2007 this resulted in the publication of a CRIRSCO-SPE mapping report.

CRIRSCO and the SPE continue to work together to assist the UNECE and others to interpret the needs of the two industries and establish the main points of similarity for use by all stakeholders.

Conclusion

CRIRSCO is a relatively small, not for profit organization comprising committed volunteers. Yet its work over the years in establishing globally accepted standards in a critical niche area of the mining industry has cemented its role as the main international monitor of and participant in the evolution of leading practice. This has provided greater certainty to international capital markets, on which the flow of investment funds for mining depends.

CRIRSCO's reporting template has become a global benchmark that is vital to the mining industry worldwide, especially with the current trend towards tighter corporate governance and regulation. CRIRSCO's continuing links and outreach on behalf of the industry mean it will remain at the forefront in maintaining and spreading the application of leading practice in mineral resource management, as well as keeping high standards of public reporting by responsible, experienced professionals.

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Published by International Council on Mining and Metals (ICMM), London, UK.

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