



COMMITTEE FOR MINERAL RESERVES INTERNATIONAL REPORTING STANDARDS

Committee for Mineral Reserves International Reporting Standards - (CRIRSCO)

Promoting International Best Practice in the Reporting of Mineral Exploration Results, Mineral Resources and Mineral Reserves

Name

The name of the international committee is the Committee for Mineral Reserves International Reporting Standards (Committee), but it is usually referred to by its acronym CRIRSCO.

A brief history of the development of CRIRSCO is provided in Appendix 1.

Role

CRIRSCO's members are National Reporting Organisations¹ (NROs) that are responsible for developing mineral reporting codes, standards and guidelines in Australasia (JORC), Brazil (CBRR), Chile (CM), Canada (CIM), Europe (PERC), Kazakhstan (KAZRCA), Mongolia (MPIGM), Russia (NAEN), South Africa (SAMREC) and the USA (SME). The member NROs nominate representatives to the Committee. Full details of current CRIRSCO member organisations and extended stakeholders are provided in Appendix 2.

A trend towards tighter corporate governance and regulation demands the application of good practice in mineral reserve management as well as high standards of public reporting by responsible, experienced persons. Based on the established reporting codes of its member countries and regions, CRIRSCO has developed an International Reporting Template (the Template), the purpose of which is to assist with the dissemination and promotion of effective, well-trying, good practice for public reporting of Exploration Results, Mineral Resources and Mineral Reserves which is already widely adopted through national reporting codes and standards.

Consistent with the aims, objectives and strategies of its members, CRIRSCO provides an international forum that enables NROs to ensure consistency of their reporting standards in an international setting, and to contribute to the development of best practice international reporting.

¹ A National Reporting Organisation is defined as the body that produces and is responsible for a reporting standard, whether for a single country or a grouping of countries.

The mining activity conducted in the countries represented by the NROs constitutes the great majority of the world's production of solid minerals. The combined value of mining companies listed on the stock exchanges of these countries accounts for a significant proportion of the listed capital of the mining industry. CRIRSCO serves the international minerals industry and its stakeholders, including professional institutions, mining and exploration companies, financial institutions, accountants, regulators and shareholders.

The Template relates to the reporting of economic and potentially economic mineralisation as defined in the reporting standards. It does not directly address the reporting of un-economic or yet to be discovered mineralisation. However, CRIRSCO maintains a dialogue with entities, such as Governments and the United Nations Economic Commission for Europe (UNECE), that require an inventory of such mineralisation in reports for strategic purposes to ensure consistency of reporting across all resource and reserve categories.

CRIRSCO's remit includes all solid minerals, including base and precious metals, gemstones, bulk commodities, construction materials, industrial minerals and energy minerals such as coal and uranium. It does not include non-solid energy minerals such as oil and gas and water or geothermal energy. CRIRSCO engages with the developers of oil and gas classification standards to ensure to the extent possible that resource and reserve definitions are compatible or mutually understandable to third parties.

In recognition of the globalisation of the mining industry and the financial and regulatory (eg corporate governance) systems that apply, CRIRSCO aims to engage with all relevant organisations on behalf of its members and to act as a focal point for dialogue on international minerals reporting issues.

Objectives

CRIRSCO promotes best practice in the international public reporting of mineral Exploration Results, Mineral Resources and Mineral Reserves for investment purposes. CRIRSCO is an international advisory body without legal authority, relying on its constituent members to ensure regulatory and disciplinary oversight at a national level. Its existence recognises the truly global nature of the minerals industry and the agreed need for international consensus on reporting standards.

CRIRSCO aims to achieve its stated objective by:

- Promoting uniformity, excellence and continuous improvement in national and international reporting standards for mineral Exploration Results, Mineral Resources and Mineral Reserves, through consultation and cooperation.
- Representing the international minerals industry on resource and reserve reporting issues, including discussions with other international organisations, attending international meetings and providing written submissions.

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- Encouraging the continued development of international reciprocity of Competent/Qualified Persons through nationally-based Recognised Professional Organisations (RPOs).
 - Promoting the use of a uniform and coherent best practice reporting standard for Mineral Exploration Results, Mineral Resources and Mineral Reserves, including the provision and maintenance of the CRIRSCO International Reporting Template.
 - Facilitating the exchange of information and dialogue among CRIRSCO members and other stakeholders through an actively managed web site that promotes discussion on current issues.

Strategic Relationship with ICMM

CRIRSCO is a strategic partner of the International Council on Mining and Metals (ICMM), which shares similar objectives and also represents the international mining industry with regards to sustainable development. CRIRSCO acts at all times to uphold the principles of the ICMM (www.icmm.com). The ICMM provides financial and administrative support to CRIRSCO but has no direct control or influence over CRIRSCO activities other than those required to maintain the relationship, such as budgetary approvals and periodic reporting of progress on agreed projects. Both parties agree to promote the activities of the other where appropriate.

Eligibility for Membership of CRIRSCO

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

1. Produce and be responsible for maintaining a reporting standard that is compatible with the Template² and which is recognised as the standard for Public Reporting, or has the wide support of professional bodies, in the country/region.
2. Agree to conduct international consultation with NROs represented on CRIRSCO before making amendments to its National or Regional reporting standard.
3. Include credible, self-regulating, professional bodies that provide disciplinary systems and codes of ethics that govern the behaviour of Competent Persons (or equivalent terms) as defined in the Template.
4. Commit to and engage in CRIRSCO activities.

CRIRSCO alone has the right to admit new members and to remove members from the Committee. NRO Members pay an annual membership fee, at a level agreed by the Committee as part of its budget process. Members, which face financial difficulty,

² Compatibility with the CRIRSCO Template means having a reporting standard that is largely based on the Template with national variations as required by regulators, but with minimal variation from the Standard Definitions contained in the Template. For purposes of government reporting, mapping to a previous Mineral Resource and Mineral Reserve classification is permitted, however “compatibility” is not achieved by linking a national reporting system to the Template by mapping alone.

may apply for temporary relief and this will be considered by the Executive. The conditions for such relief will be conveyed to the NRO.

NROs are organised in different ways. Some consist of a single professional body with no legal or regulatory status. Others consist of groups of professional bodies that to a greater or lesser extent broaden the range of disciplines providing input to the national body. Some have mining company representation and some may be linked to regulatory agencies or stock exchanges through the reporting codes/standards that they produce. Whether there is a single professional body or a group of professional bodies, the professionals must comprise experts in the areas of the reporting of Exploration Results, Mineral Resource Estimation, Mineral Reserve Estimation (through the application of modifying factors to convert Mineral Resources to Mineral Reserves and the preparation of Prefeasibility and Feasibility Studies).

CRIRSCO accommodates these differences and adheres to the principle that its member NROs represent a specific country or defined group of countries. At the same time CRIRSCO encourages the broad participation of stakeholders in minerals reporting in the activities of NROs either through membership of the NRO, joint recognition of national reporting standards and codes or in an advisory or observer capacity.

In addition to direct input from its members, CRIRSCO is advised by national and international consultative groups which may include professional bodies, regulatory authorities, legal and financial institutions and mining companies.

Language

The business of CRIRSCO is conducted in English. Members must produce and keep current an English version of their Code or Standard, which must accurately reflect the version in the NRO's language.

Expansion of Membership

CRIRSCO actively seeks to expand its membership as widely as possible and to include any NRO that embraces the CRIRSCO objectives as expressed in the Terms of Reference but in particular that meet the criteria for eligibility of membership described above. The number of Members is not limited.

NROs seeking to join CRIRSCO may apply for membership. NROs that potentially meet the eligibility criteria, but have not otherwise applied for join, may be invited by CRIRSCO to apply for membership. All applications are pro-actively encouraged by CRIRSCO.

Membership of CRIRSCO is open to all NROs whose application demonstrates that they meet the criteria. Potential members will be required to submit English language versions of their proposed Code or Standard and any other documents necessary for assessment of their application. In a country or region where English is not the national language, potential members must produce a proposed Code or Standard in the national language.

Structure

NROs each may nominate two Representatives on CRIRSCO. The number of representatives from each NRO may be reviewed by the Committee. The term of the Representative's involvement, and who should replace a current Representative are for the NRO to decide.

Executive

The Executive consists of the Chairperson, Past Chairperson, Deputy Chairperson, Secretary and Deputy Secretary, elected by Committee members from within the Committee. The Chairperson is elected for a period of one year, commencing on January 1st, having served as Deputy Chair for a period of one year. The Past Chairperson and the Secretary will also serve a one-year term. The term of the Deputy Secretary is not defined to provide continuity. The Secretary manages the administrative function and acts as a stand-in for either the Chairperson or Deputy Chairperson in their absence. The Deputy Secretary will assist the Secretary on administrative matters and gain experience in the workings of the Committee.

The Executive is responsible for the succession of Executive positions. Each year the Executive nominates existing Committee members for the positions of Deputy Chairperson and Secretary to Committee Members for election by them. The Executive will select the member who is best equipped to be Chairperson in the year following their term as Deputy Chairperson and will secure their agreement for the nomination. Similarly, the Executive selects a suitable member for the position of Secretary and will secure their agreement for the nomination. As required, the Executive will also select the member who is best suited to be Deputy Secretary and will secure their agreement for nomination.

Sub Committees

Sub committees are formed on an 'as-needed' basis. Matters for which a sub-committee might be formed include liaison and outreach with other organisations, expanding membership or Template revisions. The sub-committees will comprise Committee members. In special cases, sub-committee members with appropriate knowledge or connections may be appointed from outside the Committee. The need, and the terms of reference, for the sub-committees will be determined by the Executive.

Attendance at Meetings

All nominated Representatives from each member NRO are entitled to attend Committee meetings in person, with the cost of travel and accommodation to be met by the NRO. CRIRSCO will pay for general costs, such as some meeting costs and common meals. Members, which face financial difficulty, may apply for CRIRSCO to meet the cost of attendance and this will be considered by the Executive. The

conditions for such relief will be conveyed to the NRO. The costs of holding the meeting will be constantly reviewed by the Executive and will be discussed with the Committee.

NROs applying for Membership of CRIRSCO may be invited to send observers to observe appropriate parts of CRIRSCO meetings, at their own cost, to gain a better understanding of CRIRSCO and its objectives and may be included in relevant discussions outside of the meetings.

Part of each Annual Meeting will be open to other interested parties to attend.

Frequency of Meetings

A full meeting of the CRIRSCO Committee is held once each year, at a location selected by the Executive. Sub committees may meet as required, but most such meetings are held by telephone or video conference, or by email.

Decision Making

The preferred method of decision making is by consensus, based on an acceptance of the benefits of a united voice on matters related to the Reporting of Mineral Exploration Results, Mineral Resources and Mineral Reserves.

CRIRSCO has no power to instruct any member NRO on any matter. It is accepted that there will be differences in the detail, while embracing common principles.

CRIRSCO reports to its Members. The interpretation and implementation of internationally agreed recommendations remains the prerogative of the NRO.

Work programmes and budgets

Programmes of work and associated budgets are developed annually and form part of a rolling three-year estimate. Work programmes and budgets are generally developed in July for the following three years with final approval being given in January of the first year.

CRIRSCO is a not-for-profit organisation that relies on its member organisations and their nominated representatives to carry out its work in a thorough and professional manner without direct remuneration. As noted above, partial funding is available from the ICMM, and a significant amount of support is received from member NROs, employers and consulting organisations. The provision of funding to CRIRSCO does not provide any rights or privileges.

Appendix 1: The History of CRIRSCO

The early days

At the 15th Council of Mining and Metallurgical Institutions (CMMI) Congress at Sun City, South Africa in 1994, the CMMI Mineral Definitions Working Group was formed, made up of representatives from:

- Australia [Australasian Institute of Mining and Metallurgy (AusIMM)];
- Canada [Canadian Institute of Mining, Metallurgy and Petroleum (CIM)];
- South Africa [South African Institute of Mining and Metallurgy (SAIMM)];
- UK [Institution of Mining and Metallurgy (IMM)]; and
- United States [Society for Mining, Metallurgy and Exploration (SME)].

The primary objective of the group 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 well publicised Bre-X scandal, and in October 1997 there was a major breakthrough when the five participants met in Denver, Colorado and reached provisional agreement (the Denver Accord) for the definitions of the two major categories, Mineral Resources and Mineral Reserves, and their respective sub-categories Measured, Indicated and Inferred Mineral Resources, and Proved and Probable Mineral Reserves.

Concurrently and since 1992, the United Nations Economic Commission for Europe (UNECE) had been developing an International Framework for Mineral Reserves and Resources (Solid Fuels and Mineral Commodities) otherwise known as the UN Framework Classification (UNFC). Through a series of workshops and Task Force meetings, a final version of the UNFC was agreed and prepared with the provisionally agreed CMMI definitions appended, translated into six languages and distributed worldwide for comment and trial application. By 1998, out of the 43 countries and international organisations that replied, 37 had or were in the process of applying the UNFC, and some countries were adopting it for national mineral reserves and resource inventories.

At Geneva in October 1999, agreement was reached between CMMI representatives and the UNECE Task Force for the adoption of the CMMI standard reporting definitions for mineral resources and reserves, with minor modifications, into the UNFC for those categories that were common to both systems. The UNECE Task Force suggested, and it was agreed, that for ease of comprehension and to facilitate translation into non-English languages, the then provisional CMMI definitions be reduced into shorter sentences and given a numerical coding consistent with the UNFC. This agreement gave true international status to the CMMI definitions and preserved the distinction between resource and reserve reporting for commercial purposes and the maintenance of national mineral inventories.

As a consequence of the CMMI initiative, mineral reporting Codes and Guidelines developed in the major mining countries became standardised to a significant extent. In general, the various reporting codes are constructed such that the mandatory clauses including definitions are followed by guidelines which are not mandatory, but are intended to provide assistance and guidance to readers in interpreting the code. Each NRO is free to modify its guidelines to reflect local conditions but variations of

the definitions and codes have been kept to a minimum and are commonly made with full international consultation.

The agreements noted above led to the release of an updated version of the JORC Code in Australasia in 1999, followed by first releases or significant updates of similar codes and guidelines in South Africa (2000), USA (1999), Canada (2000) and UK and Europe (2001).

CRIRSCO is born

At what was to become the final CMMI Congress in Cairns, Australia in May 2002, the professional bodies that formed the CMMI membership agreed to disband the organisation in favour of less formal bi- and multi-lateral links, with a preference for electronic communications. The CMMI Mineral Definitions Working Group risked becoming a casualty of this change. However, largely due to the enthusiasm and commitment of its members, the group survived and was reformed as the Combined Reserves International Reporting Standards Committee, or CRIRSCO. This was later changed to the Committee for Mineral Reserves International Reporting Standards, but the acronym was retained since by then it was growing in acceptance and use.

The first members of CRIRSCO were those of the CMMI Mineral Definitions Group – Australia, Canada, South Africa, USA and UK/Europe.

Expanding the membership

A representative from Chile attended the 2002 meeting. In 2003, following an agreement between the IIMCH and the Chilean Ministry of Mines to develop a Mineral Resource and Reserve Code, Chile became an official member of CRIRSCO. In 2007, Chile launched its Certification Code for Exploration Prospects, Mineral Resources and Ore Reserves, supervised by a Mining Commission.

In 2006, Russia began an exercise to map the Russian classification system to the CRIRSCO Template. In 2008, a protocol was signed to develop conversion guidelines between the Russian system and the CRIRSCO Template, which were completed in 2010. At CRIRSCO's 2010 Annual Meeting in Moscow, a protocol was signed between CRIRSCO, the State Commission on Mineral Reserves (GKZ) and the Russian Society of Subsoil Use Experts (OERN) to develop a Code aligned with the CRIRSCO Template. The National Association for Subsoil Use Auditing (NAEN) Code was completed in 2011 and NAEN joined CRIRSCO in October of that year. The associated Professional Society is OERN.

Mongolia signed an MOU with CRIRSCO in 2011 to jointly develop a compatible standard for reporting and a professional Society, with assistance from the World Bank. It became the eighth Member of CRIRSCO, and the first from Asia, at the 2014 Annual Meeting in Ulaanbataar. The Mongolian Code for the Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves (The MRC Code) 2014 is under the Mongolian Professional Institute of Geosciences and Mining (MPIGM), which is the National Reporting Organisation, as well as the Professional Society.

An MOU was signed in May 2015 between CRIRSCO and the Brazilian Association of Mineral Exploration Companies (ABPM) and the Agency for Technological Development of the Brazilian Mineral Industry (ADIMB). The purpose of this Memorandum of

Understanding (MOU) was to collaborate in development and implementation of a national reporting standard for Exploration Results, Mineral Resources and Mineral Reserves in Brazil that is compliant with the CRIRSCO Template. The two organisations were to form an NRO and establish a professional organisation to satisfy the criteria to become a full CRIRSCO member. Subsequently, the Brazilian Agency for Mineral Technology, Research and Development (IB RAM) joined to become the third founding member of the Brazilian Commission for Resources and Reserves (CBRR), which developed the CBRR Guide to Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves. The professional society is under the umbrella of the CBRR. Brazil was welcomed as the ninth Member of CRIRSCO in November, 2015 at the annual meeting held in Brasilia.

In November 2015, an MOU was signed with the Ministry of Investments and Development of the Republic of Kazakhstan and discussions were undertaken by representatives of CRIRSCO and the Kazakh entities. Because of the strong support of the President of Kazakhstan, good progress was made on formulating a Code for Reporting and the establishment of a professional society, which would register Competent Persons. A number of documents were created to deal with the membership and operation of the NRO (the Kazakhstani Association for Public Reporting Standards on Exploration Results, Mineral Resources and Mineral Reserves (KAZRCA) and the professional society (the Professional Association of Independent Experts in Subsoil Use of the Republic of Kazakhstan (PONEN)). During a workshop in Astana in June, 2016, attended by five member representatives of CRIRSCO, it was agreed that Kazakhstan had met the conditions for membership of CRIRSCO, and it was admitted as the tenth member.

Global events drive the need for greater investor confidence

Initially retained to promote consistency and compatibility amongst the minerals reporting codes of the main mining countries, in 2005 it became apparent that there was a broader role for CRIRSCO to play in response to international events.

Public confidence in corporate management was severely damaged by numerous scandals such as Enron and WorldCom, leading to the development of significantly more stringent corporate governance requirements in the USA (the Sarbanes-Oxley Act of 2002) and elsewhere. The oil and gas industry became embroiled in similar publicity with the over-booking of Shell's oil reserves in 2004.

Meanwhile, the UNECE continued to promote the idea of a single global code for reporting all minerals, including oil and gas. The 2004 version of the UNFC was largely re-written to include petroleum (oil and gas) reporting, and in the process many of the earlier minerals definitions were lost.

Working with other organisations

CRIRSCO re-engaged with the UNECE to address the lack of definition and during the period 2006-2009, worked with the Society of Petroleum Engineers (SPE) as petroleum industry representatives to map the CRIRSCO Template (first published in 2006) to the Petroleum Resource Management System (PRMS). CRIRSCO further participated in a UNECE Task Force set up to map the Template and PRMS to the UNFC and a further Task Force to recommend revisions to the UNFC. This work

culminated in the release of a new, and much simplified, version of the UNFC in December 2009. UNFC 2009 satisfies the need for high level definitions that can bridge the petroleum and minerals industries but leaves intact the detailed definitions, rules and guidelines that are commodity specific.

Since January 2007, CRIRSCO has been associated with the International Council on Mining and Metals (ICMM), which shares similar objectives and also represents the international mining industry, initially as a Task Force of that organisation and from October 2009 through a Strategic Partnership.

From 2007 CRIRSCO was invited to work with the International Accounting Standards Board as part of its research project on the possible application of International Financial Reporting Standards to extractive activities (petroleum and minerals). This relationship is on-going and as a result of the mapping exercise between CRIRSCO and SPE the IASB is likely to adopt the definitions contained in the Template and PRMS as the basis for commodity specific financial reporting. Consultation on the IASB's Extractive Activities project has continued from 2010 and is on-going. .

Each of these initiatives has a significant bearing on how mineral resources and reserves are defined, estimated and valued, and the way that they are reported and used in financial statements. The role of CRIRSCO as an international monitor of and participant in such changes is clearly a relevant one.

Appendix 2: National Minerals Reporting Codes and their Sponsors

The following countries are currently represented on CRIRSCO. Member organisations include all bodies that have a direct influence on the form and content of national reporting codes although they may be more or less active in the affairs of the national committee. The professional societies with an enforceable Code of Ethics are marked with an asterisk.

Australasia	
National Committee	Joint Ore Reserves Committee (JORC)
Member organisations	Australasian Institute of Mining & Metallurgy (AusIMM)* Australian Institute of Geoscientists (AIG)* Minerals Council of Australia (MCA)
Representation from	Australian Securities Exchange (ASX) Financial Services Institute of Australia (FinSIA) Association of Mining and Exploration Companies (AMEC)
Brazil	
National Committee	Brazilian Commission for Resources and Reserves (CBRR, Comissão Brasileira de Recursos e Reservas)*
Member organisations	Brazilian Association of Mineral Exploration Companies (ABPM, Associação Brasileira de Empresas de Pesquisa Mineral) Agency for Technological Development of the Brazilian Mineral Industry (ADIMB, Agência para o Desenvolvimento Tecnológico da Indústria Mineral Brasileira) Brazilian Mining Association (IBRAM, Instituto Brasileiro de Mineração)
Canada	
National Committee	Canadian Institute of Mining, Metallurgy and Petroleum (CIM)
Member organisation	Canadian Institute of Mining, Metallurgy and Petroleum (CIM)
Chile	
National Committee	Commission for the Qualification of Competencies in Mineral Resources and Reserves (Comisión Calificadora de Competencias de Recursos y Reservas Mineras or "Comisión Minera")*
Member organisations	Mining Council (Consejo Minero) SONAMI (Sociedad Nacional de Minería) Institute of Mining Engineers of Chile (Instituto de Ingenieros de Minas de Chile) Association of Geologists (Colegio de Geólogos de Chile)

	Association of Engineers (Colegio de Ingenieros de Chile)
Europe	
National Committee	Pan European Resources and Reserves Reporting Committee (PERC)
Member organisations	European Federation of Geologists (EFG)* The Geological Society of London* Institute of Materials, Minerals and Mining (IMMM)* Institute of Geologists of Ireland (IGI)*
Kazakhstan	
National Committee	Kazakhstani Association for Public Reporting Standards on Exploration Results, Mineral Resources and Mineral Reserves (KAZRCA)
Member Organisation	Professional Association of Independent Experts in Subsoil Use of the Republic of Kazakhstan (PONEN)*
Mongolia	
National Committee	Mineral Resources and Reserves Committee (MRC) of MPIGM
Member organisation	Mongolian Professional Institute of Geosciences and Mining (MPIGM)*
Russia	
National Committee	National Association for Subsoil Use Auditing (NAEN)
Member organisation	Russian Society of Subsoil Use Experts (OERN)*
South Africa	
National Committee	South African Mineral Resource Committee (SAMREC)

Member organisations	Southern African Institute of Mining and Metallurgy (SAIMM)* South African Council for Natural Scientific Professions (SACNASP) Geological Society of South Africa (GSSA)* Geostatistical Association of South Africa (GASA) South African Council for Professional Land Surveyors and Technical Surveyors (PLATO) Association of Law Societies of South Africa General Council of the BAR of South Africa Department of Minerals and Energy Johannesburg Stock Exchange (JSE) Council for Geoscience The Banking Association of South Africa The Chamber of Mines of South Africa (CoM)
United States of America	
National Committee	Society for Mining, Metallurgy and Exploration (SME)
Member organisation	Society for Mining, Metallurgy and Exploration (SME)*