

# **Mineral Resources and Mineral Reserves**

## **Progress On International Definitions And Reporting Standards**

**By**

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## **SUMMARY**

Substantial progress has been made over the last ten years in the development of uniform national and international standards covering the definition, estimation and public reporting of mineral resources and mineral reserves. Agreement between the major participating countries has been reached, which include the requirement that a Competent Person prepare and approve publication of mineral resources and reserves. Most national regulatory organizations have accepted the new standards and have included them in the rules that must be followed by mining companies operating under their jurisdiction. These developments are the result of a concerted effort on the part of professional societies, national regulatory agencies, international organizations, and many dedicated individuals. Jean-Michel Rendu recognizes the singular contribution of Norman Miskelly, who has been and continues to be the driving force toward international standardization.

The historical development of these standards is summarized in this paper. Accepted definitions of mineral resources and mineral reserves are discussed, as well as the definition and role of the Competent Person. Additional effort is needed before the international standards are fully understood, accepted and followed by mining companies, regulatory agencies, the investment community and the general public. Steps being taken toward development of an International Code are outlined.

## BACKGROUND

International standards have long been recognized as desirable to create a common language, facilitate communications, and improve the quality of the information being released to the public by the mining industry. Such standards are required if rational decisions are to be made on the basis of well-understood information. Mining companies need uniformly accepted means to describe exploration projects, mineral deposits they discover or acquire, and mines they develop. Investors, governments, community leaders, international agencies, regulators and the public need to understand the representation made by the mining companies, and must have reason to believe and have confidence in the information they are given. Only if meaningful international standards are available and enforced can any of the parties involved make sound decisions concerning their participation in the mineral industry.

The quality of mineral resource and reserve reporting has significantly increased over the last decades. The evolving reporting process has now reached the point where most major industrial countries are working to common definitions and to nearly identical public reporting standards. More work is required before truly international standards are developed and accepted, and processes are in hand on several fronts to bring this to fruition.

Attempts to establish standards for classifying and publicly reporting mineral resources and reserves go back centuries. In “De Re Metallica”, published in 1556, Georgius Agricola discusses the evaluation of deposits, the relationship between miner and owner, and fraudulent behavior in mining. In 1909, Herbert Hoover, who was to become president of the United States of America, published “Principles of Mining”, in which he recommended a three-fold division of ore reserves into proved, probable and prospective. In 1980 the US Bureau of Mines and the US Geological Survey published Circular 831 “Principles of a Resource/Reserve Classification for Minerals”, which established for the first time a clear division between mineral resources and reserves.

But the events which truly motivated the accelerated development of international definitions and standards were a number of reporting scandals. In the 1960s the so-called Poseidon nickel boom resulted in warnings from the Australian government and regulatory bodies that, unless the mining industry developed appropriate reporting standards, the regulators would do so. In response the Australian industry established a committee known as the Joint Ore Reserves Committee (JORC). This committee published the first version of the JORC Code in 1989, a code which was to become the foundation on which all recently accepted national codes are built.

In 1997 the need for international standards and stronger control of the reporting of mineral information was made painfully obvious by the Bre-X scandal concerning the fictitious Busang gold deposit in Indonesia. Even though it was recognized that regulations alone could not have stopped Bre-X from happening, the lack of standards, and the lack of procedure to ensure that these standards are followed, was perceived as a significant contributing factor. The Canadian regulatory agencies formed a Mining

Standards Task Force whose final report, “Setting New Standards, Recommendations for Public Mineral Exploration and Mining Companies”, published in 1999, contained specific recommendations on standards to be followed, including recommendation that the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) work with the other international mining professional societies to develop international standards.

Stimulated partly by the outcry over Busang and similar events elsewhere and partly by a successful push by the Council of Mining and Metallurgical Institutions (CMMI) to establish internationally accepted resource/reserve definitions, Australia, the US, Canada, South Africa and the UK revised their reporting standards in the late 1990s. Work with the United Nations has resulted in general acceptance of the same definitions. In June 2001 the Institution of Mining and Metallurgy (IMM), in conjunction with the European Federation of Geologists (EFG) and the Institute of Geologists of Ireland (IGI), adopted their joint Code for Reporting Mineral Resources and Reserves. The Geological Society of London (GSL) may adopt the code later in 2001. Development of an International Code is becoming a realistic objective.

## **DEVELOPMENT OF INTERNATIONAL REPORTING STANDARDS**

Until the 1990s little progress was made toward establishing international standards for the classification and reporting of mineral resources and reserves. The first significant move was in 1989 when the “Australasian Code for Reporting of Identified Mineral Resources and Ore Reserves” (the JORC Code) was published. The code was immediately incorporated into the Australian Stock Exchange (ASX) listing rules. In 1991, the US Society for Mining, Metallurgy, and Exploration (SME) published “A Guide for Reporting Exploration Information, Resources, and Reserves”. Also in 1991, the Institution of Mining and Metallurgy (IMM) in the UK revised its standards for reporting of mineral resources and reserves. The US Guide and UK revisions were both based on the 1989 JORC Code.

In 1993 the Council of Mining and Metallurgical Institutions (CMMI) set up a Mineral Resources/Reserves International Definitions Working Group, with representatives from Australia (AusIMM), Canada (CIM), South Africa (SAIMM), the United Kingdom (IMM) and the United States (SME). The CMMI Group as it was initially called, now known as the CMMI Mineral Reserves International Reporting Standards Committee (CRIRSCO) first met during the 1994 Fifteenth CMMI Congress in South Africa. Several years of negotiations followed, led primarily by Norman Miskelly, CRIRSCO Convener and then Chairman of JORC. A provisional agreement, known as the Denver Accord, was reached in 1997 in Denver, Colorado, on definitions for the two major categories, mineral resources and mineral reserves, and for their respective sub-categories, measured, indicated and inferred mineral resources, and proved and probable mineral reserves.

Independently, starting in 1992, the United Nations Economic Commission for Europe (UN–ECE) was developing a UN Framework Classification (UNFC) to enable comparison of different national mineral resource and reserve classifications, particularly

for those countries in transition to market economies. The CMMI Group, now CRIRSCO and the UN-ECE met in Geneva in 1998 and 1999 and produced an agreement to incorporate CMMI standard reporting definitions into the UNFC for categories common to both systems.

Following the Denver and Geneva meetings, the agreed upon definitions were first incorporated into the 1999 JORC Code and subsequently, largely unchanged, into similar codes for the other four participating countries, South Africa, Canada, the United States and the UK. The Australian code (the JORC Code) and the South African code (the SAMREC Code) are recognized by their respective stock exchanges and must be followed by companies listed on these exchanges. Effective February 2001, the Canadian Securities Administrators (CSA) issued National Instrument 43-101, "Standards of Disclosure for Mineral Projects". These standards require compliance with the CIM definitions of mineral resources and reserves, and that a Qualified Person estimates such resources and reserves. There is no material difference between the Qualified Person in the Canadian code and the Competent Person in the other national codes. Recognition of the international standards by the UK regulatory agencies is anticipated. For a number of reasons, including differences in the regulatory and legal environment, recognition by the US regulatory agencies appears somewhat distant.

The success of the CMMI initiative is such that consideration is now being given to developing an International Code. This would include the formulation of an international definition for a Competent Person, reciprocal recognition of Competent Persons between participating nations, a list of principles which would constitute minimum requirements for professional rules of conduct for Competent Persons, and an international reporting code and guidelines.

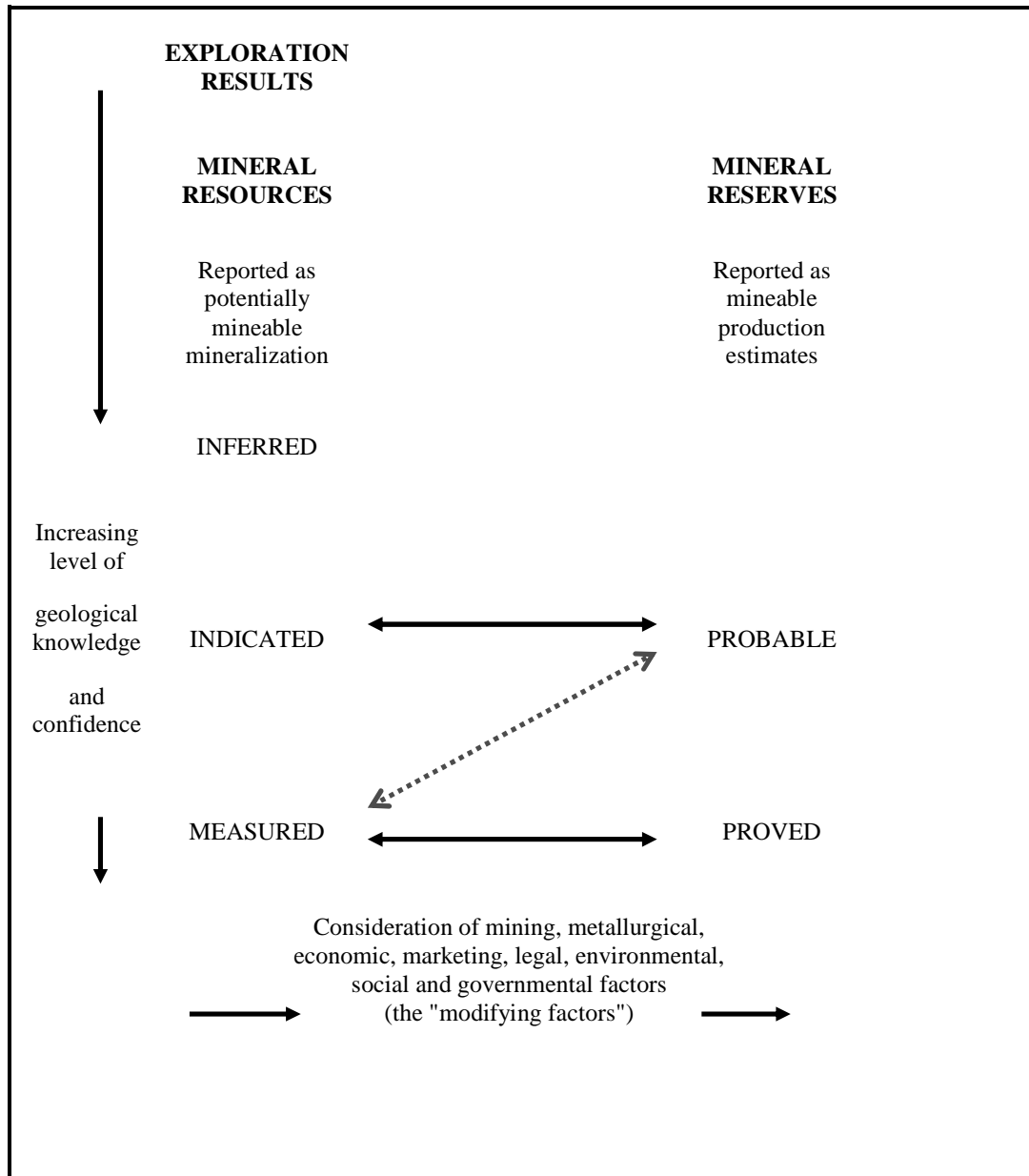
## **INTERNATIONAL DEFINITIONS OF MINERAL RESOURCES AND MINERAL RESERVES**

Figure 1 illustrates the framework for classifying exploration results, mineral resources and mineral reserves. A mineral resource must be classified as measured, indicated or inferred, a mineral reserve as proved or probable. These classifications reflect different levels of geological confidence and different degrees of technical and economic evaluation. The choice of the appropriate category of mineral resource or mineral reserve must be made by a Competent Person. When mineral resources or reserves are publicly reported, the Competent Person must be aware of the differences which exist between various jurisdictions. For example at the time of this writing the United States Securities and Exchange Commission did not allow the use of the term "mineral resource".

A mineral resource can be estimated mainly on the basis of geoscientific information with some input from other disciplines. A mineral reserve, which is a modified sub-set of a measured or indicated mineral resource, requires consideration of all factors affecting extraction, including mining, metallurgical, economic, marketing, legal, environmental,

social and governmental factors, and should in most instances be estimated with input from a range of disciplines.

**Figure 1 –Relationship between Exploration Results, Mineral Resources and Mineral Reserves**



In certain situations a measured mineral resource could convert to a probable mineral reserve rather than to a proved mineral reserve because of uncertainties associated with modifying factors which are taken into account in the conversion from mineral resource to mineral reserve. This relationship is shown by the broken arrow in Figure 1. In certain situations, a previously reported mineral reserve could convert back to a mineral resource because of new information according to which a mineral reserve can no longer be reported. The resulting two-way relationship is shown by the two-headed arrows in Figure 1.

When **‘Exploration Results’**, as defined in the IMM, IGI, and EFG Reporting Code (in the SME Guide, Exploration Information) is reported in relation to mineralization not classified as a mineral resource or a reserve, the results of individual drill hole intercepts or geologic observations can be reported, but estimates of tonnage, average grade, and metal content must not be reported.

A **‘Mineral Resource’** is a concentration or occurrence of material of intrinsic economic interest in or on the Earth’s crust (a deposit) in such form and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade, geological characteristics and continuity of a mineral resource are known, estimated or interpreted from specific geological evidence and knowledge. Mineral resources are subdivided, in order of increasing geological confidence, into inferred, indicated and measured categories. Portions of a deposit that do not have reasonable prospects for eventual economic extraction must not be included in a mineral resource.

The term “reasonable prospects for eventual economic extraction” implies a judgement (albeit preliminary) by the Competent Person in respect of the technical and economic factors likely to influence the prospect of economic extraction.

An **‘Inferred Mineral Resource’** is that part of a mineral resource for which tonnage, grade and mineral content can be estimated with a low level of confidence. It is inferred from geological evidence and assumed but not verified geological and/or grade continuity. It is based on information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes which is limited or of uncertain quality and/or reliability. An inferred mineral resource has a lower level of confidence than that applying to an indicated mineral resource.

This category is intended to cover situations where mineralization has been identified and limited measurements and sampling completed, but where the data are insufficient to allow the geological and/or grade continuity to be confidently interpreted. It cannot be assumed that all or part of an inferred mineral resource will be upgraded to an indicated or measured mineral resource as a result of continued exploration. Confidence in the estimate is not sufficient to allow the evaluation of economic viability.

An **‘Indicated Mineral Resource’** is that part of a mineral resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a reasonable level of confidence. It is based on exploration, sampling and testing

information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings, and drill holes. The locations are too widely or inappropriately spaced to confirm geological continuity and/or grade continuity but are spaced closely enough for continuity to be assumed. An indicated mineral resource has a lower level of confidence than that applying to a measured mineral resource, but has a higher level of confidence than that applying to an inferred mineral resource.

A deposit may be classified as an indicated mineral resource when the nature, quality, amount and distribution of data are such as to allow the Competent Person to confidently interpret the geological framework and to assume continuity of mineralization. Confidence in the estimate is sufficient to enable an evaluation of economic viability.

A **‘Measured Mineral Resource’** is that part of a mineral resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a high level of confidence. It is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings, and drill holes. The locations are spaced closely enough to confirm geological and/or grade continuity.

A deposit may be classified as a measured mineral resource when the nature, quality, amount and distribution of data are such as to leave no reasonable doubt, in the opinion of the Competent Person, that the tonnage and grade of the deposit can be estimated within close limits. Confidence in the estimate is sufficient to enable an evaluation of economic viability.

The appropriate mineral resource category must be determined by the Competent Person. Mineral resource figures must not be aggregated with mineral reserve figures. If re-evaluation of mineral reserves indicates that they are no longer economically viable, the mineral reserves must be reclassified as mineral resources or removed from mineral resource/mineral reserve statements altogether. It is not intended that re-classification from mineral reserves to mineral resources should be applied as a result of changes expected to be of a short term or temporary nature, or where management has made a deliberate decision to operate on a non-economic basis. Examples of such situations might be a commodity price drop expected to be of short duration or a mine emergency of a non-permanent nature.

A **‘Mineral Reserve’** is the economically mineable part of a measured or indicated mineral resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified. Mineral reserves are sub-divided in order of increasing confidence into probable mineral reserves and proved mineral reserves.



Mineral reserves are those portions of mineral resources which, in the opinion of the Competent Person making the estimates, can be the basis of a viable project after taking account of all relevant metallurgical, economic, marketing, legal, environmental, social and governmental factors.

The term “economic” implies that extraction of the mineral reserve has been established or analytically demonstrated to be viable and justifiable under reasonable investment and market assumptions. The term “mineral reserve” need not necessarily signify that all governmental approvals have been received but it does signify that there are reasonable expectations of timely approvals.

A **‘Probable Mineral Reserve’** is the economically mineable part of an indicated and, in some circumstances, measured mineral resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified. A probable mineral reserve has a lower level of confidence than a proved mineral reserve.

A **‘Proved Mineral Reserve’** is the economically mineable part of a measured mineral resource. It includes diluting materials and allowances for losses which may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified.

The choice of the appropriate category of mineral reserve is determined primarily by the classification of the corresponding mineral resource and must be made by the Competent Person.

In situations where both mineral resources and mineral reserves are reported, a clarifying statement must be included in the report which clearly indicates whether the mineral resources are inclusive of, or additional to the mineral reserves.

## **THE COMPETENT PERSON**

To minimize the risk of erroneous or fraudulent behavior in mining, Georgius Agricola made a number of recommendations, including:

- “Those who take an interest in the methods and precepts of mining and metallurgy should consult expert mining people.” Demonstrated experience is critical.

- “It is indispensable that the miners should worship God with reverence.” Strong ethical and moral values and fear of retribution are characteristics which should be expected.
- “Should the foremen be convicted of fraud, they are beaten with rods; of theft, they are hanged.” Clearly defined and enforceable punishment for improper behavior is an effective deterrent.

These statements were made in 1556. The role of religion and the types of punishments have changed significantly since then, but the same basic principles still apply.

Definitions and guidelines lose their effectiveness unless responsibility for following them is assigned to a specific individual or group of individuals who satisfy technical and ethical requirements and can be subjected to disciplinary actions. Hence the internationally recognized need to define a Competent Person.

A **‘Competent Person’** is a person who is a member of a professional society for earth scientists or mineral engineers, or has other appropriate qualifications. The Competent Person must have a minimum of five years experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity which that person is undertaking. If the Competent Person is estimating, or supervising the estimation of mineral resources, the relevant experience must be in the estimation, assessment and evaluation of mineral resources. If the Competent Person is estimating, or supervising the estimation of mineral reserves, the relevant experience must be in the estimation, assessment, evaluation and economic analysis of mineral reserves.

The professional society to which the Competent Person belongs must admit members primarily on the basis of academic qualifications and experience, must require compliance with specified professional and ethical standards, and must have disciplinary powers, including the power to suspend or expel a member.

Persons being called upon to sign as Competent Persons should be clearly satisfied in their own minds that they could face their peers and demonstrate competence in the commodity, type of deposit and situation under consideration. If doubt exists, the person should either seek concurring opinions from colleagues or should decline to sign as a Competent Person. Estimation of mineral resources may be an individual effort while estimation of mineral reserves is commonly a team effort involving a number of technical disciplines. The Competent Person (or Persons) who signs a report is responsible and accountable for the whole of the report. Where there is a clear division of responsibilities, each Competent Person must accept responsibility for his or her particular contribution. The Competent Person accepting overall responsibility for a report that has been prepared in whole or in part by others must be satisfied that the work of the other contributors is acceptable to the Competent Person.

Requirements concerning the Competent Person differ from country to country. The Australian and New Zealand Stock Exchanges require that public releases are based on

information compiled by a Competent Person as defined by the JORC Code or a "recognized mining professional" as defined by the ASX listing rules. The Johannesburg Stock Exchange requires public releases to be based on the work of a Competent Person as defined by the SAMREC Code. The Canadian National Instrument 43-101 defines, and specifies the role of, the Qualified Person. In the UK, rules under consideration by the regulatory agencies include those relating to the Competent Person. The US SEC does not specifically require that a Competent Person prepare a report.

The increased legal responsibilities of the Competent Person will have consequences which will need careful assessment. These responsibilities are likely to vary significantly between countries. In some jurisdictions, a Competent Person could be sued personally if there are indications that fraudulent public statements were made. The risk of legal action should significantly decrease the likelihood of fraudulent or misleading statements.

## **CURRENT STATUS**

A comparison of national codes and guidelines illustrates the progress already made and steps to be taken before international standards are developed and uniformly recognized.

### **Australia**

All Australian and New Zealand companies, and all international companies listed in Australia or New Zealand, must report according to the Australasian Code for Reporting of Mineral Resources and Ore Reserves (the JORC Code). The code is also recognized as a world standard by most international financial institutions and large consulting companies. In addition to including the JORC Code as part of its listing rules, the Australian Stock Exchange (ASX) has included the "recognized mining professional" rule. This rule permits ASX-listed companies reporting on mineral deposits outside of Australia to report to the ASX when the Competent Person requirements of the JORC Code cannot be met. However such reporting must comply with JORC Code standards.

The JORC Code forms the basis of all national codes accepted by the member countries of CRIRSCO. Over the years, the JORC Code has been improved by taking into account codes and guidelines developed by other countries, whose codes were themselves based on earlier versions of the JORC Code. This "leap-frog" improvement process has been particularly effective and should be maintained even after international standards are accepted.

### **South Africa**

As of March 2000, the entire mineral industry of South Africa, as well as the South African regulatory agencies, adopted the South African Code for Reporting of Mineral Resources and Mineral Reserves (the SAMREC Code). The SAMREC Code must be followed by all companies reporting information in South Africa or listed on the Johannesburg Stock Exchange (JSE). This code includes the CMMI international

definitions of mineral resources and mineral reserves and their sub-categories. As with all other national codes, country-specific requirements are included, such as conditions for qualification as a Competent Person in South Africa. A system of panel review is operating during the initial implementation period, similar to the mechanism used in Australia following the introduction of the JORC Code in 1989.

## **United States**

The Society for Mining, Metallurgy and Exploration (SME) Guide for Reporting Exploration Information, Mineral Resources and Mineral Reserves is accepted but is not mandatory in the US mining industry. The SME Guide closely follows the JORC Code and other international codes, but is not fully compatible with the requirements of the US Securities and Exchange Commission (US SEC) as expressed in Industry Guide 7. Reaching compatibility between international standards and US SEC rules remains a critical objective

The SME Guide specifies that reports must be prepared by, or under the direction of, a Competent Person. It is likely that international standards will require that Competent Persons are members of a self-regulating professional organization with disciplinary powers. This is already the case in Australia, South Africa and Canada, and is likely to be so in the UK. SME does not have disciplinary power over its members and other organizational structures are being considered to fill this gap.

## **Canada**

The Reserves Committee of the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) published in 2000 a revised code based on the international CMMI definitions. The Canadian industry will use the term Qualified Person instead of Competent Person. National Instrument 43-101, "Standards of Disclosure for Mineral Projects", issued by the Canadian Securities Administrators (CSA), came into effect in February 2001 and includes the CIM definitions and standards. The Canadian regulatory agencies recommended that CIM and the Canadian mining industry actively contribute to the development of international standards that would be considered for acceptance by the CSA.

## **United Kingdom and Europe**

In June 2001, a group comprising the UK Institution of Mining and Metallurgy (IMM), the European Federation of Geologists, and the Institute of Geologists of Ireland approved their joint Reporting Code, which followed the JORC Code with improvements based on the more recent SAMREC Code. It also included changes concerning specific reference to commodities other than metalliferous minerals, and added Rules of Conduct to be followed by the Competent Person.

## **United Nations Economic Commission for Europe (UN-ECE)**

It is recognized that the financial resources required to develop mineral deposits are likely to come from countries represented by CRIRSCO, and that these countries are moving toward a single standard whose recognition would benefit all member countries of the United Nations. The UN-ECE participating nations have adopted the CMMI definitions, with minor modifications. The UN-ECE Framework Classification takes into account requirements of the private and state-controlled mining industries, as well as government needs for mineral inventory classifications. For these reasons the CMMI definitions satisfy only part of the UNFC requirements. To satisfy the needs of countries with a variety of centralized and decentralized economic backgrounds, the UN-ECE included definitions for Reconnaissance Mineral Resource, Prefeasibility Mineral Resource and Feasibility Mineral Resource which are not used by CRIRSCO.

## **NEXT STEPS TOWARD INTERNATIONALIZATION**

International definitions of mineral resources and reserves have been accepted by the mining industry and most regulatory agencies. Compatible reporting guidelines have also been accepted by the member countries of CRIRSCO. The requirement that mineral resources and reserves are estimated by a Competent Person is widely recognized. However a number of steps still need to be taken before the objective of an International Code is reached. To continue in its leading role, CRIRSCO has decided to prepare the following draft documents, and to submit them to its member countries for review:

- International guidelines for reporting mineral resources and mineral reserves.
- International definition of the Competent Person.
- International rules of conduct for the Competent Person.
- Reciprocity conditions or conditions that must be satisfied for a Competent Person to be recognized across national boundaries.

It is expected that, as the international guidelines come into use, experience will dictate the need for modifications. CRIRSCO will coordinate requests for changes or improvements, and decide which changes should become part of the guidelines. It is also recognized that country-specific requirements, such as those imposed by national regulatory agencies, are likely to remain and should be additional to the international guidelines.

Differences in the regulatory and legal environment of each country will present significance challenges to national acceptance of international guidelines and to recognition of the Competent Person across national boundaries. With the notable exception of the US, the regulatory agencies of the member countries of CRIRSCO have either included or are considering the inclusion of the CMMI definitions and guidelines in their reporting rules. Preliminary exchanges of position between SME and the US regulatory agencies have highlighted differences which need to be resolved.

International recognition of the Competent Person is likely to require a minimum level of relevant experience as well as membership in a professional organization which has a code of ethics, disciplinary powers over its members, and the willingness to exercise these powers. The legal responsibilities of such a professional organization, as well as those of the Competent Person, are likely to vary between countries. These differences must be taken into account when developing reciprocity conditions.

An umbrella organization, which may be an extension of CRIRSCO, will be needed to specify the conditions that national organizations must satisfy if their members are to be recognized as Competent Persons outside their national boundaries. The same umbrella organization will need to review national organizations requesting international recognition, and should have the power to discipline member organizations which no longer satisfy the conditions for reciprocity.

## **CONCLUSION**

Much progress has been made in advancing a genuine International Code and developing procedures to ensure compliance. But much more remains to be done before an internationally recognized International Code becomes a reality. The need for international standards is recognized by the world mining industry. These standards will improve the quality of communication both within and outside the industry. The standards will also impose a higher level of self-discipline and self-regulation on the industry, which should not be considered a hindrance but rather as a means toward improvement of the public image of the industry.

It is worth noting that the International Accounting Standards Board, based in London, has acknowledged the importance of JORC and other codes in its recently released "Issues Paper on the Extractive Industries". Among its tentative conclusions is one that states: "While the primary financial report should be based on historical costs and not on reserve values, information about reserve quantities and values and changes in them should be disclosed as supplemental information". This is proof that the successful operation of JORC and CMMI in establishing, in effect, world-recognized standards for reporting of mineral resources and reserves has had ramifications far beyond its initial objectives,

The JORC Code played a leading role in the development of international standards. The CMMI Group, now CRIRSCO, succeeded in developing internationally recognized definitions. The full development of an International Code is moving forward at an accelerated pace. The success of this code will require a concerted education effort. The benefits which will result from its adoption must be demonstrated not only to the mining industry, but to all other stakeholders, investors, regulatory agencies and organizations which directly or indirectly influence the viability of the industry. The CMMI Congress during 27-28 May 2002 in Cairns, Queensland, Australia provides a natural focal point and chronological target towards the objective of finalizing the International Code and related matters.

## **ACKNOWLEDGEMENT**

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