International Mineral Resource and Mineral Reserve Classification and Reporting Systems

W.S. ("Steve") Vaughan
McMillan Binch
Suite 3800
South Tower
Royal Bank Plaza
Toronto, Ontario
Canada M5J 2J7
(416) 865.7931 (phone)
(416) 865.7048 (fax)
svaughan@mcbinch.com (email)

Sonja Felderhof
Aird & Berlis LLP
Suite 1800
BCE Place
181 Bay Street
Toronto, Ontario
Canada M5J 2T9
(416) 863.1500 (phone)
(416) 863.1515 (fax)
sfelderhof@airdberlis.com (email)

Paper Prepared for and Presented at:

the 48th Annual
Rocky Mountain Mineral Law Institute

Lake Tahoe, Nevada
July 24-26, 2002

Table of Contents

X.01 Foreword

The authors of this paper would like to recognize the work of Australia's Joint Ore Reserves Committee ("JORC") and in particular Norman Miskelly and Pat Stephenson for (1) being the first to recognize the need for raising the mineral resource/reserve standards bar, (2) developing an internationally accepted mineral resource and mineral reserve classification system, and (3) tirelessly pursuing international buy-in to these higher reporting standards. In Canada, we would also like to recognize the work of John Postle, Bernie Haystead and Maureen Jensen for encouraging the Canadian Institute for Mining, Metallurgy and Petroleum (the "CIM") for their efforts in establishing higher Canadian standards after the Bre-X debacle and pursuing an international solution with JORC and other members of the Council of Mining and Metallurgical Institutions (the "CMMI"). In the United States Jean-Michel Rendu, David Abbott and Trevor Ellis should be also recognized for their work to the same ends with the Society for Mining, Metallurgy & Exploration (the "SME"). Additionally, the diligent work of Ferdi Camisani (Chairman, Working Group of SAMREC) and Gordon Riddler (Chairman, IMM Reserves Committee) deserves mention. In pursuing this international objective there are certainly other people unknown to the authors who contributed to this effort who should also be recognized as we have come a long way in the last decade.

For those who wish to be at the cutting edge on the major issues related to this topic, there are a number of papers that were presented at the CMMI Congress 2002 in Cairns, Queensland, Australia held on May 27th and 28th, 2002. Notable among such papers are the following:

- "Reporting Standards – The USA Experience: Achieving True Globalisation – Problems and Solutions" by Trevor Ellis
- "Resources and Reserves – Their Impact on Financial Reporting, Valuations and the Expectations Gap" by Tim Goldsmith
- "The International Code, Mineral Resource Management and Corporate Governance" by Niall Weatherstone

Of the above papers, the authors have paid particular attention to Trevor Ellis' paper as it is closely connected to the issues discussed in this paper. Among the many issues raised by Trevor Ellis, the authors believe that recognition should be given to the international accounting standards being adopted for the extractive industries. This is an area which should be thoroughly debated as soon as possible in order to ensure that the mining industry, and its future ability to raise the requisite capital, is not put at a competitive disadvantage to other industries.

X.02 Introduction

The mineral industry has been international in scope for many years. Historically, however, raising the necessary capital for the different stages of the mining cycle had been generally confined to the particular mining company's home country. Increased globalization of the mineral exploration, mining and mine financing industries has led to raising the requisite capital in various jurisdictions, some of which are independent of a mining company's management or operations base. While this creates new financing options, it can still be a challenge to raise the requisite capital given that the mineral industry requires large amounts of high risk capital.

There are two consequences of this reality, (1) the mineral industry must develop efficient means to attain this capital; and (2) investors willing to provide this capital require transparent and comprehensive information. Meeting both of these needs, requires internationally accepted reporting standards for both mineral resources and mineral reserves using universally accepted definitions. Experts in the international mineral exploration and mining industries have been diligently working toward this end. Currently, the classification systems (definitions and standards) are very similar in the top mining and mineral financing countries. While there are various regulatory frameworks to which these systems are subject, the regulatory framework in the United States prevents universal acceptance of these definitions and standards. That is, US regulators (ie. the United States Securities and Exchange Commission (the "SEC")) seem somewhat reluctant to recognize, and/or accept, a number of internationally recognized concepts such as the reporting of mineral resources and the preparation and sign off of technical reports only by a Competent Person.

This paper begins with a brief history of how the definitions and reporting standards have been, and are currently, being developed into harmonized classification systems. A comparison of the adoption of these mineral resource and mineral reserve definitions by the world's leading mining jurisdictions will then be discussed. Summaries of the standards and regulatory frameworks in which these definitions are incorporated are provided for Australia, Canada, South Africa, the United Kingdom and the United States of America. This is followed by an analysis of the issues including a discussion of the "SEC's Reserve Standard." Finally, conclusions will be drawn regarding the status of international harmonization as we move, hopefully, to a universally accepted system.

X.03 History

There are many events and transformations in the mineral industry which have led to the beginning of the development of international reporting standards for mineral resources and mineral reserves.[1] By the early 1990's, however, there were two significant international groups which were working toward the development of international definitions for mineral resource and mineral reserve classification. These two groups, the

[1] Notably, this began with the development of the Australasian Code for Reporting of Mineral Resources and Ore Reserves (the "JORC Code").

CMMI and the United Nations Economic Commission for Europe ("UN-ECE"), worked independently through the early part of that decade.

A sub-committee of the CMMI, the Combined Mineral Reserves International Reporting Standards Committee ("CRIRSCO") is made up of representatives from Australia (Australasian Institute of Mining & Metallurgy ("AusIMM")), Canada (CIM), South Africa (South African Institute of Mining & Metallurgy ("SAIMM")), the United Kingdom (Institution of Mining & Metallurgy ("IMM"))[2], and the United States (SME). CRIRSCO[3], first met in 1994 during the 15th CMMI Congress in Sun City, South Africa. Following that meeting, in 1997, a provisional agreement (the Denver Accord) was reached regarding the definitions of the major categories and their respective sub-categories. Since 1992, however, the UN-ECE had been developing its own set of definitions, the UN Framework Classification ("UNFC"). The UNFC enabled comparison of different national mineral resource and mineral reserve classification systems, particularly for those countries in transition to market economies.

These two groups soon came to the realization that their efforts would be more fruitful if the results of those efforts were merged. In 1998 and 1999, the UN-ECE and CRIRSCO met in Geneva where the UN-ECE agreed to adopt, with minor modifications, the CRIRSCO definitions into the UNFC for mineral resources and mineral reserves that were common to both systems.[4] The UN-ECE suggested that CRIRSCO definitions be reduced into shorter sentences to facilitate translation and to give the definitions true international status.

The harmonization of mineral resource and mineral reserve definitions by UN-ECE and CRIRSCO led to consistency in the accompanying Guidelines to the definitions. The effect of this was that the reporting codes of individual countries were being revised along similar lines. The similarity of the reporting codes of CRIRSCO member countries has come to a point where there is now development of (1) an international definition for the Competent Person[5], (2) a list of principles which would provide minimum requirements for professional institutions overseeing the Competent Persons, and (3) an International Reporting Code and Guidelines. To this end, the following draft documents have been prepared by CRIRSCO for submission 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; and

[2] The IMM is now the Institute of Materials, Minerals, and Mining (the "IMMM").
[3] At the CMMI Congress 2002 in Cairns, Queensland, Australia, it was agreed that CMMI in its current structure and mode of operation was no longer an effective international representative body for professional mining institutes. CRIRSCO will continue, however, its work but will be directly accountable to the current five professional institute supporters (AusIMM, SAIMM, IMM, CIM and SME) rather than working through the intermediary CMMI.
[4] The remaining UN-ECE categories are retained and used for reporting national mineral inventories.
[5] The Competent Person is referred to as the Qualified Person in Canada and throughout this paper the two terms are used interchangeably, as there is no significant difference in the two definitions.

- Reciprocity conditions or conditions that must be satisfied for a Competent Person to be recognized across national boundaries.[6]

The new Code for Reporting of Mineral Exploration Results, Mineral Resources, and Mineral Reserves (The "Reporting Code") has been prepared by the IMM in conjunction with the Institute of Geologists of Ireland ("IGI") and the European Federation of Geologists ("EFG"). The Reporting Code is primarily based on the JORC Code, and has been pointed to as a suitable basis for an 'International Code'.[7] There has also been the suggestion that the membership of CMMI be widened to cover all of the major mining nations and, in particular, Chile.[8]

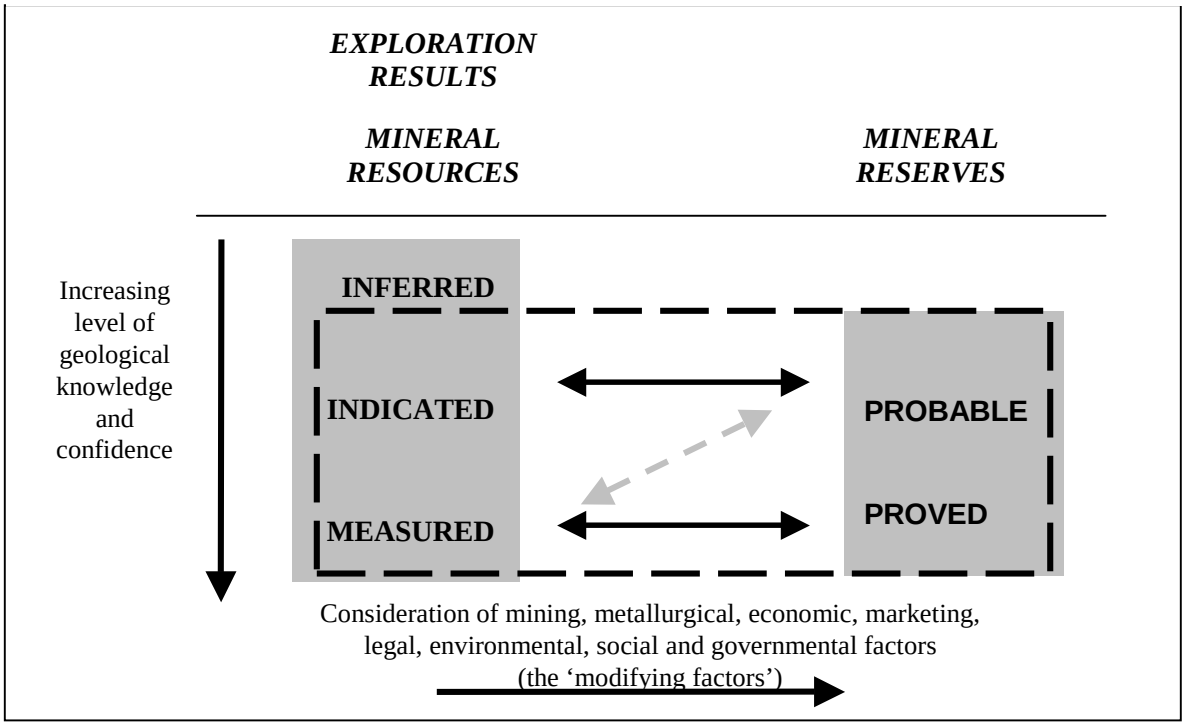
Additionally, it should be noted that it is an unrealistic expectation that identical-word codes will be adopted by each country given the necessary 'local variation' to any international code template. What one hopes is that the spirit of the international code is adopted and there is only a 1-2% variance between individual country codes.

X.04 Comparison of Accepted Mineral Resource and Mineral Reserve Definitions

Estimates of mineralization are first classified into one of two main categories, either Mineral Resources or Mineral Reserves, depending on the different degrees of technical and economic evaluation. Those two categories of classification are further subdivided according to different levels of geological knowledge and confidence. Mineral Resources must be classified as Inferred, Indicated, or Measured; and Mineral Reserves as Probable or Proved. The basic framework for classifying Mineral Resources and Mineral Reserves is set out below in Figure 1.

[6] Jean-Michel Rendu and Norman Miskelly; "Mineral Resources and Mineral Reserves: Progress on International Definitions and Reporting Standards"; December 14, 2001, at p. 13.
[7] Report on Meetings in Geneva, London, Krakow on behalf of JORC and CMMI (http://www.jorc.org/miskellytrip.htm).
[8] Australasian Joint Ore Reserves Committee Meeting held on January 11, 2002 and chaired by Mr. P. R. Stephenson.

Figure 1. Relationship between Mineral Resources and Mineral Reserves



While Mineral Resources can be estimated based on predominantly geoscientific information, Mineral Reserves are dependent on the consideration of modifying factors such as mining, metallurgical, economic, marketing, legal, environmental, social, and governmental factors. Such Mineral Reserve estimation will, therefore, require the knowledge of a variety of disciplines. Mineral Reserves can only be estimated based on Indicated or Measured Resources. In Figure 1, the double-headed arrows indicate that resources can be converted into reserves, and vice versa, between the categories shown. The dashed line between Measured Mineral Resources and Probable Mineral Reserves indicates that this conversion is possible in situations where the collective effect of the modifying factors provide uncertainties which would not permit the Measured Mineral Resources to be converted into Proved Mineral Reserves. It does not indicate a reduction of geological confidence. It follows, also, that an Indicated Mineral Resource could never be converted directly (ie. without first being upgraded to Measured Mineral Resources) to a Proved Mineral Reserve since there would not be the requisite level of geological confidence.

The Competent Person must choose, and is the only person permitted to choose, the appropriate classification category. Depending on the reporting jurisdiction, there will be different reporting requirements and the Competent Person must be aware of these existing differences. While these differences may not always be material differences, they are important for proper reporting in the various jurisdictions.

[1] Exploration Results

Exploration Results (described as 'Exploration Information' in Canada and the US) are estimates which cannot be classified as Mineral Resources or Mineral Reserves. If an entity reports Exploration Results, estimates of tonnage and grade must not be reported. The CIM Standards on Mineral Resources and Mineral Reserves (the "CIM Standards"), however, do permit such reporting as long as it is clearly stated that such estimates are conceptual or order of magnitude. Similarly, A Guide for Reporting Exploration Information, Mineral Resources, and Mineral Reserves (the "SME Reporting Guide") allows the weighted average grade of specified assay intervals to be reported.

Except for the CIM Standards, the SME Reporting Guide, Reporting Code, the JORC Code and the South African Code for Reporting of Mineral Resources and Mineral Reserves (the "SAMREC Code") all require that reporting of Exploration Results contain sufficient information to allow a considered and balanced judgment of the significance of the results.[9] The results must not be presented in a way which would unreasonably imply that a potentially economic deposit has been discovered.

[2] Mineral Resources

A Mineral Resource (reported as 'in-situ mineralization estimates' in South Africa and as 'potentially mineable mineralization' in the SME Reporting Guide) is a concentration or occurrence of material of intrinsic economic interest[10] in or on the Earth's crust in such form and quantity that there are reasonable prospects[11] for eventual economic extraction. Those portions of a mineralized deposit which do not have reasonable prospects for eventual economic extraction must not be included in a Mineral Resource.[12] The geological characteristics of a Mineral Resource (such as location, quantity, grade, and continuity) are known, estimated, or interpreted from specific geological evidence and knowledge.

All of the guidelines of the respective countries' codes (the "Guidelines")[13] provide that the term 'reasonable prospects for eventual economic extraction' implies a preliminary

---

[9] The JORC Code, SAMREC Code, Reporting Code, CIM Standards and SME Reporting Guide will be collectively referred to as the "Codes". For anyone wanting to view the Codes in their entirety, a listing of the professional institute websites are as follows: JORC (www.jorc.org); AusIMM (www.ausimm.com); CIM (www.cim.org); SAIMM (www.saimm.co.za); SME (www.smenet.org); and IMM (www.imm.org.uk).

[10] The CIM Standards define it as, "… a concentration or occurrence of *natural, solid, inorganic, or fossilized organic material* in or on the Earth's crust…".

[11] SAMREC Code also provide that they must be realistic, whereas this requirement is only in the guidelines of the other Standards being compared (the SAMREC Code, para. 5.4.1).

[12] This prohibition is not stated in the CIM Standards but this does not seem to reduce its effectiveness since this prohibition nevertheless flows from the definition.

[13] Each of the guidelines to the codes being considered will be defined similarly to the codes. For example, the guidelines in the JORC Code will be referred to as the JORC Guidelines.

judgment by the Competent Person. The JORC Guidelines further provide that any assumptions made in determining this should be clearly stated in a public report. The SAMREC Code and CIM Standards have similar guidelines but interestingly provide that such assumptions *must* be stated. Likewise, the SME Reporting Guidelines provide that where a Competent Person deems it appropriate, estimates may include mining related assumptions which should be clearly stated. The JORC, SAMREC and Reporting Guidelines further provide that interpretation of the word 'eventual' may vary depending upon the commodity or mineral involved.

[a] Inferred Mineral Resources

An Inferred Mineral Resource is that part of a Mineral Resource for which tonnage, grade and mineral content (quantity and grade or quality in the CIM Standards) can be estimated based on geological evidence and assumed, but not verified, geological and/or grade continuity. In Canada, this assumption must also be reasonable. The information on which the estimates are based, may be limited or of uncertain quality and reliability. It has a lower level of confidence than that applying to an Indicated Mineral Resource. Due to the uncertainty attached to Inferred Mineral Resources, it cannot be assumed that all or a portion of such resource will be upgraded to an Indicated or Measured Mineral Resource as a result of more exploration.

The JORC Code, SAMREC Code and SME Reporting Guide all provide that caution should be exercised if this category is considered in economic studies. The SAMREC Code goes further, requiring that full disclosure and the effect on the results of the economic studies must be stated if this category is included. The Reporting Code provides that inclusion of all or part of an entity's Inferred Mineral Resource is permitted for internal planning purposes at the discretion of the Competent Person and any such reliance in a mine plan should be made clear in the report. The CIM Guidelines provide that this category has insufficient confidence in the estimate to enable an evaluation of economic viability worthy of public disclosure and, thus, this category *must* be excluded from estimates forming the basis of feasibility or other economic studies.

[b] Indicated Mineral Resources

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 and/or grade continuity but are spaced closely enough for continuity to be assumed. This category has a confidence level higher than Inferred Mineral Resources but a lower confidence level than Measured Mineral Resources.

The CIM Standards seem to go further by giving guidance as to what 'a reasonable level of confidence' entails. The CIM Standards provide that the level of confidence must be sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit.[14] Further, the estimate is to be based on *detailed and reliable* exploration and testing information and the spacing must be close enough for geological and grade continuity to be *reasonably* assumed. It seems that the CIM Standards are slightly more rigorous in this instance than their international counterparts.

All of the Guidelines provide that the nature, quality, amount and distribution of the data must be such that it allows confident interpretation of the geological framework and an assumption of continuity of the mineralization. The Codes, except for the JORC Code, specifically state that this confidence must be determined by a Competent Person. The fact that the JORC Code does not specifically state this is most likely not too significant given that it does provide that reporting of Mineral Resources and Mineral Reserves must be based on estimates or supporting documentation of a Competent Person. The CIM Guidelines provide that resource estimates of this category are of sufficient quality to support a Preliminary Feasibility Study.

[c] Measured Mineral Resources

A Measured Mineral Resource is estimated in the same manner as an Indicated Mineral Resource, except that (1) it can be estimated with a high level of confidence; (2) the information must be detailed and reliable;[15] and (3) the locations are spaced closely enough to *confirm* geological and/or grade continuity.[16] The CIM Standards again go further by delineating what that level of confidence requires. In those standards, the characteristics must be so well established that, in addition to the confidence needed for an Indicated Resource, it must also support production planning.

Each of the Guidelines provide that the estimate of Measured Mineral Resources would leave no reasonable doubt (the CIM Standards do not specifically mention the concept of 'no reasonable doubt'), in the opinion of the Competent Person, that the tonnage and grade of the deposit can be estimated within close limits and that any variation from the estimates would not affect the economic viability of the project.

[3] Mineral Reserves

A Mineral Reserve (reported as 'Ore Reserve'[17] in the JORC Code) is the economically

[14] This is only provided in the Guidelines of the other standards.
[15] This requirement was already established for Indicated Mineral Resources in the CIM Standards.
[16] The CIM Standards, Reporting Code and SAMREC Code require that geological *and* grade continuity be confirmed.
[17] Both the SAMREC Code and the Reporting Code permit the use of the term 'Ore Reserves' as long as it is clearly stated that it is being used with the same meaning as 'Mineral Reserves' as defined in their

mineable part of a Measured or Indicated Mineral Resource. This includes diluting materials and allowances for losses which may occur when the material is mined. The CIM Standards require that this be demonstrated by at least a Preliminary Feasibility Study, whereas the JORC Code, SAMREC Code, Reporting Code and SME Reporting Guide provide that appropriate assessments are to be carried out which *may* include feasibility studies. There must be consideration of the modifying factors discussed above in section X.03. As well, the assessments must demonstrate at the time of reporting that extraction is reasonably ("could reasonably be" in the JORC Code) justified.

The Guidelines provide that Mineral Reserves result in an estimated tonnage and grade which can be used as the basis of a viable project in the opinion of the Competent Person. The term Mineral Reserve need not signify that extraction facilities are in place or operative or that all governmental approvals have been received. It does signify that there are reasonable expectations of such approvals. The SAMREC Guidelines provide that: (1) evaluation techniques and key assumptions *must* be disclosed; (2) metallurgical recovery factors *must* be included in public reports; and (3) that if any of the data is materially adjusted or modified for the purpose of making the estimate, this fact *must* be clearly disclosed in the public report. The Reporting Guidelines have similar provisions but in keeping with the fact that they are guidelines, its provisions state that those actions *should* be done.

All of the Guidelines, with the exception of the CIM Guidelines, provide that the term 'economic' implies that extraction of Mineral Reserves has been established or analytically demonstrated to be viable and justifiable under reasonable investment assumptions. The Reporting Guidelines further provide that there can be no fixed definition for the term 'economic' but that it is expected that companies will attempt to achieve an acceptable return on capital invested. As well, the returns will be competitive with alternative investments of comparable risk. In contrast, the CIM Guidelines provide that a comprehensive study of the viability of the mineral project must have been performed which includes mining method or pit configuration and an effective method of mineral processing and demonstrates at the time of reporting that economic extraction is justified. It should be noted that in every case use of the word 'profit' has been avoided.

[a] Probable Reserves and Proved[18] Mineral Reserves

Probable Mineral Reserves and Proved Mineral Reserves have the same definition as discussed with respect to Mineral Reserves except that they are further refined in that (1) Probable Mineral Reserves are the economically mineable part of Indicated Mineral Resource and in some circumstances, Measured Mineral Resources; and (2) Proved Mineral Reserves are the economically mineable part of a Measured Mineral Resource. A Probable Mineral Reserve has a lower level of confidence than a Proved Mineral Reserve.

---

respective codes. The SME Reporting Guide allows the interchangeability of the two terms where it is customary to do so (metallic deposits and some industrial minerals).

[18] Reported as *Proven* Reserves in Canada.

The choice of the appropriate category of Mineral Reserve is determined primarily by the relevant level of confidence of the Mineral Resource. Figure 1 of section X.03, shows the direct relationship between Indicated Mineral Resources and Probable Mineral Reserves and between Measured Mineral Resources and Proved Mineral Reserves. This signifies, for example, that the level of geoscientific confidence for Probable Mineral Reserves is the same, or similar[19], as that required for in-situ determination of Indicated Mineral Resources. As discussed in section X.03, the Standards also provide for a two-way relationship between Measured Mineral Resources and Probable Mineral Reserves. This accounts for any of the uncertainties associated with any of the modifying factors considered when converting Mineral Resources to Mineral Reserves which may result in there being a lower level of confidence in the Mineral Reserves than in the corresponding Mineral Resources. Again, an Indicated Mineral Resource could never be converted to a Proved Mineral Reserve. Allocation into the appropriate category must be made by a Competent Person. In addition, Mineral Reserves and Mineral Resources are not precise calculations, thus tonnage and grade calculations in public reports should be expressed to convey the order of accuracy by rounding off to appropriately significant figures.

X.05 Mineral Resource and Mineral Reserve Reporting

[1] Standards for Reporting

The JORC Code, Reporting Code, SME Reporting Guide, the CIM Standards, and the SAMREC Code all provide minimum standards, recommendations and guidelines for public reporting of Exploration Results, Mineral Resources and Mineral Reserves in their respective jurisdictions. Their reporting terminology, as discussed in section X.03 above, sets out a classification system for the tonnage and grade estimates of Mineral Resources and Mineral Reserves.

The main principles governing the operation and application of the JORC Code, SAMREC Code, and Reporting Code are transparency, materiality, and competence.[20] 'Transparency' requires that public reports contain sufficient information, which is clear and unambiguous, so that the reader of the report understands it and is not misled by it. 'Materiality' requires that public reports contain all of the relevant data that investors and their advisors would reasonably require to make judgments on the mineralization being reported. 'Competence' requires that public reports are based on work which is the responsibility of a suitably qualified person who is subject to an enforceable professional code of ethics.

[19] The SAMREC and Reporting Guidelines provide that the level of confidence between the two categories will be similar.

[20] The CIM Standards and the SME Reporting Guide do not state any 'main principles'. The CIM Standards, however, must be read in conjunction with National Instrument 43-101 ("NI 43-101") which requires transparency, materiality and competence. See section X.06[2][a] "Stock Exchanges".

The objective is to come to an international mineral resource and mineral reserve classification system with standard universally accepted definitions. Such a system should provide a "bright line test" for the transition from Mineral Resources to Mineral Reserves which is underpinned by the concept of a Competent Person.

To assist readers in understanding where each of the major mining jurisdictions is on this issue at the present time we are including, as Schedule A, a comparison table initially prepared by Bernie Haystead of the CIM Standards Committee. It demonstrates how close all countries are to universally accepted standards. Some minor modifications and additions have been made to this table by the authors of this paper.

[2] Reporting Responsibility

A public report is the responsibility of the company producing it acting through its Board of Directors. Documents which include estimates of Mineral Resources and Mineral Reserves, and are used to prepare a public report, must be prepared by or under the direction of, and signed by, a Competent Person or Persons.[21] The SAMREC Code and Reporting Code require that a public report disclose the name of the Competent Person, his qualifications, professional affiliations, and relevant experience. The Reporting Code qualifies this by stating that this disclosure is necessary only 'when required to do so'. In Australia, the requirement to identify the Competent Person is contained in ASX Listing Rules. The authors understand that this provision will likely be transferred to the JORC Code.

In all of the Codes, except the CIM Standards, written approval is required by the Competent Person for parts of a report which are included in a public report.[22] The SME Reporting Guide and JORC Code require such approval when there has been editing to a Competent Person's report to ensure it is used in the proper form and context. The SAMREC Code and Reporting Code take a slightly different approach by requiring the approval of the Competent Person for parts of his work used in a Public Report. Additionally, when all or part of a report is used in a Public Report, the *report's author* must give approval as to form and content.

A company must disclose relevant information concerning the status and characteristic of a mineral deposit which could materially influence the economic value of that deposit. Any material changes in its Mineral Resources or Mineral Reserves must be promptly reported.[23] Additionally, the JORC Code requires review of public reports of Mineral Resources and Mineral Reserves annually, while the Reporting Code *encourages* companies to report at least annually providing details of reasons for any significant year to year changes.

[21] The SAMREC Code and Reporting Code seem only to make allowance for one signatory Competent Person.
[22] Written approval requirements are covered in NI 43-101.
[23] The CIM Standards do not discuss this disclosure issue as it falls under NI 43-101.

[3] Experience and Qualifications of a Competent Person

A 'Competent Person' must[24] 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 extraction of Mineral Reserves.[25]

In addition to having a minimum of five years experience, the CIM Standards require that the Competent Person be an engineer or geoscientist who is a member of a Self-Regulating Organization ("SRO"). The JORC Code specifies that the Competent Person be a Member or Fellow of the AusIMM and/or the Australian Institute of Geoscientists (the "AIG"). The SAMREC Code specifies membership in any statutory South African or international body that is recognized by SAMREC.[26] The SME Reporting Guide specifies membership in a professional society of earth scientists or mineral engineers, or simply that the Competent Person has 'other appropriate qualifications'.[27] The Reporting Code requires that the Competent Person be a person who is a corporate member of a recognized professional body relevant to the activity being undertaken with enforceable Rules of Conduct.

Competent Persons should be confident that they could face their peers and demonstrate competence in the commodity, type of deposit, and situation under consideration. Where doubt exists, they should seek advice of appropriately experienced colleagues or decline to act as a Competent Person in the particular circumstance. The CIM Standards do not mention declining to act, rather they require that a Competent Person demonstrate that assistance was obtained where he/she lacked expertise. The SAMREC Code does not mention what should be done in instances of doubt.

The Codes also recognize the fact that estimation of Mineral Resources and Mineral Reserves is a team effort, thus such estimation must be compiled under the direction of a Competent Person. Where, however, there is a clear division of responsibilities within a team, each Competent Person should accept responsibility for his or her own contribution. The Competent Person responsible for the whole report should ensure that the work of the other contributors is acceptable.

---

[24] The SAMREC Code states that the Competent Person ***should*** have a minimum of five years experience.
[25] The CIM Standards describe the relevant experience as, "…experience in mineral exploration, mine development, production activities and project assessment, or any combination thereof, including experience relevant to the subject matter of the project or report…"; this definition is consistent with what is contained in NI 43-101.
[26] At the moment, these are restricted to, the South African Council for Natural Scientific Professions ("SACNASP"), the Engineering Council of South Africa ("ECSA"), and the South African Council for Professional Land Surveyors and Technical Surveyors ("PLATO"). A list of international bodies is being considered but no finalization has been reached yet.
[27] In this case, it seems that the SME Reporting Guide does not require membership in an SRO.

X.06 Regulatory Framework

The regulatory framework, within which the Codes sit, is important in determining whether or not it will have its intended effects. If there is no meaningful support of the Codes, such as the requirement to apply it or sanctions for non-compliance, then there is essentially no teeth to them. We will examine (1) whether or not there is backing from the regulatory authorities (eg. stock exchanges or securities commissions) where public reporting is required, and (2) whether or not there are SRO's and other relevant organizations which adopt the Codes and support them as a best practice. That is, we will be answering the question, "Is it legally mandatory for both individuals and companies to conform with the Codes for all publicly filed reports containing Mineral Resources and Mineral Reserves?". Each country will be examined separately.[28]

[1] Australia

[a] Stock Exchanges

The JORC Code has been incorporated into the Listing Rules of the Australian and New Zealand Stock Exchanges ("ASX" and "NZSE") since 1989 and 1992, respectively. Additionally, the Stock Exchange of Newcastle Limited[29] ("NSX") has adopted the JORC Code as a reporting standard by including the JORC Code as Practice Note #2.

The JORC Code is, therefore, binding on companies listed on the ASX and NZSE. For companies listed on the NSX, however, it seems to serve only as a guideline. It would appear that this is because the JORC Code has not been incorporated into the NSX's Listing Rules.

With respect to the ASX Listing Rules, Chapter 5, Rule 5.6 requires that reports must comply with the JORC Code if they include statements relating to exploration results or Mineral Resources or Ore Reserves. Rules 5.6.1 and 5.10 of the ASX Listing Rules provide a caveat to the JORC Code by permitting a recognized mining professional[30] to prepare such reports if the resource or reserve is not located in Australia. The recognized

---

[28] The format of this section followed that used by Michael Bourassa in his paper, "International Legal Requirements and Standards for Mineral Valuation" presented at VALMIN '01, Mineral Asset Valuation Issues 2001; Sydney, Australia, 25-26 October 2001.

[29] The NSX is a relatively new investment market which opened in March of 2000 for small to medium businesses. It provides specialist listings in certain investment sectors, and currently has only one mining exploration company listed.

[30] A person who has each of the following: (1) a degree or an overseas equivalent in geology, mining engineering or a related discipline relevant to the estimation of the type of mineral resource or ore reserve referred to in the report; (2) at least five years experience in the estimation, assessment and evaluation of the type of mineral resource or ore reserve referred to in the report; and (3) membership of a recognized overseas professional body that has agreed to sanction the person if the person does not comply with JORC Code.

mining professional must meet comparable standards to the Competent Person. This caveat is more in-line with the move toward international reciprocity. The authors understand that JORC and the ASX are currently working on introducing a system which should provide greater international reciprocity of Competent Persons and make redundant the recognized mining professional provision.

Rule 17.3 and 17.12 of the ASX Listing Rules permit the ASX to suspend and remove, respectively, an entity which is unable or unwilling to comply with, or breaks, a listing rule.

[b] Self Regulatory and Other Industry Organizations

The JORC Code has been adopted by both the AusIMM and AIG and is thus binding on its members. Both organizations have disciplinary powers over their members. The AusIMM, AIG, and Minerals Council of Australia are the three parent bodies of the JORC Code. Other organizations currently represented on JORC are the Securities Institute of Australia, the ASX and the Mineral Industry Consultants Association. All of these organizations support the JORC Code as best practice. Given the organizations which support the JORC Code, it is obvious it has been adopted as an industry standard.

The JORC has, however, commenced a review of the JORC Code because of the substantial developments which have occurred in South Africa, Canada, the United States, and the UK/Ireland/Western Europe. All of those countries/regions have released revised reporting codes since 1999 which were based on the JORC Code. The JORC Code is currently being revised with a completion target date during 2003.[31]

[2] Canada

[a] Stock Exchanges

In June 1997, several months after the Bre-X scandal, the Ontario Securities Commission (the "OSC") and the Toronto Stock Exchange (the "TSX") established the Mining Standards Task Force (the "MSTF"). The MSTF released its Final Report in January 1999 wherein one of the primary recommendations was the adoption of the CIM Standards through NI 43-101.

On January 12, 2001, the Canadian Securities Administrators (the "CSA") adopted NI 43-101 entitled "Standards of Disclosure for Mineral Projects", its Companion Policy 43-101CP, and Form 43-101F1[32] entitled "Technical Report", all of which related to the

[31] http://www.jorc.org/main.php
[32] This Form deals with the scientific and technical information contained in technical report.

public disclosure of information relating to mineral projects.[33] Part 1 of NI 43-101 incorporated the CIM Standards by reference thereby giving them legal sanctity. NI 43-101 replaced National Policy 2-A and National Policy 22.

[b] Self Regulatory and Other Industry Organizations

In Canada acceptable SRO's are delineated through the definition of a Qualified Person. The CIM Standards require that the Qualified Person be an engineer or geoscientist who is a member in good standing of a professional association. NI 43-101 defines "professional association" as an SRO that: (a) has been given authority by statute; (b) admits members based on academic qualifications and experience; (c) requires compliance with professional standards of competence and ethics established by the organization; and (d) has disciplinary powers, including the ability to suspend or expel a member.

In Canada, the recognized organizations are those which are members of the Canadian Council of Professional Engineers (the "CCPE") and the Canadian Council of Professional Geoscientists (the "CCPG").[34] Outside of Canada, recognition will be based on CSA review. Currently, the following externally recognized organizations are the National Association of State Boards of Geology ("ASBOG"), American Institute of Professional Geologists ("AIPG"), EFG, AusIMM, IMM, AIG, and the SAIMM. Given that SAMREC qualifications for Competent Persons are not based on SAIMM membership, SAIMM recognition is being reconsidered. The three statutory South African bodies that should receive recognition are SACNASP, PLATO and ECSA. In addition, there should be a careful review of ASBOG recognition given that many ASBOG states have no codes of ethics.

In addition to NI 43-101, its Companion Policy and Form, the CIM published Exploration Best Practices Guidelines. These guidelines must be followed by Qualified Persons when carrying out exploration work which will generate information required to prepare Mineral Resource and Mineral Reserve estimates. The CIM has also developed best practice guidelines for estimation of Mineral Resources and Mineral Reserves. The CIM created a committee to establish such guidelines which first met on June 6, 2001. A draft of its Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines was published on the CIM website[35] early in February, 2002, but have not yet been finalized as they are still out for public comment.

[33] These became effective on February 1, 2001. NI 43-101 can be referenced on the OSC website www.osc.gov.on.ca/en/Regulation/Rulemaking/Rules.html.
[34] In order to prevent protectionist attitudes which seem to have cropped up due to province-by-province regulation, the CCPE and CCPG are negotiating reciprocal arrangements.
[35] http://www.cim.org/committees/estimation.cfm

[3] South Africa

[a] Stock Exchanges

The SAMREC Code is applicable to all minerals for which public reporting of Exploration Results, Mineral Resources and Mineral Reserves is required by the Johannesburg Stock Exchange (the "JSE"). Section 12 of the JSE Listing Requirements incorporates the SAMREC Code and is, therefore, binding on companies listed on the JSE.

Paragraph 12.3(a) of the JSE Listing Rules requires the Competent Person to comply with the SAMREC Code. The Competent Person should ensure that (1) the entity commissioning the work has disclosed all material information that might prejudice the integrity and accuracy of the information; and (2) their own work has not been unfairly influenced by the commissioning entity.[36] A Competent Person who relies on third party information must perform all necessary validation and verification procedures that they deem appropriate in the circumstances to rely on such information. Any such reliance must be disclosed in the Competent Person's report.[37] Any material unresolved complaints concerning a Competent Person will be referred by the JSE Listing Division for disciplinary action by SAMREC to the body under which they are registered as professionals.[38]

In addition to the SAMREC Code requirements, paragraph 12.8 of the JSE Listing Requirements state that a Competent Person's report must state the name, address, professional qualifications and experience of the Competent Person, and the name and address of the SAMREC recognized body of which he or she is a member. A non-independent Competent Person must disclose the nature of the relationship or interest. The report must be dated less than six months prior to the date of publication of the pre-listing statement, listing particulars, prospectus or circular.

Paragraphs 12.9 and 12.14 of the JSE Listing Requirements also provide that compliance is required, by exploration and mining companies with respect to the SAMREC Code main checklist (Appendix 1). This is reproduced in its entirety, and in places expanded, in the JSE Listing Requirements.

[b] Self Regulatory and Other Industry Organizations

The SAMREC Code was produced by SAMREC under the auspices of the SAIMM. SAMREC itself consists of representatives of the SAIMM, SACNASP, the Geological

[36] Paragraph 12.3(b) and (c), respectively, of the JSE Listing Requirements.
[37] Paragraph 12.3(e) of the JSE Listing Requirements.
[38] Paragraph 12.3(d) of the JSE Listing Requirements.

Society of South Africa, the Geostatistical Association of South Africa, PLATO, ECSA, the Association of Law Societies of South Africa, the General Council of the BAR of South Africa, the Department of Minerals and Energy, the JSE, the Council for Geoscience, the South African Council of Banks, and the Chamber of Mines of South Africa. Given the representation and support of the SAMREC Code, it has been adopted as an industry standard.

Currently, a mining professional in South Africa has to belong to SACNASP, ECSA, or PLATO in order to work for, and be remunerated by, mining and exploration companies. As such, it is important to note that all persons registered with SACNASP will be liable under article 13 of the Natural Scientific Professions Act, 1993 (Act 106 of 1993) for any transgression of the Code of Conduct which encompasses the SAMREC Code, and by implication the JORC Code, regardless if the client would be in any foreign country. Any complaints made in accordance to SACNASP disciplinary procedure, will result in an investigation conducted accordingly and the relevant sanction applied if deemed necessary.[39] Although ECSA and PLATO are also bodies which a Competent Person can be a member of, no reference is made to the SAMREC Code in ECSA's Code of Conduct nor in PLATO's legislation. The authors have been advised, however, that gross transgressions to the SAMREC Code and JSE Listing Requirements by ECSA and PLATO members will, by implication, attract the same disciplinary procedures as SACNASP.

[4] United Kingdom

[a] Stock Exchanges

While the Reporting Code is applicable in the United Kingdom, Ireland and Europe, our focus is the regulatory framework in the United Kingdom. In the UK, the Financial Services Authority (the "FSA") is the 'competent authority' for listing and is known as the UK Listing Authority (the "UKLA"). The UKLA maintains the Official List and creates the rules on admission to listing, the continuing obligations of issuers, and the suspension and cancellation of listing. These rules are known as the "Listing Rules".[40]

In June, 2001, Norman Miskelly reported to the AusIMM that he and Gordon Riddler had met with two representatives of the UKLA, with the objective of explaining the Reporting Code, and its adoption/recognition in the UK Listing Rules.[41] At that time, it was thought that this approval process could take up to twelve months. Unfortunately, the April 2002 edition of the UKLA Sourcebook, which includes a new edition of Listing

[39] http://www.sacnasp.org.za/
[40] http://www.fsa.gov.uk/ukla/1_role.html
[41] Interim Report on Meetings in Geneva, London and Krakow on Behalf of JORC and CMMI; Norman Miskelly, Deputy Chairman – International Liaison, JORC; 18 June 2001-06-19

Rules, was released and it does not seem to recognize the Reporting Code. Chapter 19 of the Listing Rules deals with Mineral Companies and does not mention the Reporting Code, it still relies on the December 1991 IMM definitions for Mineral Resources and Mineral Reserves. Given that the Reporting Code is not yet incorporated into the Listing Rules, it currently lacks one of the primary supports necessary to give it authority. As a result, there are two sets of reporting standards currently in the UK; one set by the minerals industry and one set by the regulators. Fortunately, the UKLA has expressed its intention to adopt the Reporting Code but has simply not had time to do a full review. Until such time, it has been accepting reporting according to the Reporting Code including the reporting of Inferred Mineral Resources.

[b] Self Regulatory and Other Industry Organizations

The Reporting Code has been adopted by the Working Group which produced it, including the IMM, EFG and IGI, and is therefore binding on their individual members. As stated above, however, this section will focus on the UK only. In addition to the Working Group, the Council of the Geological Society of London (the "GSL") was also a participant and adopted the Reporting Code on November 20, 2001.[42] The Reporting Code is thus binding on the members or fellows of the IMM and the GSL and non-compliance will make its respective members subject to disciplinary procedures.

The consultation draft of the Reporting Code was open to, and received commentary from, a wide variety of groups including industry, government, CRIRSCO participants and other professional institutions. In addition, consultations were held with major and small-to-medium size companies, regulators, UKLA, the Alternative Investment Market ("AIM") and the Stock Exchanges of London. It seems, however, that the actual group drawing up the Reporting Code was limited in comparison to the SAMREC and JORC Codes. The fact that the UKLA has yet to incorporate it into its Listing Rules, despite the fact that it just released a new edition, illustrates that development of such standards requires frequent consultation with securities regulators from the very beginning.

[5] United States of America

[a] Stock Exchanges

In the United States the SEC regulates the reporting of exploration information, resources and reserves by parties subject to the SEC's filing and reporting requirements. Unfortunately, the SEC rules and regulations are not consistent with the content of the SME Reporting Guide. Instead of adopting the standards developed and recommended by

[42] http://www.geolsoc.org.uk/

the mineral industry in the US, the SEC relies on Industry Guide 7[43] for its basic mining disclosure policy. The lead-in paragraph of Industry Guide 7 states that "the Guide applies to all public mining entities and their public disclosures pursuant to the rules of Regulation S-K".

Industry Guide 7 is a very simple, straight-forward guide which is only 4-5 pages in length. It contains clear, concise definitions which relate to reserves and the various stages of mineral property development. It briefly sets out the nature of the disclosure required in all SEC filings relating to mines, plants and other significant properties owned by the registrant.

While the real ramifications of this policy will be discussed in section X.06, some of the major differences in the SEC's application of Industry Guide 7 are outlined below:

(i) Resource estimates may not be reported. Industry Guide 7 specifically states that "estimates other than proved or probable reserves shall not be disclosed unless such information is required to be disclosed by foreign or state law; provided however, that where such estimates have been previously provided to a party that is offering to acquire, merge or consolidate with the registrant or otherwise, require the registrant's security, such estimates may be included".

(ii) The term "resource" may not be used. The SEC's policy on 'resource' disclosure is that the term 'resources' as used in mineral industry classification schemes is generally not allowed in SEC filings. The SEC's preference is that the term 'resource' be deleted and replaced with the terms 'mineralized material' or 'mineral deposit' and continues by stating that "such a deposit does not qualify as a reserve, until a comprehensive evaluation based upon unit cost, grade, recoveries and other material factors conclude legal and economic feasibility".[44]

(iii) No Competent Person required. Strangely, the SEC does not require that a Competent Person sign a public report on Exploration Information, Mineral Resources or Mineral Reserves. This is unlike that of any of the other leading mineral jurisdictions.

[43] Industry Guide 7 is entitled "Description of Property by Issuers Engaged or to be Engaged in Significant Mining Operations".
[44] US SEC Direction in Disclosure of Mineral Information, Roger L. Baer, Mining Engineer, presented February 27, 2001, in Denver Colorado at the Annual Meeting of the Society of Mining, Metallurgy and Exploration.

[b] Self Regulatory and Other Industry Organizations

Although the SME Reporting Guide has been formally adopted by the SME and is strongly recommended to be used by members of that organization, there are two major hindrances: (1) The SME has no Code of Ethics and thus no mechanism for requiring its members to abide by professional standards, and (2) the SME Reporting Guide has no teeth if it is not adopted and implemented by the SEC.

The SME Reporting Guide does, however, require that a Competent Person be a member of a professional society of earth scientists or mineral engineers, or simply that the Competent Person has 'other appropriate qualifications'. Notwithstanding that it appears a Competent Person need not be a member of an SRO, membership in AIPG and ASBOG should qualify. It is not clear whether these organizations adopt the use of the SME Reporting Guide. While many ASBOG states have no codes of ethics, the AIPG does have a very strong enforcement history. Even if all of these organizations had the requisite powers, it would be fruitless since Industry Guide 7 does not require a Competent Person to sign off on professional technical reports.

X.07 Effects of the Current International Mineral Resource/Reserve Situation

[1] The SEC's Mineral Reserve Standard

It is evident from the analysis above that the mineral industry has done exceptionally well in producing closely harmonized international standards for the reporting of Mineral Resources and Mineral Reserves. Unfortunately, these standards have not been adopted by securities regulators in all jurisdictions. It has, thus, become evident that application of these standards may be less in the hands of the industry and more in the hands of their respective regulators. In fact, all of the work achieved by the international mineral industry in this regard is susceptible to the power of the US capital markets and its regulators, given the US capital market's attractiveness to the mineral industry. We are forced to ask ourselves what the economic consequences of these efforts in achieving international mineral resource and mineral reserve standards are, if the results of such efforts cannot be publicly recognized in a company's financial position.

As discussed in Trevor Ellis' paper "Reporting Standards – The USA Experience"[45], one of the factors influencing the acceptance of such standards by regulators, other than the power of the US capital markets, is the current work of the International Accounting Standards Board[46] (the "IASB") and the International Organization of Securities Commissions (the "IOSCO"). The IASB and IOSCO are in the process of attempting to standardize international accounting practices and international securities rules and regulations relating to multi-jurisdictional issues. In 1987, the IOSCO joined the IASC's

[45] Presented at the Council of Mining and Metallurgical Institutions' Congress 2002; Cairns, Queensland, Australia, 27-28 May 2002.
[46] The predecessor to the IASB is the International Accounting Standards Committee (the "IASC").

consultative group in a supporting role. The IOSCO, in May 2000, recommended to its members to endorse the use of International Accounting Standards ("IAS") by its member companies with cross-border offerings and listings. The extractive industries (mining and petroleum) were excluded from this approval due to the need for specialized accounting practices. There is currently an Extractive Industries Steering Committee which sought input in this respect, however, the tentative views expressed in their *Issues Paper* seem to be heavily influenced by the SEC's perspective expressed in Industry Guide 7.

The international mining community seems to have made little effort to counter the tentative views of this steering committee. Trevor Ellis states that if this committee's views were adopted and implemented, the CRIRSCO-based standards would lose their purpose and become ineffective. In contrast, if these views were adjusted, it would be possible to have the CRIRSCO-based standards, including the Competent Person provisions, adopted so as to be required globally, including in the US. Accordingly, it seems that it would be in the interest of the minerals industry if the members of CRIRSCO and the corporate mining community made a concerted effort to have their views heard by the IASB and IOSCO. In fact, it may not be out of line to say that it should become a top priority. One would hope that these two groups, the IASB and IOSCO, recognize that it would be in their best interests to receive input from a well-represented mineral industry organization that has worked so diligently at developing standards for its industry. Those working in the industry are professionals who know and understand its ins and outs. The uniqueness of the mineral industry is the reason why it had to be separated from the general IAS.

Our review of the internationalization efforts of CRIRSCO, IASB and IOSCO is all reflected in what is happening in the United States at the present time. Accordingly, the SEC seems to be approaching the topic from an accounting and regulatory bias which, in the authors' opinion, it is entitled to do if it believes it is protecting US investors' interests. The SEC ignores the fact that, (1) the SME has adopted the CRIRSCO-based standards, and (2) both the US Department of Mines and the US Geological Survey, which are instruments of the US Government, recognize the distinction between Mineral Resources and Mineral Reserves. Instead, the SEC has not, at this point, budged and seems to be increasing its efforts over recent months in maintaining its Industry Guide 7 position.

In fairness to the SEC, it seems to believe that it is taking a position that its standards bar for converting Mineral Resources to Mineral Reserves is higher than that set out in the proposed CRIRSCO classification system. For example the SEC requires a full feasibility study in order to classify 'reserves' for a new project. The SEC is also still clinging to its view that the term 'resources' should not be used in any SEC filing as it believes that the use of such a term could confuse the investing public and could allow the unscrupulous to distort the value of a mineral property. The third major point is that the SEC insists that a company be close to having all necessary permits issued to it to allow commercial mining to begin before it will allow the term 'reserves' to be used, given all other reserve criteria having been met. On the other hand, the SEC does not

recognize the concept of a Competent Person which underpins the legitimacy of the establishment of Mineral Reserves. As a result, the SEC approaches the geology of ore bodies as if they were homogenous with respect to one another. The effects of these standards are evidenced by the SEC's position in the Barrick/Homestake merger registration statement and the SEC's current difference of opinion with Stillwater Mining Company concerning its methodology for estimating Probable Reserves. Both of these transactions will be discussed later in the paper.

Additionally, the problem of having to have a full bankable feasibility study in hand before one can classify a mineral deposit as a mineral reserve is difficult. A number of jurisdictions require the receipt and review of a final bankable feasibility study in order to grant the requisite permits that are necessary to allow mine construction to commence. Normally, bankable feasibility studies must contain the results of the environmental impact assessment statement and an engineering design program to deal with, and mitigate, all environmental issues before the requisite environmental permits can be issued. Unfortunately, given the necessity for public hearings and time for legal and administrative challenges resulting therefrom, government approvals could take up to two, three or more years after the finalization of a final (bankable) feasibility study. Only then will the requisite environmental permits, construction and/or water permits be issued. By this time, mineral prices may have dropped and the feasibility study could become outdated.

In connection with the SEC's failure to recognize the concept of the Competent Person, there is no SEC requirement, that we are aware, that requires a feasibility study to be signed off by a Competent Person. It is fair to point out that in the United States there is no national organization or agency which licenses mineral industry professionals only or has an effective discipline committee that can remove one's right to practice for incompetence or impropriety. Accordingly, this may not be an oversight on the part of the SEC as it undoubtedly recognizes that the infrastructure for a mineral industry professional organization does not exist in the United States. This lack of a national professional 'umbrella' organization has not, however, hindered the concept of a Competent Person in Canada.

[2] Current Issues of Interest Before the SEC

Let us now look at some recent examples of the SEC's response to the recent round of mergers and/or consolidations in the international gold and precious metals industries.

[a] Barrick/Homestake Merger

Barrick Gold Corporation ("Barrick"), is an Ontario company listed on the Toronto Stock Exchange (the "TSX"), New York Stock Exchange (the "NYSE"), and on exchanges in London, Switzerland and Paris. It announced, on June 25, 2001, a merger with

Homestake Mining Company ("Homestake") to create the world's then largest gold mining company.

Homestake was, at the time of the merger, incorporated under the laws of Delaware. Homestake was also listed on the NYSE, the Swiss exchange and the ASX. As a result of both companies being listed on the NYSE, a registration statement was required to be filed with the SEC relating to the transaction. The SEC's "national treatment" approach to reserve reporting subjected the transaction to US GAAP and SEC Industry Guide 7 requirements for reporting exploration results and reserves. Since Barrick is a Canadian company, it estimated its Mineral Resources and Mineral Reserves in accordance with NI 43-101. It, therefore, used the term 'resources' in all of its reporting documentation up to the time of the registration statement. At that time, it had to lump all of the resource categories, with the exception of Inferred Resources, into one and reclassify it as mineralized material.

At this point, it is worthwhile to highlight that, apart from Industry Guide 7, the SEC has published very little on disclosure as it relates to mineral exploration, mineral resource and mineral reserve results. The only way to determine SEC policy is by reviewing the registration statements of companies subject to SEC rules. Industry Guide 7 does not go into any great detail or offer any real substantive practical guidance to mineral industry professionals in preparing mineral reserve reports.

SEC staff would only permit Homestake to classify as a reserve, a previously undeveloped property, once the final feasibility study was in hand and all the applicable mining permits were close to being received.[47] In Barrick's case, although its 40% interest in the Veladero project in Argentina could be classified as a mineral reserve under NI 43-101, the SEC would not let Homestake, which owned the remaining 60% interest in the Veladero project, to classify the Veladero project as a mineral reserve pursuant to the SEC's interpretation of Industry Guide 7. Under the circumstances, reserve status for the above project could have been deferred for years, thus having a negative effect on both parties.

The accounting and tax consequences of classifying a deposit as a mineral reserve, must also be considered. A reserve determination will affect whether certain expenses can be 'capitalized' or 'expensed'. Once expenditures are capitalized then amortization, depreciation and depletion ("AD&D") are exigible and this can have a major effect on a company's earnings, banking arrangements and financial or asset tests thereunder. For example, the question of whether a pilot plant can be capitalized or not, or whether exploration expenditures must be expensed should also be taken into account when designating reserves. It would be trite to say that for most companies these accounting and tax issues require some degree of certainty and consistency in interpretation as it could have a major effect on a company's financial ability going forward. With

[47] This contrasts with NI 43-101 which provides for classification as a 'mineral reserve' once there has been adequate drilling and a preliminary feasibility study is in hand. NI 43-101 also provides that a company must have a reasonable expectation of receiving its permits rather than having the requisite permits close to being in hand.

globalization there is an urgent need for harmonization of not only technical rules relating to Mineral Resource and Mineral Reserve classification, but also international accounting and securities rules and regulations as they relate to these issues. There should be global harmony on these issues as most current transactions are global in their effect.

[b] Stillwater Mining Company

Stillwater is an American mining company listed on the NYSE which produces platinum group metals from its Stillwater Mine and East Boulder Mine in Montana. Stillwater, as an American public company, is an SEC registrant.

Stillwater filed its audited financial statements for the year ended December 31, 2001 in its Form 10-K filing with the SEC on April 1, 2002. On April 2, 2002, Stillwater announced that it was engaged in discussions with SEC concerning the company's methodology of estimating its Probable Ore Reserves. The press release continued by stating that the SEC had informed Stillwater that it believed Stillwater's methodology for determining Probable Reserves should be revised in order to be in greater conformity with the SEC's interpretation of industry standards.

Apparently Stillwater's Mineral Reserves had been reported consistently for 16 years and have been reviewed annually since 1994 by Behre Dolbear & Company ("BD&C"). BD&C is an independent mining consulting company, which has subsequently reaffirmed the appropriateness of Stillwater's methodology. In response to the discussions with the SEC, BD&C retained another independent consultant to express an independent view and such consultant confirmed BD&C's opinion and Stillwater's Mineral Reserve estimation methodology. Stillwater's Chairman and Chief Executive Officer, Frances R. McAllister, stated that "16 years of actual mining experience firmly supports the estimation methods employed".

Stillwater appealed the SEC's decision given that its ruling would cause its Probable Reserves (42 million tons) to be reported as mineralized material thereby leaving Stillwater with only 3.3 million tons of Proven Reserves. If upheld, Stillwater would be forced to calculate its DD&A based on a much reduced mineral reserve. Also, such a ruling would put Stillwater in default of its bank credit arrangements and force either a renegotiation of the debt facility or a 'calling' of its debt.

Stillwater argued that its layered geological complex has far greater continuity of mineralization than most gold mines. As a result, its drill spacing of the disputed Probable Mineral Reserves are wider than that commonly used for underground gold mines.

On June 7, 2002, Stillwater reported that it had agreed to modify certain parameters used in determining its Probable Ore Reserve estimate. Instead of vertically projecting its Probable Ore Reserves in certain ore blocks of up to 1,900 feet beyond sample points, the parameter limit is now 1,000 feet beyond sample points. Its ore reserves will,

accordingly, decrease from 27.7 million ounces of palladium and platinum to 25.0 million ounces. This is a 10% decrease in Stillwater's reported mineral reserves. An amended Form 10-K was filed with the SEC to reflect this change. This is a far cry from the SEC's original ruling.

The SEC has since declared Stillwater's registration statement effective as of June 7, 2002. Since Stillwater's registration statement became effective after May 1, 2002, Stillwater incurred $720,000 of penalties associated with a private placement of equity which closed on January 31, 2002.

[c] Newmont/Normandy/Franco-Nevada Transaction

This transaction was particularly complex in that it involved a three-way transaction between American, Australian and Canadian companies which were listed on a variety of stock exchanges throughout the world. Each company had mineral deposits in a number of continents. The transaction created the world's largest gold producer in terms of gold production and gold reserves. It consisted of a two-step transaction whereby Newmont made an offer to acquire all of the Normandy common shares and independently agreed to acquire Franco-Nevada on a share-for-share exchange transaction. Newmont, as an SEC registrant, was subject to US GAAP and Industry Guide 7; Normandy reported according to Australian GAAP and its Mineral Resources and Mineral Reserves under the JORC Code; and Franco-Nevada, a Canadian company, reported its financial results according to Canadian GAAP and its Mineral Resources and Mineral Reserves under NI 43-101 which uses the CIM Standards. Accordingly, the management and shareholders of all companies had to take, or issue stock, for companies that reported in standards with which they were not familiar. To complicate the matter further, a competing bidder, Anglo, was offering securities that could only be assessed with respect to South African GAAP and the SAMREC Code. Such a complicated system makes it very difficult for even seasoned investors and mining company analysts to properly compare such reports. This often results in bad advice being given to investors.

[d] Meridian / Brancote Transaction

On April 4, 2002, the directors of Meridian and Brancote announced jointly that they had reached agreement on the terms of a recommended share exchange offer to be made by Meridian. The offer was for all the issued and outstanding shares in the capital stock of Brancote where 0.1886 of a Meridian common share would be exchanged for each Brancote share.

Meridian is a Canadian Business Corporation Act company with most of its assets located in the United States and Chile. It is listed on the NYSE and TSX. Brancote is an English company listed on AIM in London with its principal asset in Argentina being the Esquel Gold Property ("Esquel"). Brancote owned a 76% undivided interest in Esquel. The share exchange offer provided, as a condition, that Brancote acquire the remaining

24% undivided interest in Esquel prior to the closing of the Meridian share exchange offer.

This transaction is also a global transaction. Despite the fact that a Canadian company is making an offer to primarily English shareholders to acquire a company whose principal asset is in Argentina, the transaction is subject to US registration requirements. This is by virtue of Meridian's NYSE listing and Brancote's securities being held by American funds and shareholders.

It is interesting to note the type of disclosure which was accepted by the SEC in the registration statement relating to Esquel. Pincock, Allen & Holt ("PA&H"), Brancote's consulting geologists, estimated the Measured and Indicated Resources of Esquel at 6,850,000 tonnes at a cut-off grade of 2.0 grams of gold per tonne. PA&H reported that Esquel had advanced to the pre-feasibility stage in May 2001 and that a pre-feasibility study was completed on October 31, 2001. The registration statement further points out that exploration drilling is continuing on Esquel in order to enable completion of the full feasibility study by December, 2002.

The disclosure in the registration statement defines both Measured Resources and Indicated Resources which is prohibited by Industry Guide 7 and provides cautionary language to US investors concerning estimates of Measured and Indicated Resources. US investors are advised that while those terms are recognized and required by NI 43-101 in Canada, the SEC does not recognize them. Also, US investors are cautioned not to assume that any part or all of any mineral deposits in these categories will ever be converted into mineral reserves.

The registration statement further defines the term Inferred Resource and indicates that PA&H has reported that there are 2,647,700 tonnes of Inferred Mineral Resources at a grade in excess of 4.0 grams at a cut-off grade of 2.0 grams. Again, US investors are cautioned concerning estimates of Inferred Mineral Resources and indicating that while this term is recognized and required by Canadian regulations, the SEC does not recognize the term. The SEC further cautions that: (1) Inferred Mineral Resources have a great amount of uncertainty as to there existence and as to their economic and legal feasibility; (2) it cannot be assumed that all or any part of the Inferred Mineral Resources will ever be upgraded to a higher category; (3) under Canadian rules, estimates of Inferred Mineral Resources may not form the basis of feasibility or other economic studies.

The registration statement further goes on to state that pursuant to Industry Guide 7 the use of the term 'resource' is not allowed by the SEC and that generally estimates other than 'proven' or 'probable' reserves are not permitted to be disclosed in public documents filed with the SEC. Such estimates, it notes, are disclosed pursuant to exceptions provided for in Item 102 of Regulation S-K of the SEC.

In addition to the language of the registration statement relating to the resource and reserve disclosure, there were numerous pages of reconciliation of accounting practices.

UK GAAP was reconciled with US GAAP in the Brancote financial statements and Canadian GAAP was reconciled with US GAAP in the Meridian financial statements.

X.08 Conclusions

The foregoing analysis is based on our review of the current literature of the international reporting efforts proposed by the various CRIRSCO member countries. It is now universally accepted that globalization requires internationally accepted mineral resource and mineral reserve definitions with a classification system that has a bright line test for moving from Mineral Resources to Mineral Reserves. This test must be predicated on a standards base and rules of conduct carried out by Competent Persons. Any accepted international mineral resource and mineral reserve classification system requires reciprocity conditions for recognition of Competent Persons across international boundaries. It is our recommendation, along with that of many other current writers on this topic, that the sooner universally accepted definitions and guidelines are established in all CRIRSCO jurisdictions which are endorsed by the respective national technical organizations and regulatory authorities, the better.

Unfortunately, the present situation in the United States has highlighted a major problem that has not been recognized until recently by those in the industry. The classification of Mineral Resources and Mineral Reserves leads to accounting consequences which are the purview of the IASB and national accounting standards and subsequently to certain securities regulatory consequences which are the purview of various securities commissions. In order to achieve the maximum benefits from this decade long Mineral Resource and Mineral Reserve standardization objective, it is necessary for CRIRSCO, senior mining corporations, the IASB, and the IOSCO to dialogue and come to an international "buy-in" of the mineral resource and mineral reserve definitions and the standards bar to get from mineral resources to mineral reserves. In particular, we would like to emphasize the need for strong commitment and vigorous input from North American and international mining companies. Only then will the mineral industry benefit from all the efforts to date and will investors have confidence in the integrity of Mineral Resources and Mineral Reserves once established. This will permit the minerals industry to raise the requisite capital for producing minerals which are vitally necessary to enhance economic growth.

We also concur with the recommendations Jean-Michel Rendu made in his paper entitled, "International Standards of Reporting Mineral Resources and Reserves" presented to the International Mining Professional Society (Denver Chapter) on October 24, 2001 that the next step in the logical process in the United States is for a professional geoscience and/or engineering society to be formed with disciplinary power over their members where such society, and the concept of a Competent Person, will be recognized by the SEC. The professional society and the SEC should educate the mineral industry, the investment community, and all mineral industry stakeholders as to the significance of the terminology and the scientific and engineering underpinning therefor.

Schedule A

Comparison of Mineral Resource and Reserve Reporting Standards
CIM / JORC / SAMREC / SME / IMM/ CRIRSCO *

Point of Comparison	CANADA CIM (Aug 2000)	AUSTRALIA JORC (Jan 1999)	SOUTH AFRICA SAMREC (Feb 2000)	UNITED STATES SME (March 1999)	UK / EUROPE IMM / IGI / EFG (Oct 2001)	INTERNATIONAL CMMI / CRIRSCO (May 2002)
Exploration Information not meeting minimum Mineral Resource classification criteria	-estimates of tonnage and grade may be reported with conceptual/order of magnitude qualifier	-estimates of tonnage and average grade must not be reported. Any tonnage/grade figures mentioned in public reports must be order-of-magnitude and conceptual in nature and expressed so as not to misrepresent them as estimates of Mineral Resources or Ore Reserves	-estimates of tonnage and grade must not be reported	-estimates of tonnage and grade must not be reported. Any figures mentioned in public reports must be order-of-magnitude and conceptual in nature and expressed so as not to misrepresent them as estimates of Mineral Resources or Mineral Reserves	-estimates of tonnage and grade must not be reported	-estimates of tonnage and grade must not be reported
Use of Inferred Mineral Resources	-Inferred Resources must be excluded from basis for economic studies	-caution should be exercised if this category is considered in economic studies	-Inferred Resources are not normally considered in economic studies; if so, caution should be exercised with full disclosure	-caution should be exercised if this category is considered in economic studies	-a company may include all or a part of its Inferred Resource for the purpose of internal planning. Any such reliance should be made clear in the report	-a company may include all or a part of its Inferred Resource for the purpose of internal planning. Any such reliance should be made clear in the report
Confidence						
Inferred Mineral Resources	-confidence in the estimate is insufficient to allow evaluation of economic viability	-definition identical to CMMI. Guidance essentially identical to CMMI	-definition identical to CMMI. Guidance essentially identical to CMMI	-definition identical to CMMI. Guidance essentially identical to CMMI	-estimated with a low level of confidence; usually not sufficient to allow evaluation of economic viability	-estimated with a low level of confidence; usually not sufficient to allow evaluation of economic viability
Indicated Mineral Resources	-confidence sufficient to support mine planning and evaluation of economic viability	-definition identical to CMMI. Guidance essentially identical to CMMI	-definition identical to CMMI. Guidance essentially identical to CMMI	-definition identical to CMMI. Guidance essentially identical to CMMI	-estimated with a reasonable level of confidence; sufficient to allow evaluation of economic viability	-estimated with a reasonable level of confidence; sufficient to allow evaluation of economic viability
Measured Mineral Resources	-confidence sufficient to support production planning and evaluation of economic viability	-definition essentially identical to CMMI (see below). Guidance essentially identical to CMMI	-definition identical to CMMI. Guidance essentially identical to CMMI	-definition essentially identical to CMMI (see below). Guidance essentially identical to CMMI	-estimated with a high level of confidence; sufficient to enable an evaluation of economic viability with a high level of confidence	-estimated with a high level of confidence; sufficient to enable an evaluation of economic viability with a high level of confidence
Continuity						
Inferred Mineral Resources	-reasonably assumed but not verified, geological and grade continuity	-definition identical to CMMI. Guidance essentially identical to CMMI	-definition identical to CMMI. Guidance essentially identical to CMMI	-definition identical to CMMI. Guidance essentially identical to CMMI	-inferred but not verified geological and/or grade contiuity	-inferred but not verified geological and/or grade contiuity
Indicated Mineral Resources	-sample spacing close enough for geological and grade continuity to be reasonably assumed	-definition identical to CMMI. Guidance essentially identical to CMMI	-definition identical to CMMI. Guidance essentially identical to CMMI	-definition identical to CMMI. Guidance essentially identical to CMMI	-inapproriate sample spacing to confirm geological and/or grade continuity but close enough for continuity to be assumed	-inapproriate sample spacing to confirm geological and/or grade continuity but close enough for continuity to be assumed
Measured Mineral Resources	-sample spacing close enough to confirm both geological and grade continuity	-definition different to CMMI; only required to confirm geological **and/or grade continuity**	-definition identical to CMMI. Guidance essentially identical to CMMI	-definition different to CMMI; only required to confirm geological **and/or grade continuity**	-sample spacing sufficient to confirm geological and grade continuity	-sample spacing sufficient to confirm geological and grade continuity
Conversion of Mineral Resources to Mineral Reserves	-based on a Preliminary Feasibility Study, demonstrating that, at the time of reporting, economic extraction can be justified	-based on "Appropriate Assessments", which may include feasibility studies, demonstrating, at the time of reporting, that exraction **could reasonably be justified**	-based on "Appropriate Assessments", which may include feasibility studies, demonstrating that, at the time of reporting, exraction **is reasonably justified**	-based on "Appropriate Assessments", which may include feasibility studies, demonstrating that, at the time of reporting, exraction **is reasonably justified**	-based on "Appropriate Assessments", which may include feasibility studies, demonstrating that, at the time of reporting, extraction **is justified** . In order to achieve the required level of confidence in the Mineral Resources and all of the modifying factors, it is expected that **studies to at least a prefeasibility level** will have been carried out prior to the determination of the Mineral Reserves	-based on "Appropriate Assessments", which may include feasibility studies, demonstrating that, at the time of reporting, extraction **is justified** . In order to achieve the required level of confidence in the Mineral Resources and all of the modifying factors, it is expected that **studies to at least a prefeasibility level** will have been carried out prior to the determination of the Mineral Reserves

Comparison of Mineral Resource and Reserve Reporting Standards
CIM/ JORC/SAMREC/SME/CMMI *

Point of Comparison	CANADA CIM (Aug 2000)	AUSTRALIA JORC (Jan 1999)	SOUTH AFRICA SAMREC (Feb 2000)	UNITED STATES SME (March 1999)	UK / EUROPE IMM / IGI / EFG (Oct 2001)	INTERNATIONAL CMMI / CRIRSCO (May 2002)
Conversion Study Definition	-a comprehensive study of the viability of a mineral project that has advanced to to the stage where mining method or pit configuration has been established and an effective method of mineral processing has been determined. The Study must include financial analysis based on reasonable assumptions of technical, engineering, operating, economic factors and evaluation of other relevant factors which are sufficient for a QP, acting reasonably, to determine if all or a part of a Mineral Resource may be classified as a Mineral Reserve	-partially defined through guidance	-partially defined through guidance	-partially defined through guidance	-partially defined through guidance. The study will have determined a mine plan that is technically achievable and and economically viable and from which Mineral Reserves can be derived	-partially defined through guidance. The study will have determined a mine plan that is technically achievable and and economically viable and from which Mineral Reserves can be derived
Qualified/Competent Person definition	-a QP is an engineer or geoscientist with at least 5 years experience in mineral exploration, mine development, production activities and project assessement, or any combination thereof, including experience relevant to the subject matter of the project or report and is a member in good standing of an SRO.	-a CP is a person who has a minimum of 5 years experience relevant to the style of mineralization and type of deposit under consideration and to the activity which that person is undertaking. If the CP is estimating or supervising the estimation of Mineral Resources, the relevant experience must be in the estimation, assessement and evaluation of Mineral Resources. If the CP is estimating, or supervising the estimation of Ore Reserves, the relevant experience must be in the estimation, assessment, evaluation and economic extraction of Ore Reserves. A CP is a person who is a Member or Fellow of the AUSIMM and/or the Australian Institute of Geoscientists	-a CP **should** have a minimum of 5 years experience relevant to the style of mineralization and type of deposit under consideration. If the CP is estimating, or supervising the estimation of Mineral Resources, the relevant experience must be in the estimation, assessement and evaluation of Mineral Resources. If the CP is estimating, or supervising the estimation of Mineral Reserves, the relevant experience must be in the estimation, assessment and economic extraction of Mineral Reserves. A CP must be a member of SACNASP, ECSA, PLATO or any other statutory South African or international body that is recognized by SAMREC.	-a CP **must** have a minimum of 5 years experience relevant to the style of mineralization and type of deposit under consideration and to the activity which that person is undertaking. If the CP is estimating or supervising the estimation of Mineral Resources, the relevant experience must be in the estimation, assessement and evaluation of Mineral Resources. If The CP 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. A CP is a member of a professional society for earth scientists or mineral engineers, or has other approriate qualifications.	-a CP **must** a minimum of 5 years experience relevant to the style of mineralization and type of deposit under consideration and to the activity which that person is undertaking. If the CP is estimating or supervising the estimation of Mineral Resources, the relevant experience must be in the estimation, assessement and evaluation of Mineral Resources. If the CP is estimating, or supervising the estimation of Mineral Reserves, the relevant experience must be in the estimation, assessment and economic extraction of Mineral Reserves. A CP is a person who is a corporate member of a recognized professional body relevant to the activity being undetaken, and with enforceable Rules of Conduct.	-a CP **must** a minimum of 5 years experience relevant to the style of mineralization and type of deposit under consideration and to the activity which that person is undertaking. If the CP is estimating or supervising the estimation of Mineral Resources, the relevant experience must be in the estimation, assessement and evaluation of Mineral Resources. If the CP is estimating, or supervising the estimation of Mineral Reserves, the relevant experience must be in the estimation, assessment and economic extraction of Mineral Reserves. A CP is a person who is a corporate member of a recognized professional body relevant to the activity being undetaken, and with enforceable Rules of Conduct.

* Prepared by Bernie Haystead, CIM Standards Committee, as modified by Sonja Felderhof and Steve Vaughan, June 2002, with the permission of Bernie Haystead.